MORPHOLOGY OF COMMERCIAL AREA USING GIS FOR WALLED CITY, JAIPUR

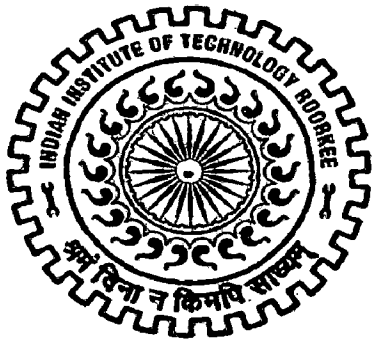
A DISSERTATION

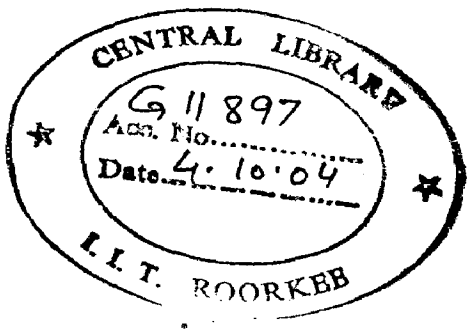
Submitted in partial fulfilment of the requirements for the award of the degree of

MASTER OF URBAN AND RURAL PLANNING

By

SHASHI MOHAN SRIVASTAVA





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CERTIFICATE

Certified that this report titled **MORPHOLOGY OF COMMERCIAL AREA USING GIS FOR WALLED CITY, JAIPUR**, which has been submitted by **Mr. Shashi Mohan Srivastava,** in partial fulfillment of the requirements for the award of Post Graduate Degree in **Master of Urban and Rural Planning,** in the Department of Architecture and Planning, Indian Institute of Technology Roorkee, Roorkee, is the student's own work carried out by him under our supervision and guidance. The matter embodied in this dissertation has not been submitted for the award of any other degree.

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CANDIDATE'S DECLARATION

I hereby certify that the work, which is being presented in the dissertation, entitled **MORPHOLOGY OF COMMERCIAL AREA USING GIS FOR WALLED CITY, JAIPUR** in partial fulfillment of the requirements for the award of degree of **MASTER OF URBAN AND RURAL PLANNING**, submitted in the **Department of Architecture and Planning, Indian Institute of Technology Roorkee, Roorkee,** is an authentic record of my own work carried out during the period from August 2003 to June 2004 under the supervision of **Prof. Rajesh Chandra & Prof. (Dr.) Ila Gupta,** Department of Architecture and Planning, IIT Roorkee, Roorkee.

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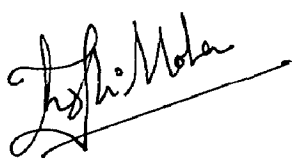

Date: 4 June, 2004

(SHASHI MOHAN SRIVASTAVA)

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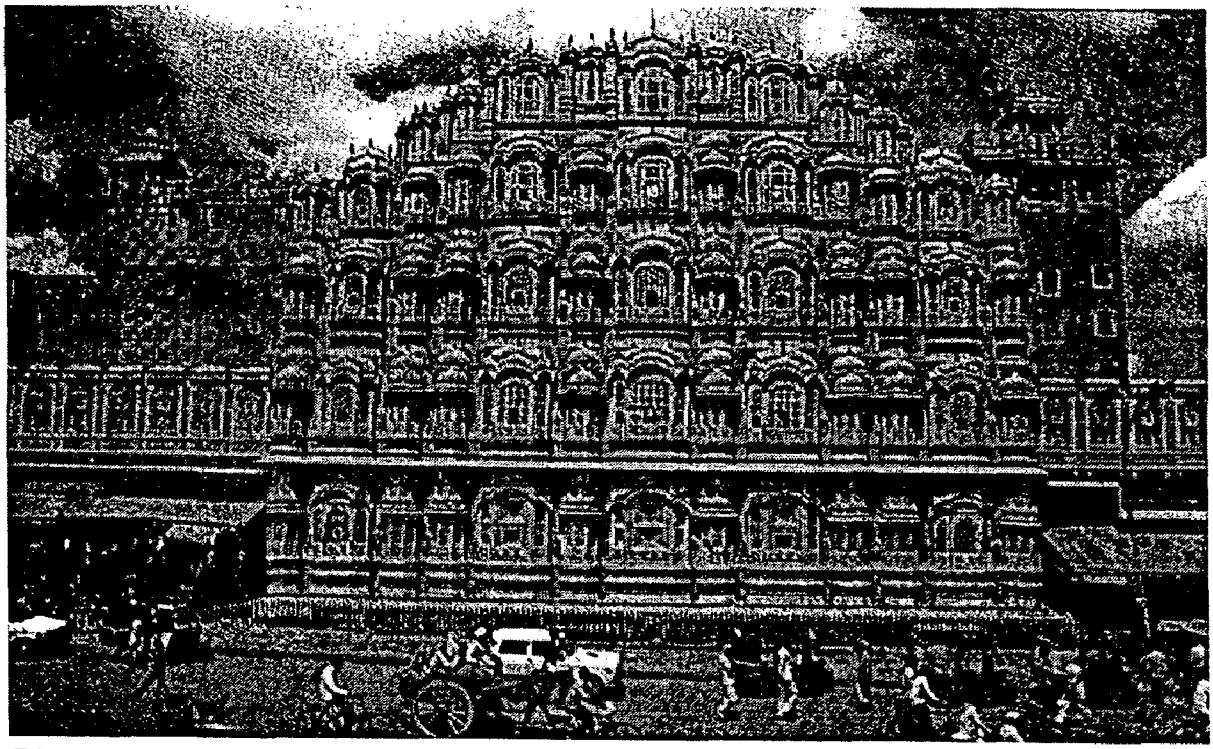


Photograph 1.1: Front view of Hawa –Mahal (Palace of Winds), Walled City, Jaipur (Sep., 2003)

Chapter 1 INTRODUCTION

1.1 GENERAL:

Towns and cities in India are facing complex problems regarding the provision and maintenance of infrastructure and services in the face of the rapid growth of population, caused both by natural increase and migration.

In order to meet such challenges a planner needs to have fairly accurate and up-to-date information, specially about physical structures and related land parameters. A study of their trends generally helps in the understanding of the emerging growth pattern and in formulating policies in the perspective plans. In the preparation of a environmentally compatible urban development plan, it is a prerequisite to understand linkages and interactions that exist between different components of the urban environment. Secondly, the data collected on different aspects of the urban environment has to be translated into useful information for the purpose of urban development. Thirdly, there is also a need to aggregate this information according to administrative/natural and hierarchical units. Basic caveat for this is the availability of systematic, detailed, reliable, timely and accurate information on various facets of urban environment. Experiences gained so far show certain shortcomings in regard to acquisition of statistics, processing, generation of graphic outputs and their storing in the existing conventional system. Such a lacuna impedes efficient and meaningful planning, implementation of programmes and their monitoring. Moreover, by the time the plan is made using conventional surveys, the data becomes old and the plan may not be suitable for implementation.

It is in this context, the Geographic Information System (GIS) techniques play a major role by providing reliable, accurate, timely, periodic data and methods of integration of spatial and non-spatial data to create various planning scenarios for decision making. This type of planning scenarios helps planners and administrators to view various advantages and disadvantages of different perspectives and select best perspective for implementation and monitoring. (Pathan et al., 1998, 1996 and 1987).

1.2 IDENTIFICATION OF THE PROBLEM:

Metropolitan centres in the country are increasing both in number and population. There were 40 such cities in 2000. Most of these cities have developed from historical times. The economic activities like trade, commerce and administration created in the old parts of the

cities are getting densified rapidly. In some cities the historic spots of tourist interest are also located in these old parts. As of today the commercial areas in every city are faced with numbers of problems.

Jaipur is one of the metropolitan cities in the country with a population of over 1.5 million and is observed to be growing at 49% per decade. Besides being the capital city of Rajasthan, the city of Jaipur is a major tourist centre in the country as well.

Major portions of economic activities of the city are located in walled city area, spreading over 6.7 Sq. km. This area is, besides having heavily concentrated activities, a very important tourist centre and attracts tourists from all over the globe. The economic activities in the form of wholesale trade, commerce, household industries, administration and tourist spots generate large numbers of problems in this area.

In brief, walled city is facing numbers of problems like high degree of commercial nucleation, Extreme Congestion, Overflow of traffic, ,Parking Problems ,Encroachment Problems, Garbage collection problems ,Markets developing in Side Lane & narrow streets , health hazards, Changes of old residential Havelies into markets, Informal Sectors , Unorganised & Temporary markets, Shortage of spacious commercial premises in this area & other essentials activities like Schools, College and Parks etc., Vertical growth as well as the Foot paths & Pavements under commercial use to degradation of the market landscape, Change of Market façade, Many Services are not planned like toilets & Drinking Water as per requirements, Distributions of commercial activities are not as per standard.

1.3 AIM AND OBJECTIVES:

1.3.1 AIM:

Aim of this dissertation is "To formulate planning proposals for Sustainable development for Commercial Area of Walled City, Jaipur."

1.3.2. OBJECTIVES:

The present study objectives are:-

- To identify the character of walled city, Jaipur.
- To study the Morphology & growth of commercial area of Walled City, Jaipur.
- To Study the functional classification & specialization of commercial activities.
- To study the Unorganised, Temporary markets & Informal Sectors.

- To study the changes of old Residential Havelies into markets.
- To identify the impact of Commercial Activities on the built form & physical infrastructure of walled City.
- To analyze the data base & identify and prioritize planning problems at micro level.
- To formulate planning proposals for sustain the walled city, Jaipur.

1.4 SCOPE AND LIMITATIONS:

Since a lot of scope is available for study of commercial Areas. This study gives an ample scope for understanding the urban planning and future urban development. The Scope is to be widened in order to include the various aspect of morphology and study of functional morphology, the process of development, morphological problem and solutions using GIS.

In this study the limitation is mainly of time & database. So I limited my studies only up to Jaipur. Jaipur is also a big city, it is a metropolitan city. Its have a traditional and modern planned or unplanned markets. For the study of commercial area, I limited my studies up to the walled city of Jaipur only.

To study functional classification and changes in markets, I have done case study of sixteen main markets of walled city as described in master plan of Jaipur.

1.5 RESEARCH METHODOLOGY:

The methodology of the present investigation is presented in Fig.no.1.1

1.5.1. RESEARCH METHOD:

Survey research methods is employed for this study.

1.5.2 DATA:

Required data pertaining to of this study is collected from both secondary and primary sources.

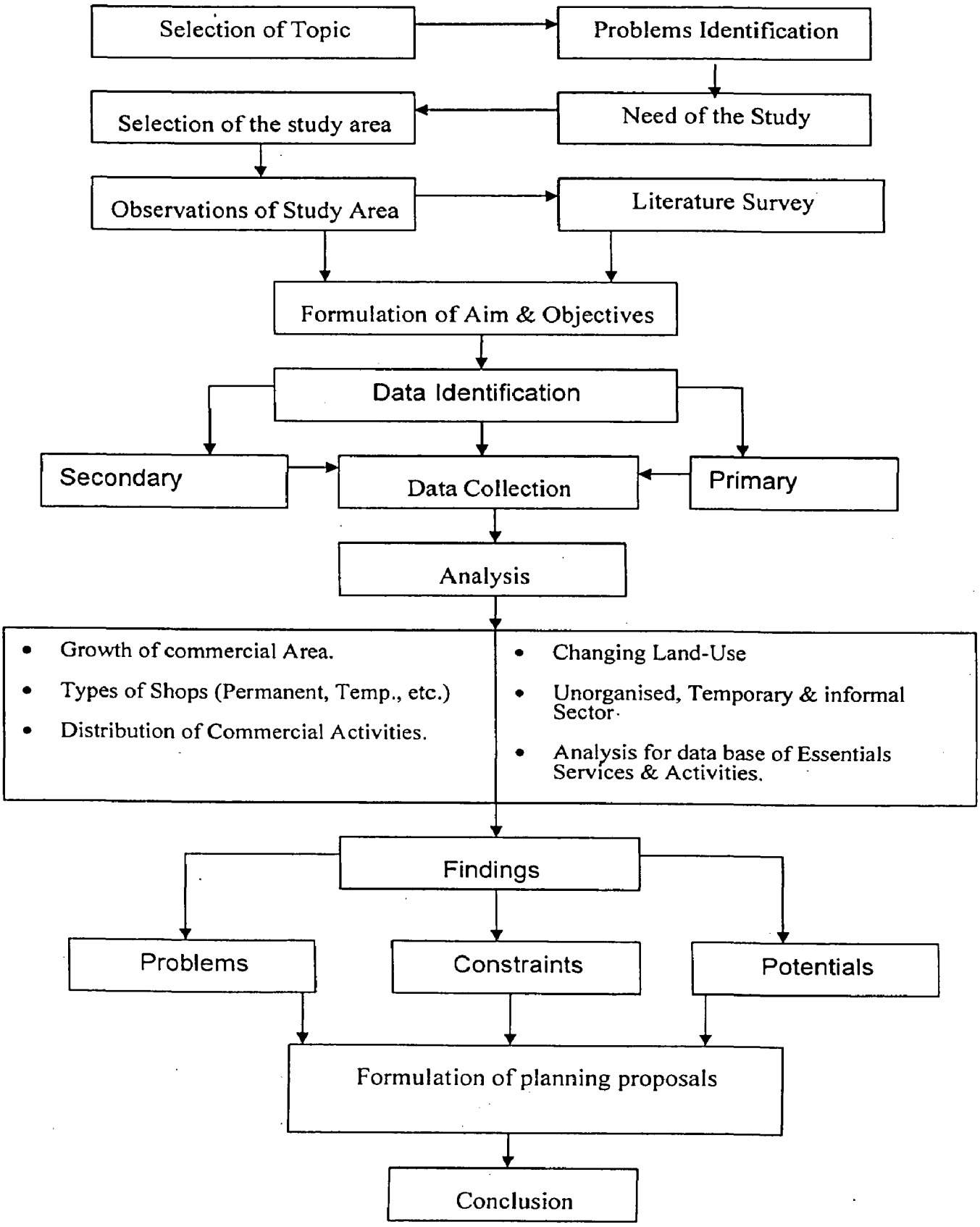
1.5.3 ANALYSIS:

Detailed analysis has done with the help of GIS tools and techniques to understand the morphology of commercial Areas.

1.5.4 FINDINGS:

Findings have been evolved based on the analysis, results & discussions.

Figure 1.1: Methodology:



1.5.5 RECOMMENDATIONS:

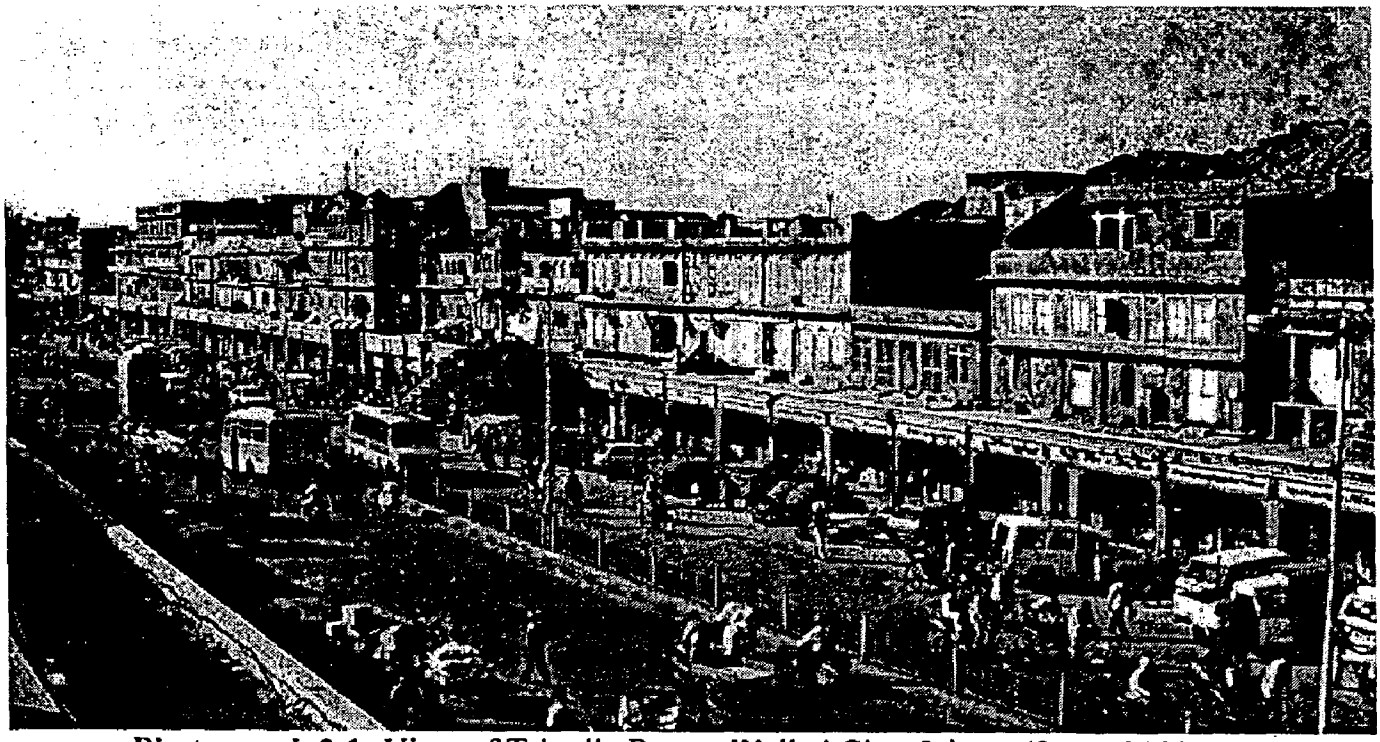
A set of recommendations made as a part for the sustainable development plan for commercial area of walled city, Jaipur.

1.5.6 CONCLUSIONS:

The present study concluded with possible recommendation for the sustainable development planning for commercial area of walled city, Jaipur.

Chapter 2

LITERATURE REVIEW



Photograph 2.1: View of Tripolia Bazar, Walled City, Jaipur. (Sep.., 2003)

PART I: MORPHOLOGY: OVERVIEW

2.1 WHAT IS MORPHOLOGY?

The term 'morphology' has been derived from two Greek words, *morphe* (form) and *logos* (discourse), which literally mean description of form. Though the essence of the idea of morphology was initially expressed in the writings of the great poet. and philosopher Goethe (1790), the term as such was first used in bio-science. Recently, it is being increasingly used in planning, geography, geology, philology and other subjects. In bio-science, it is defined as the science of organic form, or simply the development of the form of living organisms. The term, however, is used not only to study the shape and structure in plants, animals and microorganisms but also of the size, shape, structure and relationship of the parts comprising them *(Encyclopedia Britannica,* p. 451). Morphological analysis has been widely used in geography as well. According to Stamp (1961, p. 326), it is defined as the science of form and structure, including developments which influence the form. In humanities, the concept of morphology has been applied in the study of social institutions phenomenologically; these institutions are inter-related with socio-economic norms and bonds and various functional as well as interactional system supporting decision, transformation and communication among the complex structures of various groups or cultures within the spatial matrix (Singh, R.L. and R.P.B. Singh). Morphology of settlement, however, is the expression of various functions of physical and cultural variables which can be identified in the building fabric of build-up area.

Morphology of plants and animals is quite distinct from those of settlements. The form and function of a living organism can be easily distinguished, but in settlement these are inter-fused together.

Consequently, the biological domain is rather more distinct than the geographical sphere. Another difference is noticed in regard to pattern weaving and structural behaviour. An organism is always governed by the norms set by a particular reproductive group, which goes on producing a particular form, but this is not so in case of town development. For example, two towns sited either on river banks or at rail-heads do not possess identical morphological

characteristics.

Thirdly, an organism is short-lived, whereas the town, with the passage of time, transforms itself into different structural forms and continues to exist even afterwards. A town may grow into a city or it can degenerate into a rural settlement.

Morphology is the function of space & the process of development and is related to three variables, the plan or planning, the function of buildings and the growth of structure as described by Dickinson.

Under morphology of settlements, Dickinson (1951, p. 8) considers the plan and build of the habitat as viewed and interpreted in terms of its origin, growth and functions. Morphological studies, according to Murphy (1966, p4), generally deal with the development of form and pattern of the present city or other urban area through time, in short, with evolution. The morphology of a town may be, therefore, considered as the reflection of its manifold functions as a consequence of either planned or unplanned growth. In fact, evolution, functions and morphology of a settlement are so closely inter-related that their separation is somewhat difficult. Nevertheless, the morphology of a town relates to its anatomy, i.e., its physical form and structure, including the layout of streets, spacing and size of buildings and their architectural designs. Evidently, there is a lot of variation in the physical form, street pattern, type and design of buildings in walled city to merit a scientific investigation. Such an investigation is necessary not only from academic point of view but also for planning economic development and expansion of the town in future.

2.2 COMMERCIAL AREA:

Shops in any commercial area vary in commercial characteristics and organisation. Therefore, the commercial areas vary in their composition and evolve varying types of shopping centres having their own varying pattern. Their pattern forms a complex aerial phenomenon, consisting of significant dynamic elements like the commercial area places and their infrastructures.

The development of transportation and growth of urbanisation, the daily commercial area or commercial area centres for retail and wholesale business came into existence in all the urban centres, may they be towns or metropolitan cities. These commercial areas have their own morphological pattern determined by the factors, like the site, situation, socio-economic and political conditions.

2.3 MORPHOLOGY OF COMMERCIAL AREA

The growth of commercial area is very much linked with the growth of a settlement and it is very difficult to find out whether the commercial activity determines the urban area or whether the urban area determines the commercial activity but definitely both factors are related and depended on each other. Among the various functional zones of a settlement, the commercial or the commercial area zone enjoys its supremacy, as it forms a useful linkage between the various activities of man.

Morphology of commercial area covers:

- Growth of commercial development,
- Location of various commercial area, distribution,
- Spatial affinities and Changing land use,
- Type of shops
- The functional classification & specialization of shops
- The Unorganised, temporary commercial area & informal sectors.
- Movement of commodities
- Problems related to commercial area

However, the study of commercial area morphology is essential for the future planning of cities, investment in facilities, and to provide functions.

2.4 COMPONENTS OF MORPHOLOGY OF COMMERCIAL AREA:

A five-fold classis typology of American city retail structures by Proudfoot is given as follows:

i) The Central Business District (CBD)
ii) The Outlaying Business Centre
iii) The Principal Business Thoroughfares
iv) The Neighborhood Business Streets
v) The Isolated Store Clusters

This study was done before the rise of modern commercial complexes but most of the basic elements still continue. His classification is based on concentration or dispersion of outlets and nature of service area. After him, most of the studies were based on his lines with some modifications. A new detailed scheme of classification was proposed by Kelly as follows:

1. Central business district:
    a) Inner core
    b) Inner belt
    c) Outer belt
2. Main business thoroughfare
3. a) Secondary commercial sub-districts (unplanned):
    i) Neighborhood
    ii) Community or district
    iii) sub-urban or outer

b) Controlled secondary commercial subcentres:
    i) Neighborhood
    ii) Community or district
    iii) Sub-urban or outer

4. Neighborhood business streets
5. Small store cluster and scattered
6. Controlled regional shopping centres

Berry's five-fold types of commercial area of metropolitan areas are:

Table 2.1: Berry's five-fold types of commercial area of metropolitan areas

Centres	Ribbons
Convenience	Traditional Shopping
Neighborhood	Street, Urban Arterial
Community	New Suburban Ribbon Districts
Regional	Highway oriented (Planned)
Metropolitan (CBD)	Unplanned

Source: Barry M.: MORPHOLOGY OF TOWNS IN GERMANY AND ITALY: PhD, University of Sheffield.

The above mentioned components of commercial area morphology are mostly related to highly urbanised centres, particularly of western countries, which are developed. With reference to the characteristic of Indian commercial area, have been done in this country, very few studies have been done in this country.

Another classification is mentioned in the Master Plan of Jaipur City, as follows:

1. Central Business Area
2. Sub-city Centre
3. District Centre
4. Local Shopping Centres
5. Convenient Shops

The Master Plan has considered the main thoroughfares of the walled city and the M. I .Road as Central Business Area tending to be in the north-eastern corner of the city with its fast growth to the west and south and, therefore, planned a sub-city centre covering an area of about 115 acres towards the south on the Tonk Road. It will supplement the facilities available in the Central Business Area (Main Business thoroughfares) for the population living in the southern planning districts. It will also have land for public offices, besides, large showrooms and retail shopping centre. It shall have a cinema, house and hotels. When it is fully developed and starts functioning, traffic in Central Business Area would be reduced considerably by taking other regulatory measures. The Master Plan also envisaged five district centres and 3 sub-district centres, local shopping centres, as well as convenient shops. It has also planned for the wholesale commercial area, warehousing and godowns, industrial estates and industrial areas around Jaipur.

PART II: GIS: OVERVIEW

2.5 WHAT IS GIS

"In the strictest sense, a GIS is a computer system capable of assembling, storing, manipulating, and displaying geographically referenced information, i.e. data identified according to their locations. Practitioners also regard the total GIS as including operating personnel and the data that go into the system." **USGS**

"A geographic information system (GIS) is a computer-based tool for mapping and analyzing things that exist and events that happen on earth. GIS technology integrates common database operations such as query and statistical analysis with the unique visualization and geographic analysis benefits offered by maps." **ESRI**

"GIS is an integrated system of computer hardware, software, and trained personnel linking topographic, demographic, utility, facility, image and other resource data that is geographically referenced." **NASA**

GIS is a rapidly growing technological field that incorporates graphical features with tabular data in order to assess real-world problems. What is now the GIS field began around 1960, with the discovery those maps could be programmed using simple code and then stored in a computer allowing for future modification when necessary. This was a welcome change from the era of hand cartography when maps had to be painstakingly created by hand; even small changes required the creation of a new map. The earliest version of a GIS was known as computer cartography and involved simple line work to represent land features. From that evolved the concept of overlaying different mapped features on top of each other to determine patterns and causes of spatial phenomenon.

GIS is a system of computer hardware and software designed to allow users to collect, manage and analyze large volumes of spatially referenced data and associated attributes. Because GIS technology allows analysts to process and interrelate, many more kinds of data

that were previously infeasible, GIS users have the potential to greatly improve traditional missions, such as data collection, research, assessment, and information delivery.

Thus, a GIS is not simply a computer system for making maps, although it can create maps at different scales, in different projections and with different colors. A GIS is an analysis tool. The major advantage of a GIS is that it allows the user to identify the spatial relationships between map features.

A GIS does not store map in any conventional sense; nor does it store a particular image or view of a geographic area. Instead, a GIS stores the data from which a user can create the desired view drawn to suit a particular purpose.

The capabilities of GIS are a far cry from the simple beginnings of computer cartography. At the simplest level, GIS can be thought of as a high-tech equivalent of a map. However, not only can paper maps be produced far quicker and more efficiently, the storage of data in an easily accessible digital format enables complex analysis and modeling not previously possible. The reach of GIS expands into all disciplines and has been used for such widely ranged problems as prioritizing sensitive species habitat to determining optimal real estate locations for new businesses.

The key word to this technology is Geography - this usually means that the data (or at least some proportion of the data) is spatial, in other words, data that is in some way referenced to locations on the earth. Coupled with this data is usually data known as attribute data. Attribute data generally defined as additional information, which can then be tied to spatial data. An example of this would be schools. The actual location of the schools is the spatial data. Additional data such as the school name, level of education taught, school capacity would make up the attribute data. It is the partnership of these two data types that enables GIS to be such an effective problem solving tool.

GIS operates on many levels. On the most basic level, GIS is used as computer mapping. The real power in GIS is through using spatial and statistical methods to analyze attribute and geographic information. The end result of the analysis can be derivative information, interpolated information or prioritized information.

2.6 Defining GIS

A GIS is an information system designed to work with data referenced by spatial / geographical coordinates. In other words, GIS is both a database system with specific capabilities for spatially referenced data as well as a set of operations for working with the data. It may also be considered as a higher order map.

GIS technology integrates common database operations such as query and statistical analysis with the unique visualization and geographic analysis benefits offered by maps. These abilities distinguish GIS from other information systems and make it valuable to a wide range of public and private enterprises for explaining events, predicting outcomes, and planning strategies. (ESRI)

A Geographic Information System is a computer based system which is used to digitally reproduce and analyse the feature present on earth surface and the events that take place on it. In the light of the fact that almost 70% of the data has geographical reference as it's denominator, it becomes imperative to underline the importance of a system which can represent the given data geographically.

A typical GIS can be understood by the help of various definitions given below:-

A geographic information system (GIS) is a computer-based tool for mapping and analyzing things that exist and events that happen on Earth.

Burrough in 1986 defined GIS as, "Set of tools for collecting, storing, retrieving at will, transforming and displaying spatial data from the real world for a particular set of purposes"

Arnoff in 1989 defines GIS as, "a computer based system that provides four sets of capabilities to handle geo-referenced data :

- data input
- data management (data storage and retrieval)
- manipulation and analysis
- data output.

Hence GIS is looked upon as a tool to assist in decision-making and management of attributes that needs to be analysed spatially.

2.7 Questions A GIS Can Answer:

We can distinguish a GIS from other computer drafting systems by listing the types of questions it can (or should be able to) answer. If we stand back far enough from a particular application, we can see that there are five generic questions that a sophisticated GIS can answer.

Location What is at....?

The first of these questions seeks to find out what exists at a particular location. A location can be described in many ways using, for example, place name, posts or zip code, or geographic references such as latitude and longitude.

Condition Where is it....?

The second question is the converse of the first and requires spatial analysis to answer. Instead of identifying what exists at a given location, we want to find a location where certain conditions are satisfied (e.g., an unforested section of land at least 20,000 square meters in size, within 100 meters of a road, and with soils suitable for supporting buildings).

Trends What has changed since....?

The third question might involve both of the first two and seeks to find differences within an area over time.

Patterns What spatial patterns exist?

This question is more sophisticated. Someone might ask this question to determine whether cancer is a major cause of death among residents near a nuclear power station. Just as important, someone might want to know how many anomalies there are, that don't fit the pattern and where they are located.

Modeling What if....?

"What if...." questions are posed to determine what happens, for example, if a new road is added to network or if a toxic substance seeps into the local groundwater supply? Answering this type of question requires both geographic and other information (and possibly even scientific laws).

A spatial Questions

"What's the average number of people working with GIS in each location?" is an aspatial question - the answer to which does not require the stored value of latitude and longitude; nor does it describe where the places are in relation with each other.

Spatial Questions

"How many people work with GIS in the major centres of Delhi?" OR "Which centres lie within 10 Kms. of each other? ", OR "What is the shortest route passing through all these centres?". These are spatial questions that can only be answered using latitude and longitude data and other information such as the radius of earth. Geographic Information Systems can answer such questions.

2.8 Need of GIS?

Many professionals, such as foresters, urban planners, and geologists, have recognized the importance of spatial dimensions in organising & analysing information. Whether a discipline is concerned with the very practical aspects of business, or is concerned with purely academic research, geographic information system can introduce a perspective, which can provide valuable insights as :

1. 70% of the information has geographic location as it's denominator making spatial analysis an essential tool.
2. Ability to assimilate divergent sources of data both spatial and non-spatial (attribute data).
3. Visualization Impact
4. Analytical Capability
5. Sharing of Information

2.9 Factors aiding the rise of GIS.

- Revolution in Information Technology.
    - Computer Technology.
    - Remote Sensing.
    - Global Positioning System.
- Communication Technology.

- Rapidly declining cost of Computer Hardware, and at the same time, exponential growth of operational speed of computers.
- Enhanced functionality of software and their user-friendliness.
- Visualizing impact of GIS corroborating the Chinese proverb "a picture is worth a thousand words."
- Geographical feature and data describing it are part of our everyday lives & most of our everyday decisions are influenced by some facet of Geography.

2.10 Advantages of GIS

The Geographic Information System has been an effective tool for implementation and monitoring of municipal infrastructure. The use of GIS has been in vogue primarily due to the advantage mentioned below:

- Planning of project
- Make better decisions
- Visual Analysis
- Improve Organizational Integration

Planning Of Project

Advantage of GIS is often found in detailed planning of project having a large spatial component, where analysis of the problem is a pre requisite at the start of the project. Thematic maps generation is possible on one or more than one base maps, example: the generation of a land use map on the basis of a soil composition, vegetation and topography. The unique combination of certain features facilitates the creation of such thematic maps. With the various modules within GIS it is possible to calculate surface, length, width and distance.

Making Decisions

The adage "better information leads to better decisions" is as true for GIS as it is for other information systems. A GIS, however, is not an automated decision making system but a tool to query, analyze, and map data in support of the decision making process. GIS technology has been used to assist in tasks such as presenting information at planning inquiries, helping resolve territorial disputes, and sitting pylons in such a way as to minimize visual intrusion.

Visual Analysis

Digital Terrain Modeling (DTM) is an important utility of GIS. Using DTM/3D modeling, landscape can be better visualized, leading to a better understanding of certain relations in the landscape. Many relevant calculations, such as (potential) lakes and water volumes, soil erosion volume (Example: landslides), quantities of earth to be moved (channels, dams, roads, embankments, land leveling) and hydrological modeling becomes easier.

Not only in the previously mentioned fields but also in the social sciences GIS can prove extremely useful. Besides the process of formulating scenarios for an Environmental Impact Assessment, GIS can be a valuable tool for sociologists to analyze administrative data such as population distribution, market localization and other related features.

Improving Organizational Integration

Many organizations that have implemented a GIS have found that one of its main benefits is improved management of their own organization and resources. Because GIS has the ability to link data sets together by geography, it facilitates interdepartmental information sharing and communication. By creating a shared database one department can benefit from the work of another--data can be collected once and used many times.

As communication increases among individuals and departments, redundancy is reduced, productivity is enhanced, and overall organizational efficiency is improved. Thus, in a utility company the customer and infrastructure databases can be integrated so that when there is planned maintenance, affected people can be informed by computer-generated letters.

2.11 Components of GIS

GIS constitutes of five key components:

1. Hardware
2. Software
3. Data
4. People
5. Method

2.12 GIS Applications

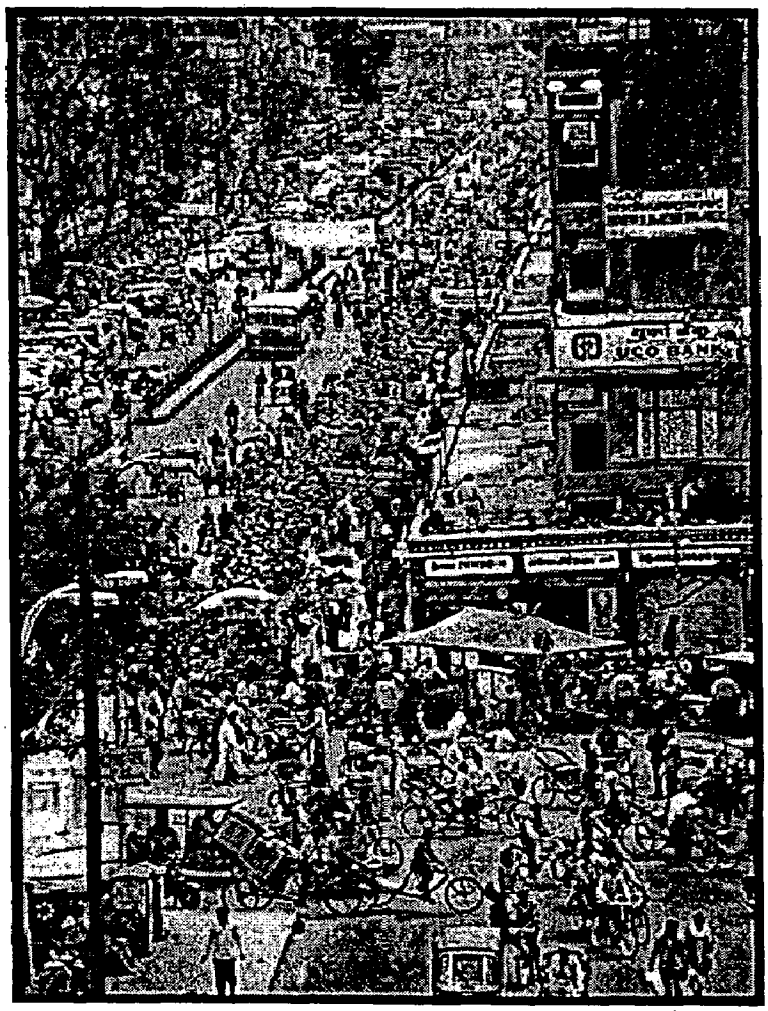
Computerized mapping and spatial analysis have been developed simultaneously in several related fields. The present status would not have been achieved without close interaction

between various fields such as utility networks, cadastral mapping, topographic mapping, thematic cartography, surveying and photogrammetery remote sensing, image processing, computer science, rural and urban planning, earth science, and geography.

The GIS technology is used to assist decision-makers by indicating various alternatives in development and conservation planning and by modelling the potential outcomes of a series of scenarios. It should be noted that any task begins and ends with the real world. Data are collected about the real world. Of necessity, the product is an abstraction; it is not possible (and not desired) to handle every last detail. After the data are analyzed, information is compiled for decision-makers. Based on this information, actions are taken and plans implemented in the real world.

Chapter 3

CASE-STUDY



Photograph 3.1: View of Johari Bazar (Jewellery Market), Walled City, Jaipur showing transportation problems (Nov., 2003)

3.1 PARKING MANAGEMENT STRATEGY FOR THE WALLED CITY OF JAIPUR

This case - study is done by:

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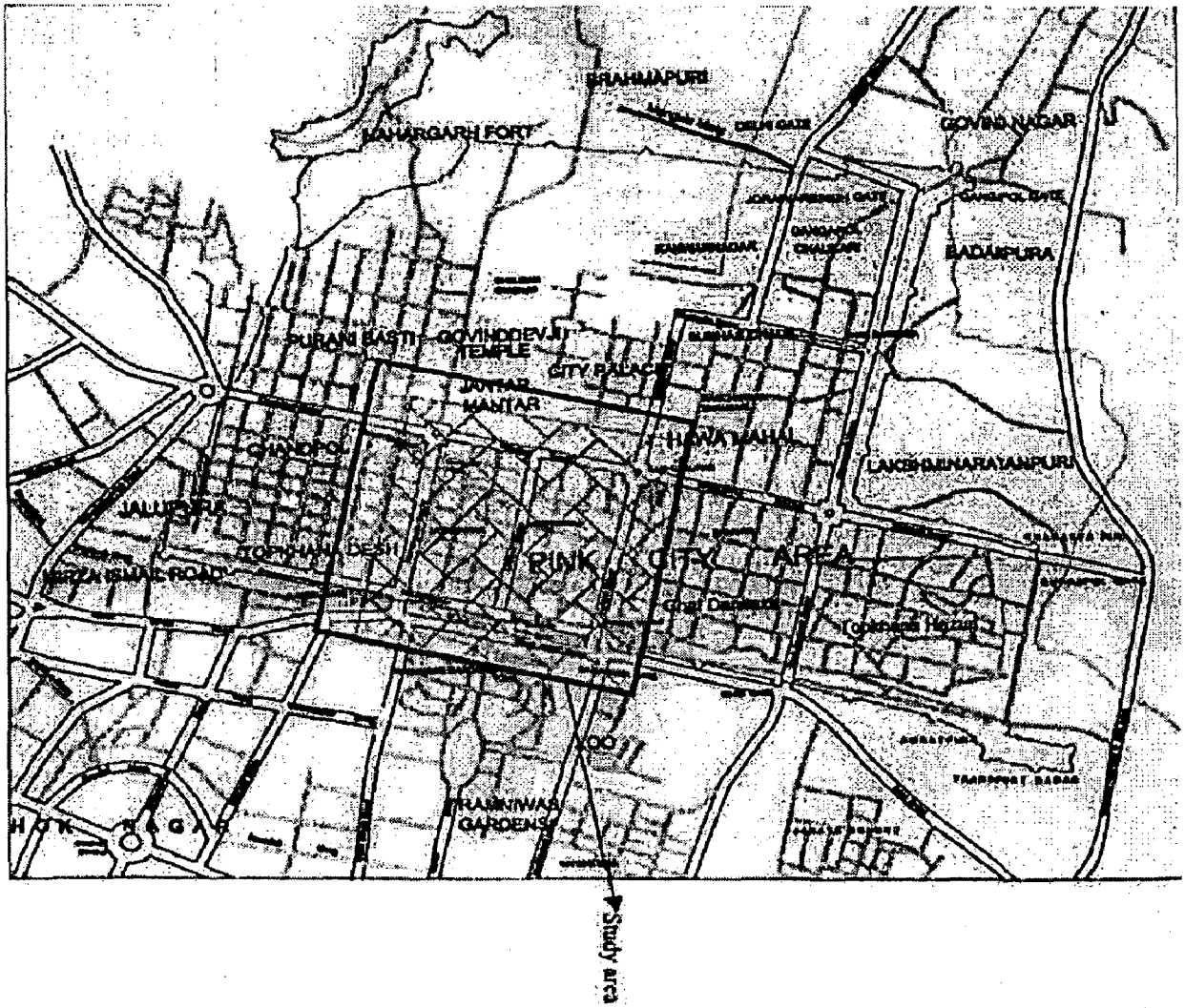
3.1.1 INTRODUCTION

Jaipur is one of the metropolitan cities in the country with a population of over 1.5 million and is observed to be growing at 49% per decade. Besides being the capital city of Rajasthan, the city of Jaipur is a major tourist centre in the country as well. Major portions of economic activities of the city are located in walled city area, spreading over 6.7 sq. km. This area is, besides having heavily concentrated activities, a very important tourist centre and attracts tourists from all over the globe. The economic activities in the form of wholesale trade, commerce, household industries, administration and tourist spots generate heavy traffic to and from these areas. The limited road space of the area is congested with vehicular and pedestrian traffic. The shopkeepers and vendors also occupy the sidewalks and carriageways. Consequently the traffic in these areas is facing acute congestion, bottlenecks and hazards.

The environmental pollution as well as physical and visual intrusions are also some of the other problems increasingly faced by the residents and the visitors to the area. Parking demand in the walled city area is met mainly by roadside parking along all major roads and there is no major off-street parking facility. With the ever increasing parking demand the vehicles are parked in two rows on carriageways. Footpaths are also filled with parked vehicles. While there is heavy demand for parking, the limited enforcement of regulatory measures fails to control and manage the parking problems. The Jaipur Development Authority (JDA) concerned with the growing demand for parking and the related problems, (ie, traffic circulation, congestion etc), requested the Central Road Research Institute, New Delhi, to study the parking problems and suggest policies and schemes of management. In the light of the resource and time constraints, as well as severity of problems, the scope of the study was restricted to Kishanpole bazaar in the west, Tripolia bazaar in the north, Mirza Ismail Road (M I Road) in the south and Johari bazaar in the east as shown in **Map 3.1.1.**



Map 3.1.1: Study Area for Case study in Walled City, Jaipur.

3.1.2 OBJECTIVE AND SCOPE OF THE STUDY

The study was taken up with the following objectives:

- to assess the parking demand and characteristics of the study area;
- to assess the traffic operating conditions on the major roads within the study area;
- to project the parking demand of the future;
- to explore the possibilities of augmenting the parking spaces; and
- to develop parking management schemes and policies to meet the parking demand of the present and future.

3.1.3 FIELD STUDIES

With a view to assess the existing parking demand, parking supply, traffic volume and traffic speed on major roads and related data was collected by carrying out field surveys, namely,

- traffic volume survey;
- speed and delay survey of traffic;
- parking duration and accumulation surveys;
- users opinion survey;
- inventory of regulatory measures of parking; and
- inventory of parking spaces.

3.1.3.1 Traffic Volume Survey

This survey was carried out between 0900 h and 1300 h and between 1600 h and 2000 h on a normal working day at mid- block locations of the following road sections:

- Kishanpole Bazaar;
- Chaura Rastha;
- Johari Bazaar; and
- Tripolia Bazaar.

3.1.3.2 Speed and Delay Surveys

Speed and delay studies were conducted on all the major road sections to obtain average journey speeds and related delays during the morning and evening peak hours. The road sections included in the survey are:

- Kishanpole Bazaar;
- Chaura Rastha;
- Johari Bazaar;
- Tripolia Bazaar;
- Nehru Bazaar;
- Bapu Bazaar; and
- Mirza Ismail Road.

3.1.3.3 Parking Surveys

These surveys were carried out to assess the parking demand, parking characteristics, parking accumulation and duration within the study area.

3.1.3.4 Users Survey

Both two-wheeler and four-wheeler users were interviewed on sampling basis to obtain the data on socio-economic characteristics, purpose of the trip, origin of trip, duration of parking, time needed to walk to the final destination and problems faced while parking. The interviews covered all the seven road sections mentioned in the speed and delay studies.

3.1.3.5 Inventory of Regulation and Control

The inventory of regulatory and control measures that are in vogue have been identified and the prevailing enforcement measures have been studied through field inspection. The inventory survey covered all the road sections mentioned in speed and delay studies.

3.1.3.6 Inventory of Off-street Parking Facilities

Inventory of the two available off-street parking facilities in the vicinity of the study area has been carried out. This included the assessment of the available spaces and their effectiveness as parking lots.

3.1.4 TRAFFIC CHARACTERISTICS

The data collected through surveys have been analysed to understand the nature and magnitude of the traffic problems and parking characteristics.

3.1.4.1 Traffic Volume

The road sections in the study area are found to carry traffic not only terminating to the activities located in the study area but also to other areas (through traffic). The peak hour traffic and composition presented in **Table 3.1.1** show that the traffic volume ranges from 3600 vehicles/h to 8200 vehicles/h. The maximum flow was observed on Tripolia Bazaar. It is interesting to note that the two-wheelers, cycles and cycle rickshaws accounted for more than 85% of the traffic. Tripolia Bazaar has maximum percentage of non-motorised traffic (more than 50%).

3.1.4.2 Parking Accumulation

Vehicles parked in the study area comprised two-wheelers, cycles, cycle rickshaws, four wheelers and goods vehicles, such as, pedal carts and cycle carts. Amongst these two-wheeler and cycle rickshaws were dominant. Peak parking demand of vehicles on selected road sections is presented in **Table 3.1.2**. The table shows that Tripolia Bazaar ranks high with 1882 vehicles followed by Johari Bazaar with 1604 vehicles. The parking demand for the entire study area in terms of equivalent car spaces (ECS) was worked out to be 3985. The

hourly variations in terms of the vehicles parked on different road sections are presented in **Figure 3.1.1**

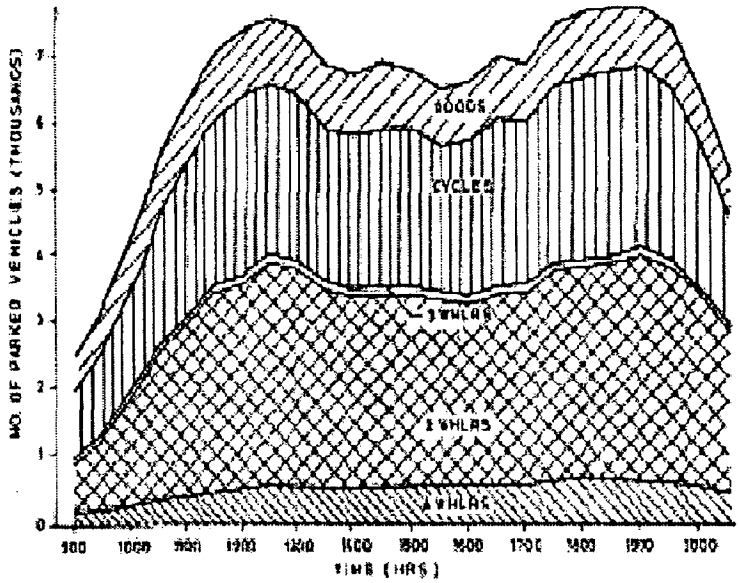


Figure 3.1.1: No of Parked vehicles on different road sections with Time

From the figure it can be observed that the accumulation reaches maximum by 1200 h and declines gradually by afternoon and again becomes maximum in the evening by 1830 h.

Table 3.1.1: Peak hour traffic flows in the study area

Name of Road	Peak hour	Composition of flows, %							Hourly flows (no of vehicles)
		Bus/ Mini Bus	Car/ Jeep	Two-Wheelers	Three-Wheelers	Cycle Rickshaw	Cycle	Goods Vehicles	
Kishanpole bazaar	1900-2000	0	5	47	2	17	24	4	7186
Chaura rastha	1200-1300	0	11	45	3	14	23	3	3645
Johari bazaar	1100-1200	2	10	46	5	17	17	3	5231
Tripolia bazaar-I	1900-2000	1	3	39	1	18	35	3	6647
Tripolia bazaar-II	1900-2000	1	3	41	1	18	32	4	8142

Table 3.1.2: Peak parking accumulation on selected roads within the study area

Location	Type of vehicle								
	Car	Two-Wheelers	Auto	Cycle	Cycle Rickshaw	Animal drawn	Hand cart	Pedal cart	Total
Kishanpole bazaar	88	508	36	521	134	0	30	57	1374
Chaura rastha	165	512	23	412	101	1	37	81	1332
Johari bazaar	132	834	33	511	53	0	27	12	1604
Tripolia bazaar-I	47	413	2	367	68	0	8	54	959
Tripolia bazaar-II	36	389	8	322	68	10	53	52	938
Nehru bazaar	67	305	5	248	88	0	37	10	760
Bapu bazaar	68	405	9	399	60	0	25	27	993
M I road	81	62	9	32	20	0	0	0	204

Data on duration of parking of the cars and two-wheelers in the study area has been analysed. Cumulative percentages of cars and two-wheelers parked for different time duration are presented in **Figure 3.1.2**. It can be seen from the figure that 60% of cars and 55% of two-wheelers were parked for less than half an hour. Similarly, 78% of cars and 75% of two-wheelers are parked for less than one hour. The parking duration of two- wheelers is observed to be more than that of cars. This may be due to the shop keepers owning two-wheelers and parking them for more time. The number of cars and two-wheelers entering the parking lots on the day of survey are also presented in **Table 3.1.3**. As shown in the table a total of 6000 cars and 25 900 two-wheelers enter the various parking lots in the study area between 0900 h and 2100 h.

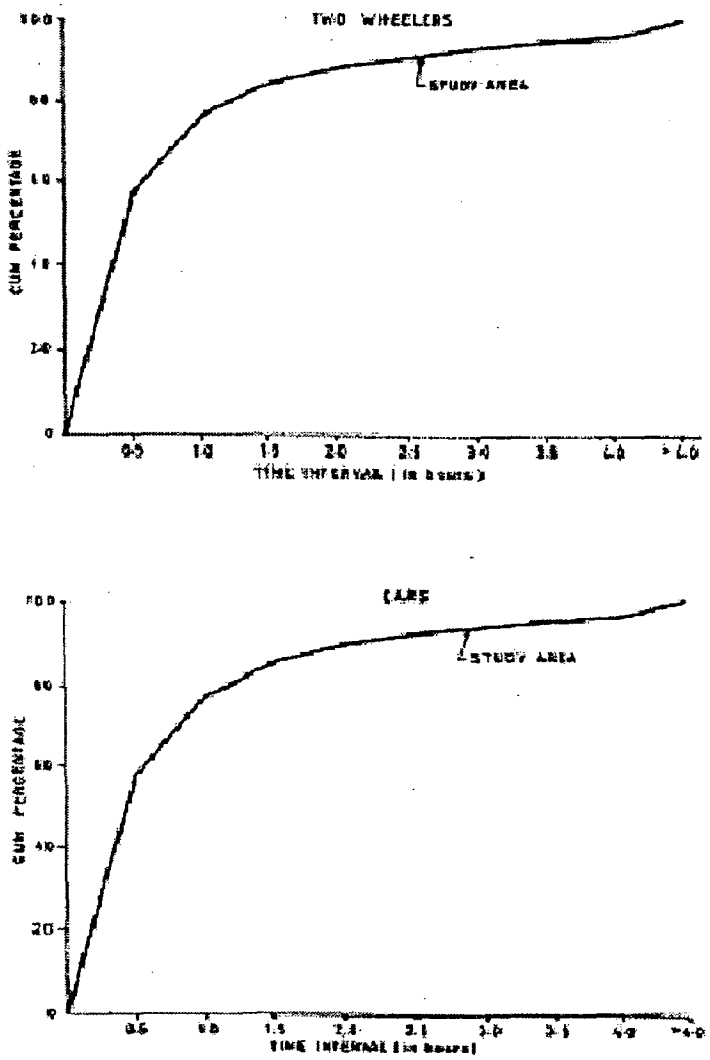


Figure 3.1.2: Distribution of Parked Vehicles according to parking duration

Table 3.1.3: Number of Trips by private Vehicles to the study area (0900 h. to 2100 h)

Road	Cars	Two-Wheelers	Total
Kishanpole bazaar	700	3500	4200
Chaura rastha	2200	4800	7000
Johari bazaar	1300	5700	7000
Tripolia bazaar	700	6200	6900
Nehru bazaar	300	2700	3000
Bapu bazaar	800	3000	3800
Total	6000	25900	31900

Table 3.1.4: Parking duration and purpose of study

Purpose	Percentage of users as per parking duration, minutes						
	15	30	45	60	120	> 120	Total
Work as employee	12	12	17	12	6	41	100
Work as employer	13	5	5	20	2	55	100
Shopping for self	22	25	18	23	9	2	100
Trading for business	9	17	17	25	14	18	100
Others	32	22	14	13	6	14	100
All purposes	19	20	16	20	9	16	100

3.1.5. USERS SURVEY

The data of users survey was analyzed to know the purpose of their visit to the area, the duration of parking, problems faced while parking etc.

3.1.5.1Trip Purpose: The purpose of the trips to the study area revealed the following salient features:

- Shopping for self followed by trading for business were the main purposes of their visit to the study area; and
- 20% to 30% of the trips were for work.

3.1.5.2 Parking Duration: The analysis of parking duration according to trip purpose revealed that as expected users reporting work as trip purpose are found to be parking for longer duration whilst those reporting shopping and trade as trip purpose are found to be parking for shorter duration **(Table 3.1.4).**

3.1.5.3 Walking Times: Analysis of walking times from parking lots to the ultimate destination revealed the following salient features:

- Along all the road sections nearly 80% of the users reported walking time of 5 min from the place of parking to the ultimate destination; and
- On Bapu Bazaar nearly 26% reported walking time of more than 15 min indicating the shortage of parking spaces closer to their place of destination.

3.1.5.4 Users Problems: Under the problems reported by the users the time spent in locating the place for parking was predominant. Further, the regulation of one hour restriction on parking at Johari Bazaar was another problem. This is the only section where parking time restriction is strictly implemented. Insecurity for the vehicles is another major problem reported by the users.

3.1.5.5 Trip Origins:

The analysis of the data relating to the place of origin of the parkers, visiting the study area, revealed that the walled city attracts trips from all parts of the city. The pattern of the trips is presented in **Figure 3.1.3** in the form of desire line diagram. Trips are also attracted from far off places like Sanganer and Mansarover thus indicating that the walled city continues to be the main centre for wholesale and retail trade.

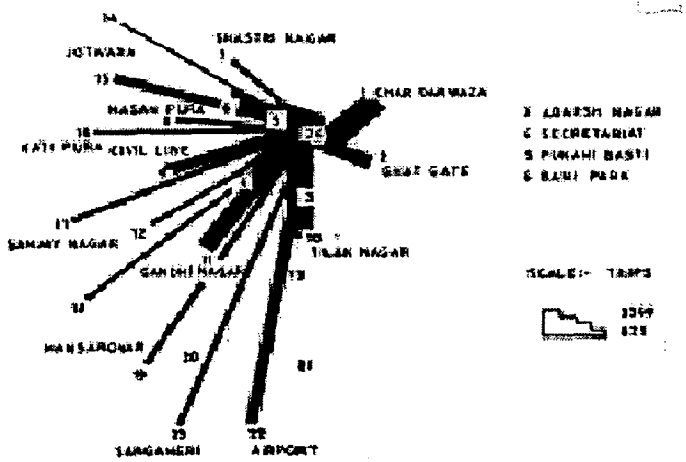


Figure 3.1.3: Desire line diagram of Vehicular trips bound to study area (year 1995)

3.1.6 EXISTING PARKING REGULATIONS AND CONTROL

The measures in force are:

- Organised parking of cars, two-wheelers and goods vehicles along the kerb side in the study area;
- 'Parking' and 'No Parking' zones are specified through sign boards though the signs are not clear and conspicuous; and
- Time restriction on duration of parking in some areas.

The field inspection showed that 'No Parking' restrictions are not observed by the users. The time restriction of one hour is enforced only on cars parked in the Johari Bazaar area.

3.1.7 OFF-STREET PARKING LOTS

There are only two off-street parking lots in the vicinity of the study area, namely, Sanjay Market near Sanganeri gate and Ramnivas Garden. The Sanjay Market parking lot can estimatedly accommodate about 50 cars. The circulation and parking arrangements as well as the entry and exit are not designed and regulated on any scientific basis and these results in haphazard parking and inefficient use of the available space. Ramnivas Garden parking lot caters mainly to the requirement of the visitors to the garden and the present parking lot can accommodate about 40 cars and 50 two- wheelers. Parking fee is also charged at this parking lot. The visitors to the bazaar area have the problem of crossing the heavy traffic moving on Mirza Ismail Road, and this discourages the visitors from parking at this lot.

3.1.8 EXISTING PARKING SUPPLY

Kerb side parking is allowed on all the road sections in the study area and can accommodate a total of 2645 ECS. The section wise details of the ECS for various road sections are presented in **Table 3.1.5**.

Table 3.1.5: Existing parking supply within study area

Location	Parking supply (ECS)
Kishanpole bazaar	512
Chaura-rasta	527
Johari bazaar	508
Nehru bazaar	155
Bapu bazaar	168
Tripolia bazaar-I	283
Tripolia bazaar-II	279
MI road	130
Ramniwas garden/Sanjay market	83
Total	2645

3.1.9 PROJECTION OF PARKING DEMAND

The growth in parking demand is directly related to growth in activities located in the study area coupled with increase in vehicle ownership in the city besides economic status of the people visiting the area. The growth levels in trade and commerce which is the main activity in the study area was considered for parking demand projection. The planned growth for these activities in the city is 4.9%, 5.9% and 6.2% per annum. Parking demand has been worked out using these growth rates. The space and infrastructure available in the study area may not allow a higher growth of 6.2% per annum in activities. But to account for increasing growth trend of vehicle ownership/economic status in the projection of parking demand, a

growth rate of 6.2% per annum is considered appropriate and hence the same was adopted in this study. Parking demands have been projected separately for cars and two-wheelers for the year 2001 and 2011 AD. **Table 3.1.6** presents the mode wise and road section wise projected parking demand in comparison with base year.

3.1.10 FINDINGS

The study area has limited parking spaces with five road sections. These road sections carry traffic to and from the activities located in the study area in addition to the through traffic. The kerb side parking is allowed on both sides of road sections.

(i) Because of the road traffic and parked vehicles the traffic crawls at a speed of less than 15 kmph.

(ii) Due to inadequate parking space and ever increasing parking demand the vehicles can be seen parked in two rows on the carriageway and even footpaths are occupied with parked vehicles.

(iii) The perceptions of the people visiting the area are that they face problems in locating a parking space and the restriction of parking to one hour duration is a problem.

(iv) The available spaces can meet only two-thirds of the demand thus leaving an unsatisfied demand of one-third.

Table 3.1.6: Projected peak parking demand

Name of the Road	Mode	Parking Demand for the Year		
		1995 (Observed)	2001	2011
Kishanpole bazaar	Car	97	139	230
	Two-wheeler	508	729	1252
Chaura rasta	Car	198	284	488
	Two-wheeler	512	735	1262
Johari bazaar	Car	138	198	340
	Two-wheeler	893	1281	2202
Tripolia bazaar-I	Car	45	65	111
	Two-wheeler	454	651	1119
Tripolia bazaar-II	Car	55	79	136
	Two-wheeler	527	756	1299
Nehru bazaar	Car	69	99	170
	Two-wheeler	329	472	811
Bapu bazaar	Car	74	106	182
	Two-wheeler	473	679	1166
MI road	Car	58	83	143
	Two-wheeler	72	103	178
Total	Car	734	1053	1809
	Two-wheeler	3768	5406	9289
	ECS	1676	2404	4131

Note: The parking demand is projected for two-wheeler and car only. The parking demand in 1995 (base year) for all vehicles (two-wheeler, car, three-wheeler, cycle and cycle rickshaw) is 3985 ECS.

(v) The existing off-street parking lots are ill managed and are lacking in design and suffer from the absence of systematic design and regulations.

(vi) The projected parking demand shows that the parking spaces have to be created in the form of off- street parking lots besides regulating the present kerb side parking.

(vii) Parking accumulation reaches maximum by 1200 h in the morning and comes down for couple of hours in the afternoon and again reaches maximum accumulation during evening hour.

(viii)Sixty percent of cars and 55% of two-wheeler are parked for less than half an hour.

3.1.11 RECOMMENDED STRATEGIES AND POLICIES

The parking space available can cope with only two-third of the present demand and the projected parking demand is much higher. Presently no parking fee is being charged for kerb side parking. In the absence of parking fee the user can move from one parking lot to another thus creating avoidable demand. Therefore, it is proposed to introduce parking fee in some of the areas. This will moderate parking demand and also act as deterrent to the growth of parking demand up to certain time period. With the continuous increase in economic status of the residents, the parking demand is bound to increase. Therefore, there is a need to evolve strategies to meet the growing demand through demand management and capacity augmentation.

3.1.11.1 Demand Management through Pricing

Keeping in view the activities parking fee to be charged is considered and recommended.

The recommended fees are Rs 4 per entry of cars and Rs 2 per entry of two-wheelers on the following roads: Johari Bazaar, Chaura Rastha, Nehru Bazaar and Bapu Bazaar. A fee of Rs 2 for car and Rs 1 for two-wheeler is to be charged on the following roads: Tripolia Bazaar, M I Road, Kishanpole Bazaar. The cycles and other modes are exempted from parking fee. With the pricing of parking space the emerging scenario will be (i) the growth in parking demand will be retarded; (ii) the available parking space will be effectively utilised and only the needy would use the parking spaces; and (iii) in view of (i) and (ii) the present demand for parking can be managed. The parking fee is proposed to be increased yearly to meet operational and maintenance expenses and also to act as a deterrent to the growth of parking demand. The proposed fee and the annual revenue estimates are presented in **Table 3.1.7**.

As can be observed from the table revenue of about Rs 130 million will be accrued by 2000 AD. Allowing 25% of the revenue towards operational and maintenance costs net revenue of Rs 98 million will be available for development of parking facilities. From 2001 onwards it is

proposed to charge uniform fee for the entire area. The fee proposed is Rs 6 for cars and Rs 3 for two-wheeler up to the 2010.

Table 3.1.7: Proposed fee and expected revenue

Year	Parking Fee in Rupees				Total Revenue, Million, Rs
	Category I		Category II		
	Four-wheelers	Two-wheelers	Four-wheelers	Two-wheelers	
1996	4	2	2	1	19.00
1997	4	2	2	1	19.00
1998	6	3	5	2	30.78
1999	6	3	5	2	30.78
2000	6	3	5	2	30.78
2001 to 2010	6	3	6	3	341.10

3.1.11.2 Capacity Augmentation

The open spaces available in the vicinity of the study area are identified for developing off-street parking facilities. The following sites are identified for this purpose:

(a) Ramnivas garden;

(b) Ramlila ground;

(c) Old Pension Office premises;

(d) Space near Rajasthan Chamber of Commerce and Industry;

(e) Choti Chaupar; and

(f) Badi Chaupar

The above sites are in addition to the parking spaces already in use, namely, Sanjay market and Ajmeri gate. Depending on the available space and activities the parking facilities are proposed as surface, underground and multi-storeyed parking facility (Figure 1).

(i) Surface: Ajmeri Gate (SP-1);

(ii) Underground: Ramvilas Garden (UG-1), Ramleela Ground (UG-2), Badi Chaupar (UG-3) and Choti Chaupar (UG-4); and (iii) Multistoreyed Parking: Sanjay Market (MP-1), Old Pension Office Premises (MP-2).

After taking into account the space for entry, exit and circulation these areas can accommodate spaces for 2200 ECS as illustrated in Table 3.8. The projected parking demand for 2011 AD is 4134 ECS (for cars and two-wheelers only) of which the present demand of 1676 ECS is available for two-wheeler and cars through management strategy and pricing for parking space. The remaining demand of 2455 ECS is nearly equal to the additional space created through off-street parking spaces. The approximate cost of developing these facilities

requires an investment of Rs 350 million. Local authorities or Government alone cannot meet this huge investment.

The present demand can be met by levying parking fee as mentioned earlier. The projected parking demand has to be met by creating off-street parking facilities as discussed earlier. The net revenue accrued by levying of parking fee on the kerb side parking is proposed to be utilized for developing the needed parking facilities. Based on the discussions held with JDA it is assumed that the government gives the land/ site proposed for off-street parking development. The net revenue, parking facility to be developed and the cost of proposed development (excluding land) are presented in **Table 3.1.8**.

Table 3.1.8: Cost of developing off street parking facilities and net revenue

Net Revenue from Parking fees,** Rs Millions	Parking facility to be developed	Cost of development,* Rs Millions
98	Ramnivas Garden Ajmeri Gate	90
240	Ram Leela Ground Sanjay Market Old Pension Office Premises Near Rajasthan Ch of Commerce	161
195	Chotti Chaupar Badi Chaupar	100

* As per 1995 rates;

** A deduction of 25% is made to meet operational/ maintenance charges.

It can be observed from the table that the parking facilities can be developed using the resources generated from proposed kerb side parking fee, thus avoiding any capital investment from the local government. The entire scheme of collecting the parking fee and developing the parking lots in a phased manner is to be entrusted to a private investor.

3.1.12 CONCLUSIONS

The population of Jaipur city is growing at a very rapid rate. Further, the per capita vehicle ownership of Jaipur is around 0.23, next only to Delhi in the country. This coupled with narrow roads within walled city area has resulted in parking problems and traffic congestion. The in-depth analysis of traffic data showed that the peak hour traffic volume was 8600 vehicles/hour, of which more than 50% was slow moving vehicle. The parking surveys carried out showed that the parking demands for the study area was 3985 ECS and three-quarters of this was for short durations. The interviews revealed that shopping for self and trading required short term parking whilst work purpose trip required long term parking.

The parking demand for horizon year was projected at 6.2% per annum based on planned growth, space and infrastructure availability. The parking space available can cope with only two-thirds of the present demand and the projected parking demand of cars and two-wheelers only is much higher (4131 ECS). The approximate cost of developing these facilities requires an investment of Rs 350 millions. Due to paucity of funds Local authorities or Government alone cannot meet this huge investment. Therefore, in order to meet the parking demand different strategies and policies were explored. The demand management through pricing would not only act as a deterrent but also generates revenue. Therefore, to start with, it was suggested to levy a parking fee of Rs 4 for cars/jeep and Rs 2 for two-wheelers and is to be increased gradually. The revenue generated from parking fee was proposed to be earmarked as 'parking fund' to be used for capacity augmentation through private sector participation. Using this revenue an additional 2200 ECS of off-street parking facility was proposed to be developed at different locations in order to satisfy the growing demand. It was shown that by streamlining the existing parking facilities and implementing appropriate parking and management policies could provide better facilities for the users and at the same time reduce the burden on local governments.

3.2 ANALYSIS OF INTRA-DISTRICT DISPARITIES FOR DEHRADUN DISTRICT USING GIS TECHNIQUE

This study is down loaded from www. gisdevelopment.com internet website, and this paper is written by R.D.Gupta, P.K. Garg, Manoj Arora ,Department of Civil Engineering, IIT, Roorkee .

3.2.1 INTRODUCTION

Today planning is an integral part of our national policy. It embodies the collective aspirations of people as well as the commitment of Government to achieve specific goals and targets. Planning is a process for achieving certain self-defined and pre-determined goals laid down by a central planning authority. In other words, planning is usually done at the top level. On the other hand, in case of decentralised planning, planning is generally carried out from the bottom e.g. each village panchayat may be asked to prepare a plan for the economic development of the village and each industry may be asked to prepare its own development plan. Thus, an important objective of the decentralised planning is the optimum utilisation of human, material and finance resources and to ensure involvement of those people for whom the plans are intended to be implemented (Ali and Kumar,1997). Planning commission, from sixth plan onwards, has also laid considerable stress on area based micro-level planning in which a district is considered to be a viable unit. The district level planning begins with the analysis and prioritisation of the small areas (micro-regions) as well as needs of the people (different social classes) and demands for the future development. Further, it provides a framework which rationalises and integrates them with the objectives laid down for state (sub-national) and nation. District is thus an atomized part of the national level macro-space, and hence district planning is required to be carried out scientifically so as to generate development from grassroots(Mukherjee 1993)

3.2.2 INTRA - DISTRICT DISPARITIES: BASIC CONCEPT

The development in a district is never uniform. For the formulation of a development plan for a district, it would be necessary to make a critical assessment of present scenario, on the basis of available resources (natural/physical) and potentials, nature of local needs and problems, the priorities assigned to different socio-economic activities and the trends of development. Owing to the difference in the levels of economic development and provision of various facilities among the sub-regions (community development block level) of a district, it is

essential to carry out intra-district disparity analysis for prioritising the developmental programme within a district.

The purpose of the present study, therefore is to examine the distribution of infra-structural and socio-economic facilities in the district Dehradun and to categorise various community development blocks of district, based upon overall level of development, using the concepts of GIS.

3.2.3 GIS AND DISTRICT LEVEL PLANNING

From the early days of civilisation, human activities have always acquired geographic information on various themes with their locations and inter-relations. The planners and decision makers always require locational, quantitative and statistical information concerning various cultural features and infra-structural facilities affecting the planning. These information may be available in different forms, such as maps, photographs, textual, graphical or tabular form. Integration and analysis of these information in an effective manner is only possible through the use of a GIS.

A GIS represents a computer based system for capturing, storing, retrieving and handling spatial and non-spatial data. A complete geographical information system perform four major functions i.e. (i) Data input (ii) Data storage and retrieval (iii) Data manipulation and (iv) Data output. GIS integrates policy with land resources and land use, thereby providing a powerful tool for land managers, planners and policy makers. The enormous data on natural resources, socio-economic and demographic setup required for district level planning can be efficiently handled and analysed in a GIS. Different management scenario can also be processed allowing the planners/managers to analyse various alternatives before selecting the most appropriate plan.

Although the use of computers in automating the spatial information for districts has increased but the use of GIS in planning is still very crude. Mohammad (1991) has emphasized the need for applying GIS in micro-level planning. Baburajan and Stalin (1996) have attempted to develop an information system for planning at village level using index criterion in dBase IV for Kothur and Amangal mandals of Mahboobnagar district of A.P.

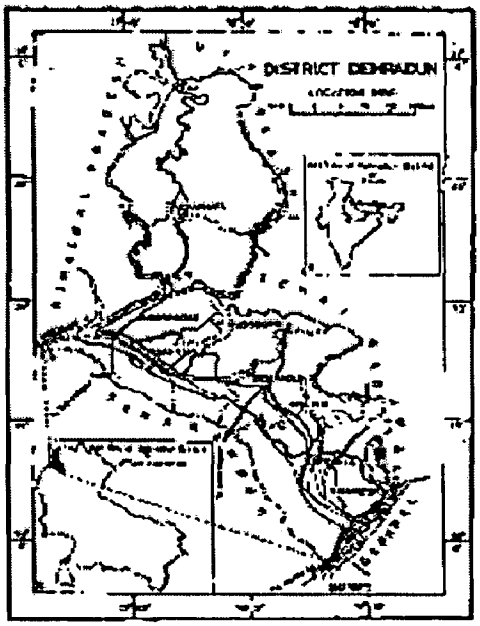
3.2.4 THE STUDY AREA

Dehradun district is situated in the foothills of Himalayas and is facing severe environmental degradation due to various reasons, namely, improper land use patterns, deforestation activities, uncontrolled urban sprawl, industrial and mining activities and population growth. The district lies between 29058'00" N and 31002'30" N latitudes and 77034'05" E and

78018'13" E longitudes (Map 3.2.1), covering an area of 3088 Km2. The total population, as per 1991 census, is 10,25,679 out of which 5,10,199 is rural. The district is divided into six community development blocks consisting of 764 villages. These blocks are Chakrata, Kalsi, Vikasnagar, Sahaspur, Raipur and Doiwala having 153, 204, 61, 120, 129 and 76 villages respectively.

3.2.5 METHODOLOGY AND RESULTS

For the present work, a village boundary map for all blocks of the district has been digitized using A0 size CALCOMP 9100 digitizer attached to ARC/INFO (ver. 7.2.1) GIS software. The digitizing errors have been corrected using ARCEDIT module. Nine registration points (TICS) have been used for registering the digitized map to the ground, and to transform the coverage from digitizer units to real-world coordinates. There are 725 inhabited villages in Dehradun district as per 1991 census.



Map 3.2.1: The Study Area

The non-spatial data used for these villages include demographic and socio-economic data. Various facilities and services for the district considered in this study include:

1. Education Facilities:
2. Primary Schools
3. Middle Schools
4. High Schools

5. Pre-University College
6. Adult Education Centre
7. Medical Facilities:
8. Primary Health Sub-centre
9. Primary Health Centre
10. Health Centre
11. Child Welfare Centre
12. Maternity and Child Welfare Centre
13. Maternity House
14. Family Planning Centre
15. Dispensary
16. Hospital
17. Registered Medical Practioner
18. Drinking Water
19. Post Office
20. Approach Road to a Village
21. Power Supply
22. Market/Shopping Centre
23. Literacy in a Village
24. Irrigated Land in each Village

The above data are obtained from Census Handbooks of 1981 and 1991 and updated based upon the information collected from Tehsil, Block Development Offices and NIC, Dehradun.

The TABLES module of ARC/INFO, which has most of the capabilities of a Data Base Management System, has been used for creating and managing the non-spatial data. These attributes of all villages are then associated with the corresponding spatial features. An important aspect of integrated area-level planning is the combined analysis of the thematic natural resource data and the tabular socio-economic data. For this, a criteria based analysis of the integrated data bases has been carried out in GIS environment. User interactive program has been developed in GIS using Arc Macro Language (AML) of ARC/INFO GIS software.

The weightage to each facility has been assigned to reflect the true indication of its status in Dehradun district. In the present work, a centrality formula for assigning the weightage to different facilities has been used. It is based upon the principle that the greater the scarcity of function, the greater is its importance in terms of centrality and thus the higher its weightage (Khan 1990).

The weight of ith village (wi) can be written as:

$$wi = \frac{N}{F_i}$$

where, N = Total number of villages

Fi = Number of villages having a facility

The composite index for ith village (Ci) for all the facilities is then computed from:

$$C_i = \sum_{i=1}^{m} w_i X_{ij}$$

where, Xij = Value of jth function in ith village

m = Number of sub-functions in ith village

The Village Development Index (VDI) for each village has been computed by aggregating the composite indices of all facilities for that village. Relative weights for different facilities have been assigned based upon analytical hierarchical process proposed by Saaty (1980). Finally, Composite Block Development Index (CBDI) for each block has been computed from the mean of VDI of all villages in that block. This index is considered to be an indicator of development in that block. The CBDI values, thus computed for each block, by doing programming using AML in GIS have been shown in **Table 3.2.1.**

The ranking of various blocks of Dehradun district, based upon their relative development, has been shown in **Fig. 3.2.1**, which has been generated using ARCPLOT module. In the

figure, the village boundary map has also been shown. This overlay is very useful to carry out analysis based upon interactive queries for each village by linking it with the database of various facilities.

Table 3.2.1: CBDI for all blocks of Dehradun district.

S.No.	Name of Block	CBDI
1.	Vikasnagar	972.43
2.	Doiwala	697.64
3.	Sahaspur	426.83
4.	Raipur	391.49
5.	Kalsi	220.50
6.	Chakrata	190.82

It is found that Vikasnagar block is the most developed and Chakrata block the least developed in Dehradun district. So, more financial resources would be needed to further develop Chakrata block, at par with the facilities of Vikasnagar block. This finding is required to be confirmed from visits to the area before any concrete conclusion is drawn.

Next objective of this study is to analyse the least developed block in details and identify the villages that require the development of aforesaid facilities. This work is in progress and results shall be published elsewhere in due course of time.

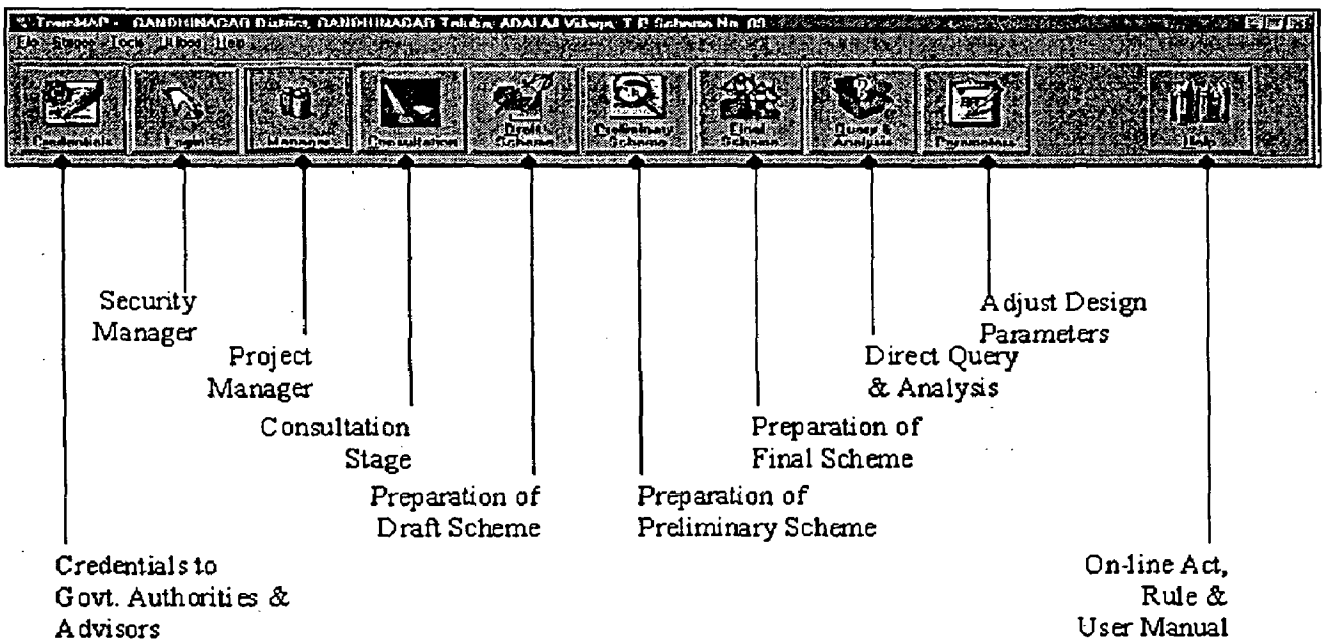


Fig. 3.2.1: Ranking of Blocks based upon CBDI

3.2.6 CONCLUDING REMARKS

A large data base consisting of nine major facilities in Dehradun district has been created using GIS technique. An approach has been developed to use this database to assess the relative development in all six blocks of the district. GIS is found to be extremely useful to establish links amongst all the facilities as well as to compute the various indices quickly on the basis of different weightage assigned to different facilities. The database is quite flexible in its design such that it can be easily updated and any complex transformation equation can be used involving all the facilities.

GIS is found to be a powerful tool for data integration and modelling for district level planning. In India, GIS is not being used by planners and decision makers as intensively as it should have been used. It is hoped that with the increased awareness and reduced cost of hardware and software in future, GIS technology will become a part of our life for planning even day to day activities.

3.3 REMOTE SENSING AND GIS FOR EFFICIENT URBAN PLANNING IN INDIA

This case study is done by **D.P.Tiwari (IAS),** Commissioner, Town & Country Planning, Madhya Pradesh. It's available on www.gisdevelopment.net.

3.3.1 INTRODUCTION

The urban areas in the developing world are under constant pressure of a growing population. Indian cities are experiencing an accelerated pace of growth since independence. Cities are now emerging as centers of domestic & international investments in an era of economic reforms, liberalization and globalization. This has created opportunities for technologists and planning professionals to guide and develop the process of planned development and management.

Efficient urban information system is a vital pre-requisite for planned development. The increasing demands in urban planning and management sectors call for co-ordinate application of Remote sensing and Geographic Information System (GIS) for sustainable development of Urban areas. There is an urgent need to adopt Remote Sensing and Geographic Information System approach in urban development and monitoring process for implementing pragmatic plan of urban development. The plan must incorporate an integrated approach of spatial modeling using Remote Sensing Data, GIS database and GPS solutions. This helps in evolving efficient and economical models for development and location of industries, education, housing, water supply, service facility and disposal system etc.

The availability of high resolution data from IRS –1C and 1D satellites has revolutionized the process of thematic mapping and spatial data base creation, specially, in the context of urban and regional planning. Whereas the technologies such as GIS has emerged as a powerful tool in integrating and analyzing the various thematic layers alongwith attribute information to create various planning scenarios for decision making . Remote Sensing (RS) data provides reliable, timely, accurate, and periodic data, while Geographic Information System (GIS) provide various methods of integration tools to create different planning scenarios for decision making. Therefore, the task force on urban and rural studies setup by the Planning Commission suggested the use of RS and GIS techniques for meeting the information and analysis needs of urban areas.

3.3.2 URBANISATION IN INDIA

The urban population of India has rapidly increased in recent years. In 1961 about 79 million persons lived in urban areas of the country, by 2001, their number had gone up to over 285 million, an increase of over 350 percent in the last four decades, which will increase to over 400 million by the year 2011 and 533 million by the year 2021. In 1991 there were 23 metropolitan cities which have increased to 35 in 2001.

Table 3.3.1: Urbanization trends in India 1951-2001

Census	Total Population (Million)	Urban Population (Million)	% of Urban population to total Population	Decadal Urban growth rate (percent)
1951	361.08	62.44	17.29	-
1961	439.23	78.93	17.97	26.41
1971	548.15	109.11	19.91	38.24
1981	683.32	159.46	23.34	46.15
1991	846.30	217.61	25.71	36.47
2001	1027.01	285.00	27.78	36.47

As a result, most urban settlements are characterised by shortfalls in housing and water supply, inadequate sewerage, traffic congestion, pollution, poverty and social unrest making urban governance a difficult task. Urban Local Bodies [ULBs] which are statutorily responsible for provision and maintenance of basic infrastructure and services in cities and towns are under fiscal stress. According to Census of India 2001, there are 5621 ULBs in the country classified into three major categories of municipal corporations (500), municipalities (50-500) and town committees (5-50).

The 74 th Constitutional Amendment Act (CAA74) mandates compulsory reconstitution of municipal bodies within a stipulated time-frame, thus ensuring continuity of local representatives. The twelfth schedule of the CAA74 has listed 18 functions and responsibilities to local bodies. These are :

1. Urban planning, including town planning;
2. Regulation of land use and construction of buildings;
3. Planning for economic and social development;
4. Roads and bridges;
5. Water supply for domestic, industrial, and commercial purposes;
6. Public health, sanitation, conservancy, and solid waste management;
7. Fire services;
8. Urban forestry, protection of the environment, and promotion of ecological aspects;

9. Safeguarding the interests of weaker sections of society, including the handicapped and mentally retarded;
10. Slum improvement and up-gradation;
11. Urban poverty alleviation;
12. Provision of urban amenities and facilities such as parks, gardens, and playgrounds;
13. Promotion of cultural, educational and aesthetic aspects;
14. Burials and burial grounds; cremation grounds and electric crematoria;
15. Cattle pounds, prevention of cruelty to animals;.
16. Vital statistics, including registration of births and deaths;
17. Public amenities including street lighting, parking lots, bus-stop, and public conveniences;
18. Regulation of slaughterhouses and tanneries.

Importantly the CAA74 expressly recognizes a role for the ULBs within the constitutional framework and provides for devolution of financial powers from the state government for strengthening of municipal finances. The CAA74 also provides for constitution of Ward Committees in municipalities with a population of more than 300 thousand, Metropolitan Planning Committees and District Planning Committees for consolidation and preparation of plans of spatial, economic and social development. From a "top down" approach, the emphasis has thus shifted to the" bottom up" approach. In view of the challenges facing by ULBs the planners have to prepare themselves for a new role and much wider responsibilities. As a bridge between the civil society and the politico-economic structure, the planner has to perform the role of the catalysts of change. With the ongoing globalization, economic liberalization and devolution of power to local bodies, gone are the days of armchair professionals.

3.3.3 URBAN PLANNING AND DEVELOPMENT

It is now being recognised that urban areas are the engines of growth at both regional and national level. To facilitate and sustain this growth, cities have to provide both a high quality of life and an efficient infrastructure for economic activities.

Table 3.3.2: Percentage of Urban population to total population year wise

Year	% Urban Population to Total Population	% Contribution to National Income
1951	17.3	29
1981	23.3	47
1991	25.7	55
2001	28.5	61

Urban planning is basically resource generation, resource development and resource management exercise. The efficiency of urban settlements largely depends upon how well they are planned, how economically they are developed and how efficiently they are managed. Planning inputs largely govern the efficiency level of human settlements. Urban planning and development refers to a process that harnesses spatio-economic potential of an area for the benefit of the people. Its scope ranges from a cluster & houses to the entire settlement and beyond to a region and even the nation as a whole. Urban planning includes preparation /rendering of –

1- Perspective Plan

2- Development Plan

3- Annual Plan

4- Schemes and projects

5- Participatory approach for supply of land and infrastructure development.

The urban development planning process in the past has been unduly long and has been largely confined to the detailing of land use aspects. The plans have paid inadequate attention to the provision of trunk infrastructure, environmental conservation and financing issues. They have been unrealistic and have not been accompanied by investment programmes and capital budgets. The planning and plan implementation processes have not paid adequate attention to the integration of land use and transport planning. The fact that transport is a key determinant of land use and "leads" development is sometimes ignored. A Development Plan is essentially a blue-print for development, which seeks to guide development along desired lines for a particular horizon year. In addition to the general layout, it addresses issues related to development on virgin land, heritage conservation, environment, improvement of an old city etc. At present, hardly 30 percent of the urban centers have some sort of Master Plan, which in many cases, is just a policy document. It is estimated that there are about 1600 master plans prepared by various Agencies responsible for plan preparation but their implementation is not encouraging. The implementation of master plan facilitates the orderly and planned development of cities in a sustainable manner, which would ultimately help in good governance.

3.3.4 THE MASTER PLAN APPROACH - OBJECTIVES AND FUNCTIONS

The master plan, which was perceived to be a process rather than a conclusive statement, provides guidelines for the physical development of the city and guides people in locating their investments in the city. In short, Master Plan is a design for the physical, social,

economic and political frame work for the city, which greatly improves the quality of Urban Governance also. The functions of the Master Plan / Development plan are as follows:

i) To guide development of a city in an orderly manner so as to improve the quality of life of the people

ii) Organise and coordinate the complex relationships between urban land uses

iii) Chart a course for growth and change, be responsive to change and maintain its validity over time and space, and be subject to continual review

iv) Direct the physical development of the city in relation to its social and economic characteristics based on comprehensive surveys and studies on the present status and the future growth prospects; and

v) Provide a resource mobilization plan for the proposed development works.

The Constitution (74 th) Amendment Act, 1992 provides for a democratic and participatory planning process so as to incorporate the needs of the people, particularly the poor and socially disadvantaged, in the planning process. The Act stipulates the setting up of District planning Committees (DPCs) and Metropolitan Planning Committees (MPCs) for integration of spatial and economic development and rural and urban planning. The DPCs / MPCs need to be constituted under the State Acts. A three tier planning structure is envisaged in the states – Panchayats / Municipalities level, district and metropolitan level and state level. Under this framework, Panchayats/ Municipalities would prepare plans for their areas which would be consolidated at the district level in the form of draft district development plans. The metropolitan development plan would be prepared by the MPCs. All district and metropolitan development plans would then lead to the formulation of a plan at the state level.

The 12th Schedule of the Constitution (74 th Amendment) Act lists the 18 functions of the municipalities which among others include: (I) urban planning including town planning; (ii) regulation of land use and construction of buildings; and (iii) planning for economic and social development. For a rational integration of spatial and economic development, functions related to spatial and socio economic planning and development should be assigned to Urban Local Bodies (ULBs). For an effective urban planning system, there is the need to have a package of inter-related plans at three levels namely long-term perspective structure plan (20-25 years) short term integrated infrastructure Development plan (5 year) and Annual Action plan as part of Infrastructure Development plan. The short-term integrated Infrastructure plan and Annual plan could be in the form of "rolling" plans to enable the ULBs to continuously review and monitor the plan, and to update it every year / five years.

The aim should be to make urban planning system as a continuous process. Each level of plan must include measures for infrastructure development and environmental conservation

i) Perspective Structure Plan: The long-term Perspective Structure Plan could be prepared by the MPCs broadly indicating goals, policies and strategies for spatio-economic development of the urban settlement. The perspective plan may include:

- Physical characteristics and natural resources:
- Direction and magnitude of growth and development – area and population (Demography)
- Arterial / grid road network and mass transit corridors with modular development block.
- Infrastructure network – water, sewage, drainage, roads, bus and truck terminals, rail network, etc.
- Broad compatible and mixed land use packages and zones:
- Community open space system and organization of public spaces:
- Environmental conservation and preservation of areas of architectural, heritage and ecological importance;
- Major issues and development constraints;
- Financial estimates and fund flow patterns; and
- Policy and plans for EWS housing.

ii) Infrastructure Development Plan: Integrated infrastructure Development Plan should be prepared by ULBs in the context of the approved Perspective Plan. The scope of the Plan should cover an assessment of existing situation, prospects and priorities and development including employment generation programs, economic base, transportation and land use, housing and land development, and environmental improvement and conservation programs. The development plan may include.

- Identification of gaps and shortcomings in the delivery of municipal services;
- Identification of service and remunerative projects and their prioritisation along with capital budgeting and investment programmes; and
- Housing and land development programmes, including identification of areas for residential and non-residential development and development of trunk infrastructure.

iii) Annual Plan: Within the framework of Development Plan, Annual action plans for the urban areas should be prepared by the ULBs specifying the projects and schemes with costing and cash flow for both on-going and new projects. The Annual action plan should provide and in-built system for implementation of the Development Plan. In this plan various urban

development schemes should be integrated spatially and financially. Annual plan may consist of :

- Targets to be achieved – physical and fiscal;
- fund flow; and
- Project design and specification, including tender document for implementation.

iv) Projects and Schemes: As part of the Development plans and Action plans, projects and schemes within towns / cities could be taken up for any area / activity related to housing commercial centers, industrial areas, social and cultural infrastructure, transport, environment, urban renewal etc. by governmental bodies / local agencies / private sector and through public private-partnership. Such projects could be both long-term and short-term and in conformity with the development requirements of the respective town / city.

3.3.5 STAGES OF URBAN PLANNING

Urban areas face critical environmental problems which are manifested at the time of crises. To avoid such occurrences the first requirement is quantification and "resource potentiality", its availability and consumption in the urban areas which requires a comprehensive urban information system (UIS) to be developed to cater to the developmental needs of the growing urban areas.

- Thematic map preparation from satellite data using visual interpretation techniques.
- Generation of spatial framework in GIS environment for perspective and development plans.
- Integration of thematic maps using GIS techniques for urban sprawl analysis and urban land use change analysis.
- Area required for urbanisation will be determined on the basis of population projection of the city and its growth centers.
- Calculation of land requirements for urban development based on the carrying capacity of the region.
- Projection urban land use suitability analysis.
- Urban environmental sensitivity analysis based upon both physical as well as air quality parameters.
- Determination of composite functionality index to setup various amenities such as educational, medical, recreational etc.

3.3.6 URBAN PLANNING SURVEYS

The preparation of any plan for the development of urban area requires reliable factual data regarding existing physical and social-economic conditions such as housing, transport, industries, social services and recreational facilities. The process of collection such data is called a planning survey, which consist of the following components –

1- Preparation of Base Map.

2- Existing land use survey

3- Utilities and the Services survey

4- Community facilities survey

5- Sample household survey for collecting essential data.

For the urban development plans the base maps are to be drawn on large scale and should show all physical topography, cultural features, administrative and planning boundaries. Innovative techniques for preparation of base maps are–

1- Aerial Photography

2- Remote Sensing

3- Geographical Information System.

3.3.6.1 Aerial Photography

Now a day's Aerial photography is being used for generation of base maps and other thematic maps for urban areas as it proves to be cost and time effective and reliable. Wealth of information pertaining to land features, land use, built up areas, city structure, physical aspects of environment etc is available from the aerial photography.

3.3.6.2 Remote Sensing

Satellite Remote Sensing data is used to study and monitor land features, natural resources and dynamic effects of human activities on urban areas. A broad base map of the city and city region, indicating physical features may be prepared quickly with the help of satellite imageries. Using the ground truth or interpretation key, the remote sensing data is analyzed, interpreted and maps related to existing features, land use, broad settlement structure, resource analysis etc could be generated. Remote sensing data can be effectively integrated with the conventional data for analysis, planning and decision making.

3.3.6.3 Geographical Information System

GIS is a computer based system, capable of input, storage, manipulation, analysis of data useful for planning, decision making and implementation. It is a powerful tool which helps planners to view different scenarios and their outcome so that an optimal strategy may be

chosen for planning and development. GIS is basically a map processing technique. Once the spatial and attribute data is generated in GIS, its application areas are many and varied. Planning agencies can acquire the P.C. based GIS system, available in the market, to have quick analysis of geo-referenced data for planning and development.

3.3.7 MODIFICATIONS IN THE URBAN PLANNING APPROACH:

For a more dynamic urban planning exercise, the following modifications in the planning approach are recommended:

i) Flexibility: Plans must have flexibility to provide for ever-growing and ever-expanding city boundaries and provide quality of life to all inhabitants. The plan should be flexible to respond not only to the present needs but also the changing conditions in foreseeable future.

ii) Role of Actors: People's participation in preparation of policies, perspective plan, development plan and annual plans should be ensured through elected representatives in the municipal council / corporation and ward committees.

iii) Information system: A well maintained information system can make possible the fine-tuning of the plan proposals at the various stages of implementation of the plan according to the changing urban scenario.

iv) Urbanisable Areas: The development potential may be assessed for the areas located in the periphery of the developed areas. A profile of the development potential and the possibility of optimizing the existing infrastructure should determine the prioritization of development of these areas.

v) Growth Centers: Given the paucity of resources, it would be more feasible and desirable to promote strategic development initiatives in the selected secondary cities, growth center and their hinterlands. In the growth centers, the location of infrastructural and environmental services could form the 'core' of the Development Plan.

vi) Policy Guidelines: Policy guidelines notified under law, can help in identifying priority areas, subsequent modifications in the plans and administration in general.

vii) Mixed Land Use: With a view to provide for development, the zoning regulations need to be simplified. The land use package should not be allowed to be changed by any authority, except as a part of the review of the Development Plan at the city / town level.

viii) Financial Planning: Land development and infrastructure investment need to be coordinated through integration of physical, financial and investment planning. There is the need to link spatial development plan with resource mobilization plan focusing on credit enhancement mechanisms.

ix) Land Policy and Management: As opposed to the process of compulsory land acquisition, and the related issue of low compensation rates, the ULBs should adopt collaborative approaches within the existing legal framework.

x) Legal Framework: Plan implementation would call for a legal framework so as to make it enforceable and mandatory. The legal framework has to be supported by an effective and efficient machinery which would see that no distortion of master plan proposals take place at the ground level.

xi) Standards: Plot sizes, layout and social overheads need to be designed to reduce costs aligned to the affordability of different income groups and also the sale price for lower income groups can be reduced by differential pricing.

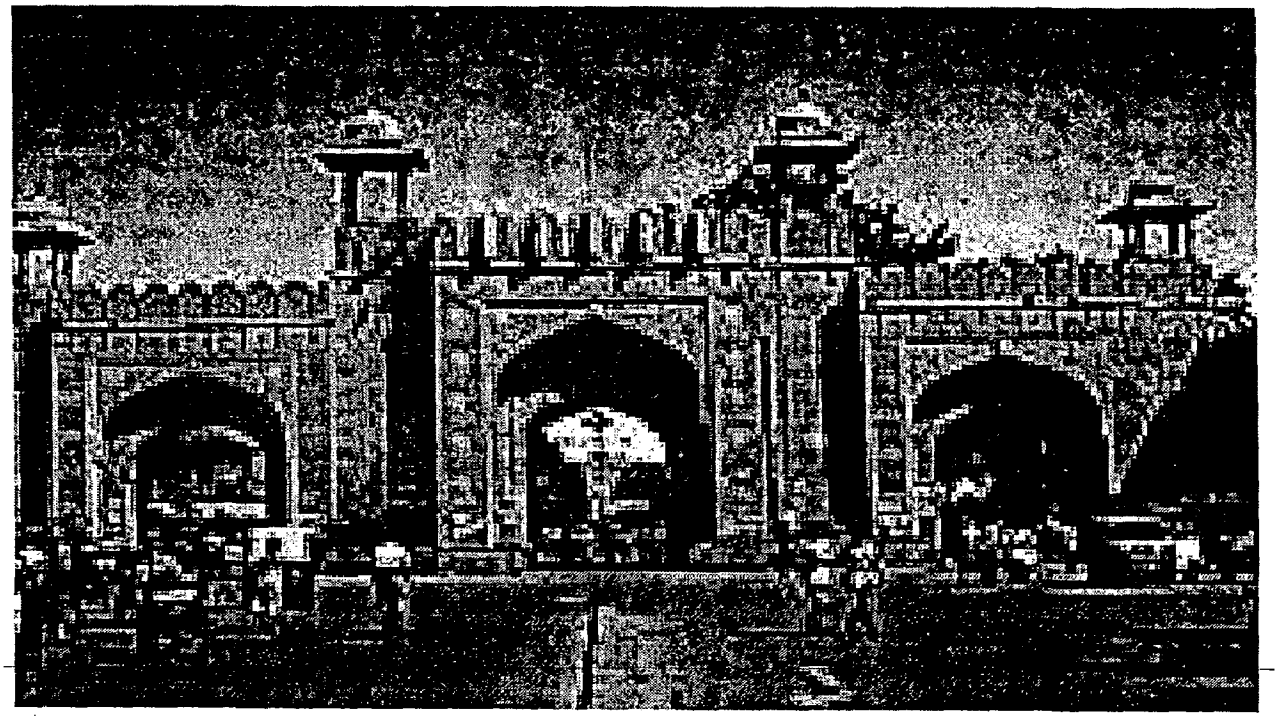
xii) Building Bye-laws: Building bye laws and zoning regulations for the city / town should match the local needs. However, the existing bye-laws need to be simplified and transparent, and there should not be an element of discretion. Adequate provision for parking facilities should be made.

xiii) Database at Metropolitan, district and state levels:

The planning exercise needs continuous data collection, analysis interpretation and updating of data. A computer-generated data base and information system in GIS environment should be developed at various levels which would provide support to planners in development planning.

Chapter 4

STUDY AREA PROFILE



Photograph 4.1: View of Ajmeri Gate, Walled City, Jaipur (Sep., 2003)

Chapter 4 STUDY AREA PROFILE

4.1 INTRODUCTION

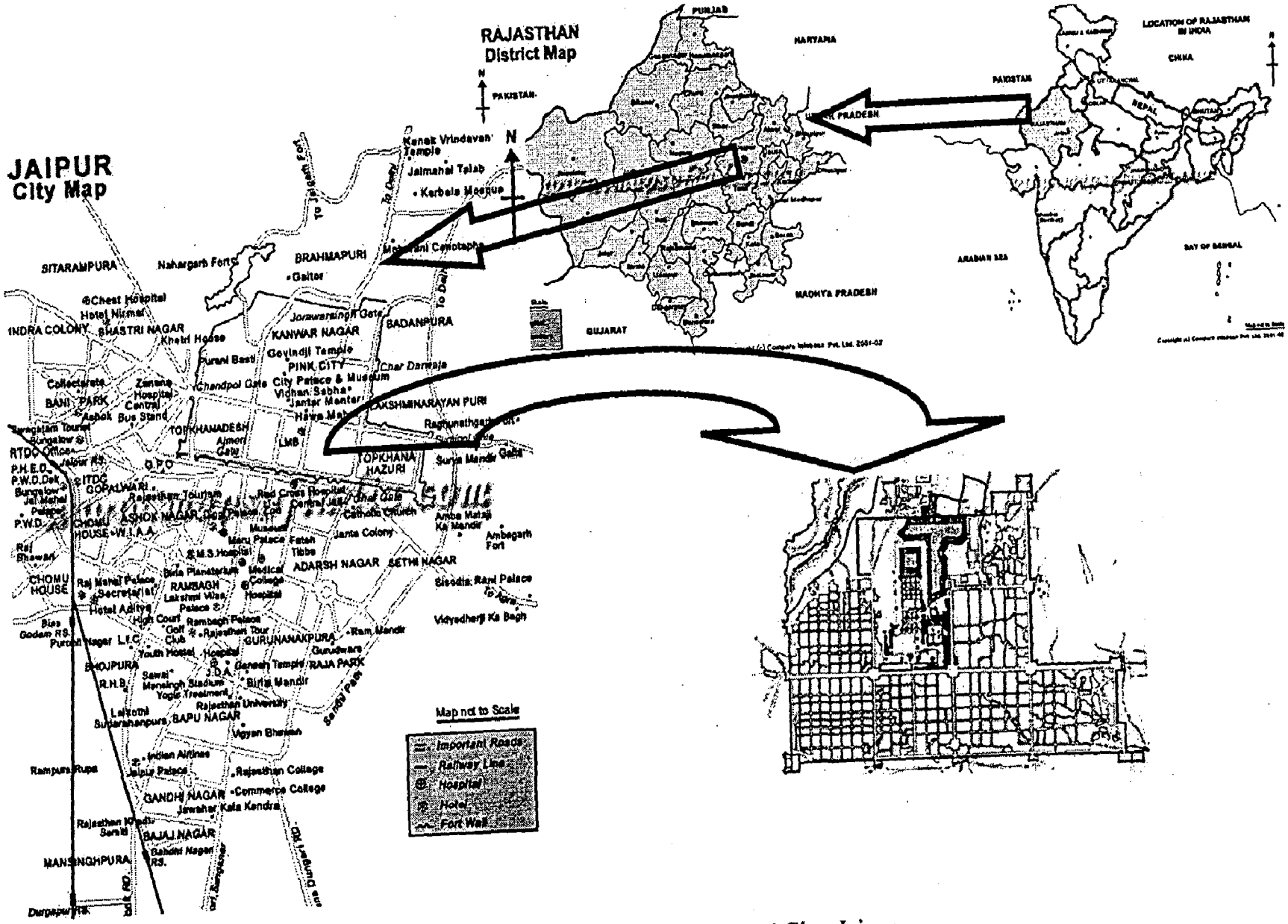
Settled in the rugged hills of the Aravallis, Jaipur is the pristine jewel in the desert sands of Rajasthan. Jaipur is as remarkable for its marvelous architecture and town planning as it is for the lively spirit of the people who inhabit it. The picturesque capital of Rajasthan, Jaipur is color washed pink-the color associated with hospitality in Rajput culture. Jaipur displays a remarkable harmony and architectural splendor. The ancient heart of the Pink city still beats in its fairy-tale palaces, rugged fortresses perched on barren hills and broad avenues that dot the entire city. The only planned city of its time, Jaipur is encircled by a formidable wall.

This famous city is the capital of Rajasthan and has earned universal renown as the "Pink City ", and pink it is, with beautiful constructed palaces, havelis and forts. Jaipur which means the city of victory was built exactly 273 years back and is 262 km by road from Delhi (Capital of India). A strong wall encircles the old city and even today has a suggestion of formidable strength; its function of protecting all within is obvious.

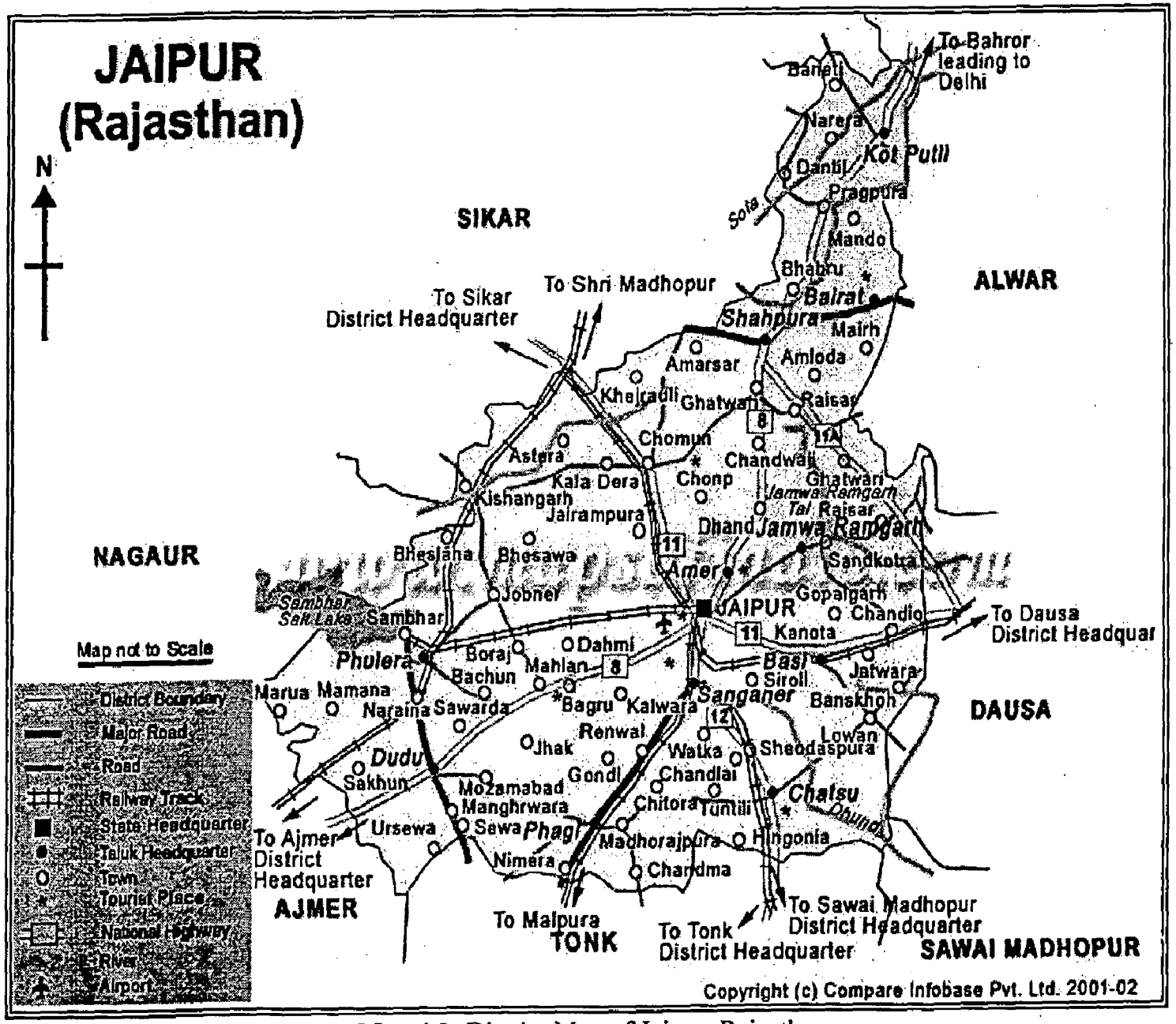
The plains of Rajasthan of which Jaipur is the capital once thundered and echoed with clash of swords and the drums of wars. Built in 1727 by Sawai Jai Singh-II, Jaipur was the first planned city of its time (the earlier planned city in northern India having been built near Taxila sometime in the 2nd century BC).

Jaipur was planned by Vidhyadhar Bhattacharya, a Bengali architect, in a grid system with wide straight avenues, roads, streets and lanes and uniform rows of shops on either side of the main bazaars, all arranged in nine rectangular city sectors (chokris) in accordance with the principles of town planning set down in the 'Shilpa Shastra'- and epochal treatise on the Hindu architecture.

The city itself is an attractive creation worthy of universal admiration. There is a feast in store for tourists. Attractive monuments where one can breathe the fragrance of history. Comfortable and luxurious hotels, once the proud of kings, parks, gardens, and excursions of nearby places of interest, make Jaipur a tourist's paradise.



Map 4.1: Location of Walled City, Jaipur



Map 4.2: District Map of Jaipur, Rajasthan

4.2 LOCATION

Jaipur city is located at 26 degrees and 54 minutes North latitude and 75 degrees and 49 minutes east longitude **(Map 4.1)**. The district is situated in the eastern part of Rajasthan. It is bound in the north by Sikar and Alwar, in South by Tonk, Ajmer and Sawai Madhopur., Nagaur, Sikar and Ajmer in the west and in east by Bharatpur and Dausa districts.

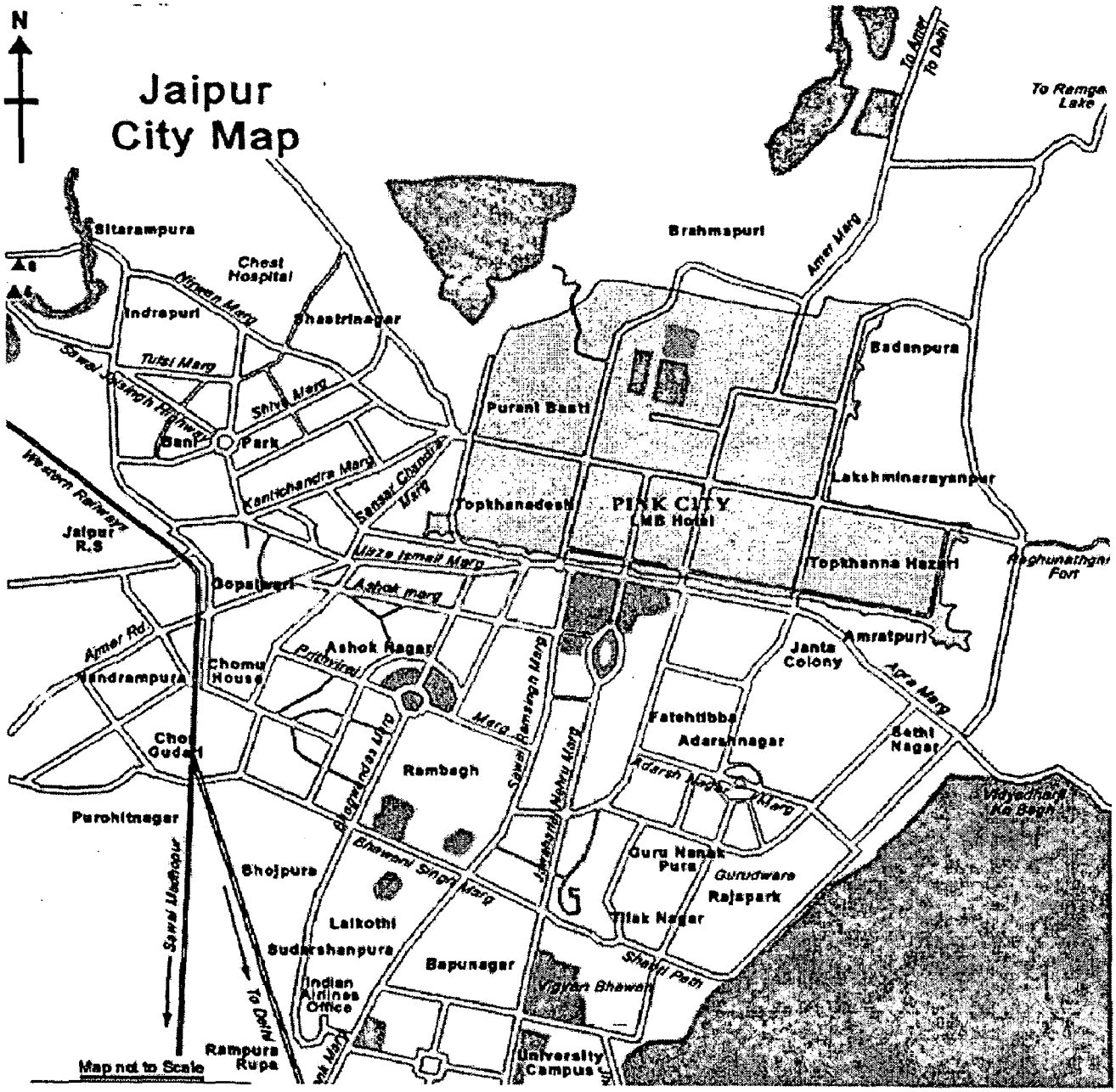
4.3 REGION

Jaipur Region comprising of area includes Jaipur city, Amer, Sanganer, and towns and settlements of Bassi, Chandlai, Sheodaspura, Bagru, Chomu, Achrol, Jamwa Ramgarh and Contiguous areas **(Map 4.2)**.

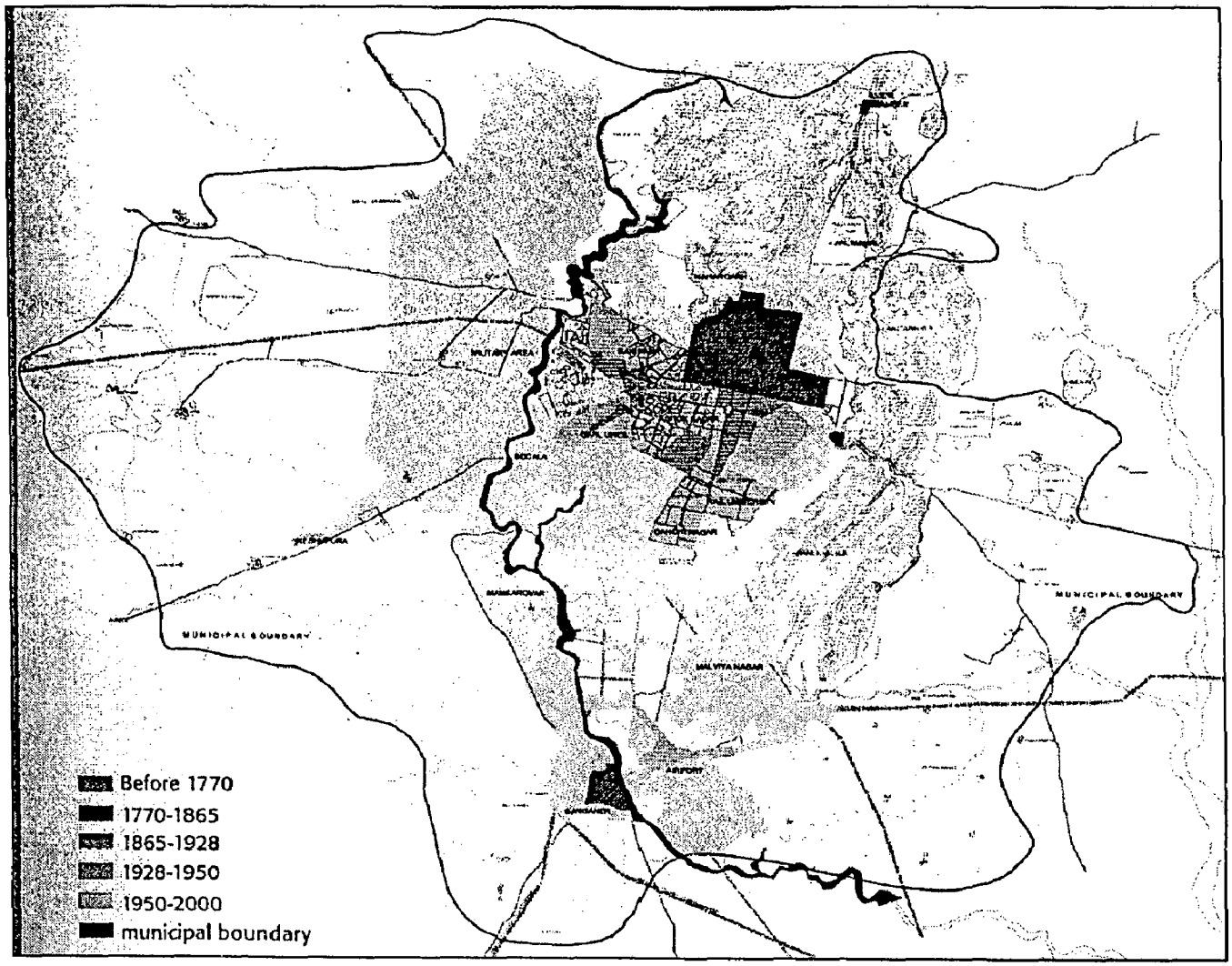
The area of Jaipur Region may work out to be approximately 1464 Sq. Km & it's 4.11 % of the state.

4.4 LINKAGES

Jaipur is well linked by roads, railways and airways to the rest of the country. The city lies on Delhi- Ahmedabad rail route of Western Railways. The N.H. 8 and N.H. 11 intersect at Jaipur and NH 12 leading to Jabalpur starts from Jaipur. Jaipur lies at a distance of about 260 Kms from Delhi, 135 Kms from Ajmer, 225 Kms from Agra, 245 Kms from Kota. The city is well connected by Air with its airport at Sanganer located towards south of the city **(Map 4.3)**.



Map 4.3: Map of Jaipur City.



Map 4.4: Morphology of the Jaipur city

4.5 HISTORICAL PROFILE

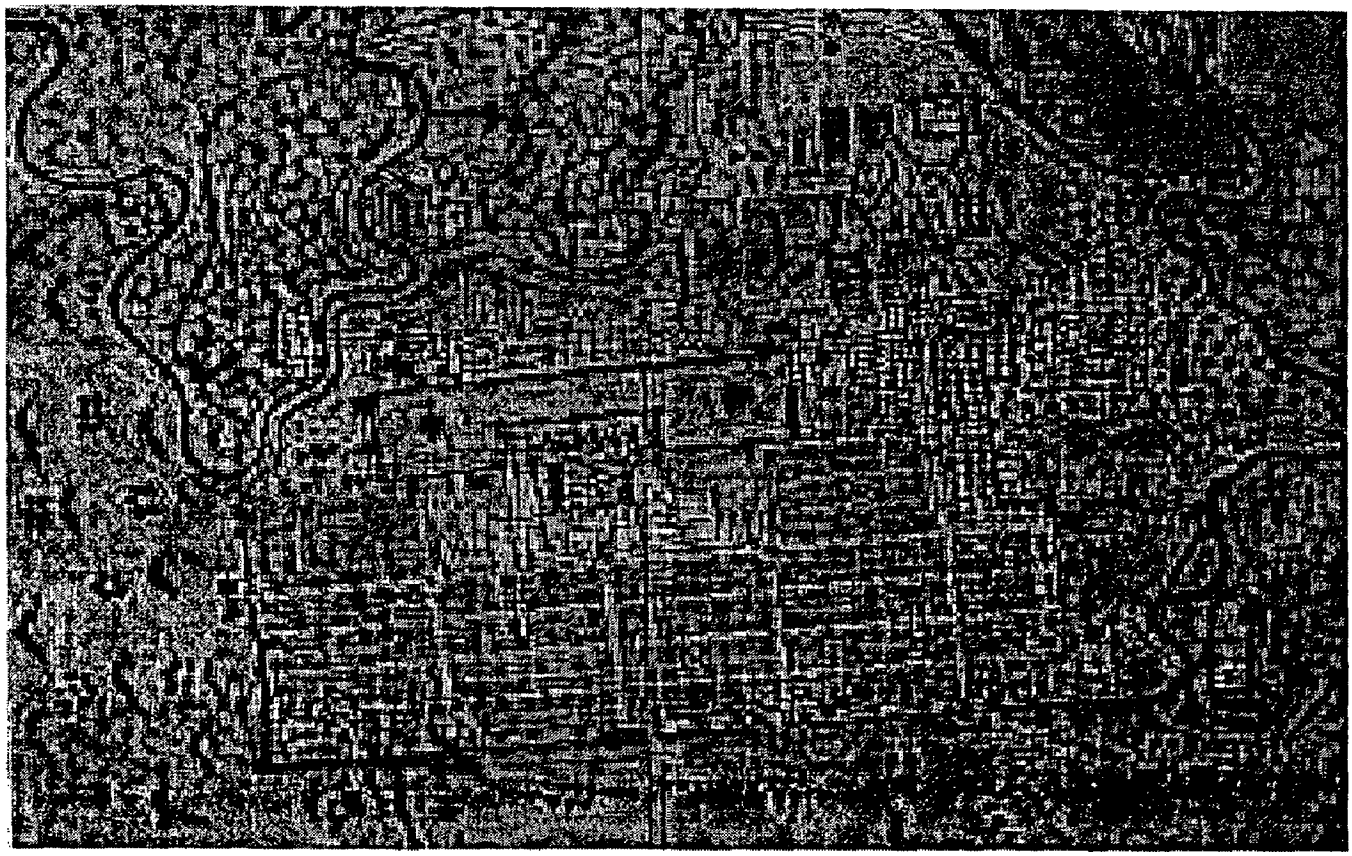
Jaipur, like all cities, has passed through different phases of growth, stagnation, decay and rapid development. Before Jaipur was built, Amber town was the capital of a small state by the same name consisting of three parganas-Amber, Dausa & Baswa. Its rulers belonged to the Kachwaha clan of Rajputs.

Foundation of the city of Jaipur was laid by Sawai Jai Singh II in November, 1727 as a new capital of the Amber State. Most of physical development of this new capital took place before 1800 A.D. Jai Singh's successors continued to add to the glory of the city by constructing various temples, palaces and other important buildings (**Map 4.4**).

The beginning of Sawai Mansingh II's reign was the beginning of the modernization of Jaipur city. After Sir Mirza Ismail took over as Dewan of Jaipur in 1942 major land development schemes outside the walled city were taken up.

Bagru, Chomu, Neendar, Sewar and Achrol were the prominent seats of Jamindars in the feudal system, then functioning under Jaipur State and thereby had their own autonomous functions for land and revenue management under their control. Jamwa Ramgarh was the prominent hunting area of Jaipur State which assumed the status of major picnic spot with the creation of a large water body.

Jaipur State continued as a separate entity for some time after independence of India in 1947. It became a part of the present Rajasthan State on 30th March, 1949.



Map 4.5: Original Map of walled city, Jaipur designed by the Architect Vidyadhar Bhattacharya in 1727(Courtesy: City Place Map Library, Jaipur)

4.6 PLANNING OF THE CITY

Jaipur is the first planned city of the medieval period. It's plan prepared by the Chief Architect Vidyadhar Bhattacharya (**Map 4.5**).

Jaipur city is a geometrically square shaped city. The square of the walled city on a side of 1.61 mile is divided into nine equal works by two intersecting lines from each side at right angle, and at equal distances. Its approximate area is 7.77 Sq. km.

Map 4.6: Map of Walled City, Jaipur

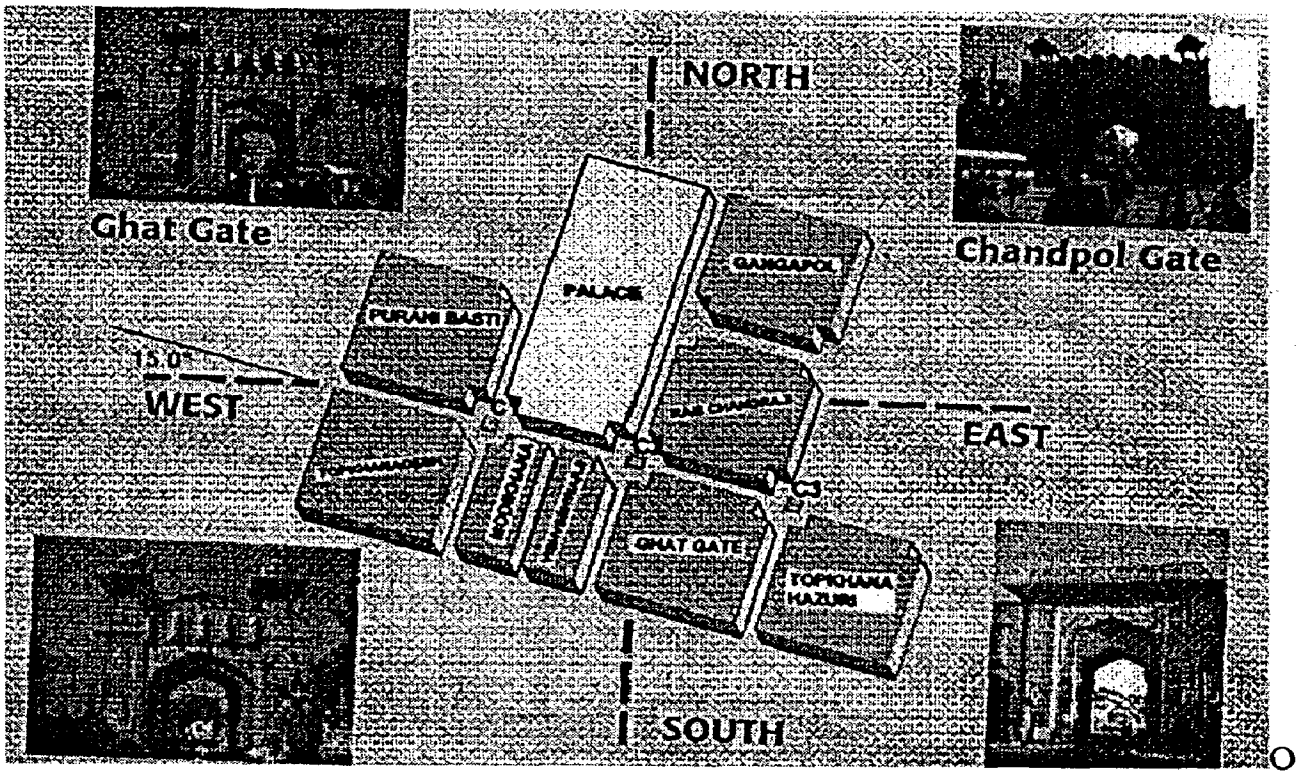
The iron-grid patterns of streets of Jaipur were carefully classified according to the width and usage. The main streets are 110 feet wide, while the smaller streets. Lanes and by lands are of proportionate 55 feet, 27.5 feet, 13.75 feet respectively. The crossings of the main market are called Chaupars. Like street width, the shops on both sides are also standardized in widths and design. There are about 160 shops between the Chaupars on each side of the main street and their widths and heights have been collectively worked out.

The roads are built on the highest level in an area to avoid their flooding during the rains, so the first major road running east-west along the southern wall of the Chandra mahal (city palace) was kept on the crest line of the dunal plane. This ridge road running through the Chaupars. Since the crest line is not exactly east-west but slightly tilled from south-east to rorth-west at an angle of 11.75 degrees **(Map 4.6)**. Hence the square of the city automatically

tilted by the same angle and it is not horizontal on the plan.

The walled city has seven main entrances (**Map 4.7**).

1. Suraj Pole
2. Jorwar Sing Gate
3. Ganga Pole
4. Ajmeri Gate
5. Sanganeri Gate
6. Gath – Gate
7. Chand Pole



Map 4.7: Map showing Chowkries and Main Entrances

On the north of the ridge line there are five Chowkries

1. Purani Basti (where the workers of the city const were first accommodated)
2. & 3 are Palace complex (called Chowkari Savahad) occupying the two central blocks
4. Ramchandra ji
5. Ganga Pole

On the south of ridge lien there are four chowkaries

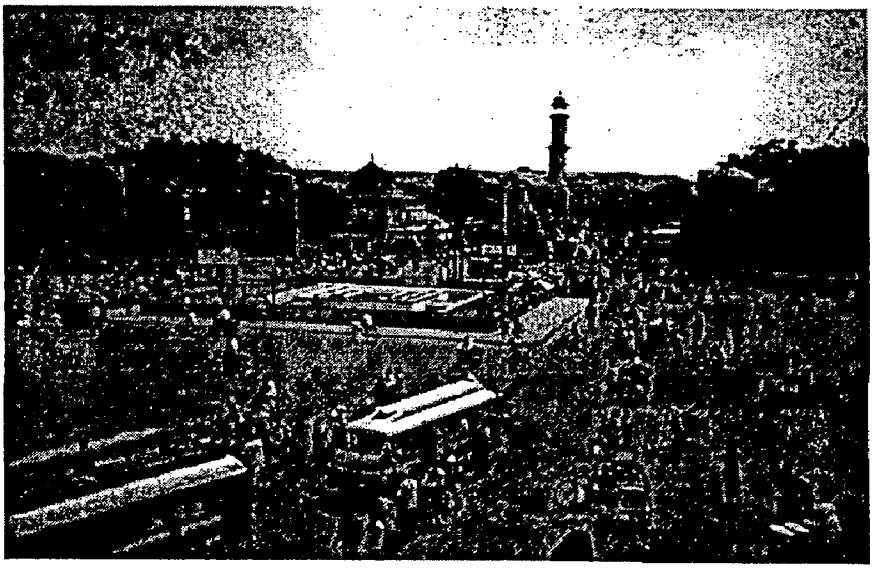
6. Topkhana Desh
7. Modikhana (The colony of gushiness community)

8. Ghat Darwaja
9. Topkhana Hazoori

As the Chowkri Savahad covers two blocks and as the Chowkri Modikhana is bifurcated into two Modikhana and Vishwesharji, so the total number of Chowkrin continues to remain only nine.

The three broad roads running from the three southern gates northwards and interesting the ridge road at three points or Chaupars called **(Photograph 4.2);**

1. Chhoti Chaupar
2. Badi Chaupar
3. Ramganj Chaupar



Photograph 4.2: View of Chhoti Chaupar (Courtesy: Rajasthan Patrika)

The first two of them (Chhoti and Badi) acquire the pivotal position around which the commercial life of the city revolves. The east-west through fare between Chaupars is called the Tripolia Bazar extending westward into Chandpole Bazar and extending eastward into Ramganj Bazar. The main through fare running south-north from Ajmeri Gate to Chhoti Chaupar is called Kishanpole Bazar and Gangori Bazar north of the Chaupar. Similarly from the Sanganeri Gate to Badi Chaupar, it is called Johari Bazar and north of the Chaupar called Sirh-Deorhi Bazar. The market from Ghat Gate to Ramganj Chaupar is called the Ghate Darwaja Bazar.

As the population grew, the people occupied the undeveloped land and were thus called "Koocha Upar" settlers. It is indicated by the unplanned streets in Chowkries Ghat Darwaja, Ramchandraji and Topkhamna Hazoori. When completed, the longer southern wall gave added advantage of more effective fortification and security of the city.

Thus from the above description it is evident that the walled city has not developed at any one time, but expanded from time to time by the rulers of Jaipur state and finally by the Government of Rajasthan.

4.7 DEMOGRAPHIC PROFILE

Total Population of Jaipur district is 52.52 lac & Total urban population of the Jaipur City is 24.89 lacs(**Table 4.2**). The sex ratio for Jaipur is 868 i.e. 868 females for every 1000 males. The density of population for Jaipur has been recorded as 6956 persons per sq. km.

Table 4.1: Population of Jaipur City

Year	Walled City	Municipality
1729	60 000	-
1870	116563	137 887
1931	144 179	148 755
1961	256 274	403 444
1971	355 532	615 258
1981	365 328	966 677
1991	395 945	1458 483
2001	350 183	2324 319

Table 4.2: Demographic Data of Jaipur

Population	persons	52,52,388
Density of population	persons per sq. kms.	471
Density of population(Urban)	persons per sq. kms.	6956
Density of population(Walled city)	persons per sq. kms.	57916
Literacy	per cent	70.63
Total working population	per cent	29.17
Percentage distribution of work force		
Cultivators	per cent	40.05
Agricultural labourers	per cent	5.66
Household industry manufacturing, processing servicing and repairs	percent	14.71

District	Population 2001			Decadal growth rate		Sex ratio		Density	
	Persons	Males	Females	1981-1991	1991-2001	1991	2001	1991	2001
Jaipur	5,252,388	2,769,096	2,483,292	49.11	35.10	892	897	349	471

Source: Census of India, 2001

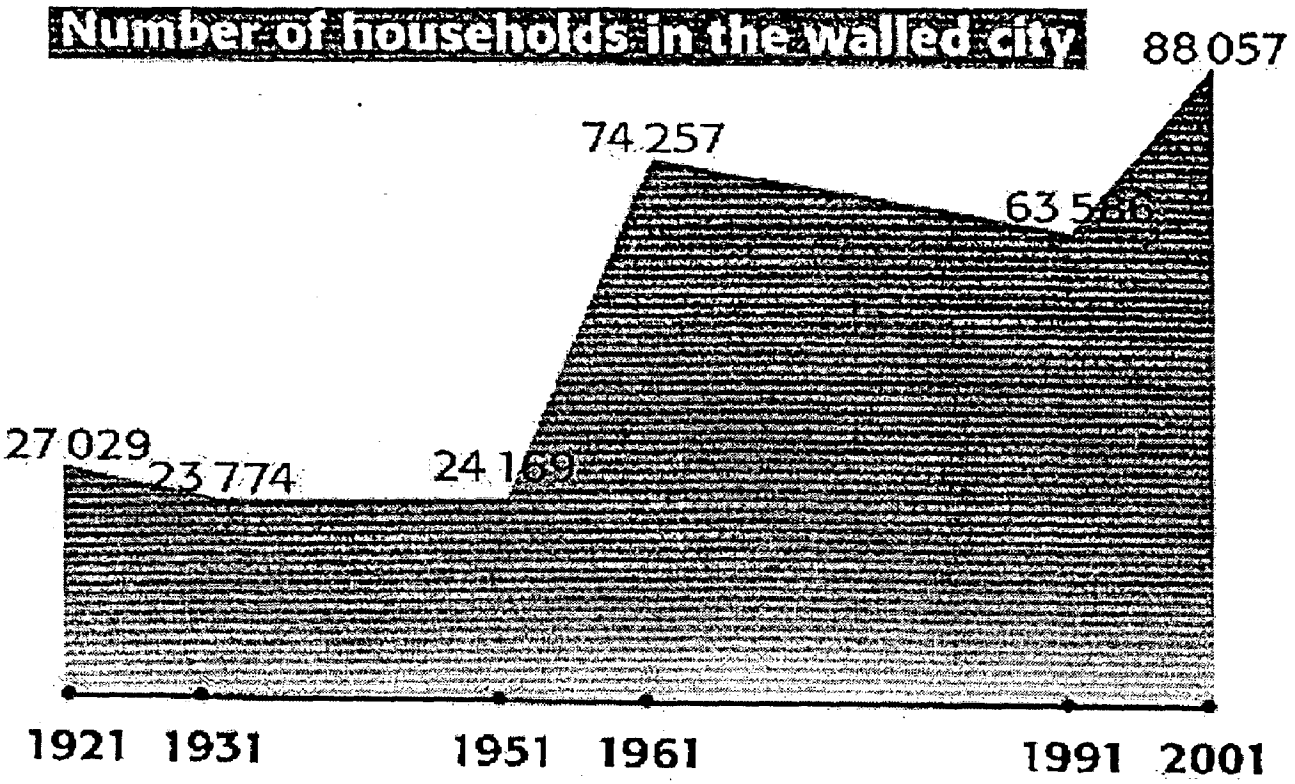
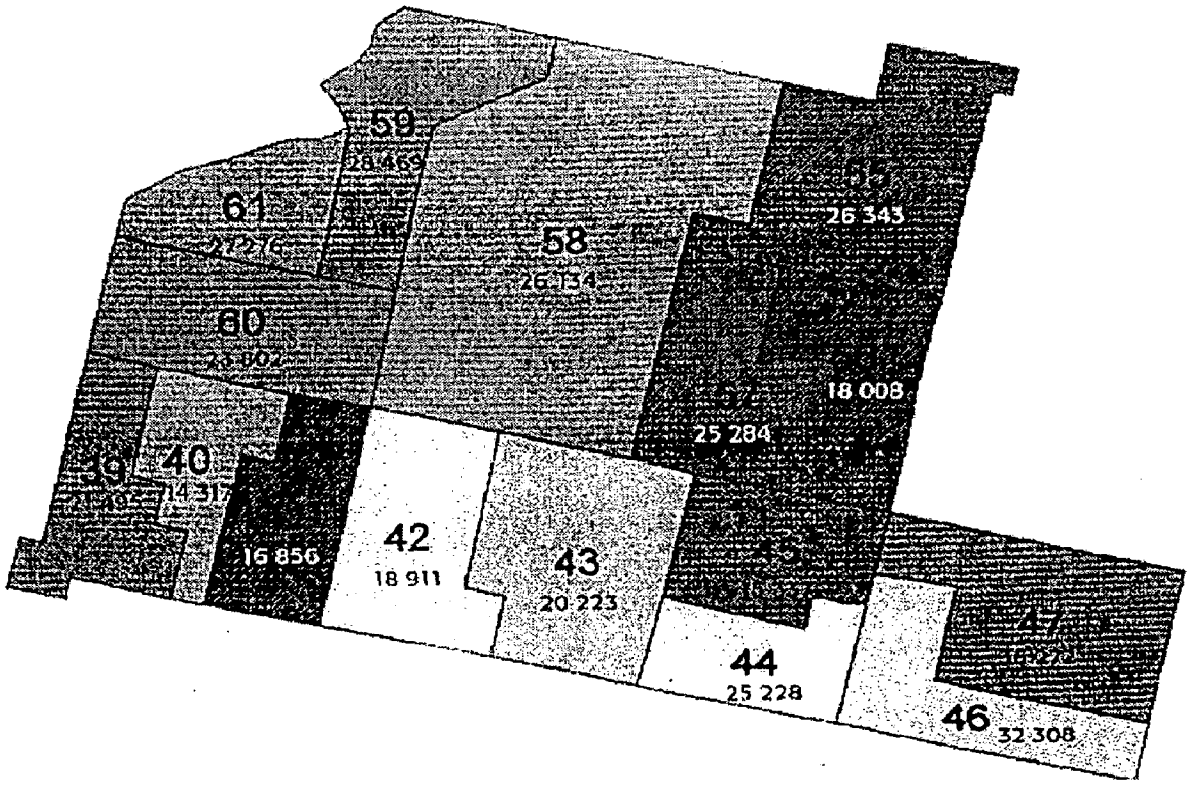
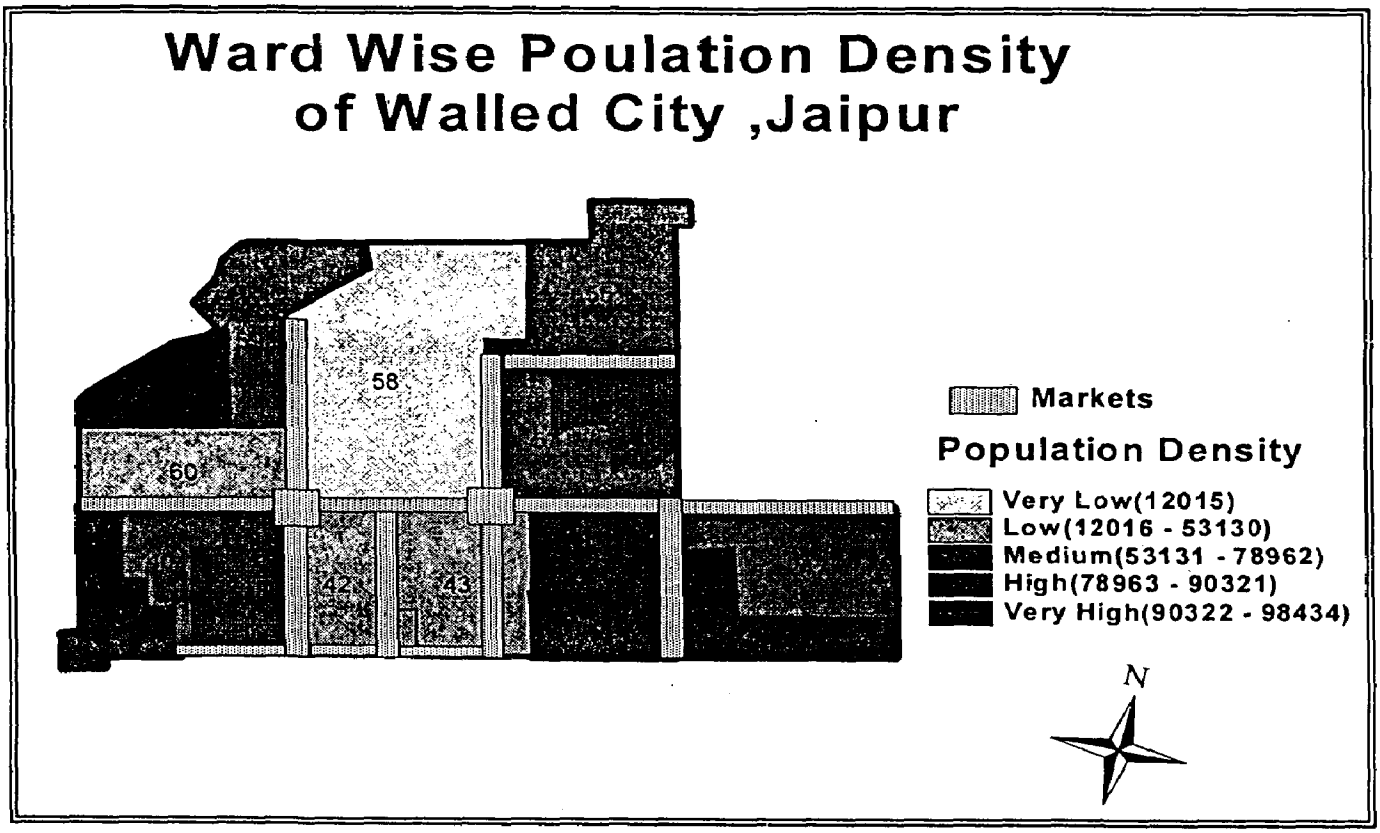


Figure 4.1: Numbers of Households in Walled City, Jaipur



Map 4.8: Ward-wise Population of Walled City, Jaipur (2001).



Map 4.9: Ward-wise Population Density of Walled City, Jaipur (2001).

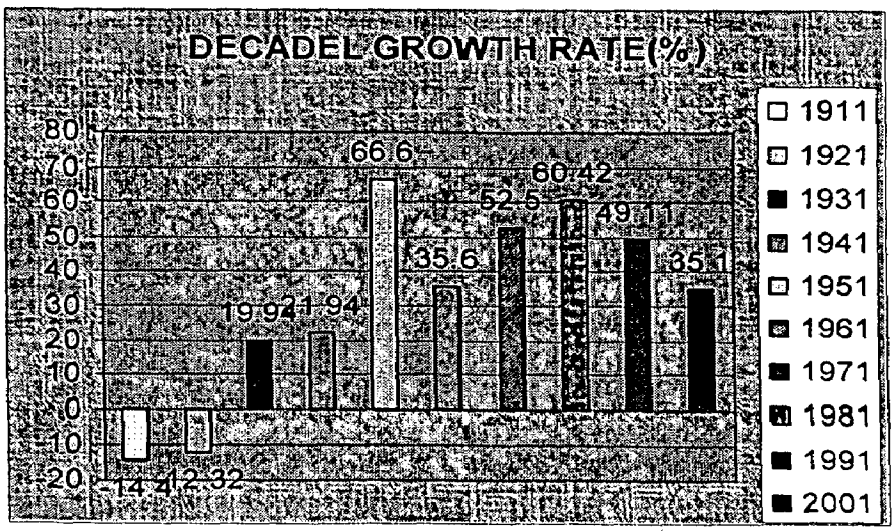


Figure 4.2: Decadal Growth Rate of Jaipur

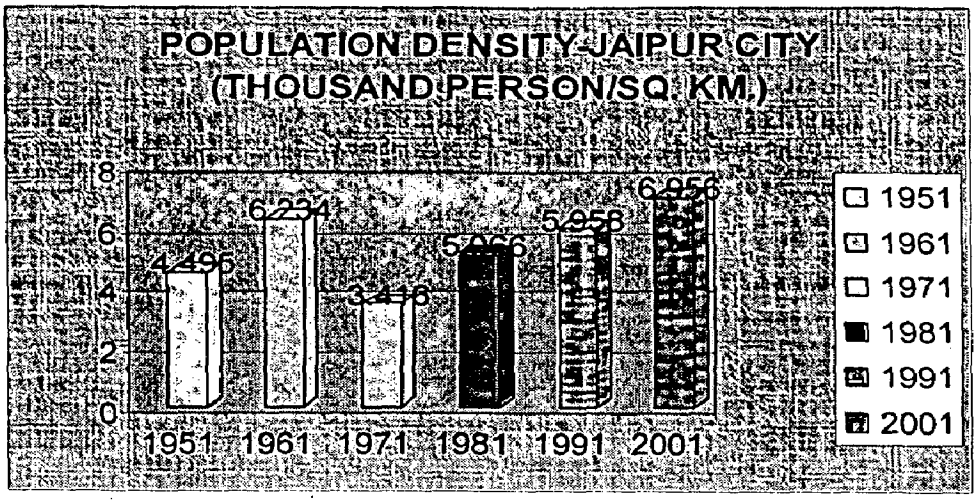


Figure 4.3: Population Density-Jaipur City

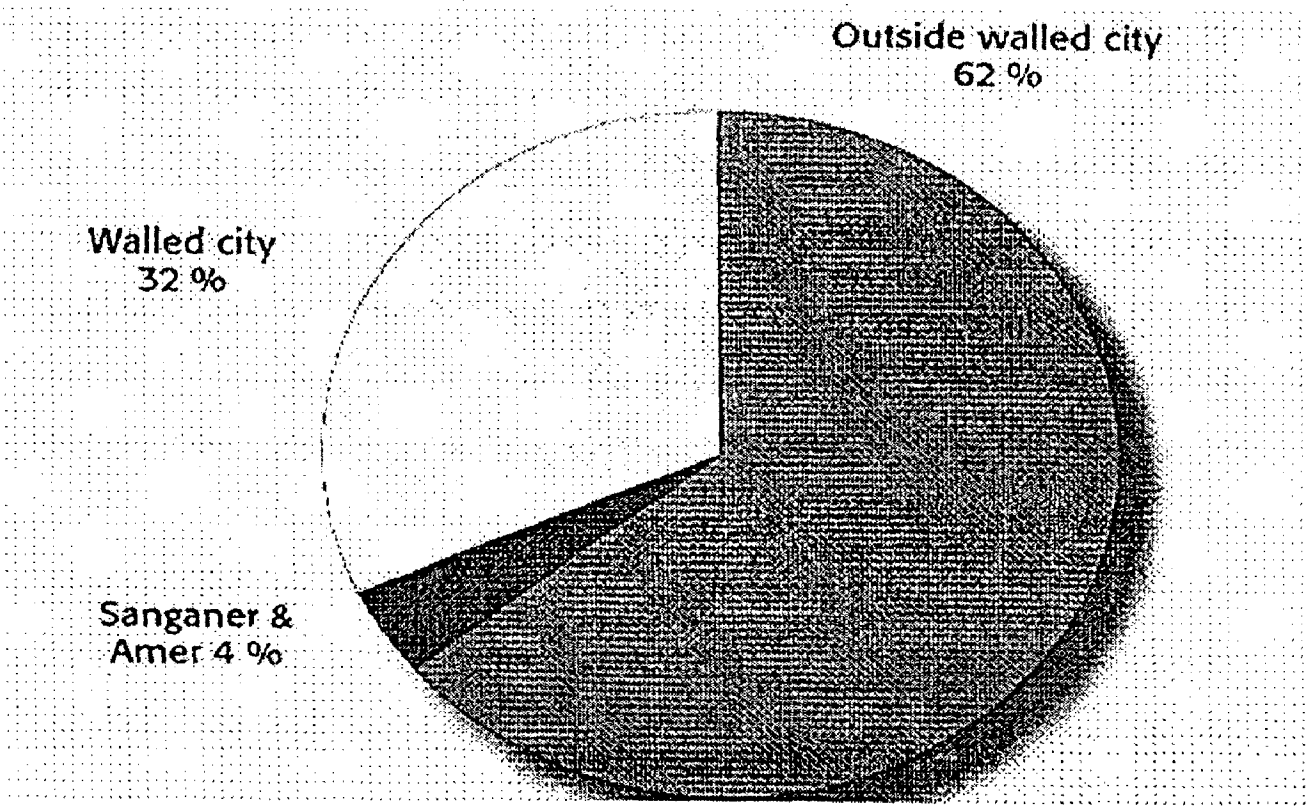


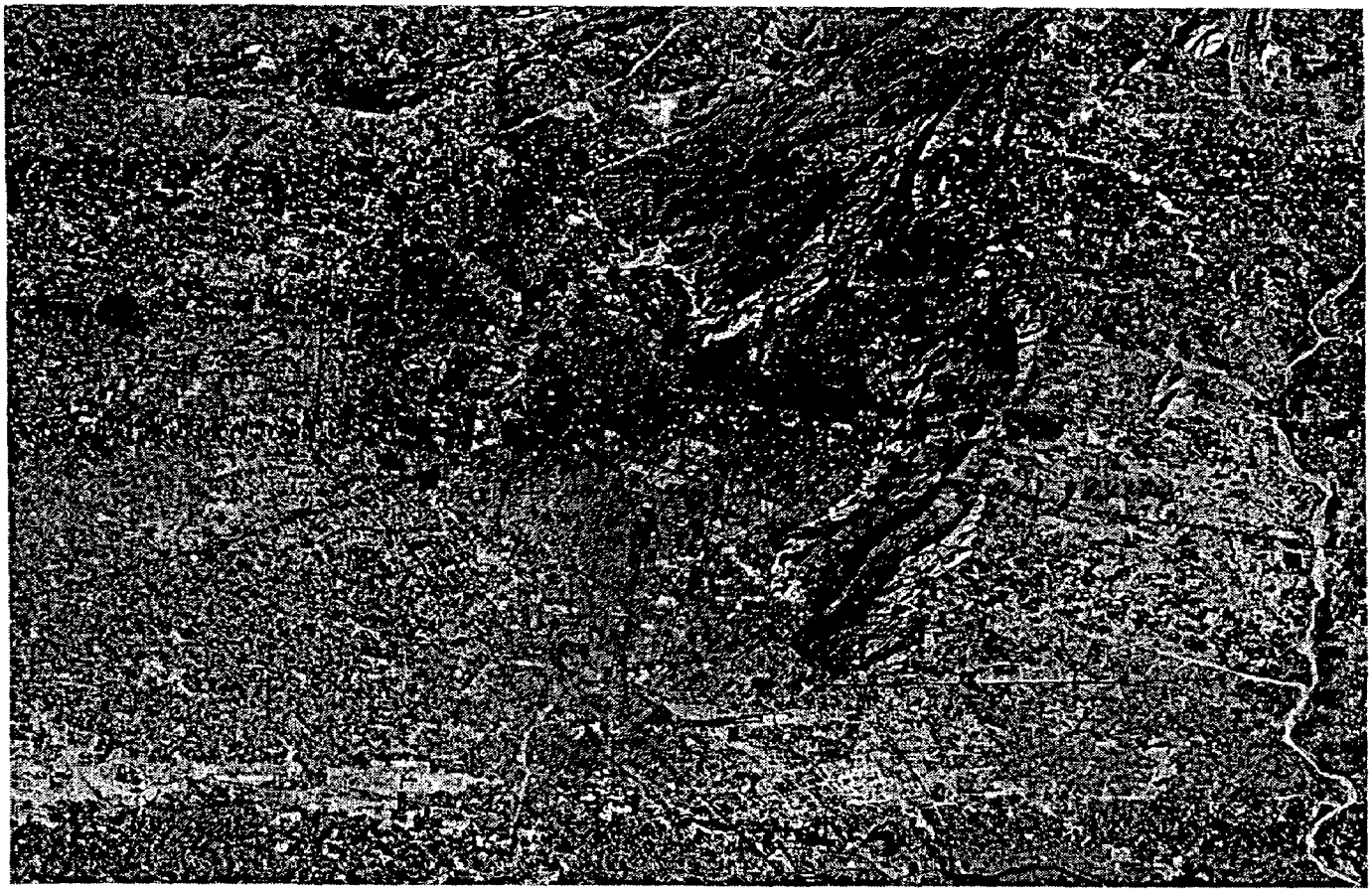
Figure 4.4: Spatial distribution of workforce, Jaipur

4.8 PHYSICAL PROFILE

A major part of Jaipur Region is covered with thick mantle of soil, wind-blown sand and alluvium. The eastern and the northern parts are formed of hill-ranges.

Three major hill ranges belonging to Aravalli system exist in Jaipur (**Map 4.10**). These are

known by



Map 4.10: Satellite Image of Jaipur city

different names such as (1) Torawati hills, situated west of Sabi and Banganga rivers (2) Range starting from Sambher Lake, and crossing over to Singhana in Jhunjhunu district (3) Puranaghat, Nahargarh, Jhalana and Amagarh hills.

The Region is drained by a number of seasonal rivers, of which Banganga, Dhundh and Bandi are prominent. Banganga has been impounded near Jamwa Ramgarh by Ramgarh dam. A study of Regional slopes indicate that Amani Shah Nala towards the west and the south of the city area forms a major drainage system which flows to meet Dhundh river towards the south-east of Jaipur city. The Region towards the north-west has various local nala slopes which join together to form Bandi river situated further down towards the south west of the city. The northern area converges through local nala slopes to form Banganga River which flows towards the east. Bandi river has two major reservoir basins known as Kalakh Sagar towards the west of Jaipur Region and Hingoniya Sagar towards the south-west.

The land area of the Region as per use are:

1. Agricultural Land	88529 Ha.
2. Waste Lands	21770 Ha.
3. Forest	14052 Ha.
4. Others	22049 Ha.
Total	146400 Ha.

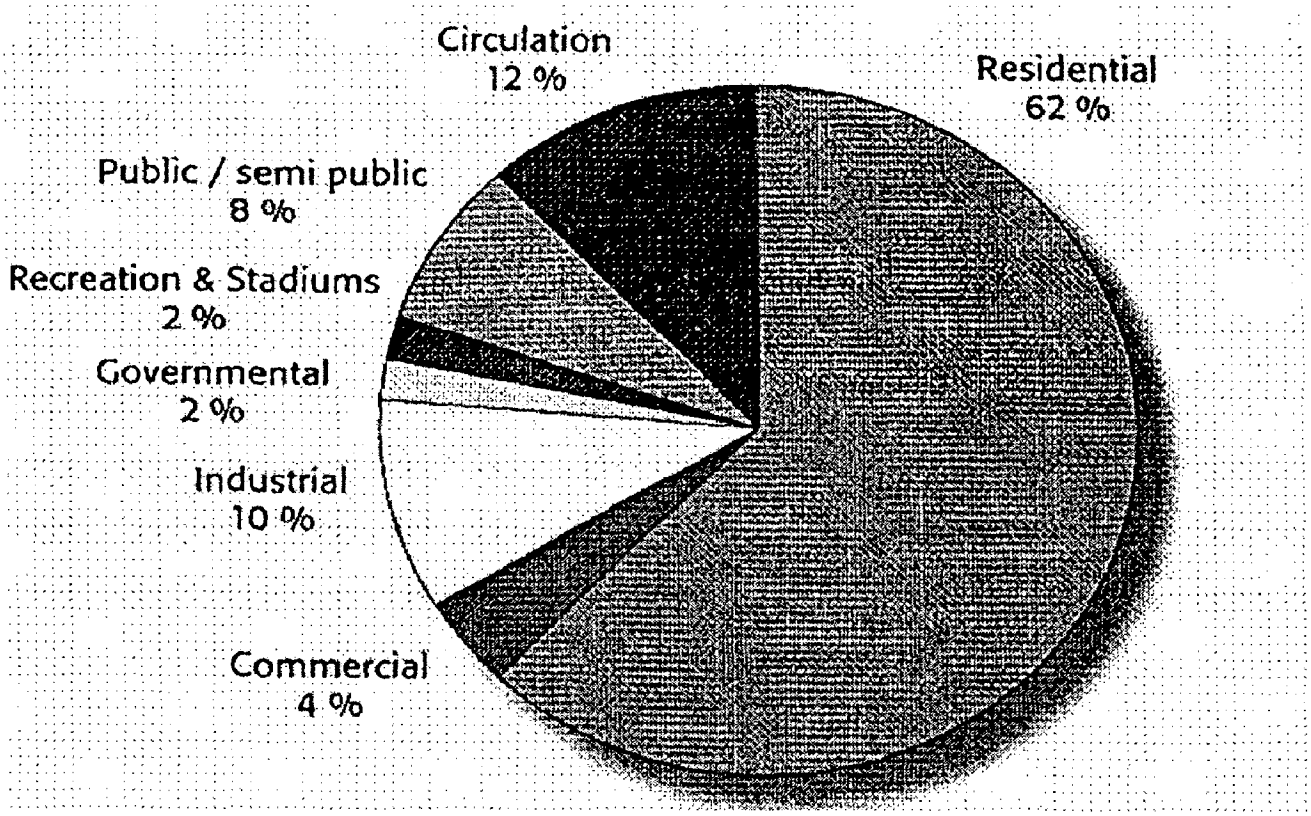


Figure 4.5: Existing Land –Use of Jaipur City.

4.9 CLIMATE PROFILE

Table 4.3: Climatic Data of Jaipur City.

Climate	Mean Max.	Mean Min.
Summer	45.0 degree C	25.8 degree C
Winter	22.0 degree C	8.3 degree C
Altitude	431 meters	

Jaipur Region falls under the semi arid Region of climatic zones. The average annual rainfall is 62 cm and predominant wind direction is from North West and West.

4.10 ENVIRONMENTAL PROFILE

Jaipur Region has experienced an emergence of environmental crisis in terms of depletion of water, forests, soil erosion, flora and fauna and climatologically changes.

The whole area towards the east has experienced substantial deforestation. This has further deteriorated due to mining operations for building stones. At regional level the upper Banganga valley is slowly turning into a deforested patch. Devastation of tree and soil cover has turned hilly areas to rocky exposures. Silting of Ramgarh dam and the upper river channels of Banganga has been the result of wide spread deforestation in the upper river basin. The waste land areas are continuously increasing and degrading the environment.

Salination process is generating saline wastelands at the district level in general. These areas are mostly concentrated around Sambher Salt Lake and along river channels in the western, southern and eastern parts of the district. Saliniation is prominent in the area towards the west and the south-west of Jaipur Region. Few chunks of waste. lands with or without scrub can be seen in the areas towards west of Achrol and also towards east of Jaipur.

Jaipur district has also recorded increase in sandy wasteland due to strong dust storms and drifting of sand from the gap in areas located on the western boundary of the district on Aravalli hill range. A large concentration of sand features can be observed across the gaps in the district stretching right up to Jhalana- Dungri area of Jaipur.

Wide spread deforestation, mainly on hilly areas, has resulted in increase in the rate of soil erosion due to combined impact of wind and water erosion. Higher rate of soil erosion has accelerated the process of silting in the river channels and water reservoirs. It has further disturbed the natural habitat of wild life and other biotic processes in the area.

The resultant impact of the deforestation, erosion, siltation, salination processes has created environmental changes in the eco-system and their sub-systems. This is affecting the recharge of ground water, resulting in lowering of the water table every year. It has also affected the micro climate of the region in terms of temperature and humidity.

4.11 URBAN INFRASTRUCTURE

4.11.1 WATER SUPPLY

Water supply for Jaipur city as per the existing scenario is catered to by underground sources as well as surface sources. Ramgarh reservoir meets only about 30% of the total requirement and the rest is fed by the network of tube wells spread allover the city. In some of the cooperative societies and unauthorized colonies people have their own arrangements in the form of tube wells for water supply to the local needs. As there are no major dams or other surface sources in the nearby vicinity it is likely that dependence on ground water will continue inspite of low recharge.

The major rivers passing through the Jaipur district are Banas and Banganga. The ground water resources to the extent of about 28.65 million cubic meter are available in the district.

4.11.2 ELECTRICITY

The Region is well serviced with uniformly distributed network of electricity feeder and service lines for the present requirements. Connection with the National grid ensures the level of supply as per the priorities of supply at National level. Jaipur district is receiving the hydro-electric power, supplied by the Chambal Hydel System. Out of total 2,131 villages in the district, 2,131 were electrified as on March 2000.

The converging pattern of High Tension lines to Hirapura Grid Sub Station in Jaipur has engulfed a sizable chunk of urbanisable land under their electromagnetic fields.

4.11.3 ENERGY

Rajasthan has various sources of energy. R S R E Board regulates the management of energy supply in the State.

4.11.4 COMMUNICATION

The Region has a fairly developed communication system. Bagru Town is connected to main Jaipur local system of telephones while other satellite towns have trunk dialing facility.

Table 4.4: Total No. of Communication system in Jaipur City

(Nos)	
Post offices	599
Telegraph offices	143
Telecom centres	9
PCOs	859
Telephone exchanges	150

4.11.5 TRANSPORTATION

Besides the major linkages as enumerated under 'Linkages' the Region is serviced by a network of village roads giving access to the entire Region within an accessibility limit of approx 4 Kms from a black top rural road. The rural settlements otherwise are well linked with jeepable tracks.

4.11.5.1Road Transport

Jaipur city is the capital of the state and is centrally located. The National Highway No.8 links Delhi to Ahmedabad and No.11, linking Bikaner to Agra passes through Jaipur district to a total length of 366 kms. The total length of different types of roads in the district was about 4,102 kms as of March 2000.

4.11.5.2 Rail Transport

Jaipur district is connected with meter gauge rail route with Sri Ganganagar, Ajmer, Udaipur and Sirohi. Jaipur is also connected with major centres of neighbouring states such as Agra (Uttar Pradesh), Ahmedabad (Gujarat) and Delhi. Recently, Jaipur has got connected in broad gauge, enabling direct connections to cities like Sawai Madhopur, Kota, Jodhpur, Bikaner, Bombay, Howrah, Lucknow, Kanpur & Delhi.

4.11.5.3 Air Transport

Jaipur is connected by air with Jodhpur, Udaipur, Aurangabad, Delhi, Bombay and outside the country with Paris, London & Dublin.

4.11.6 SEWERAGE & DRAINAGE

The sewerage disposal system in the Region varies from open disposal to sewer lines and sewerage treatment plant for a part of Jaipur. The satellite towns have no sewerage system and the method of disposal is through raw disposal in pits, septic tanks and soak pits, besides

open disposal. Jaipur city has sewerage system limited to walled city, RHB colonies and some colonies.

Most of the areas resort to direct disposal to pits (Kul) many of which are even taken up to sub soil water level. Limited use of septic tanks and soak pits is also in use. The system of disposal is of an alarming magnitude in terms of pollution threat to ground water and increasing incidence of water born diseases. Waste water drainage is by way of open and covered drains left untreated. Storm water drainage again is through open nallahas some of which are lined. However, these are insufficient in terms of quick disposal of rain water.

In case of Jaipur, the sewerage system is available in walled city and housing colonies developed by Housing Board and some colonies only. Over 400 approved Housing Cooperative Colonies, about, 175 Kachi Basties, old colonies and several unauthorized colonies in the city do not have provisions of sewer line. Most of the colonies developed at the time of U.I.T. were not provided with sewerage system. Only about one third of the total population is catered by the existing sewerage system in the city and rest depends on septic tank or pit system. A very large percentage of population is still using open fields for defecation, especially kachi basti dwellers, who constitute about one third of the total population.

In the development of a city the disposal and treatment system of human excreta is a subject of major concern. An improper care in this aspect creates breeding grounds for mosquitoes resulting in various types of epidemic diseases.

4.11.7 SOLID WASTE MANAGEMENT SYSTEM

Solid waste Management of Municipal Corpn. Jaipur, is based on three tier System. The female sweepers sweep the garbage & sand etc. & accumulate it in small heaps. The city is divided into 2,800 parts for this stage of work. In each part, one female sweeper is engaged to sweep the road etc. and accumulate the garbage. The male sweeper cleans the drains and accumulates the garbage in small heaps. For drain cleaning the city is divided into 1200 parts, known as beats.

After sweeping of roads by female sweepers and cleaning of drains by male sweepers the heaps are removed through hand carts by male sweepers. For this stage of work, the city is divided into 1500 beats 1 with prescribed place for collection depot.

From the 1500 collection depots, where the garbage is collected, the garbage is then lifted and transported to the dumping grounds.

At present Jaipur Municipal Corp. is dumping the entire solid waste of Jaipur City near Jagatpura andin Amanishah Nalha in Vidyadhar Nagar zone.

Since the moisture content in the waste of Jaipur City is quite high, the possibilities of Power generation are remote. NEERI in 1975 has reported that the moisture in the waste of Jaipur City varied between 40% to 45% and their study showed that such wastes having high moisture content waste are unsuitable for energy generation.

So far there has been no legislation setting standards for collection or disposal of solid wastes. Public health laws have sometimes been used against garbage dumps with problem of rodents or flies. Guidelines of Airport Authorities are also a determining factor in selection of solid waste disposal sites.

The major cost of solid waste disposal is in the collection and transportation of the wastes; by comparison the cost of disposal is a lesser factor. Good disposal methods that do not threaten public health or aesthetic sensibilities are unlikely to increase costs very significantly.

There is still a practice of reclaiming non-destructible components of garbage for recycling, in India and Jaipur being no exception. In fact, recoverable garbage contributes to employment and manufacture, mainly because of the intrinsic value of the junk. The residual organic matter is easily bio-degradable, provided it is collected and transported to treatment centres. Organic waste is amenable both to trenching and to mechanical composting. The least economic use of garbage is land filling, which is resorted to in increasing measure by most of the large cities. This practice will have its own limitations beyond a certain period. Innovative and research oriented solutions will have to be resorted to for a solution on continuous basis.

4.11.8 EDUCATIONAL FACILITIES/INSTITUTIONS PROFILE

Table 4.5: Total No. of Educational Institute in Jaipur

(Nos)	
Universities	1
Colleges	45
Agricultural colleges	2
Engineering colleges	1
Polytechnical colleges	2
Medical colleges	1
Secondary & higher secondary schools	554
Higher primary schools	1,460
Primary schools	2,905
ITIs	6
Agricultural research centre	2

4.11.9 INDUSTRIAL PROFILE

- No. of large & medium scale running units: 48
- No. of small scale units: 19,544
- No. of industrial areas: 19

  Bagru, Bassi, Bais Godam, Bindyaka, Dudu, Hirawala, Jetpura, Jhotwara, Kaladera, Kanakpura, Kartarpura, Malviya Nagar, Phulera, Renwal, Sanganeer, Shahpura, Sitapura, Sudarshanpur and Vishwakarma.

- Main Industrial Products

  Acetylene gas, ACSR conductors, ball bearings, bottling of LPG, ceramics, pottery, cold roll strips, common salt, corrugated boxes, deoiled cakes, durries, dyeing and printing, edible oil, electronic items, engraving on brass items, ferrous and non-ferrous castings, gems and Jewellery, general engineering and manufacturing, granite slabs and tiles, hand made paper, handicraft items, halogen auto bulbs, hawai chappals, household electrical appliances, HT steel strips, iodized salt, lamps, laminated springs for railways, marble statues, marble tiles & slabs, moulded plastic components for electronics, perfumes, pigment colors, plastic containers, P.P. multifilament yarn, PVC cables, PVC doors, PVC footwear, canvas shoes, nitro chloro benzene, oxygen gas, port land cement, readymade garments, re-roller products, steel furniture, steel ingots, stone grits, synthetic leather, synthetic suiting &

shirtings, tablets and capsules, two way radio and line, washing so ap, wheat maida, suji, atta, woolen carpet, re fined vegetable oil and vanaspati ghee.

- Export items

  Brass and lacquer work, enamel work, gems and jewellery, granite tiles, handloom, marble statues, printed cloth and textiles, readymade garments and woollen carpets.

4.12 ADMINISTRATION PROFILE

After the formation of new Dausa district, there are 13 tehsils and the same number of Panchayat Samities. The total number of towns are 14.

4.13 TOURISM PROFILE

Rajasthan State attracts nearly one third of the total foreign tourists visiting India. In Rajasthan, Jaipur has its own attraction and forms one apex of the Golden tourism triangle of Delhi, Agra and Jaipur. Besides this, Jaipur functions as a gateway to other tourist destinations of the State which also get a large volume of tourist traffic.

Jaipur has attracted tourists both foreign as well as Indian for its city planning, urban design, historical monuments, array of natural features supplemented by forests, Temples and Palace complexes.

The international image of Jaipur City can effectively be further developed and strengthened to provide a strong environment friendly economic base to the region through tourism.

4.14 URBAN SPRAWL AND SETTLEMENT PATTERN

In the Jaipur Region, the urban sprawl of Jaipur city has registered the fastest growth and most of the increase besides ribbon development has been along the highway corridors.

The satellite towns and rural settlements have not enlarged much in physical terms. The various transportation nodes in between Jaipur city and satellite towns indicate potential of emergence as important nodes for economic activities.

Sectoral investment at various locations in the region specially development of Industrial Areas by RIICO without providing the rest of the urban infrastructural facilities which are

otherwise essential and incidental to principal activity have resulted in haphazard growth of these activities around the industrial estates developed by RIICO.

4.15.1 URBAN AREA

The population of urban agglomeration in 1981 was 1 0.151acs and 15.181acs in 1991.

Participation ratio in Jaipur was 26.87% as against 20.9% in Rajasthan (urban). The total land envelope of 38,400 acres for population of 12.54 lacs. Out of this, the assigned developed area was 33,500 acres. This was expected to accommodate different urban activities.

The developed area in the city in 1991 was only 25,270 acres and it accommodated a population of 15.18 lacs. This is a clear indicator of growth of the city accommodating itself in lesser quantum of land and consequently the city has grown at a density higher.

As per data's Urban Land parcels under different uses per 1000 population reveals that the scenario of quality of urban spaces has not changed from the level which existed in 1971. In fact, it has deteriorated in certain spheres.

The entire urbanizable area was contained in the 8 Planning District, for detailed planning. Each of these districts were envisaged to be more or less self contained in the matter of employment, habitation and recreation. A Peripheral Control Belt was considered as 9th Planning District. Four out of eight districts encompassed more or less the existing urbanized area of 1971. 25,000 acres of area earmarked for development was placed in four districts.

The situation as it exists today is that these specified districts have no distinct identity. They have also not developed as self-contained communities.

4.16.1 SOCIO-ECONOMIC PROFILE

The economic profile predominantly is Trade and Commerce, Tourism and Tertiary sector for the urban area and Agriculture for the rural areas. These activities have grown in size and output, without indicating a noticeable change in participation ratio and percentage of workforce.

The result of liberalized economic policy and uniguage system of Indian Railways has not yet shown its impact in terms of increase in the pace of Industrial Development.

The only noticeable change relevant to spatial planning during the last decade has been the investments by the urbanites in agricultural lands in the rural areas and in the fringes of urban areas.

4.16.2 ECONOMIC GROWTH

4.16.2.1 INDUSTRIAL

The city of Jaipur has experienced a growth in industries, especially, in the two decades between 1961-81. During a span of five years from 1986-91, the number of small scale industries has increased by, almost 50%. Presently there are about 5000 registered small scale industries in Jaipur city alone. The employment under large & medium scale and small scale industries is about 10,000 and 27,000 respectively thereby accounting for almost 9% of the total workforce. Household industries manufacturing goods on household basis such as stone cutting and polishing, 'lakh' work, gota, sculptures etc. have always played an important role not only in providing employment and growth of economy but also in maintaining the traditional art and culture of the city. Besides registered small scale units and household industries. Large number of unregistered small scale units is in operation in Jaipur city employing almost two times the workforce engaged in registered units.

The walled city of Jaipur has an industrial workforce of 51,841 (46.42%) as against 54,323 (48.65%) in the city area outside the walled city. Sanganer and Amer have an industrial workforce of 5,508 (4.93%). The share of population in the walled city is just 32.67%. This indicates the high degree of concentration of small scale and household industries in the walled city of Jaipur.

It has also been observed that in household industries, the participation of female workers is 11.22% and in other industries it is just about 3.63% which highlights that most of the female workers are engaged in household industries.

4.16.2.2 WHOLE SALE TRADE

As per the 1991 census the services under the administration forms the basic sector of economy with about 31.8% of the total workers and other sectors such as trade and commerce, transport & communication, manufacturing, construction agriculture etc. together accounts for 68.2% of the total workforce out of which trade and commerce forms the highest share having workforce of 102,521

Total workforce in trade and commerce is 102,521 as against 70,000 proposed for 1991, which is 23.97% of the total workforce of 4,27,772 workers. This indicates that there has been increase in workforce in the sector which is due to growth of informal sector and small shops.

The percentage share of workforce in trade and commerce has been increasing in every decade. The total workforce in trade and commerce has been increasing from 19,349 (16.49%) in 1961, to 32,581 (19.70%) in 1971 and to 1,02,521 (23.98%) in 1991. The increasing growth rate also indicates a tendency of further increase of commercial activities in the city.

The proportion of female workforce is meagre. Out of total workforce of 427722, 390819 (91.4%) are males and rest 36,903 (8.6%) are females.

On an average 3,500 new shops and commercial establishments are set up every year in Jaipur city alone and it is estimated that more than 75,000 people work in the existing 45,000 shops and commercial establishments in the city. The major portion of the workforce is employed in the walled city area which consists of important commercial work centres like Johari Bazar, Chaura Aasta, Kishanpole Bazar, Tripolia Bazar, Indira Bazar, Bapu Bazar, Sanjay Market etc.

Surveys reveal that there are approximately 2500 wholesale traders in Jaipur city. The wholesale. traders of wood products and textiles are maximum in number i.e. 500 (9.0%) and 300 (5.33%) respectively. The food product traders are scattered throughout the city except for those dealing in food grains and fruits. The wholesale market dealing in textiles is located in Purohit Ji ka Katla inside the walled city.

Trade and commerce is being mainly conducted from inside the densely populated Walled city part of Jaipur. The goods are first transported into the walled city area, from where they are again distributed to various parts of the city which aggravates the traffic and transportation problems in the congested streets of the walled city. The emergence of informal sector activities in the adjoining areas of the wholesale, markets along the road corridors have further aggravated transportation problems.

The total employment in wholesale trade is about 12,000 which is 11.7% of total work force of trade and commerce (102521). It indicates an average of 4.5 workers per wholesale trade

unit. Maximum workforce (25.6%) is engaged in wholesale trade of food products. The building material trade is having the highest number of workforce per unit (6.71 workers/unit).

74% of wholesale traders are located in market areas or shopping complexes and 19% are located in residential areas indicating that several residential buildings are either fully or partially being used for running wholesale trades.

The analysis of surveys has also revealed that 53.5% of wholesale traders are willing to expand their business and need additional space of different sizes.

4.16.2.3 INFORMAL SECTOR

The informal sector activities have attained the status of being a part and parcel of all the sectors of economy including Trade and Commerce, Industry, Agriculture, Construction and Transportation.

The informal sector absorbs nearly 36% of the total migrant population of about 27%. This clearly indicates that the share of migrant population in informal sector is substantially large. Nearly 94% of the persons engaged in the informal sector have migrated to Jaipur for employment. The general economic profile of informal sector workforce is. very poor. Nearly three-fourth of the workers are living in accommodation having one or two rooms only. Nearly 63% of the activities in this sector have come up in the last ten years only which is indicative of this sector as a fast emerging and enlarging economic activity.

Nearly 80% of the activities in this sector are being conducted along the roads. The urban space occupied by these activities is mainly on the lands meant for traffic and transportation purposes. This is generating undue stress on the network, creating problems of pedestrian movement and is a serious traffic hazard. Nearly 47% of these people walk to their place of work, about 20% use cycles and rest use public modes of transport. This is indicative of a very low percentage of dependency of informal sector workforce on the transportation system.

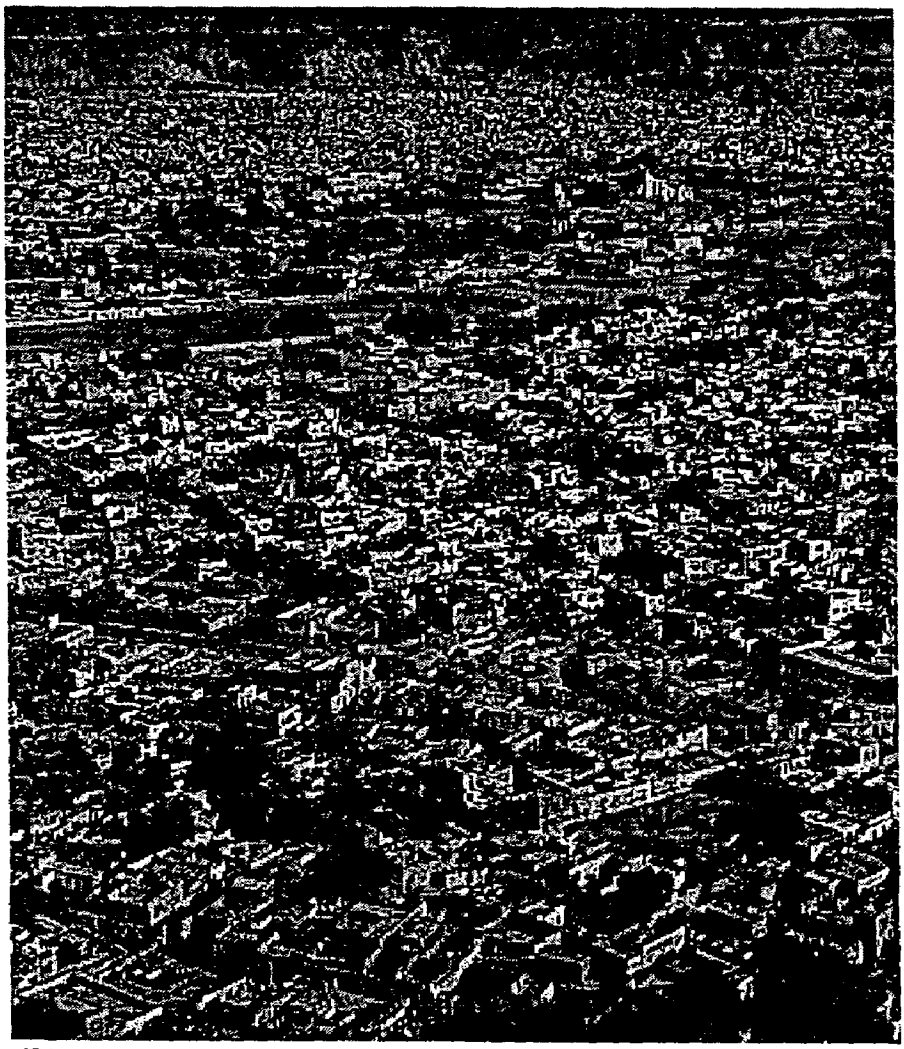
The location of emergence and consolidation of informal activities has a strong inter relationship with the location of wholesale markets, places of recreation and tourist interest work places, educational institutions and traffic nodes.

It has been estimated that the total work force in Jaipur city in the informal sector is about 1.45 lakh which is approximately 33.96% of the total workforce of Jaipur city. This indicates that informal sector is sector which warrants immediate attention to be recognized as a major participant in economic activity.

The informal sector is playing a vital role in generating employment accelerating economic activity, augmenting distribution system, creating scope for transportation system and providing service sector in the city. The growth of informal sector in the context of urbanization in Jaipur city is dynamic and demands priority action, review and redress.

Chapter 5

MORPHOLOGY OF COMMERCIAL AREA OF WALLED CITY



Photograph 5.1: View of Walled City, Jaipur. (Dec., 2003)

Chapter 5 MORPHOLOGY OF COMMERCIAL AREA OF WALLED CITY

5.1 MARKET TRELLISED PATTERN

The study of the morphology of these original main markets and their subsequent growth and development within the Jaipur walled city leads to believe that the pattern of market has been analogous to the natural drainage pattern (**Figure 5.1**).

The drainage pattern in the simplest case is notably rectangular or rectilinear and is known as trellised pattern. The initial drainage plan consists of sub-parallel consequent streams. The gullying action of rain on the sides of growing consequent valleys initiates by head ward erosion.

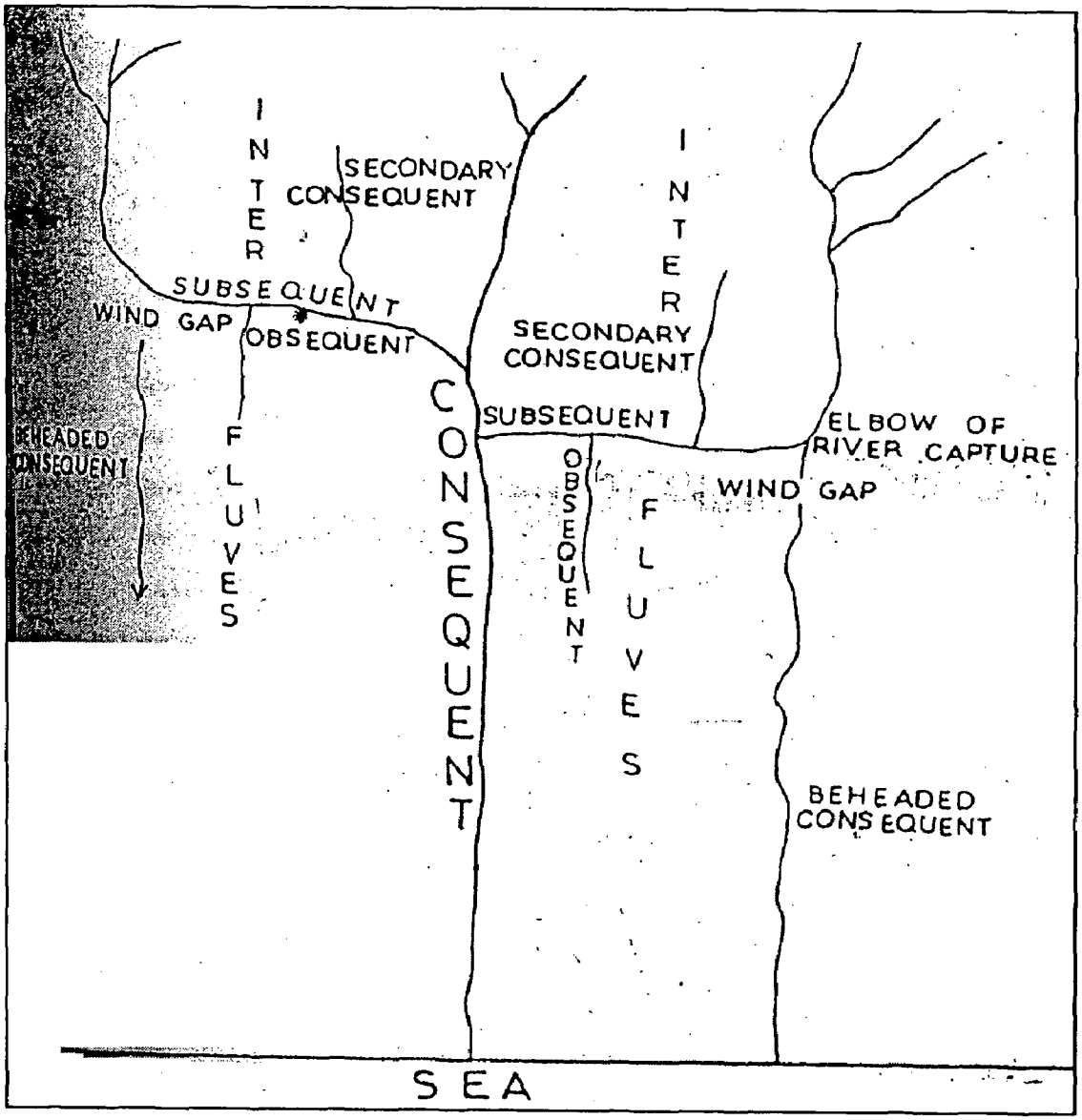
During the earlier stages a process of extension prevails, involving lengthening of the streams by head ward erosion and multiplication of tributaries. It should be noted that all the first generation of tributaries to consequent streams are subsequent in the sense that they arise subsequently to the establishment of the consequent streams. The consequent streams run on the initial surface and along the initial slope and hence the initial streams are consequent to this slope(c). The subsequent streams (S) thus trend more or less at right angles to the "consequent" direction.

Tributaries to the subsequent streams then develop, flowing from the upstanding ridges of more resistant rock; those flowing down the initial slope (i.e. seaward or parallel to the consequent) are secondary consequent(SC)streams; those flowing down the opposite slope are obsequent(O).

The tributaries have a definite relationship to structures as well as are modified by the theory of river-priacy or river capture. These structural and denudational characteristics modify the drainage pattern in such a way that the status of the main streams or their tributaries is drastically modified.

The aforesaid principles of drainage development are conveniently applied to the market development in the Jaipur walled-city. The original markets Kishanpole Bazar, Gangori Bazar, Johari Bazar and Sireh Deori Bazar were built on the original slope of the dunal crest. Hence these are called the consequent markets. These markets continued to Develop for about 200 years. When the pressure of population grew on these markets, new shops started coming up into the lanes of these markets by converting the residential premises into shop structures one by one. The corner of lane with main market became the discordant junction of the tributary market which may be called subsequent market. Its length increases inward like

head ward erosion with the increasing pressure of population and commerce in the area. These subsequent markets are further in their turn intersect with other lanes of the grid. Thus they have their own tributaries on either side of the crossings. Here the tributaries may be called secondary consequent and obsequent respectively.



***Source:** F. J. Monk House (Principals of Physical Geography)*

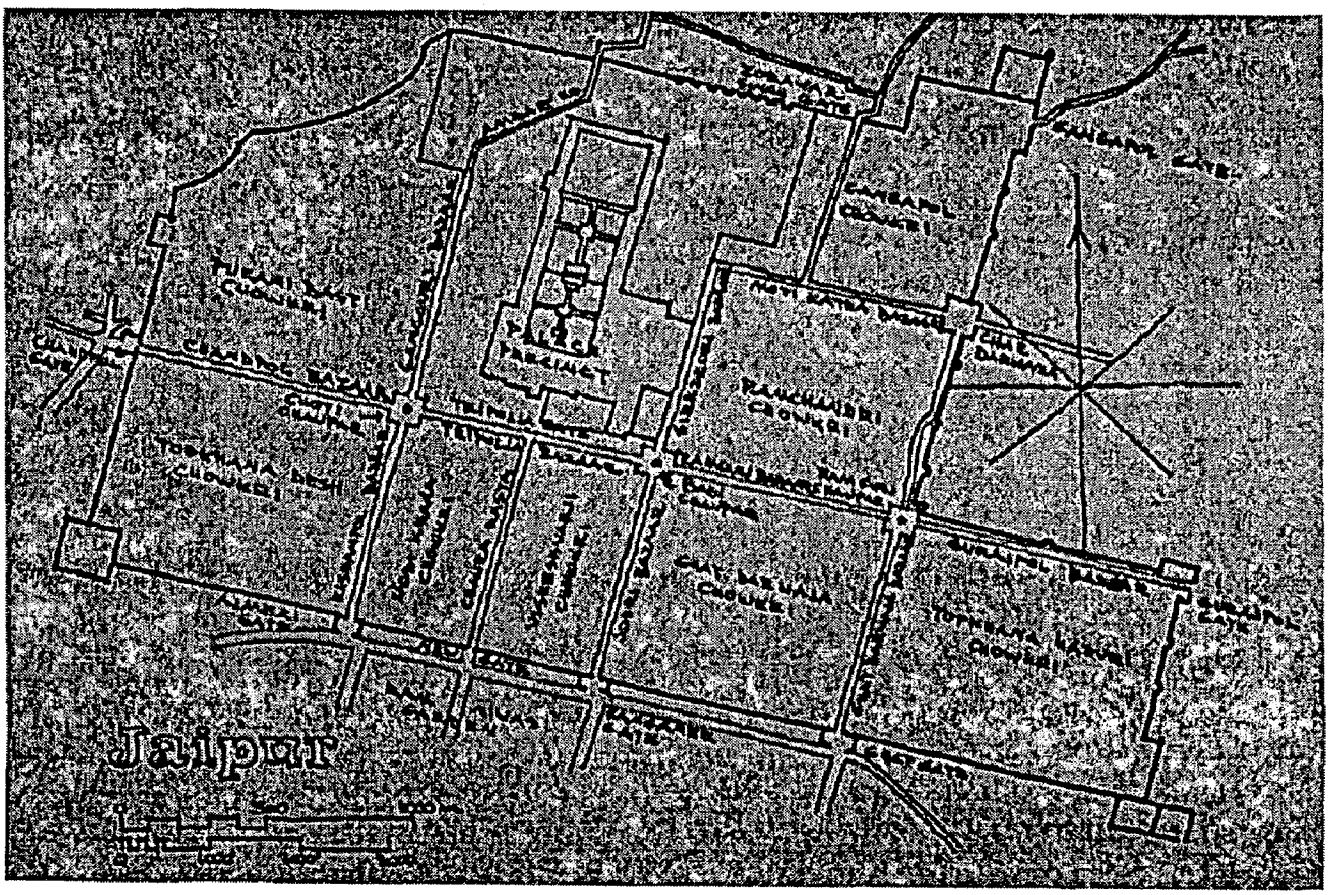
Figure 5.1: Market Trellised pattern

Taking concrete example, Johari Bazar is along the southward slope of the dunal plane and developed with the foundation of the city. The first lane to the east from Badi Chaupar is Haldion ka Rasta in which the jewelers in which started coming up one by one by the middle of the last century. This market has now reached its saturation extending up to the subsidiary

of Ghat Darwaja Bazar. The first tributaries of this market from the north and south are formed by the Maniramji ki Kothi ka Rasta and therefore may be termed as secondary consequent or obsequent market. Although this market appears to be the subsequent of the Ramganj Bazar, but the development of Maniramji ki Kothi ka Rasta (Dara Bazar) is subsequent to the Haldion ka Rasta. The shops from the side of Ramganj Bazar (which itself has developed only lately) have started developing only recently. It is in the way the analogy of the market pattern is compared with the development of drainage pattern.

5.1.1 The Consequent Markets

The north-south running four markets, Johari Bazar, Sireh Deori Bazar, Kishanpole Bazar and the Gangori Bazar are not only the consequent markets but are also the oldest markets completed by 1734. They intersect at the Chhoti and Badi Chaupars. The east-west running ridge line markets, Chandpole Bazar, Tripolia Bazar and Ramganj Bazar, also run across the two Chaupars. Other main business markets within the walled city are the Chaura Rasta (Broadway) and the Ghat Gate Bazar running south of the Ramganj Chaupar (**Map 5.1**).

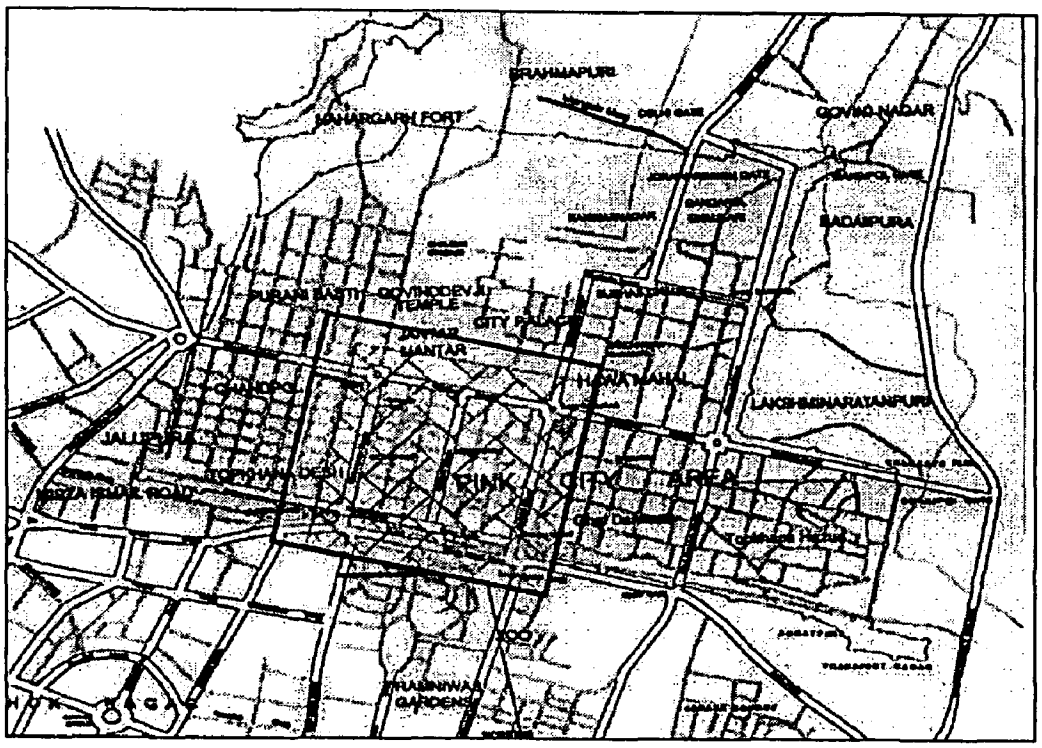


Map 5.1: Consequent Markets of walled City, Jaipur

5.1.2 The Central Business District

The Central Business District (retail heart or business core) is an important part of city commercial morphology in the western advanced countries have certain specific characteristics such as intensive land use, concentration of day time population, extended vertical scale, centre of specialized functions, focus of intra-city mass transit.

In Indian traditional cities there are no Central Business District. It is because in India, main business areas have intensive residential use also. This is equally true of the walled and extra-walled city. Both the side lanes and the upper floors of the shops are crowded residential units. If all other characteristics of CBD are applied the Central shopping district of Jaipur would comprise of the three north-south running Jaipur Bazars: Johari Bazar, Chaura Rasta and Kishanpole Bazar commencing at Sanganeri Gate, New Gate and Ajmeri Gate respectively on the south. The Tripolia Bazar between the Chhoti and Badi Chaupars extending into the Chandpole Bazar in the west is also included in the central shopping district (**Map 5.2**).



Map 5.2: Central Business District of Walled City, Jaipur

The Central Shopping district of the walled city, though more than 250 years old, does not have narrow streets as are found in many Indian towns with long history. The Central Shopping Districts of Jaipur, lack, unlike the western CBD, in multi-storied blocks that can accommodate the greatest amount of business on a restricted site. Similarly these lack in rent

values as most of the tenants are continuing in their establishments for a long time under the Rent Control Act and can not be evacuated. Simultaneously, the premium or pagri on transfer of establishments and their land values on evacuation are at their peak.

An important characteristic of the main markets that the agglomeration of business has been sprawling into the broad and narrow lanes and alleys (subsequent and obsequent markets) by pushing out residential accommodation and resulting in the daily commuting of more people over longer distances, and growing greater congestion of traffic as the main characteristic of the CBD. It has already paralyzed accessibility and rendered parking impossible. It is a dangerous sign.

The pink city has already been degraded in the core, since the Maharajas and their families have left the city Palace and started living in the palaces outside the walls. The other dignitaries and wealthier population have followed them by constructing modern beautiful bungalows in the new residential colonies farther and farther away from the city centre. This is why the city is unable to maintain itself.

5.1.3 Subsequent Markets

The saturation of the consequent markets gave birth to the subsequent markets which like head ward erosion grew into the interior of different residential areas of the different Chowkries. The width of the consequent markets like the main streams is 110' while that of the subsequent markets is 55' and are called rastas meaning ways. These rastas meet the main markets at right angles, these are classified as originating from the consequent markets and leading into the respective Chowkries (**Table 5.1**).

The terminology of markets on the analogy of drainage Pattern in on the walled city the would however depend forces and direction working in their growth. In some cases a secondary consequent or obsequent market may be growing head wards and then meeting some subsequent market from the opposite side as all the secondary tertiary and Streets intersect at right angles. In this respect Maniramji ki Kothi ka Rasta and Thakur Pachewar ka Rasta may be termed as secondary consequent and partly obsequent markets.

Table 5.1: Subsequent markets originating from main markets of Walled city, Jaipur.

A.	**Rastas Originating from Kishanpole Bazar**	
	Western Side (Chowkari Topkhana Desh)	**Eastern Side** (Chowkari Modikhana)
1.	Jhalanion ka Rasta	Godhon ka Rasta
2.	Tikkarmal ka Rasta	Bordi ka_Rasta
3.	Sonkion ka Rasta	Godikon ka Rasta
4.	Khunteton ka Rasta	Acharyon ka Rasta
5.	Akaron ka Rasta	Ajab Ghar ka Rasta
6.	Tikkiwalon ka Rasta	Sanghon ka Rasta
7.		Diwan Shivlalji ka Rasta
B.	**Rastas Originating from Gangori Bazar**	
	Western Side (Chowkari Purani Basti)	**Eastern Side**
1.	Bordi ke Kunwe ka Rasta	Occupied by the City Place Complex
2.	Nagar Pande ka Rasta	
3.	Raja Shivdasji ka Rasta	
4.	Langar ke Balaji ka Rasta	
C.	**Rastas Originating from Johari Bazar**	
	Western Side (Chowkari Vishweshwarji)	**Eastern Side**(Chowkari Ghat Gate)
1.	Gopalji ka Rasta	Haldion ka Rasta
2.	Sonthliwalon ka Rasta	Gheewalon ka Rasta
3.	Partanion ka Rasta	Motisingh Bhomio ka Rasta
4.	Ramlalaji ka Rasta(Telipara ka Rasta)	Kundigar Bhairon ka Rasta
D.	**Rastas Originating from Sireh Deori Bazar**	
	Western Side	**Eastern Side**
1.	Occupied by the City Palace Complex	Khawasji ka Rasta
E.	**Rastas Originating from the Chandpole Bazar**	
	Southern Side (Chowkri Topkhana Desh)	**Northern Side** (Chowkri purani Basti)

1.	Topkhana ka Rasta	Balanandji ka Rasta
2.	Nidar Rao ka Rasta	Uniara Raoji ka Rasta
3.	Kalyanji ka Rasta	Bagru ke Thakur ka Rasta
4.	Bhindo ka Rasta	Jat ke Kunwe ka Rasta
5.	Khazanewalon ka Rasta	Jailal Munshi ka Rasta
6.	Khejron ka Rasta	Govind Rajion ka Rasta
7.	Tahvildaron ka Rasta	Nahargarh ka Rasta
8.	Mishra Rajaji ka Rasta	Daroga Balabaksh ka Rasta (Dinanathji ki Gali)
F.	**Rastas Originating from Tripolia Bazar**	
	Southern Side(Chowkri Modi Khana)	**Northern Side**
1.	Maniharon ka Rasta	Occupied by the City Palace Complex
2.	Natanion ka Rasta	
	(Chowkri Vishweshwarji)	
	Vidyadhar ka Rasta	
	Hanumanji ka Rasta	
G.	**Rastas Originating from the Ramganj Bazar**	
	Southern Side(Chowkri Ghat Gate)	**Northern Side**(Chowkri Ramchandraji)
1.	Maniramji ki Kothi ka Rasta (Dara Bazar)	Dhabhaiji ka Rasta
2.	Thakur Pachewar ka Rasta	Kanwation ka Khurra
3.		Phuta Khurra
4.		Ghoda Nikas Road (Maharshi Dayanand Marg, North of Ramganj Chaupar)
H.	**Other Consequent Markets within the Walled City**	
1.	Ghat Gate Bazar (Southward from Ramganj Chaupar)	
2.	Surajpole Bazar (Eastward from Ramganj Chaupar)	
3.	Moti Katla Bazar (Between Ramchandraji and Gangapol Chowkries)	

5.1.4 Other Types Of Markets In Jaipur City

5.1.4.1 Katlas

In many Indian cities there are some small areas of profuse marketing and business activities. Herein both the wholesale and retail business goes on throughout the day. These are sometimes located away from the main business markets, and congested shopping area in an enclosure and sometimes within so-called CBD and characterized narrow lanes. These are named differently in different cities. In the Jaipur walled city these are specially called "Katlas" and "mandis".

Purohitji ka Katla is located in the south-west corner of the Badi Chaupar, part of it carries business in general merchandise and part in textiles (**Photograph 5.2**). Main entrance to these gates is through the Khanda of the Chaupar.

Photograph 5.2: View of Purohit ji ka katla at Badi Chaupar(Dec. ,2003)

Photograph 5.3: View of Mandi at Johari Bazar, Walled City, Jaipur (Dec., 2003)

5.1.4.2 Mandis

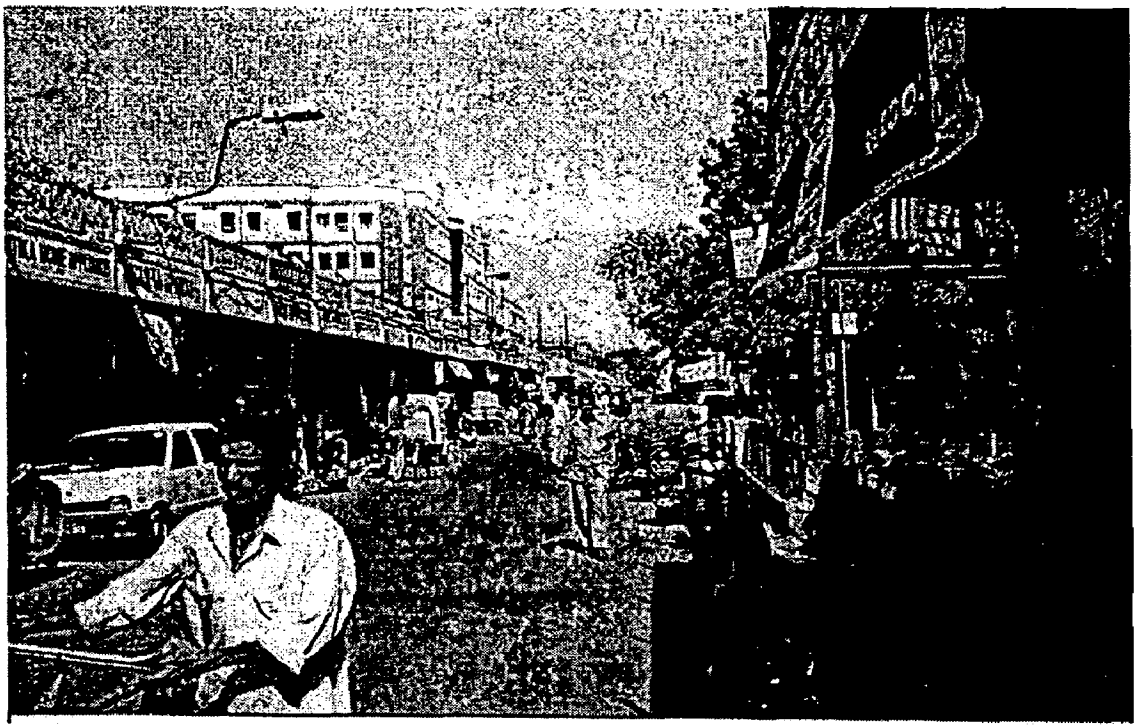
Mandis refer to a market place in a city and generally carry business in some specific commodity. Such mandis are found both within and outside the walled city. Within the walled city on the entrance into Johari Bazar from Sanganeri Gate there was a fruit mandi on the left and a grain mandi on the right side of the Johari Bazar(**Photograph 5.3**). To the north and adjacent to the grain mandi, there was the Rooi ki Mandi for cotton. On the entrance from the Ajmeri Gate there was the Namak ki Mandi for salt in the Kishanpole Bazar. But all these mandis have been shifted outside the walled city.

The vegetable and fruit mandis are now located on the Tonk Road behind Laxmi Mandir. A grain mandi is located outside each of the Chandpole Gate and the Surajpole. All these are well-planned and spacious.

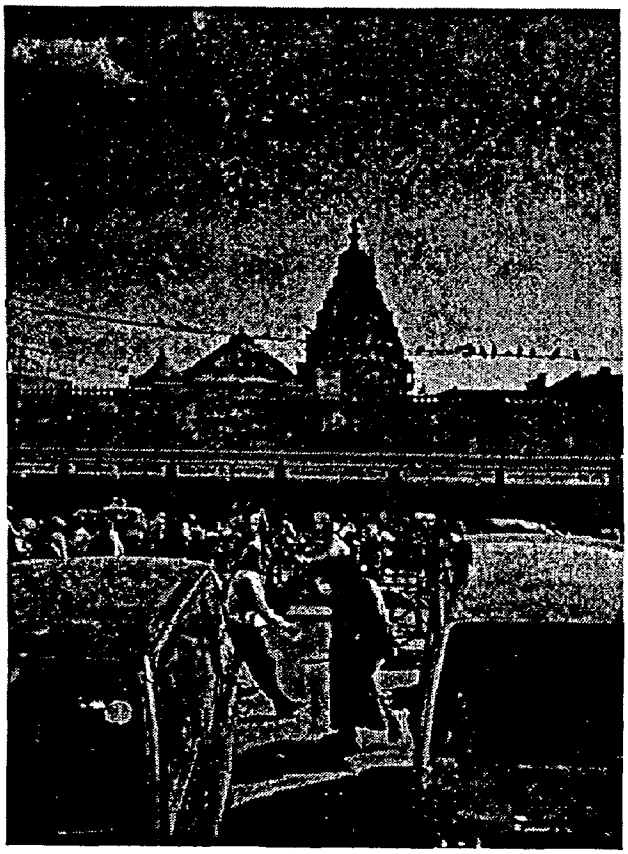
5.1.4.3 Markets Developed for Rehabilitating Purposes

During the post-Independence period some markets were developed both within the walled city and the extra-walled city for the rehabilitation of displaced persons from West Pakistan. Among these Bapu Bazar, Nehru Bazar, Indira Bazar, and sanjay Bazar are all located along the southern wall of the city(**Photograph 5.4**). These have developed of subsequent to the main markets Chaura Rasta, Kishanpole Bazar and Johari Bazar respectively.

The footpaths of Tripolia, Chandpole and the Ramganj Bazars were occupied by "tharies" (the wooden stalls) of the displaced persons. These were not only spoiling the beauty of the main markets facade, but also increasing the traffic congestion in the streets.



Photograph 5.4: View of Indira Bazar which is developed for Rehabilitating Purposes (Dec., 2003)



Photograph 5.5: View of Tripolia Bazar showing Religious Places Developing in Shopping Sites
(Dec., 2003)

5.1.4.4 Religious Places Developing Shopping Sites

In the same way the outer premises on the ground floors of some of the religious and public buildings have been developing for shops for extra income from rents to be utilized for the maintenance and development of the institutions. This kind of development has been a tradition in all Indian cities and Jaipur is no exception to this **(Photograph 5.5)**.

5.1.4.5 Isolated Shops

In Jaipur every residential area has some convenient shops of daily needs in scattered form.

5.1.4.6 Periodic Markets

Periodic markets are still a characteristic feature of cities in India. In Jaipur city a weekly market of general merchandise and another of cattle are held on Saturdays in Sanjay Market and Rawal ji ka Bandha respectively.

5.2 TYPES OF SHOPS

In India varied types of shops are found. These are enumerated as pucca, semi-pucca shops and kachcha, Tharis(stalls),Thelas (mobile and fixed), squatters (roofless), tents,peddlers, etc. These are built of varied building materials in different designs, sizes, and shapes. These deal in varied articles, with their range of prices and variety of goods and form of organisations. The quality of shops to refer the condition of the shops , its degree of modernization and the market facade, etc. However, quality of shops does not take into account the material of which the shops of different varieties are constructed. The building material is influenced by the physico-cultural environment, the economic condition of the owner.

5.2.1 Built-up of Shops

Pucca shops in Jaipur are built of stone which is quarried in the adjoining Jhalana and Nahargarh ranges of the Aravalis. Hence, the masonary look of these buildings is more magnificent and gracious than built up of bricks. In Jaipur the soil, being sandy, is not suitable for making high quality bricks. This is why Maharaja Sawai Jai Singh II built the whole walled city of stones **(Photograph 5.6)**. Even when the city expanded outside the walls the construction material continued to be the same.

In olden days lime was used as sticking material but its quality and strength was very high. It's plaster used to be lasting and shining. It was the result of mixing several ingredients and churning them laboriously. The roofs were built of stone slabs brought from Karauli, Kota and Jodhpur. The floor also used to be plastered with lime. Since Makrana mines of marble though located within ninety kilometres from Jaipur, fell in the Jodhpur State, Maharaja

Sawai Jai Singh, considered it below his dignity to ask for the supply of marble from a smaller state. This is why he did not use it even in the construction of his magnificent Chandra Mahal. Thus it is found used in a very few cases of construction.

However, in modern times lime plaster is being replaced by cement. Now the walls continue to be built of stone and lime but the roofs are built of RCC and the floors of marble chips and Kota stone etc.

The semi-pucca shops have the same built up as the pucca shops except the roofs which are built of asbestos or GI sheets with gentle slope (one-way or two-way).Such shops are found away from the main markets.

Walls of Kuchcha shops are built from sandy clay and plastered with dung. The roofs are either clay tiled or made from thatch. The floor is also made from sandy clay and plastered with dung. These are the characteristics of the slums or the rims around the residential colonies built by the Housing Board. These shops generally shift farther away from the city centre as the population grows and outer rural areas are brought under construction. These

Photograph 5.6: View of Pucca shops (permanent) at Johari Bazar, walled City, Jaipur (Dec., 2003)

types of the shops specially located along the main arteries are radiating from the city. No shops of these types in the main market of wall city. This is a very silent feature.

5.2.2 Temporary Shops

Although pucca shops exist yet the demand for establishing retail trading centres has been always on the increase, with the result that wooden tharis or wooden shift stall, mobile fixed (roofless) thelas, and squatters or shops have come into existence within the walled city.

5.2.3 Tharis

There are a considerable number of tharis in Jaipur and are found in different forms. These are actually small wooden structures with tinned roofs like a kiosk or a small stall. Sometimes these have wooden frames and tinned structures with sloping GI sheet or asbestos roofs,generally small in size 1 metre to 2.5 metre wide and 1 metre to 3 metres deep, located independently or attached to the outer corner of any pucca shop. The betal shops are particularly very small wooden structures, seen in any part of the city. **(Photograph 5.7)**

Photograph 5.7: Thari (Wooden Kiosk) at Chawgan Stadium (Dec., 2003)

In a poor country like India these type of shops are most convenient for the poor people. One important characteristic of these shops is that the shopkeeper is the owner of the wooden structure and not of the land where it is stalled. This is why these can be removed as and when required. Hundreds of such tharis were stalled all along the footpaths from Chandpole to Ramganj Chaupar and Gangori Bazar upto the early seventies. In some cases these were provided alternate sites.

5.2.4 Thela

The most common types of thela is a wodden board platform,150 cm. X 100 cm. Mounted at a height of 80 to cm. On a chasis of a bicycle wheels held tighter by iron rods and strip framing. Some thelas have small shelves on two sides for resting the plates of edibles. Many thelas form a box-mounted on a chasis. In this type of thelas one side of the box is hung a top so that when it is opened it acts as a shade. Inside the box are narrow wooden shelves. The floor of the box is used by the owner for squatting upon. But this type structure is found generally in thelas fixed at the sites wherever possible under shady trees, open land, street corners, etc. In Jaipur city one can see them throughout the city as fixed or mobile. A large number of fruits, vegetables and "chat" sellers stand on the road sides. **(Photograph 5.8)**Thus usurping the free movement of pedestrians and vehicular traffic.

Photograph 5.8: Thela at sanjay bazar,Walled City, Jaipur(Dec.,2003)

5.2.5 Squatters (Roofless Shops)

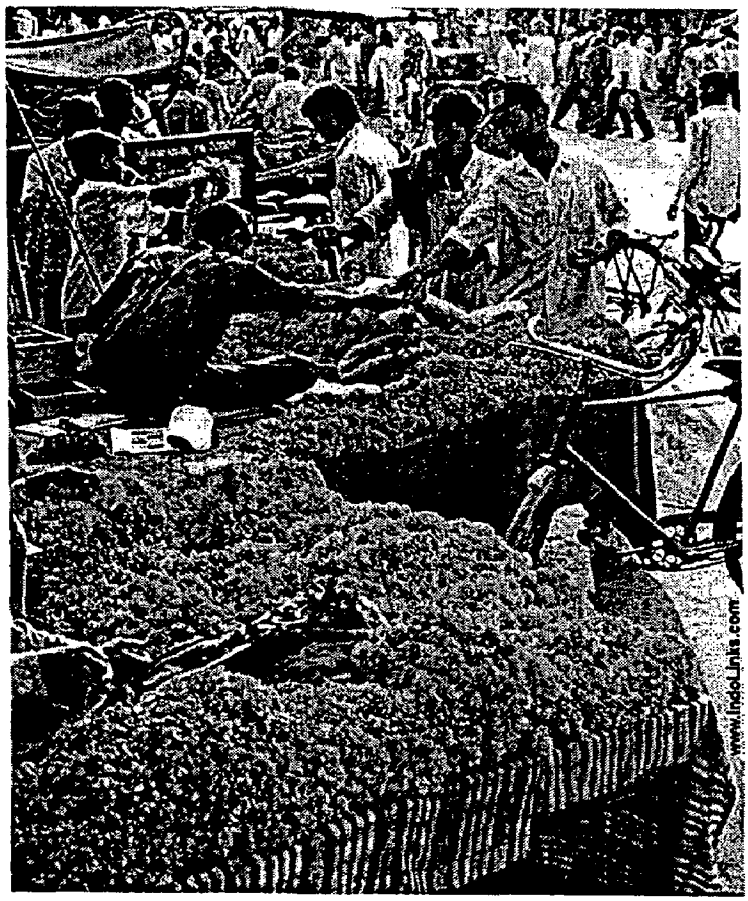
These types of shops have no permanent roots on the ground but are nevertheless permanent in character. These squatters sit for a long time on the footpaths of the main markets and create traffic hazards. **(Photograph 5.9)**

5.3 UNORGANISED MARKETS

The unorganised markets are weekly markets, the temporary structures and the Tibetan market. Weekly markets are those markets which are held regularly once in a week on a specific day, place and time. Such markets are called "hatwaras" in Rajasthan. In fact, these form a class of periodic markets which provide a necessary stimulus for the revival of local trade, their flexible organization being readily adaptable to all kinds of constraints.

Conceptually, these markets are held by stallers or squatters who squat on the ground and deal generally in low cost articles catering to the needs of poor people or at the most of middle income groups. These markets in general have acquired a rural characteristic. But, it is surprising that the weekly markets are not only held in rural areas but also in urban areas, that too allover the world.

It is equally surprising that in these markets the urban cliental is no less significant than the number of rural customers. A few high income group people also patronize these markets for one reason or the other.



Photograph 5.9: Flower Market at Badi Chaupar, Walled City, Jaipur (Dec., 2003)

Jaipur is no exceptions to the weekly markets as there are two such markets in the city; one is for general articles and the other for cattle (cows and buffaloes). The former appears to be as old as the city itself, but it has been changing its location from time to time. It is said that its first site was on the Chaura Rasta in front of the Gates of the Chandra Mahal, the first structure built by Maharaja Jai Singh for the new capital of his State. Naturally, thousands of laborers for the construction of the palace and the city must have been employed who needed articles of their personal use and so weekly market originated at this site.

When Sir Mirza Ismail developed Chaura Rasta as a new market in the forties, the weekly market was shifted near the Chaughan stadium.

5.3.1 WEEKLY MARKETS

The market is held in a linear shape on the footpaths. All the marketers set their shops and exhibit their articles on cloth-sheets or jute bags. To protect from the sunshine they use umbrellas or erect cots supported against bamboo-poles. They also use cloth, bed sheets, or tripal for shades and some squat under trees. Others use "thelas" as movable shops. The isolated site and location appears to be the reason of indifferent development. So, no progress in numbers of shops in weekly market.

5.3.1.1 Pattern of Shops

The shifting location of the weekly market is shown on the plan. The street runs east-west in a straight line and the squatters' squat on the footpaths on either sides of the road. Thus, the hatwara has a linear pattern unlike any other weekly or periodical market outside Jaipur. There is a row of shops on the north or the street and a row on its south. With regard to the pattern of shops, there is remarkable specialty and affinity. On the northern row there are cutlery articles, cheaply quality furniture, fancy articles for ladies make-up, old, books, magazines, glass, bottles, tumblers, and vegetables etc. All these have great affinity of articles. On the back of this row are the shops of indigenous shoes (deshi juta)and other leather articles which are the specialty of this market. On the southern row the squatters sell cloth, printed cloth and readymade garments, all of cheap quality. The specialty and affinity of items provide an opportunity to the customers to compare goods and their prices. It may be astonishing as to why these hatwaras have survived in metropolitan cities where merchandise of great varieties are sold in the regular markets everyday. The fact is that cheap indigenous shoes made of leather are not sold anywhere in the city. These are specially made by poor cobblers in their houses and the weekly product is brought to the hatwara for poor customers. Similarly, the new lower middle class settler in Jaipur and the students coming from surrounding areas seeking rented accommodation need cheap and poor quality furniture made "aru" from a soft wood. Similar is the case with cutlery articles. All these articles generally meet the special requirement of a particular section of the society which hesitates to visit the sophisticated shops in regular markets. Thus hatwara survives for the economy of the poor marketers, as well as for the poor and middle class customers.

5.3.2 TEMPORARY STRUCTURES

The temporary structures like thari, thela and squatters are common features of Indian bazaars. These play significant role in retail trade at a low level and provide facilities to a large section of the settlements. Though they do not form part of permanent occupation, they are the integral part of the market system. These shops are mostly wayside temporary structures run by the small scale dealers being installed compound of residential houses, footpaths, road crossings, street corners, near offices, cinema halls, schools, out corners of permanent shops etc., Generally these are unauthorized establishments.

5.3.2.1 Distribution of Temporary Shops in Walled City

In Jaipur along with a large number of pucca shops in the planned outlay, hundreds of temporary structures exist in both the walled and extra-walled city. The easy approach of the clients has inspired the small and petty dealers to establish themselves in temporary structures. These shops can be stationary or mobile to be carried at will to any place at any time wherever the cliental is available. In the beginning several tharis were installed in front of the pucca shops of all the main markets all along the footpaths. These structures had not only crowded the markets of the walled city but also marred the beauty of the Pink City. Their development affected the trade of the native shopkeepers adversely. But nothing could be done in this regard till the 1975 Emergency during which these were shifted from at least all the main markets by allotting pucca shops in the Indira Bazar and Janata Market. But these structures continue to flourish in the walled city where these are scattered allover. The roughly ratio these are 4:6 in the walled and extra-walled city. These do not reflect the environmental interrelationship.

These are less in number within the walled city as a large number of temporary shops have been rehabilitated in the newly built markets and there are more in the extra-walled city because they provide welcome services in the absence of pucca shops in many well-planned colonies. Their distribution is given in the **Table 5.2. (Map 5.1, 5.2, 5.3, 5.4)**

Table 5.2: Distribution of Temporary Shops in the Walled City, Jaipur

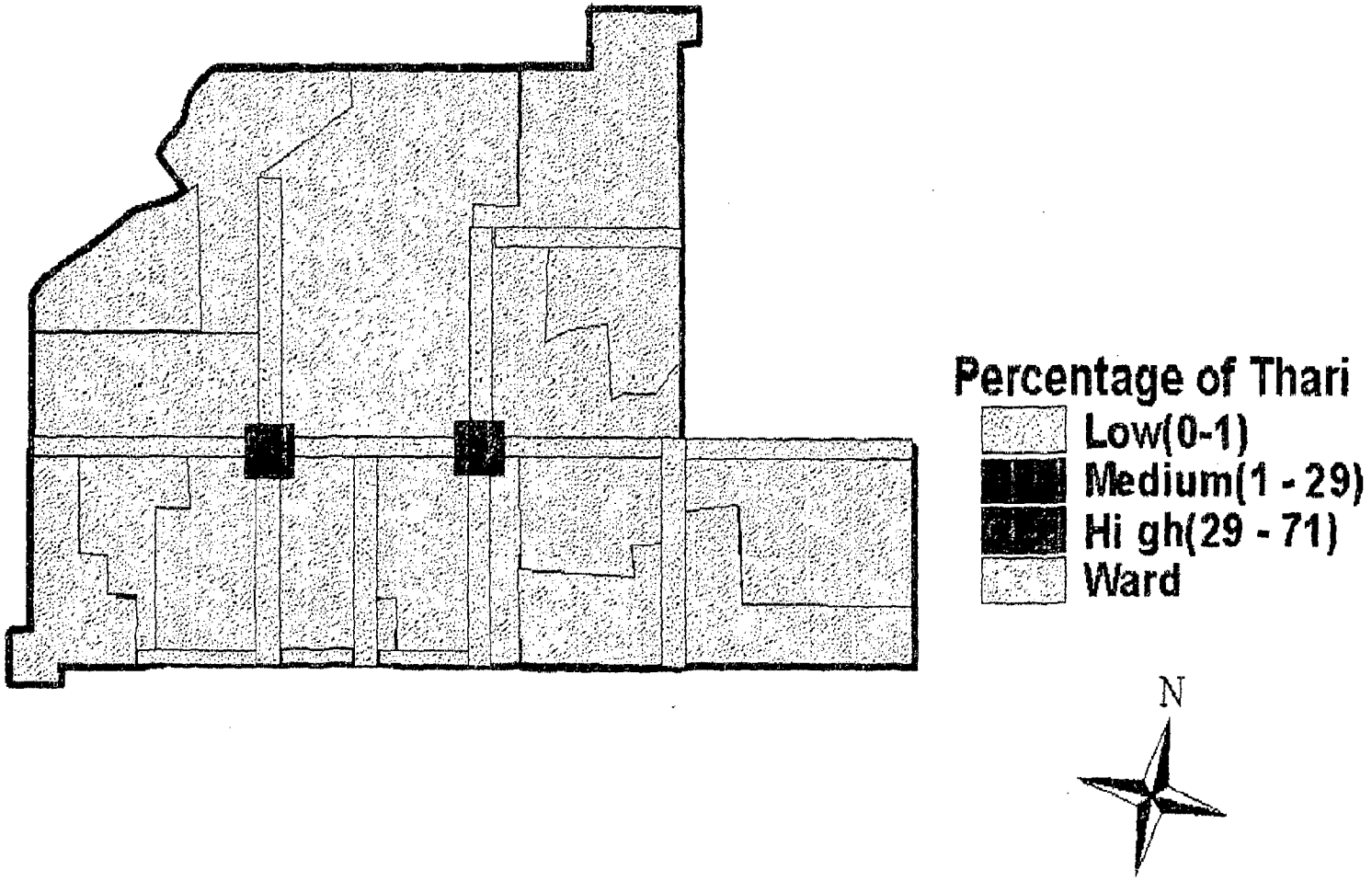
S. N.	Name of Market	Types of Shops			Total
		Thari	Thela	Squatter	
1.	Chandpole Bazar	-	69	185	254
2.	Chhoti Chaupar	24	41	39	104
3.	Tripolia Bazar	-	19	57	76
4.	Badi Chaupar	60	26	29	115
5.	Ramganj Bazar	-	34	57	91
6.	Ghat Darwaja Bazar	-	57	64	121
7.	Johari Bazar	-	26	96	122
8.	Chaura Rasta	-	29	37	66
9.	Kishanpole Bazar	-	41	40	81
10.	Indira Bazar	-	38	21	59
11.	Gangori Bazar	-	27	102	129
12.	Nehru Bazar	-	26	36	62
13.	Bapu Bazar	-	42	28	70
		84	475	791	1350

The temporary shops distributed are randomly different markets. In the walled City, there are only six markets in which the number of temporary structures exceeds 100. These markets are Chandpole Bazar, Gangori Bazar, Ghat Darwaja, Badi Chaupar, and Chhoti Chaupar. Of these Chandpole Bazar has the largest number (254) and the last one has the lowest (104). The distribution corresponds with the intensity of business in the markets. Hence, Chandpole Bazar which has the greatest intensity of the retail marketing has the highest number of temporary structures.

Type wise, 791 are squatters, followed by 475 thelas and 84 tharis. It is because, as stated above, the tharis have been rehabilitated in the newly built markets. While the squatters occupied their vacant space. This is why some markets do not have even a single thari.

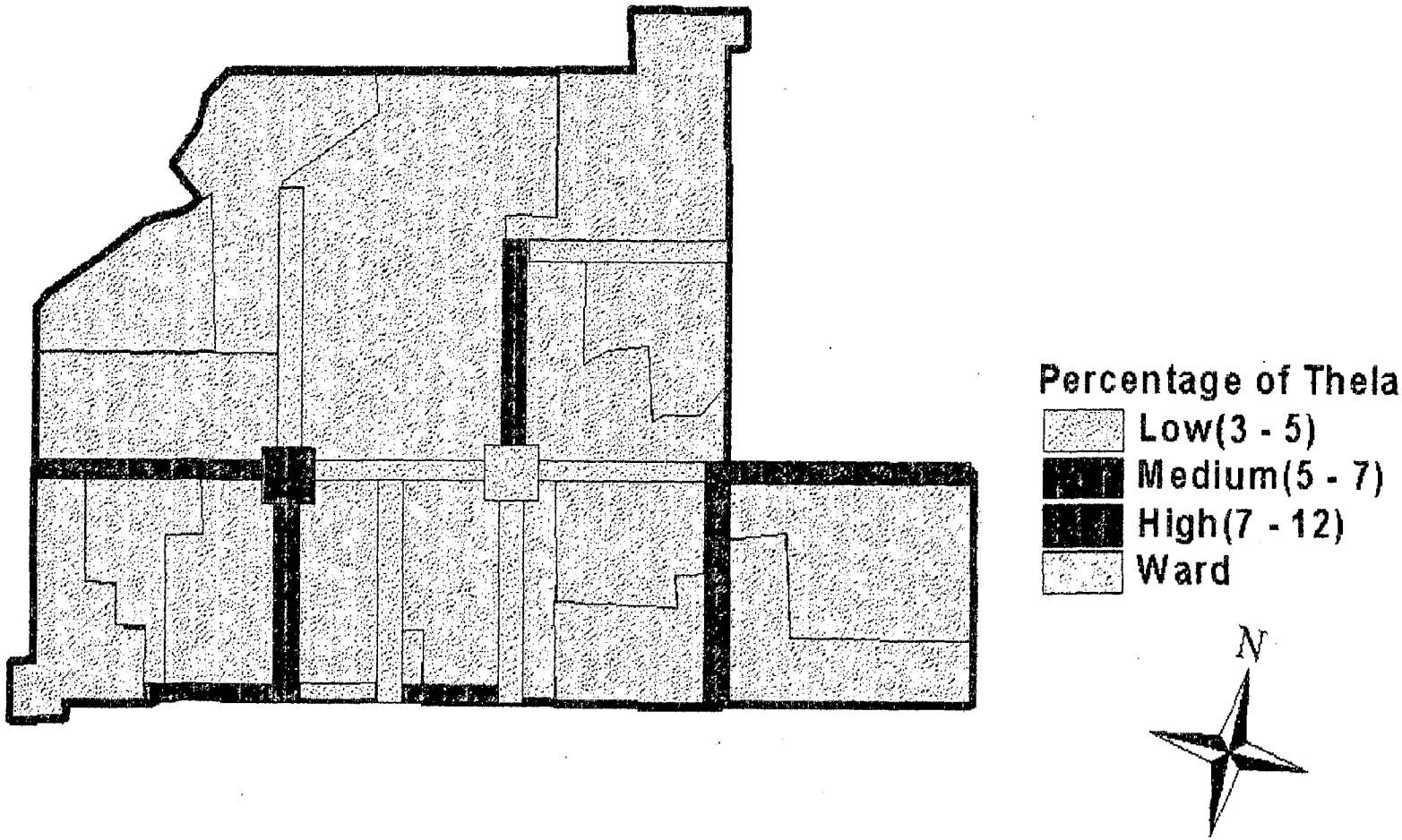
Only two of the 21 markets have tharis.

Total Percentage of Thari in Main Markets of Walled City ,Jaipur



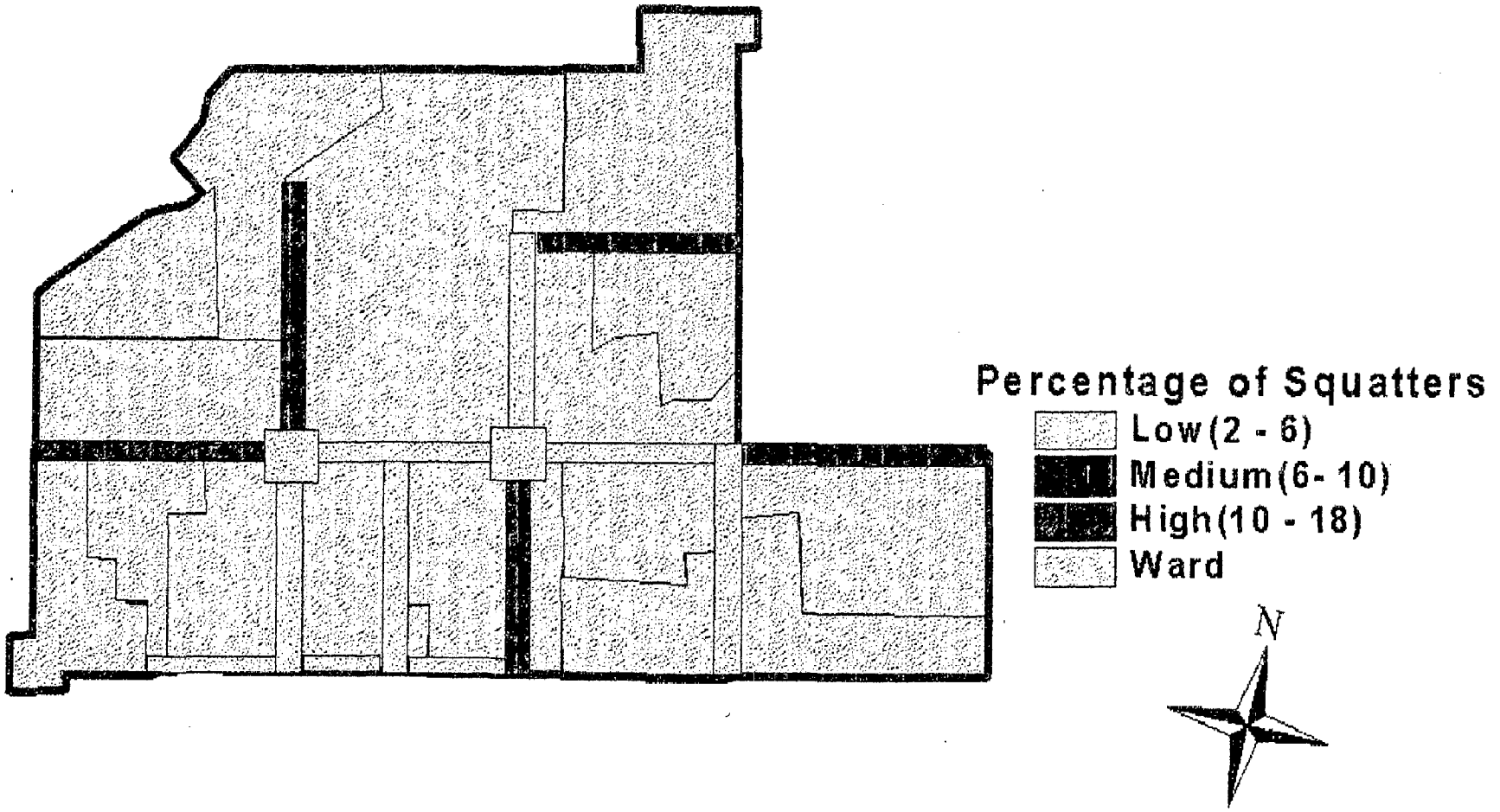
Map 5.3: Total percentage of Thari in Main markets of Walled City, Jaipur

Total Percentage of Thela in Main Markets of Walled City ,Jaipur



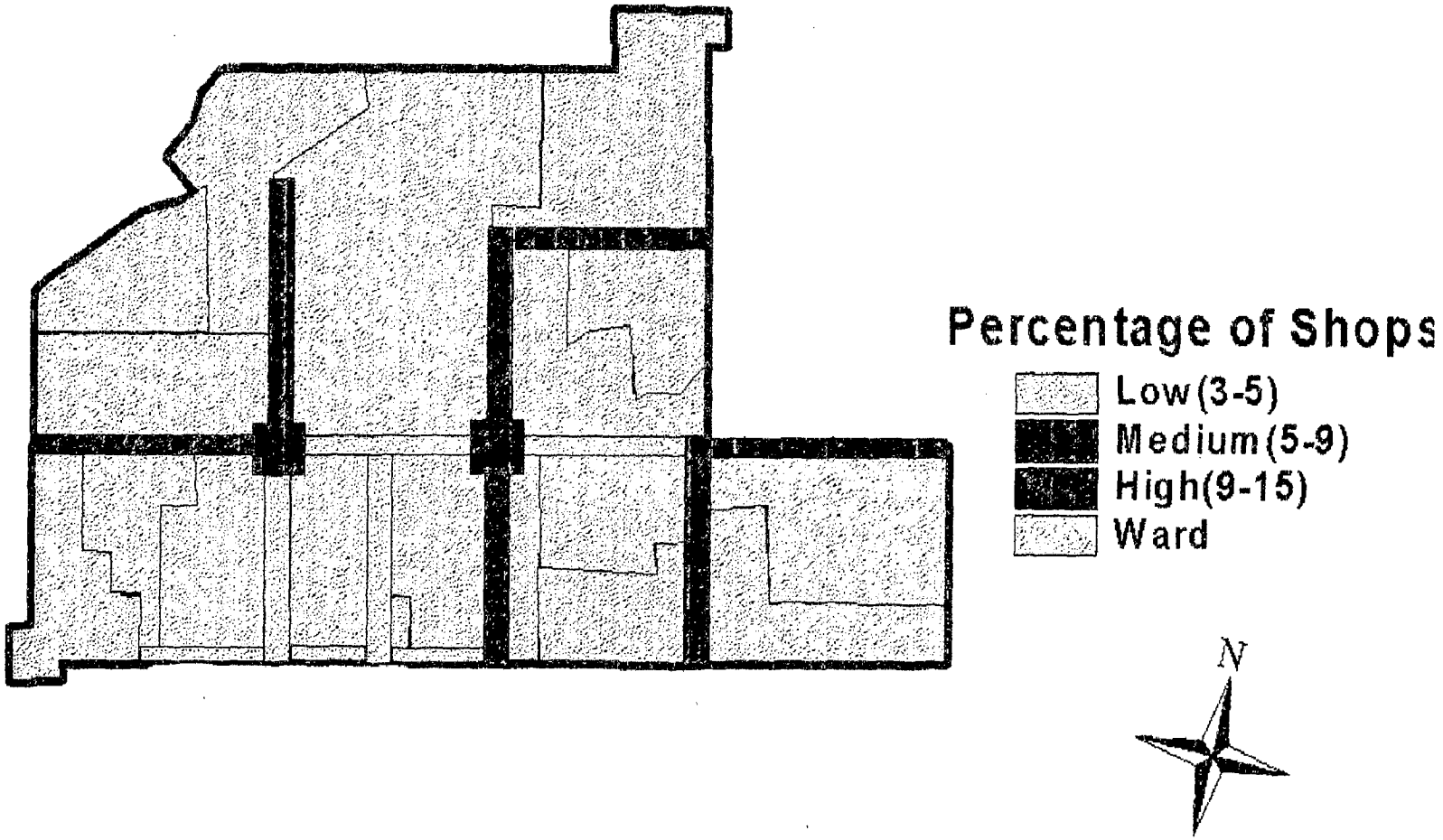
Map 5.4: Total percentage of Thela in Main markets of Walled City, Jaipur

Total Percentage of Squatters in Main Markets of Walled City,Jaipur



Map 5.5: Total percentage of Squatters in Main markets of Walled City, Jaipur

Total Percentage of Temporary Shops in Main Markets of Walled City, Jaipur.



Map 5.6: Total percentage of Temporary Shops in Main markets of Walled City, Jaipur

5.3.2.2 Functional Characteristics

These temporary shops generally cater food stuffs, perishable and non-perishable goods made and served on the spot, parched grain, eggs, fruits, vegetables, etc. But they also sell merchandise, footwears, clothing, general crockery, toys, flower-garlands, earthen pottery, cutlery, lottery tickets, (Kabad), etc. secondhand goods books, These stalls also provide services like the repairing of bicycles auto-vehicles, hair dressing, ginning, and laundary, shoe repairing etc. In brief except for some heavy and luxury goods almost all types for daily needs are obtained at these shops. Generally, some of these articles are not found in pucca shops like the parched grain, chat, vegetables and garlands, etc. All these articles are low cost and sold at low prices as they have not to invest on establishments.

According to the case-study the largest number of temporary structures deal in vegetables and fruits which is 39.44 percent of the total, of these 24.15 per cent are in the walled city. The second largest number of these shops deal in bidi-cigarette, tea stalls, "chat", betel and parched grain, cobbler, cycle repairers, eggs, hair dresser, etc., which are dealt by small scale investors. In the walled city these shops are generally found on footpaths, lanes, By lanes and crossings of main thoroughfares. The largest number of vegetable and fruits shops are spread over Chandpole Bazar, Gangori Johari Bazar and Ramganj Bazar, Bazar. Second largest of stalls are "chat" number established at Badi Chaupar, Chandpole Bazar, Jalebi Chowk and Bapu Bazar. Garlands and flower shops are concentrated at Badi Chaupar and Chhoti Chaupar. Other functions are found unevenly distributed in all the main markets with their heavy traffic.

These temporary structures create traffic problem and parking problem as well as reduces the decor of the markets. Sometimes they plant their "tharis" as permanent establishment in planned colonies. In such a situation they are like regular ramshackle shops and mar the beauty of the market. Similarly vegetable fruit and stalls create unsanitary conditions by the heaps of litter, waste vegetables, fruits and other edibles, which invite herds of stray animals creating hazard for the traffic and the pedestrians.

Although the tharis were removed in 1975 from the main markets but the squatters have encroached upon the vacated space. Whatever the case may be the triangular spaces of Badi Chaupar Chhoti and Chaupar called Khandas must be relieved for parking and for improving the look of the Chaupars.

5.3.3 UNORGANISED WINTER MARKET

It is quite interesting to study an unorganised market which is held every year only during the winter days. New location is the behind the Chaugan stadium. The Genesis of these unorganised markets is associated with the Indo-Tibetan trade.

These Tibetans have been trading in woolen clothes and other articles during the winters The Tibetans, men and women, spread their bed sheets, carpets on the pavements and exhibit their goods on the ground and hang over the bamboo sticks. Their multi-colored woolen garments, shawls, jersy, sweaters, pullovers, etc., etc. and their own multi-colored costumes present a joyful landscape which all the more shine under the mid-day sun.

Chapter 6

FUNCTIONAL CLASSIFICATION AND SPECIALIZATION

Photograph 6.1: View of Bangles Markets at Maniharo Ka Rasta Walled City, Jaipur (Dec., 2003)

Chapter 6 FUNCTIONAL CLASSIFICATION AND SPECIALIZATION

6.1 FUNCTIONAL CLASSIFICATION OF SHOPS OF JAIPUR

A metropolitan city has many shops and many functions to perform, while a town or village has few shops and limited functions. The study of market morphology of a city leads to necessarily to investigate the type of functions available there. The types of functions differ according to the area and purpose of study. The aforesaid classifications have been made with reference to retail market in the Western countries where generally the departmental stores are found. Although many functions are common allover the world but in developing countries like India there are many functions different from the Western world; for example, shops of earthen pots, country shoes, betel, glass or lac bangles, bhang, sugar-cane juice, etc. The classification of commercial functions has been made by the Census of India as Standard Industrial Classification (SIC) which is given in the Census of India. But these do not cover all the existing functions available in Jaipur.

Prof. Khendelwal classified the functions in 5 major groups of 100 types of shops in Jaipur. Jaipur City divided into five major groups:

1. Food articles,
2. Household articles,
3. Fancy and novelties,
4. Miscellaneous articles, and
5. Services.

For a detailed item wise study and analysis, these groups are further divided into items as follows:

(1) FOOD ARTICLES

Animal Food: Fodder, straw, oil cake, kankra (cotton seed)

Confectionery: Biscuits, cakes, parched grain, groundnut, etc.

Betel, tobacco products and arecanut

Cold drinks and cold delicatessen, ice depots, juice.

Namkeen, chat, pickles.

Grain and cereals.

Grocery:

Parchuni, Kirana, pulses, lintel, spices, condiments, salts, vegetable oil and ghee, clarified butter, tea, gur, sugar, salt, batasa, boora, dry fruits, candy, fine flour.

Intoxicants: Wine, liquor, opium, ganja(Marijuana), bhang (Cannabis), etc.

Milk and dairy products.

Milk and sugar products: sweetmeat, curd (Halwai)

Meat, fish, and egg.

Vegetable and fruits.

(2) HOUSE HOLD ARTICLES

Building Materials:

Cement, Bricks, stones, lime, marble, sand, timber, glasses, plywood, thatches, tiles, door fittings, sanitary fittings, stone and cement products.

Utensils: Stainless steel, copper, plastic, brass, aluminium, earthen pottery, bamboo leaves, stem, bronze, etc.

Household Furnishing:

Bedding, cotton, upholstery, tapestry, mattresses, carpets.

Decorative Articles: Mirror, glass picture, calendar, silver paper-leaves (Chandi ka Varaq).

Electrical Appliances: Bulbs, fans, press, heaters, electric fittings.

Fuels: Fire wood, kerosene, coal, gas.

Furniture: Steel, wooden, plastic, cots with their using articles like rope, niwar, etc.,

coir and foam products, trunks, almirahs.

Gadgets, fridge, coolers, air conditioners, sewing machines.

Iron and hardware.

Recreational Appliances: Radios, TVs, Tape recorders, Video, CD/DVD Player, musical instruments, CD's ,DVD's ,cassettes, stereo and other electronic equipment.

Sophisticated kitchen appliances:

Stove, gas burners, pressure cookers, Microwave, Electric kitchen Appliances, mixer, cutlery.

Crockery

Paints and colours.

(3) FANCY NOVELTIES

Fancy Stores: Bangles, bags, cosmetics, perfumes, gota lining.

Flowers and Garlands.

Footwear.

Handicraft Emporiums and Antiques.

Jewellery and precious stones, gold and silver ornaments.

Readymade garments, hosiery, wool.

Soaps.

Opticals.

Textiles.

Watches and clocks.

General Merchandise.

(4) MISCELLANEOUS

Diesel engines, agricultural and irrigation equipment and water meters.

Arms and ammunition.

Auto parts and bearings.

Auto vehicle sales: cars, trucks, tractors, motor cycles, scooters, mopeds.

Books, stationery.

Departmental stores, Uphar, Upbhokta Bhandar.

Fertilizers and seeds, agricultural medicines and Godowns.

Jute and plastic bags (Bardana).

Lottery tickets.

Medicines, surgical instruments, chemists, Attars.

Motion Picture (Film) Distributors.

Secondhand goods (Kabaddi).

Sports goods.

Sculpturing.

Vacant or under construction.

Bicycle and rickshaw

Tyre-tubes.

Machinery stores, etc.

Fireworks.

Funeral goods.

(5) SERVICES

Agencies: Commission agents, brokers, travel agents, property dealers, auctioners, housing societies.

Auto Repairing: Vehicle repair including garage, tyre retreading, auto body builders, battery repairers.

Bakery.

Banks and insurance companies.

Beautification: Hair Dressers, beauty parlors, dry cleaners, cobblers, washer men, dyers, embroidery, tailors.

Bicycle and Rickshaw Repair.

Ginning, Painters, Photography studios.

Eating House: Restaurants, tea stalls, dhabas. Flour mills.

Gadgets Repairing: watches, radios, TVs, Computer, Electronic Items, Pens, torches , sewing machines, typewriters, fridges, cameras, stove, etc.

Health services: Clinics, X-ray, dentists, pathological.

House Building Accessories: Construction appliances, planks, long sticks (ballis), bamboos, etc., stone polishing, marble cutting, plumbers.

Lodging: Hotels, guest houses.

Printing: Printing presses, Xeroxing, Computer Prints, block makers, typing institutions, rubber stamps, book-binders.

Petrol pump, mobile oil. Post Offices.

Recreational: Cinemas, multiplex, Cyber cafe

Solicitors: lawyers, advocates, chartered accountants.

Transport offices.

Water huts.

Electric Decorators, tent houses, amplifiers.

Engineering works: lathe workshops, nickle-plating, gas welding, hone.

Goldsmiths.

Light and water bills depositing offices.

Orchestra, musical bands.

Table 6.1: Changes the Number of Food Articles Shops of Main Markets, Walled City

CHANGES THE NUMBER OF SHOPS IN FUNCTIONS OF MAIN MARKETS, WALLED CITY						
S. N.	Name of Market	Number of Shops			Variation	
		1986	1996	2004	1986 to 1996	1996 to 2004
I.	**FOOD ARTICLES**					
1.	Chandpole Bazar	417	201	178	-51.7	-11.44
2.	Chaura Rasta	44	41	17	-6.8	-58.53
3.	Ramganj Bazar	142	142	96	-	-32.07
4.	Indira Market	-	73	33	+100.0	-54.79
5.	Johari Bazar	125	122	102	-2.4	-16.39
6.	Tripolia Bazar	96	98	48	+0.08	-51.02
7.	Ghat Darwaja	151	116	106	-23.1	-8.62
8.	Sireh Deori Bazar	44	48	35	+9.0	-27.08
9.	Kishanpole Bazar	83	68	65	-18.0	-4.41
10.	Moti Katla	19	24	21	+26.31	-12.50
11.	Bapu Bazar	7	13	5	+0.7	-61.53
12.	Gangori Bazar	67	59	38	-12.0	-35.59
13.	Nehru Bazar	16	19	11	+18.7	-42.10
14.	Suraj Pole Bazar	-	-	29	-	100.00
	Total	**1211**	**1024**	**784**	**-15.44**	**-23.43**

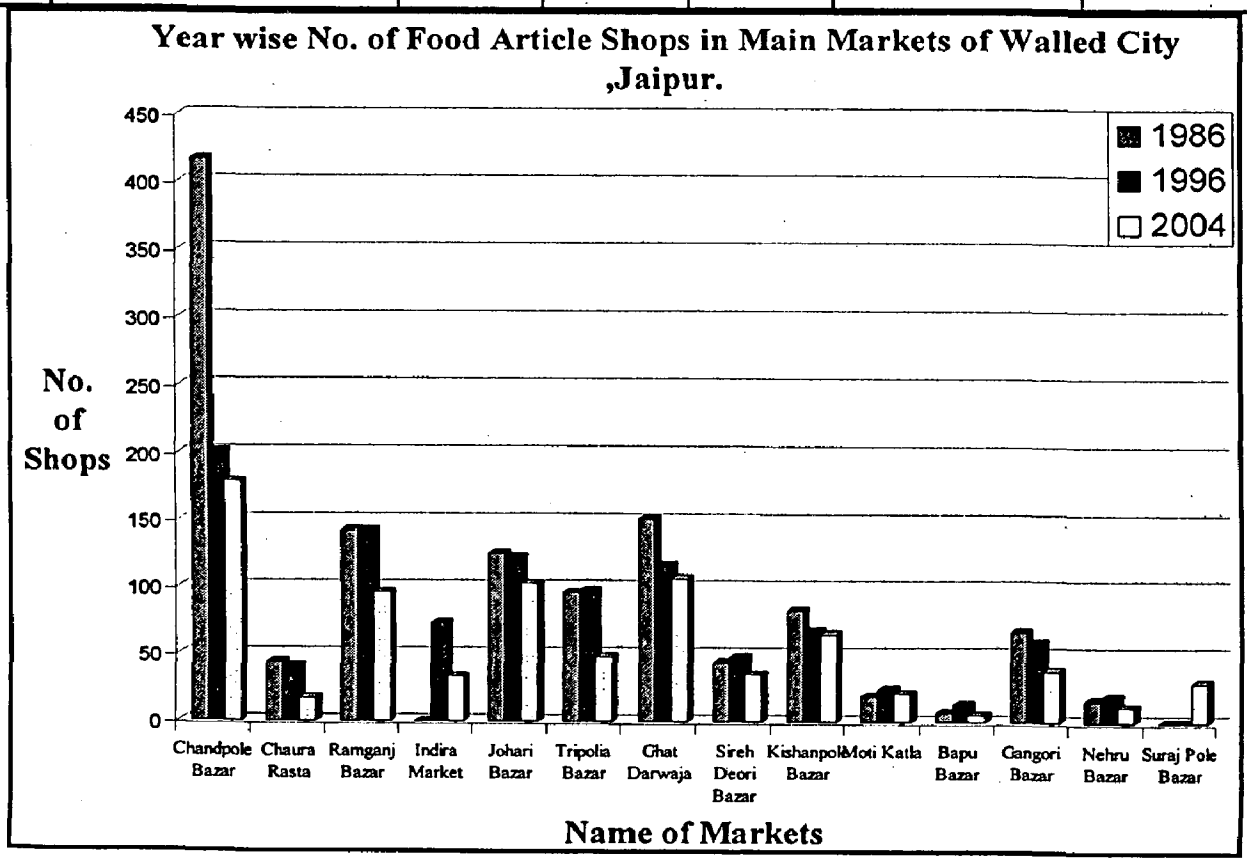
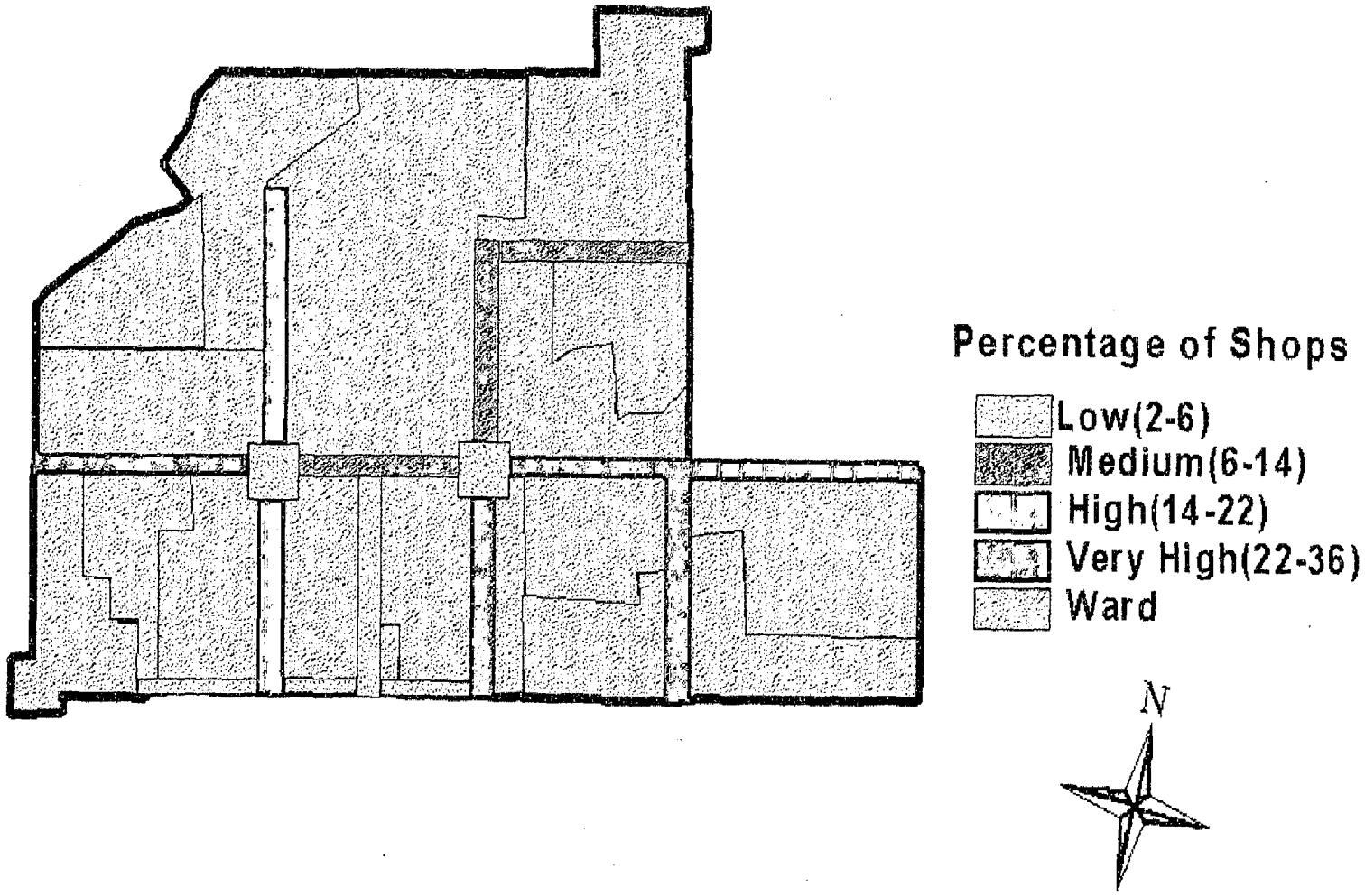


Figure 6.1: Year wise No. of Food Articles Shops in Main Markets of Walled City, Jaipur

Total Percentage of Food Articles Shops in Main Markets of Walled City,Jaipur



Map 6.1: Total percentage of Food Articles Shops in Main markets of Walled City, Jaipur

Table 6.2: Changes the Number of Fancy Articles Shops of Main Markets, Walled City

CHANGES THE NUMBER OF SHOPS IN FUNCTIONS OF MAIN MARKETS, WALLED CITY						
S. N.	Name of Market	Number of Shops			Variation	
		1986	1996	2004	1986 to 1996	1996 to 2004
II.	FANCY ARTICLES					
1.	Chandpole Bazar	134	59	94	-55.97	+59.32
2.	Chaura Rasta	71	129	63	+81.69	-51.16
3.	Ramganj Bazar	132	106	106	-19.69	-
4.	Indira Market	-	113	182	+100.00	+61.06
5.	Johari Bazar	176	153	155	-13.06	+1.30
6.	Tripolia Bazar	247	81	83	-67.20	+2.46
7.	Ghat Darwaja	39	46	53	+17.94	+15.21
8.	Sireh Deori Bazar	32	43	46	+34.37	+6.97
9.	Kishanpole Bazar	61	31	43	-49.18	+38.70
10.	Moti Katla Bazar	19	24	21	+26.31	-12.50
11.	Bapu Bazar	126	143	148	+13.49	+3.49
12.	Gangori Bazar	10	11	21	+10.00	+90.90
13.	Nehru Bazar	92	65	92	-29.34	+41.53
14.	Suraj Pole Bazar	-	-	27	-	+100.00
	Total	**1139**	**1004**	**1221**	**-11.85**	**+21.61**

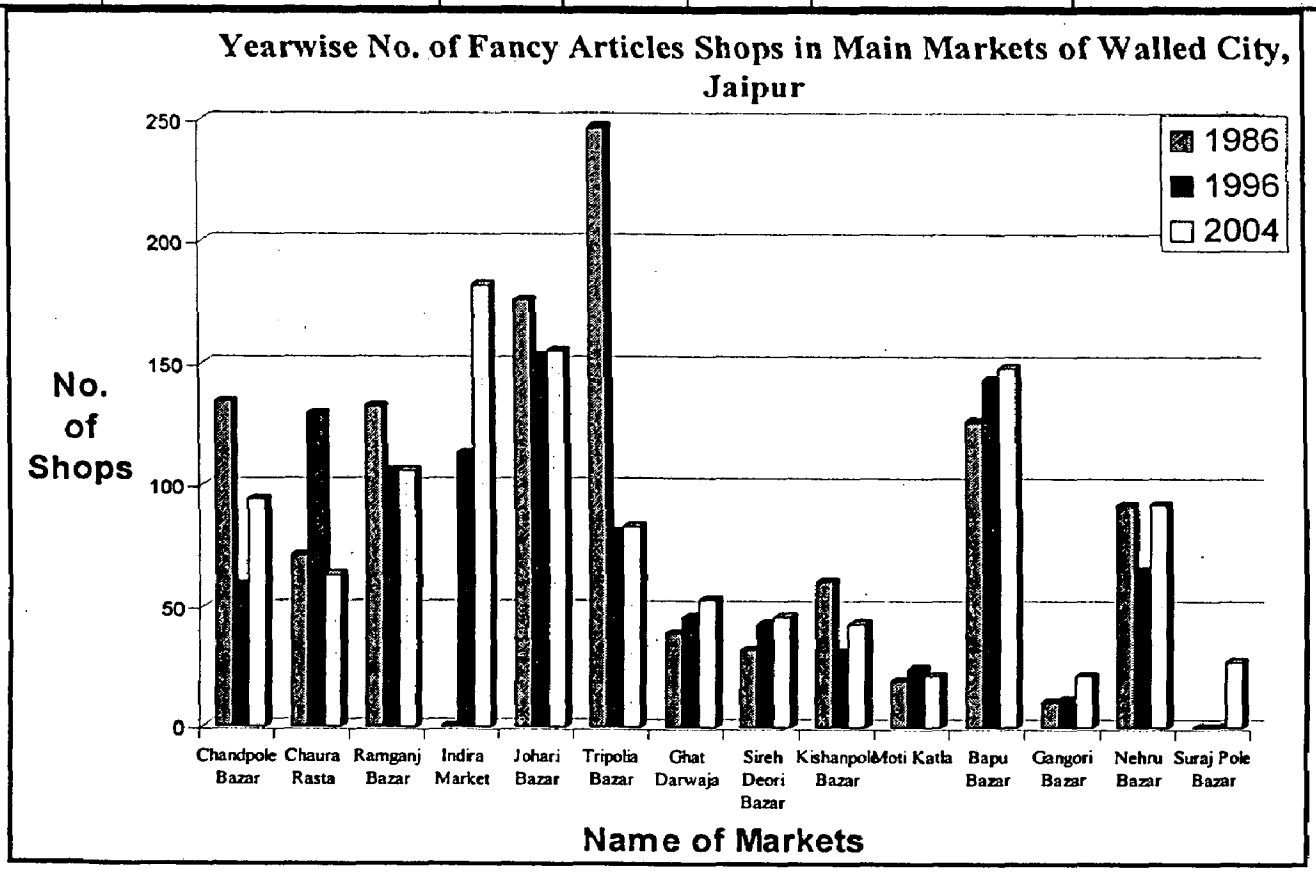
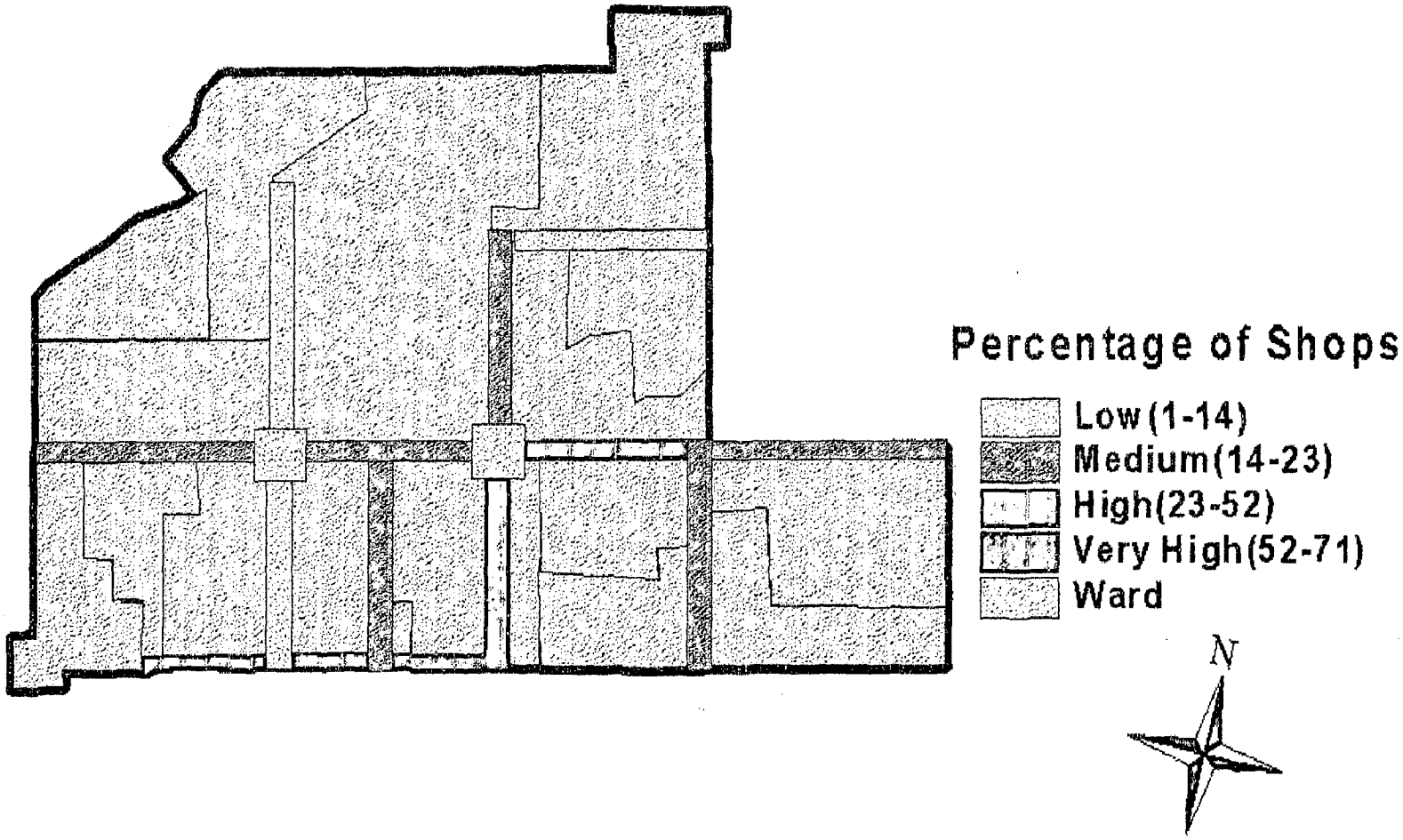


Figure 6.2: Year wise No. of Fancy Articles Shops in Main Markets of Walled City, Jaipur

Total Percentage of Fancy Articles Shops in Main Markets of Walled City, Jaipur



Map 6.2: Total percentage of Fancy Articles Shops in Main markets of Walled City, Jaipur

Table 6.3: Changes the Number of House Hold Articles Shops of Main Markets, Walled City

CHANGES THE NUMBER OF SHOPS IN FUNCTIONS OF MAIN MARKETS, WALLED CITY						
S. N.	Name of Market	Number of Shops			Variation	
III.	**HOUSEHOLD ARTICLES**	1986	1996	2004	1986 to 1996	1996 to 2004
1.	Chandpole Bazar	32	26	41	-18.75	+57.69
2.	Chaura Rasta	52	96	63	+84.61	-34.37
3.	Ramganj Bazar	33	37	42	+12.12	+13.51
4.	Indira Bazar	-	37	105	-	+183.78
5.	Johari Bazar	18	11	29	-38.88	+163.63
6.	Tripolia Bazar	139	78	162	-43.88	+107.69
7.	Ghat Darwaja	14	59	66	+321.42	+11.86
8.	Sireh Deori Bazar	12	83	29	+591.66	-65.06
9.	Kishanpole Bazar	54	58	54	+7.40	-6.89
10.	Moti Katla Bazar	22	40	21	+81.81	-47.50
11.	Bapu Bazar	21	25	29	+19.04	+16.00
12.	Gangori Bazar	15	26	23	73.33	-11.52
13.	Nehru Bazar	32	24	34	-25.00	+41.66
14.	Suraj Pole Bazar	-	-	22	-	-
	Total	**444**	**600**	**720**	**+35.13**	**+20.00**

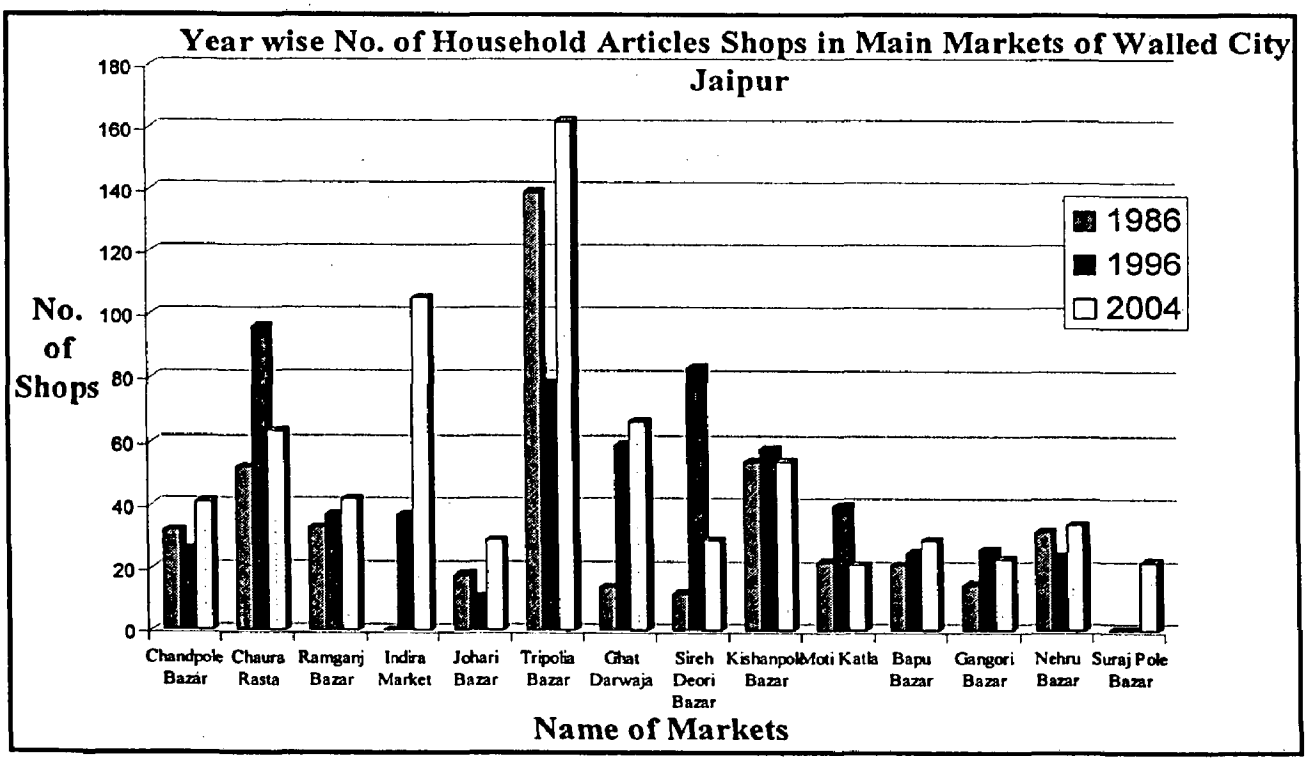
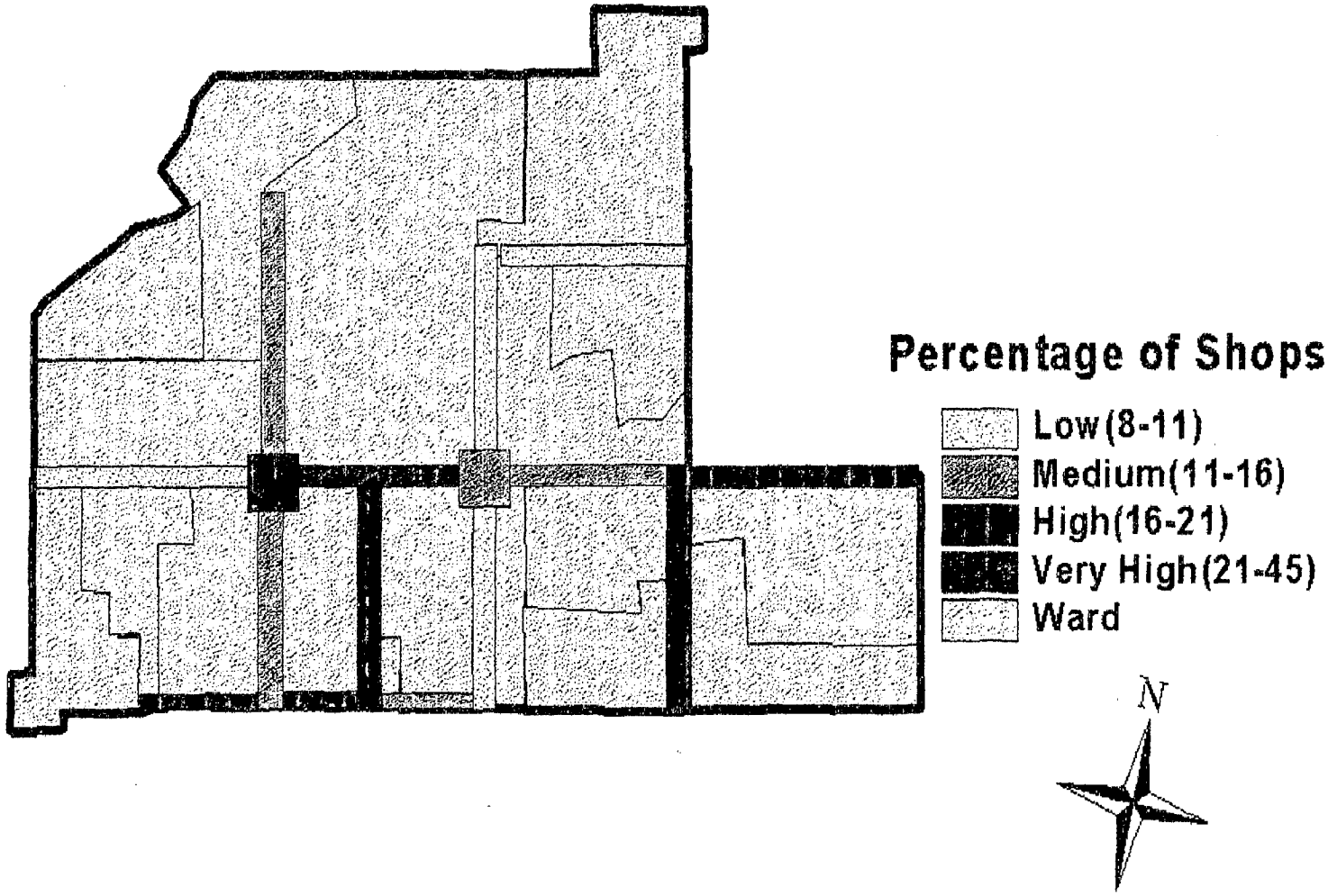


Figure 6.3: Year wise No. of Household Articles Shops in Main Markets of Walled City, Jaipur

Total Percentage of House Hold Articles Shops in Main Markets of Walled City,Jaipur



Map 6.3: Total percentage of Household Articles Shops in Main markets of Walled City, Jaipur

Table 6.4: Changes the Number of Miscellaneous Shops of Main Markets, Walled City

CHANGES THE NUMBER OF SHOPS IN FUNCTIONS OF MAIN MARKETS, WALLED CITY						
S. N.	Name of Market	Number of Shops			Variation	
		1986	1996	2004	1986 to 1996	1996 to 2004
IV.	**MISCELLANEOUS ARTICLES**					
1.	Chandpole Bazar	37	7	82	-81.08	+1071.42
2.	Chaura Rasta	121	9	111	-124.44	+1133.33
3.	Ramganj Bazar	21	13	16	-38.09	+23.07
4.	Indira Bazar	-	140	158	-	+12.85
5.	Johari Bazar	53	16	47	-69.80	+65.95
6.	Tripolia Bazar	59	15	54	-74.57	+260.00
7.	Ghat Darwaja	24	17	13	-29.16	-23.52
8.	Sireh Deori Bazar	20	14	71	-30.00	+407.14
9.	Kishanpole Bazar	20	20	88	-	+340.00
10.	Moti Katla Bazar	25	20	15	-20.00	-25.00
11.	Bapu Bazar	4	1	13	+25.00	+1200.0
12.	Gangori Bazar	14	12	19	+14.28	+58.33
13.	Nehru Bazar	9	5	11	-44.44	+120.00
14.	Suraj Pole Bazar	-	-	10	-	+100.00
	Total	**407**	**289**	**708**	**-28.99**	**+144.98**

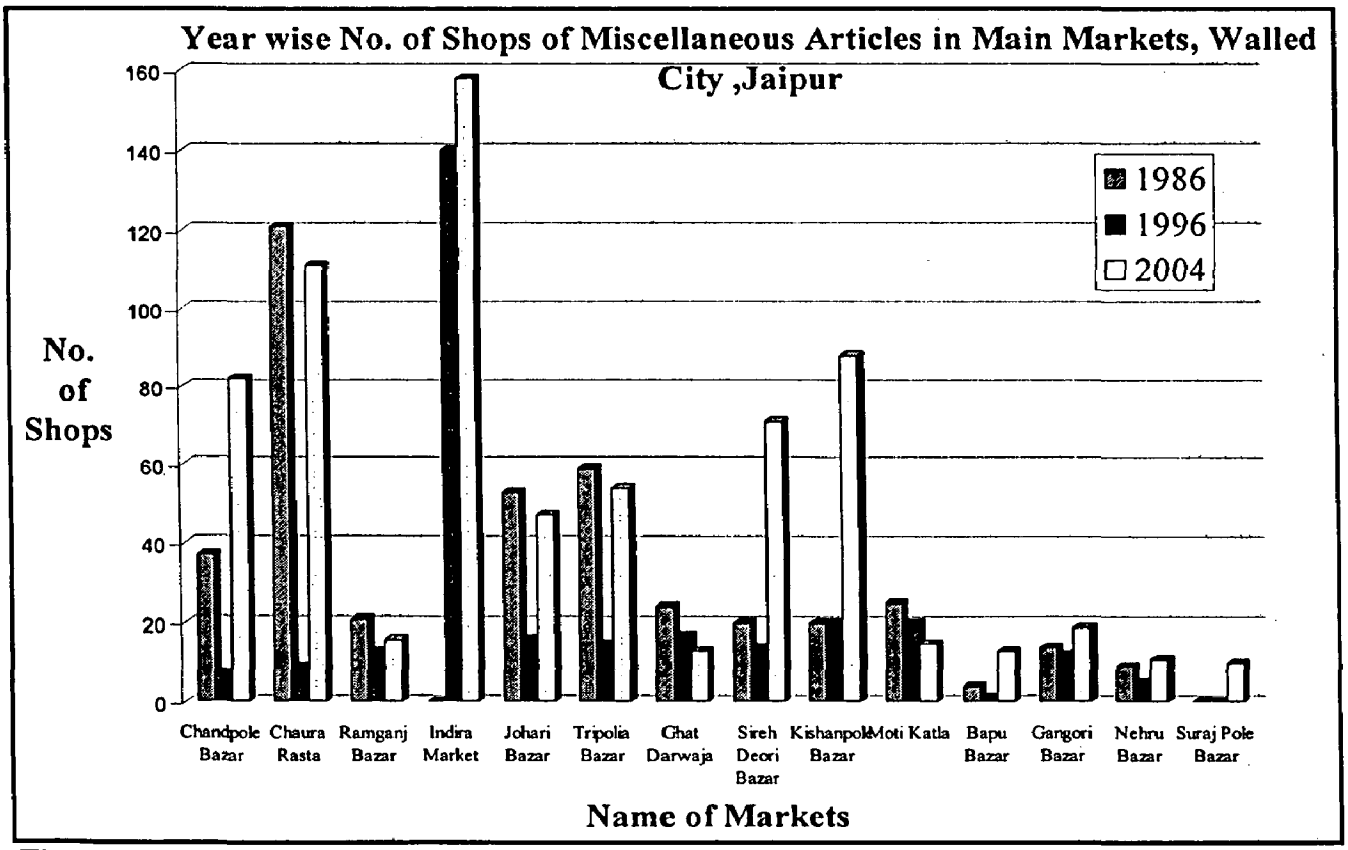
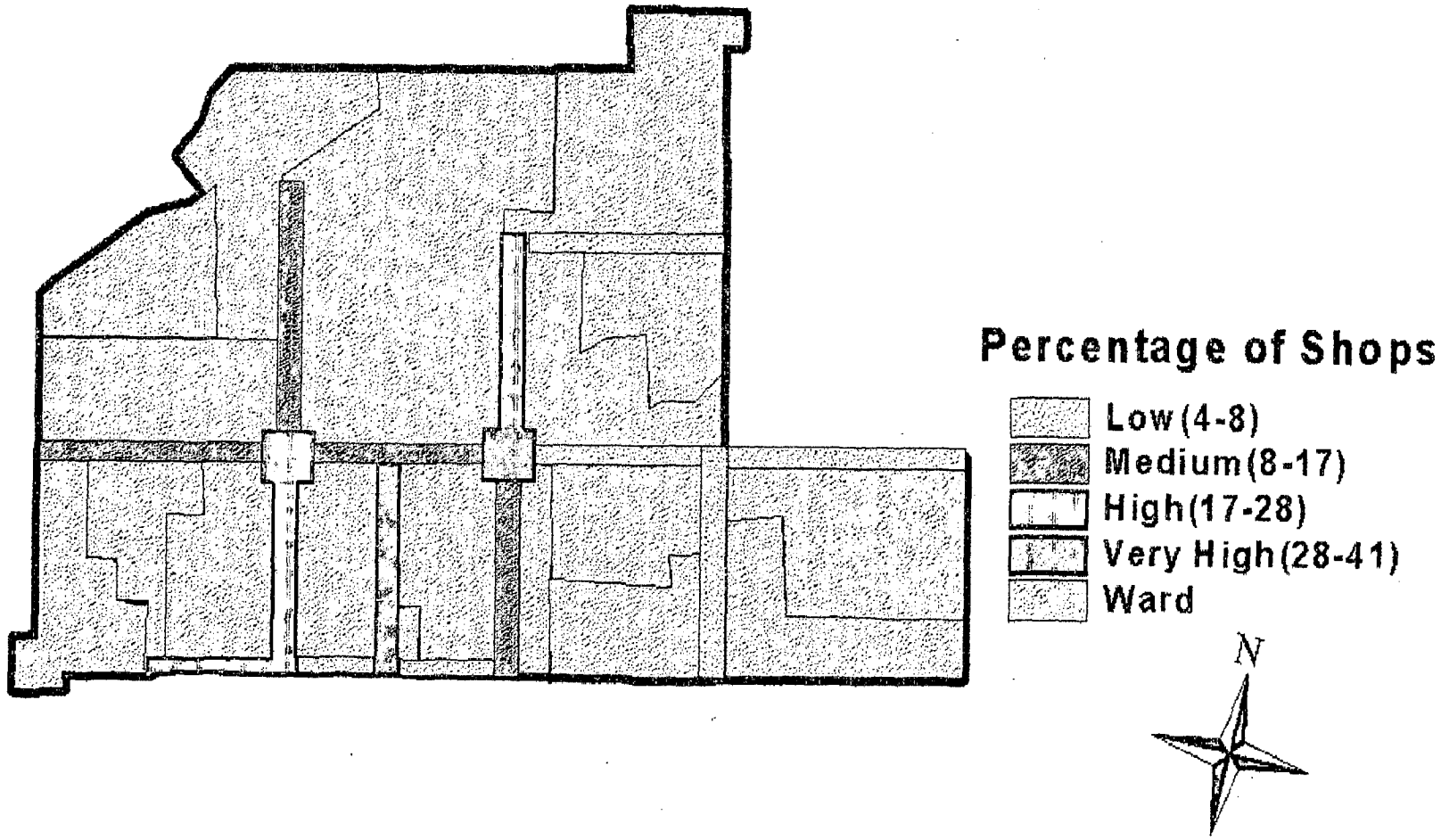


Figure 6.4: Year wise No. of Miscellaneous Articles Shops in Main Markets of Walled City, Jaipur

Total Percentage of Miscellaneous Shops in Main Markets of Walled City , Jaipur



Map 6.4: Total percentage of Miscellaneous Articles Shops in Main markets of Walled City, Jaipur

Table 6.5: Changes the Number of Services Shops of Main Markets, Walled City

CHANGES THE NUMBER OF SHOPS IN FUNCTIONS OF MAIN MARKETS, WALLED CITY						
S. N.	Name of Market	Number of Shops			Variation	
		1986	1996	2004	1986 to 1996	1996 to 2004
V.	**SERVICES**					
1.	Chandpole Bazar	77	110	99	+42.85	-10.00
2.	Chaura Rasta	74	130	62	+75.67	-52.30
3.	Ramganj Bazar	84	71	61	-15.47	-14.08
4.	Indira Bazar	-	29	78	-	+168.96
5.	Johari Bazar	31	73	28	+14.19	-145.16
6.	Tripolia Bazar	47	43	17	-8.51	-60.46
7.	Ghat Darwaja	101	64	78	-36.63	+21.87
8.	Sireh Deori Bazar	110	96	78	-30.00	-20.40
9.	Kishanpole Bazar	60	96	96	-60.00	-
10.	Moti Katla Bazar	76	84	128	+10.52	+52.38
11.	Bapu Bazar	16	17	12	+6.25	-29.41
12.	Gangori Bazar	36	33	68	-8.33	106.06
13.	Nehru Bazar	11	6	30	-47.45	+400.00
14.	Suraj Pole Bazar	-	-	68	-	-
	Total	**723**	**854**	**903**	**+18.11**	**+5.73**

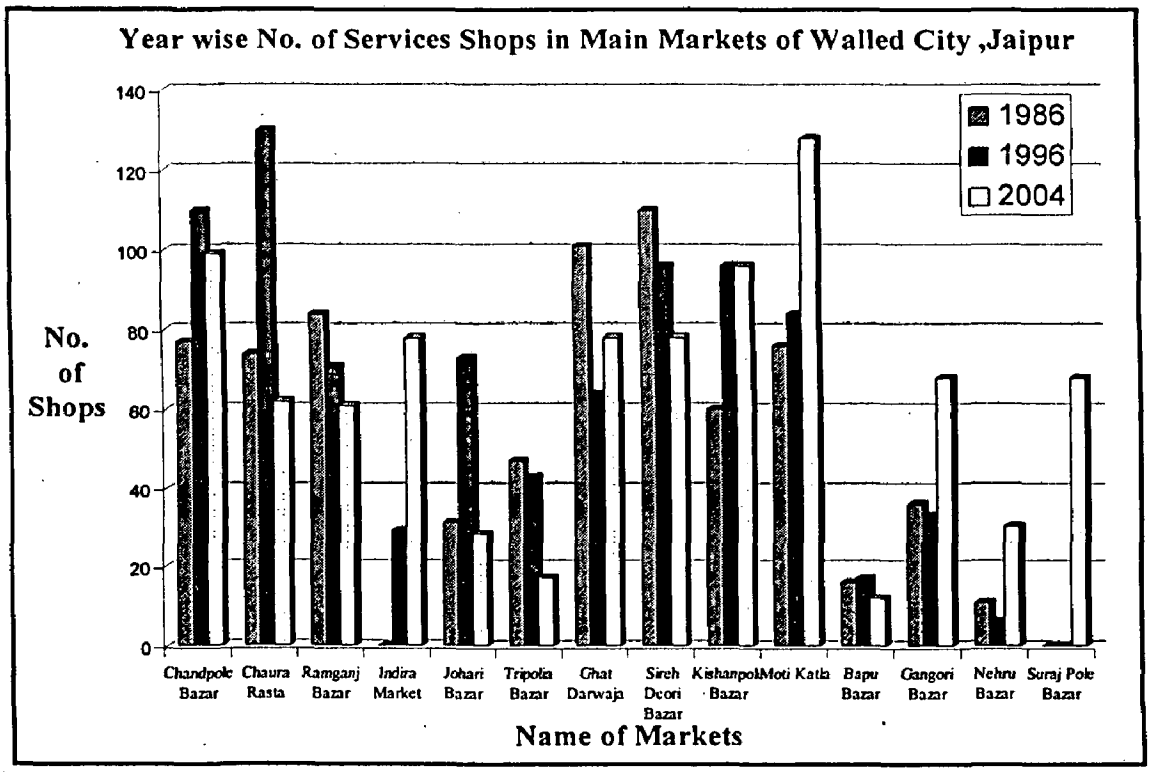
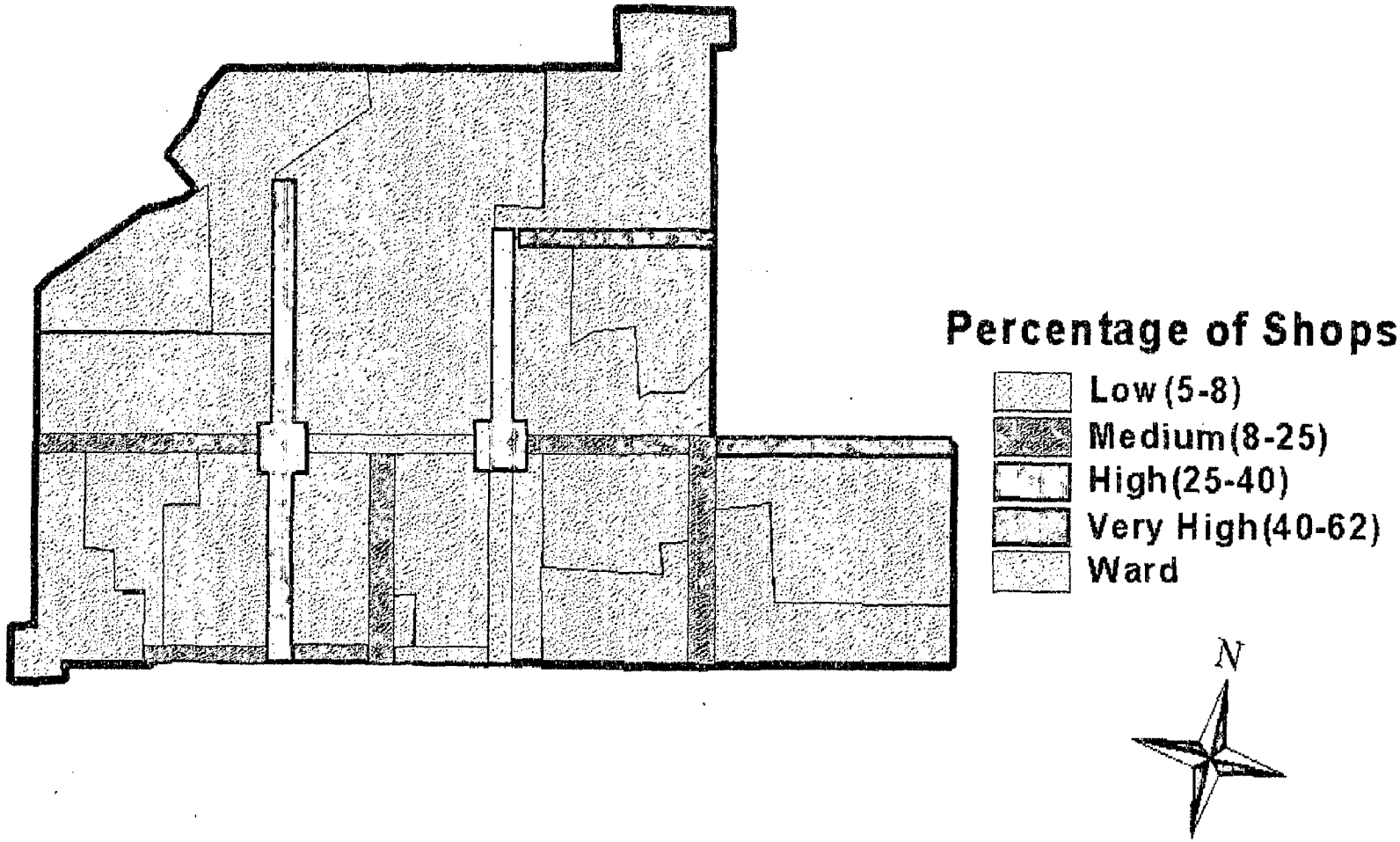


Figure 6.5: Year wise No. of Services Shops in Main Markets of Walled City, Jaipur

Total Percentage of Services Shops in Main Markets of Walled City ,Jaipur



Map 6.5: Total percentage of Services Shops in Main markets of Walled City, Jaipur

6.2 RETAIL SITES

The arrangement of shops within markets has been an important consideration in retail trade. The pattern of shops arrangement within the walled city has an specialty found nowhere else. It is all due to the Shilp Shastra of the medieval period developing iron grid patterned main roads where the shape, size, ground space and fronts of all the hundreds of shops are uniform and symmetrical in the whole city. The Maharaja had already planned the sites for various types of trades and so in most cases they were given freehold of the shops in particular areas. This is why the main markets had been named after the type of trade like the Johari Bazar, the jewelers markets.

However, with the passage of time and development of democratic system, the traders felt free to adopt the trade type of their own choice and there was no restriction to force them to a particular type of trade at particular sites. Consequently, though the shape and size did not change, within the walled city. The retailers have located themselves at sites where they maximize their profits with maximum accessibility to the greatest number of potential customers.

The earliest traders who had come from far and wide at the invitation of the Maharaja occupied these shops as hold ownership or long leases. The shops are now under Rent Control Act and many of the tenants are paying old and nominal rents and would not vacate their premises unless circumstances force them to vacate. This is why those who need shops in the centre are obliged to pay huge "Pugri" to get the possession and then also pay higher rents. In such cases the original tenants shift trade in the lanes, by lanes and distant colonies where they survive in inferior locations despite very low profitability. But the new incumbents unable to compete successfully when located some considerable distance apart, may increase their sales sufficiently to become supramarginal when located in close proximity. The Specialization thereby made possible provides a higher class service or a greater variety of merchandise at lower prices. More potential customers are attracted, a higher proportion makes purchases, and probably more return to make further purchases. Customers are thus given greater opportunities for choosing their requirements within given expenditure of time and money.

"Special accessibility" or proximity to particular complementary facilities may be of three kinds. It may be

(i) Proximity to outlets similar in trade types, (ii) Proximity to markets, and

(iii)Proximity to sources of supply. It is the first type of complementarity's which is the most

important.

This is complementarity's fundamental feature of retail distribution in Indian markets and to this may be ascribed the nomenclatures like the "bajaja" (textile market), "sarafa" (gold and silver market), "kaserat" (the utensils market), "bisayat khana"(general merchandise market), "paserat" (condiments & dry fruits market) and "lohat" (iron market), etc.

6.3 FUNCTIONAL SPECIALIZATION

The market specialization in a city reflects the nature of demand and the stage of cultural evolution of city and its urban field and this depends on the growth of the city. Specialized functional areas develop also because many kinds of uses agglomerate in big cities to facilitate comparison buying to make joint use of specialization facilities. Specialized functional areas are characterized by the presence of several related types of establishments, notable, dealership in new and used cars in automobile rows and doctors, dentists, in X-ray technicians and so forth medical complexes.

For the present study selected eight types of trades in Jaipur which are clustering in certain areas. These are the Jewellery, grain, and hardwares, books, shoes, stationery, bicycles, textile and utensils.

Table 6.6: Functional Specialization in Jaipur City

S. No.	Functions/ Trade Type	Name of the Market	Total No. of shops	Total No. of shops in trade type	%of trade type shops to total shops
1.	Jewellery	Johari Bazar	361	23	6.37
2.	Iron & Hardware	Tripolia Bazar	364	43	11.87
		Chaura Rasta	316	30	9.40
3.	Bicycle	Kishanpole Bazar	346	32	9.24
4.	Utensils	Tripolia Bazar	364	39	10.70
5.	Grain	Chandpole Bazar	494	32	6.47
		Ghat Darwaja Bazar	316	42	13.29
6.	Textile	Bapu Bazar	207	89	42.99
7.	Shoes	Ramganj Bazar	321	49	15.26
		Johari Bazar	361	20	5.54
		Indira Market	556	24	4.31
		Chandpole Bazar	494	17	3.44
8.	Books and Stationery	Chaura Rasta	316	63	19.93

6.4 ANALYSIS OF RETAIL AFFINITY

Empirical studies of retail affinity have seldom yielded substantial findings. Ideally retail clusters need to be interpreted more especially through the functioning of the property market. The locational decision making of entrepreneurs, the market behavior of retail firms and the shopping habits of distinctive consumer groups. In the case of certain trades historical reasons have played their role in clustering them in certain parts of the city. Sculpturing, Jewellery, hardware, auto-vehicles and their auxiliaries are such commodity.

Jaipur on account of its architectural & planning and constructional activity has produced a community of "salavats"(stone engravers). They were located in a part of Topkhana Desh, but to serve in different parts of the city and the country. In Times to come the engravers turned traders and that too in their homes. This is why certain lanes of this Chowkri have a sequence of their establishments. Their next door neighbours are none else except the sculptors. 166 of these establishments have their own kind as the next door neighbours. One of the blocks in the Chowkri is surrounded by lanes all round and shops of salavats. There is not a single shop of any kind in their midst. It is an example of high degree adjacency of business, clustering of shops of the trade, as well as of residential land use being changed commercial land use. The customers in this area are all purposeful purchasers. Wherever there is any break in sequence of this trade it is by clinic which is a necessity in a residential area.

6.5 DISTRIBUTION OF SHOPS

It is interesting to know on an average the number of shops per 100 persons in Jaipur and compare it with some other cities in India. These are given below:

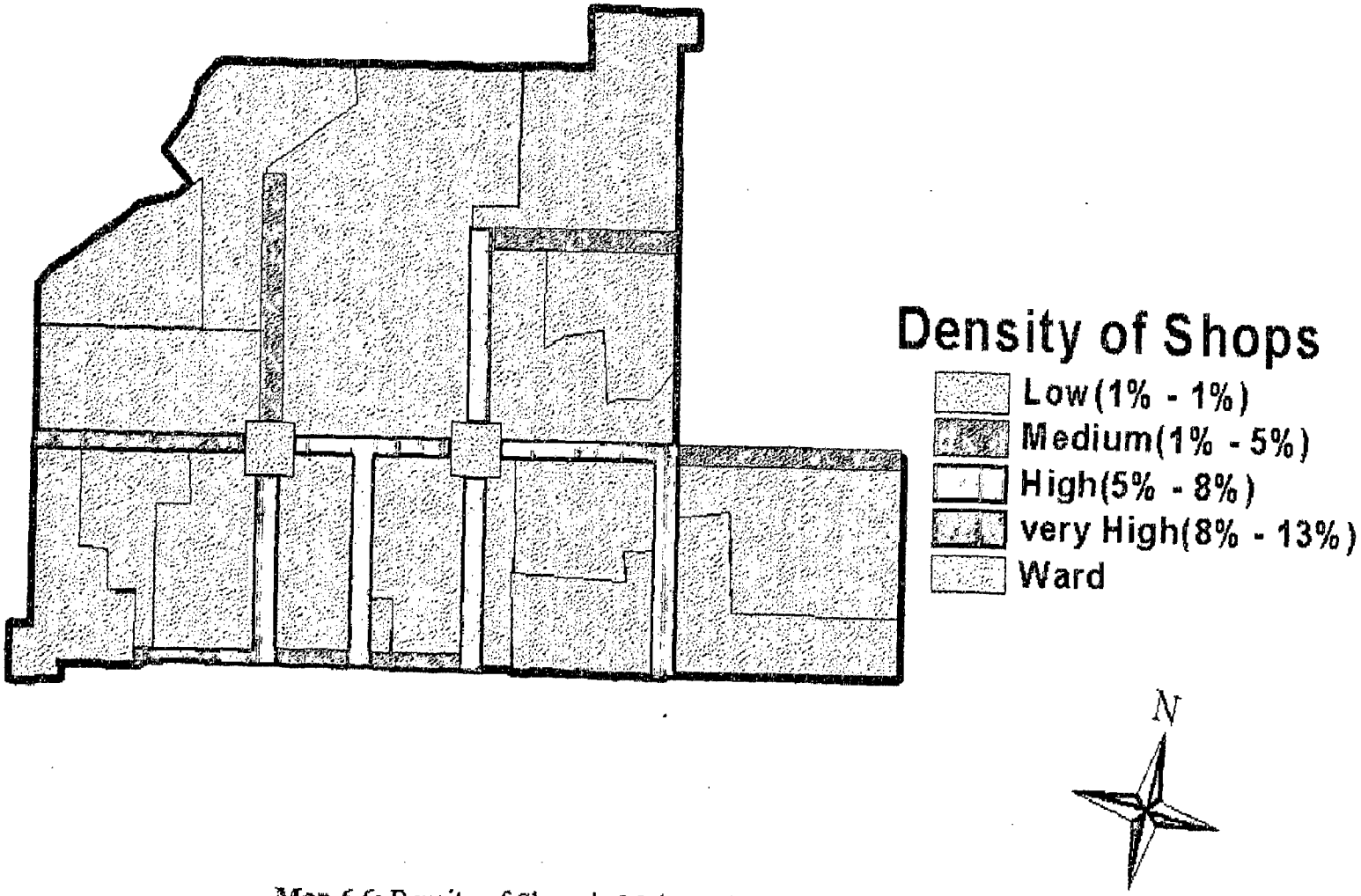
Table 6.7: Average No. of Shops in India

City	Average No. of shops per 100 persons
Jaipur	2.5
Nagpur	0.6
Bikaner	1.79
Bangalore	1.16
Patna	2.61

Source: Geography of Market centers: M.K khandelwal (A Research paper)

The total number of shops in Jaipur is 29,253, spread over a total area of 210 sq. km. Thus an average density comes to 139 shops per sq. km. Al though this average is relatively higher as compared to Bangalore where it is 134 shops. However, it is a crude density of shops because in a small area of 7.6 sq.km. of the walled city there are 119 markets while in an area of 202.4 sq. km. in the extra-walled city separately. They have almost an equal number of shops.

Density of Shops in Main Markets of Walled City ,Jaipur

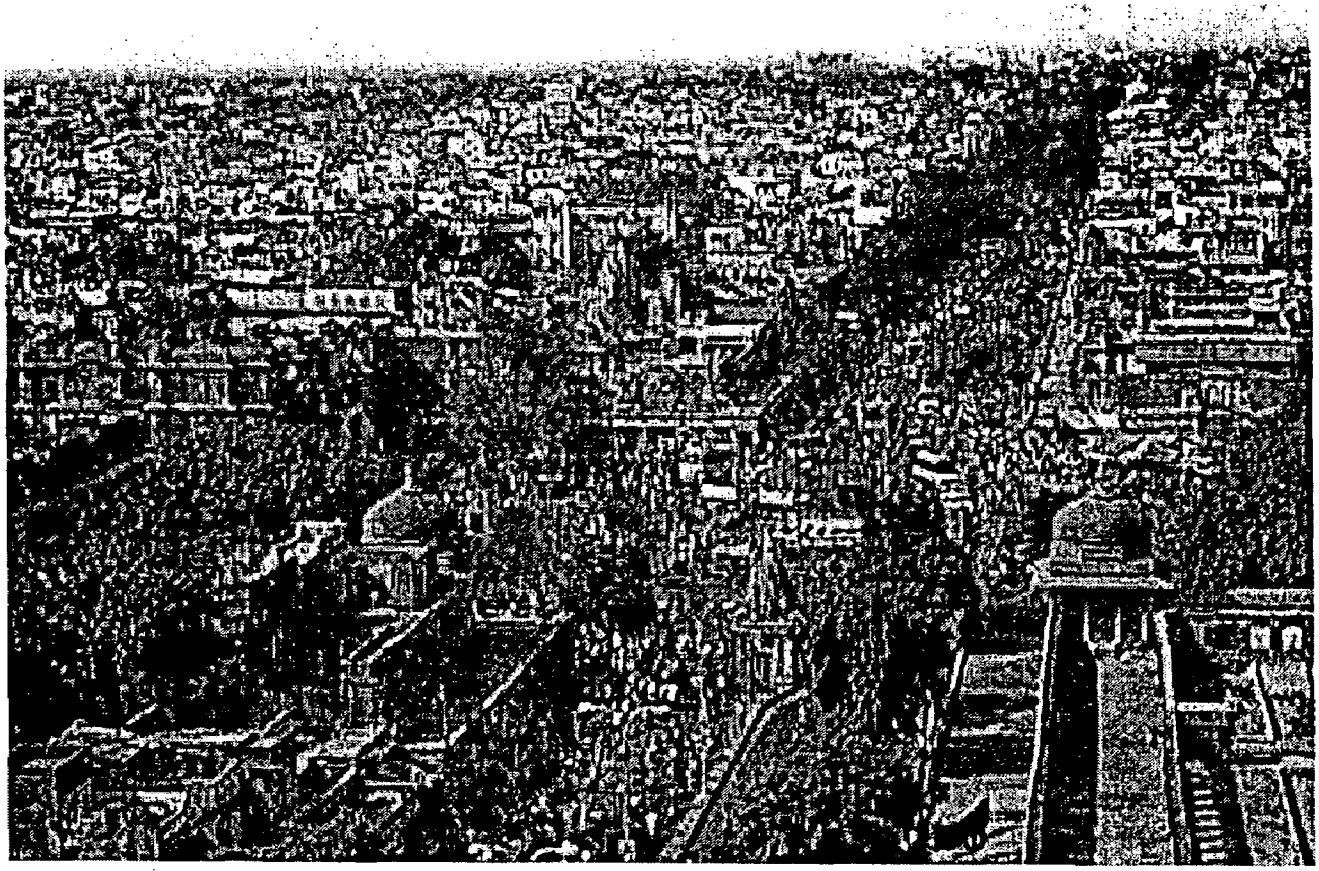


Map 6.6: Density of Shops in Main markets of Walled City, Jaipur

But the density within the walled city is 1964 shops per sq. km. and only 70 shops per sq. km. outside. From this it is clear that there is a higher concentration of shopping activity within the walled city. Contrarily, the shops and shopping activities are highly scattered and sparred outside. This congestion may be viewed against the background of uniform shape and size of shops within the walled city. In this connection it may be recollected that the size and shapes of shops within the walls are equal and the main facade is 10 feet.

Chapter 7

EFFECTS OF COMMERCIAL ACTIVITIES IN WALLED CITY



Photograph 7.1: View of Chhoti Chaupar, Walled City, Jaipur. (Courtesy: Rajasthan patrika)

7.1 EFFECT OF COMMERCIAL ACTIVITY ON PHYSICAL INFRASTRUCTURE

Table 7.1 Population Projection for Jaipur

Year	Walled City Pop. (Lakhs)	Outside walled City Pop. (Lakhs)
1991	3.95	10.21
1996	3.81	14.20
2001	3.50	19.53
2006	3.76	26.72
2011	4.06	36.40
2016	4.38	49.43

Source: Eekas International Planning and Design Consultants, New Delhi - Draft final report

Calculation of Daytime Population

This calculation is done to find out how many people are using the physical infrastructure.

People (Workers + Consumers) per ha. of commercial land

people attracted due to commercial activity = 1500x230 = *3,45,000.*

Considering that 1/2 of workers of walled city i.e. *75,000* go outside walled city for work the day time pop. of walled city.

Daytime Population = Resident population - outgoing workers + incoming

= 4.97-0.75 + 3.45 = 7.67 lakhs.

7.1.1 STRESS ON TRANSPORTATION

Table 7.2: Stress on Transportation

Markets	Peak Hour (C.P.G.U/Hr)	Traffic Flow	Capacity of Road	Adjoining Land-use	Avg. Speed
Chandpole Bazaar	6000	7500	2400	Whole sale/retail/informal	<15 K.P.H.
Kishanpole Bazaar	4430	5900	2400	Whole sale /Retail/ informal	20 K.P.H.
Johari Bazaar	4710	6400	2400	Whole sale/retail/ informal	<15 K.P.H.

Source: NATPAC , New Delhi- Jaipur Urban Transportation Study

7.1.2 STRESS ON WATER SUPPLY

Table 7.3: Stress on Water Supply

Demand Commercial	Total Demand	% of Commercial to Total	Deficit Supply	Period of Availability	Remarks
(In m.l.d.)	(In m.l.d.)		(In m.l.d.)		
8	72.50	11%	35	1 HR/Day	Not Very high stress on water supply due to commercial activity as consumption is less by commercial activity

7.1.3 STRESS ON ELECTRICITY SUPPLY

Table 7.4: Stress on Electricity Supply

Year	Demand Commercial (In million units)	Total Demand (In million units)	%of commercial to Total	Deficit Supply	Period of Supply	Remarks
1996	40	170	23.5	Nil	24 Hrs.	Share of commercial to total in use of electricity to be increase in future ,now high stress on electric supply
2001	205	29.5	-	-	-	
2006	80	240	33.3	-	-	
2011	100	285	35.1		-	
2016	130	37.1	-	-	-	

Source: *R.S.E.B., Jaipur*

7.1.4 STRESS ON DRAINAGE SYSTEM

In walled City of Jaipur waste water generated by commercial activities is 11 % of total waste water generated. But as already load is 5 times the design capacity of the drains so they are choked. Stress is due to population increase.

7.1.5 STRESS ON SOLID WASTE DISPOSAL SYSTEM

Increasing polymer compounds in packing and distribution of products have changed the composition of garbage. Otherwise stresses due to commercial activity are generally localized to whole sale market locations.

Table 7.5: Projected Solid Waste Generation

Year	Solid Waste By Commercial Activities (M.T.)	Generation Total
1991	30	230
1996	32	240
2001	33	253
2006	34.5	265
2011	36.3	279
2016	38.0	293

Source: Eekas International Planning and Design Consultant, New Delhi - Draft final report

7.2 CHANGES IN MARKET FACADE

The walled city is the most valuable asset of Jaipur manifesting some very important principles of urban architecture. An analysis of the facade shows that there is a fairly rigid control of ground-floor level, the level of shopping, and as one goes up, a reasonable flexibility. Thus in spite of the use of single color all over the main markets, sufficient variation of elements in the facades avoids monotony. All these buildings erected over so many centuries represent more than a mere collection. The city pattern, to which the eighteenth century likely contributed most, binds them together in a design or mosaic that possesses more harmony and order than plan. Unity is found in the cozy compactness of the city within the wall, in the continuity of shop facades along the straight streets, in the sympathetic repetition of quartz, pink color and kangooras as decorative structural material, and in the clustering of districts. The Chaupars themselves have been knit in the webs of street hierarchies, markets domed structures, Jharokas, Chhajas, Jalis, motifs, frescos, etc. Thus, Jaipur remains a medieval city, even though some of its buildings are of more recent date and style, even though old frontage lines have been smoothed and old buildings refaced.

However, a lot of damage is being done within the city walls by new constructions coming up like sores. The replacement of the colored awnings and colored tin shades on shop fronts with masonry verandas with usual kangooras and uniform signboards has been a continuous improvement in the market facade till the forties. But the encroachment of the shops into these verandas during the sixties has not only disturbed the uniformity of shop fronts but also deprived the buyers their comfort. This has also narrowed down the well-known wide main markets overcrowded the pavements and the roads and created

traffic hazard. The verdict of the Supreme Court to get these verandas vacated has also been thwarted. The obscene iron merchants at the head of the Chaura Rasta, just in front of the gate of City Palace is a public nuisance and must be shunted outside the walls.

The shopkeepers have also lowered the plinths of the shops to pavement levels to modernize the facade but at the same time they have invited hazards during excessive rains when flood waters enter into their premises.

The trader today does not want to meet the prospective customers on the pavement. This is why the Jaipur city trader has reduced the plinths and changed the facade. But this is no reason to change the harmony and traditional architecture that invites the foreign customers and the tourists. The modern trader has a chance to be modern and sophisticated out of the city walls. For overnight security there are the grilles and shutters. The facade acts as a visual barrier to the interior while the latter uses the actual shop interior as the prime display feature. An open shop front does not preclude the use of individual free-standing showcases which are, in fact, the most suitable display vehicle for valuable items. An open front, on the other hand, is one where no obstruction, physical or psychological, separates the interior from exterior. Under these considerations one should be satisfied with either style, one being developed within the city. The JDA has a number of these types schemes of commercial complexes like the Nehru Place, Indira Place, etc.

It may be argued that it is not conducive to successful retailing or pleasant shopping to impose over-restrictive controls in types of display facade, signing, or other characteristic trading features, in order to present a "unified" total concept in which the individual shopping expression is subordinated to a standard over all pattern.

A argument to the aforesaid plea may be that not only the freedom to design but even a slight change in color shade of the facade at various places is greatly altering the character of the Pink City, which was decided upon after long experimentations by Maharaja Ram Singh in the last century and presently by the Municipal Council which has prescribed a particular hue of the color and the restrictions on the new Constructions on the upper floors. The Lakshmi Mishthan Bhandar, the so-called L.M.B. , a multi-storied hotel-cum-restaurant in Johari Bazar in the middle of the traditional architecture, first and second floors consisting of jharokas, domed structures with spires, terraces, motifs and frescos, has marred the total harmony of the market facade.

The increasing construction of buildings on the upper floors in designs other than the

tradition reduces the city into a mass of concrete structure which no tourist-national or international- would come to see. The nation and the State would lose millions of dollars of invisible income. If this destruction of is not arrested immediately the country would lose its Pink City once for all.

The "Havelies" perhaps are equally threatened like the numerous types of urban dwellings, due to their important locations and the large pieces of prime land they invariably tend to occupy. The pressures of commercial development has started eating away this unique house-form also. The "Havelies" could be converted to adaptive re-use, keeping in mind their original functions. Small hotels and guest houses could well be accommodated within them. This would provide most sought out space for tourist accommodation, welcome specially to the Western tourists and be one way of restricting, by proper enforcement, the penetration of commercial function into residential areas.

Individually these buildings may not show facades of great architectural quality but taken as a group, they form an outstanding element of this city-scape. If the facades along the main Bazars cannot be preserved, it can be assumed that the character of Jaipur cannot be preserved. Even if the internal changes are made by the owners, the external facade must be maintained. If urgent steps are not taken to protect the original planning, a very valuable piece of India's urban heritage would be lost for. ever. Of all conservative efforts, this should be given a top priority. The requirement of such controls in conservation areas can be made good by creating an Urban Art Commission that function well and make available architectural & planning advice to local authorities in carrying out development and control functions. A band of masons and allied craftsmen should be trained for it. Subsidies for retaining or reconstructing the traditional facades will go a long way in the maintenance of the tradition.

7.3 CHANGES IN NUMBERS *OF* FLOORS

Sawai Jai Singh had originally planned to build shops only on the ground floors but now they are growing vertically also due to commercial expansion and limited space to meet with the growing demand for more shops. This expansion started during forties, early the a phenomenon which is speeding up considerably even today. The ground floor shops are economizing space by going either down to the basements or erecting a sub-ceiling and creating sub-floor called balcony. Business is increasing on the first and higher floors in many commercial establishments more specially in the walled city where residential accommodation even on the upper floors is being converted into commercial use with a

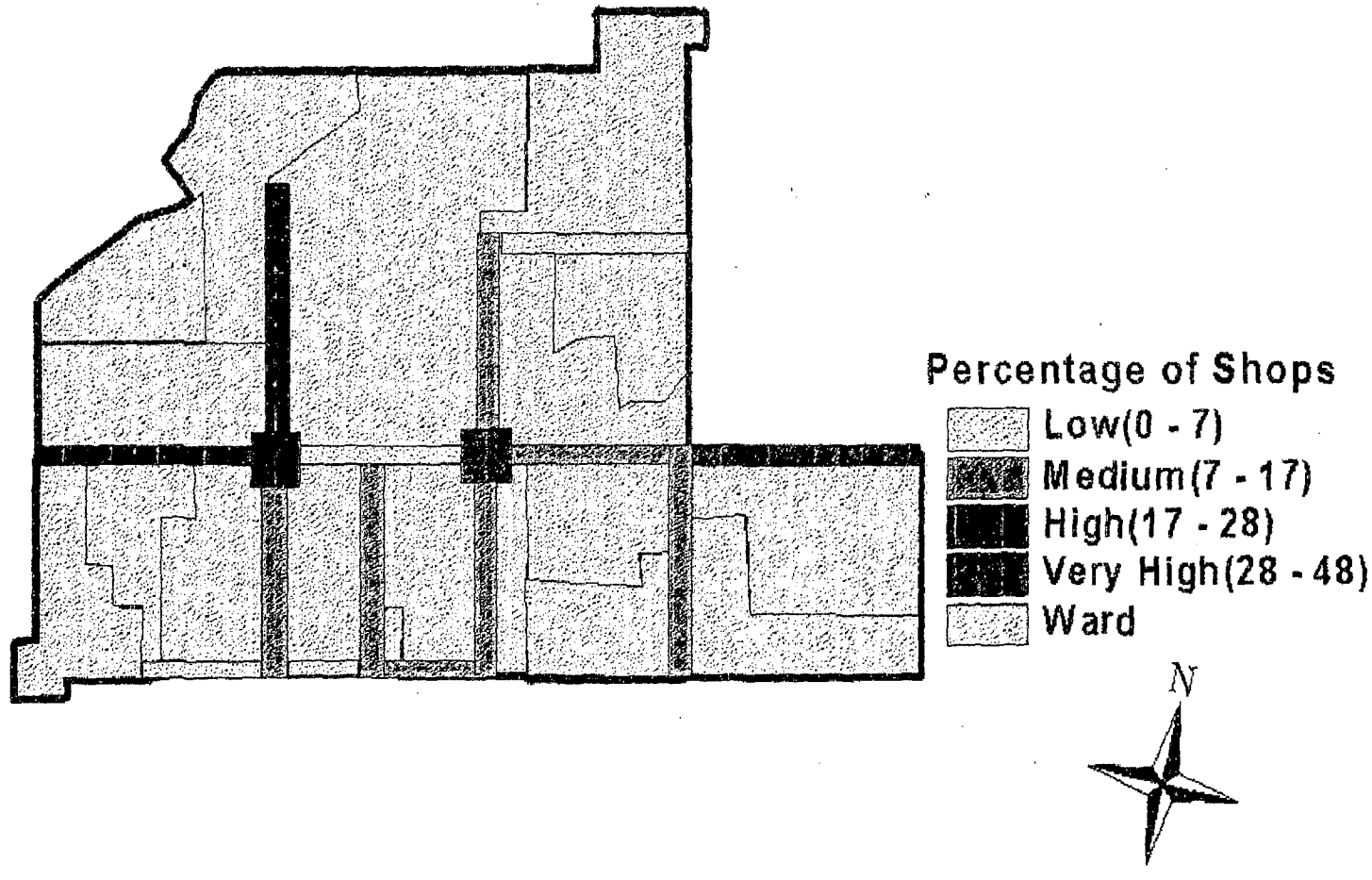
remarkable speed. However, shops are numbered not by no. of floors but by function. For example, if a shopper owns a cloth shop on the ground floor as well as on the first floor, it is counted as one shop. But if he owns a cloth shop at the ground floor and a Electronic items shop on the first floor, these are counted as two shops. Here the shops are classified according to functions and their floors are described as follows **(Map 7.1) (Table 7.6):**

1. Ground floor shops
2. Ground floor with basements
3. Ground floor with balconies
4. First floor shops
5. Second floor shops
6. Third floor shops
7. More than third floor shops (multi-storied)
8. Ground plus first floor shops
9. Ground to second floor shops
10. Ground to third floor shops
11. Ground to more than third floor shops
12. First to second floor shops
13. First to third floor shops
14. Second to third floor shops.

Table 7.6: Upper Floor Shops in Main Markets of Walled City, Jaipur.

S. N.	Name of the Market	No. of Shops
1.	Chandpole Bazar	94
2.	Chaura Rasta	38
3.	Johari Bazar	37
4.	Kishanpole Bazar	33
5.	Bapu Bazar	23
6.	Nehru Bazar	13
7.	Tripolia Bazar	12
	Total	250

Total Percentage of Upper Floor Shops in Main Markets of Walled City ,Jaipur.



Map 7.1: Total Percentage of Upper Floor Shops in Main markets of Walled City, Jaipur

7.4 CHANGES OF OLD RESIDENTIAL HAVELIES (MANSIONS) INTO MARKETS

Being the capital of the State Jaipur had been the abode of many Thikanedar, Jagirdars and big landlords, who had built their huge residential buildings, and Kothis and gardens in Jaipur. In modern times with the change in economies, rise in rental values, etc. tended the dignitaries to better utilize their big mansions for higher rents and for that purpose to covert their big mansions for higher rents and for that purpose to convert their large mansions into markets. In general these had been lying vacant or partially used. By using them for lucrative business, the fashionable shopping centres have come out in different parts of the city. A list of such markets is given here:

Table 7.7: List of old Residential Havelies changed into Markets

S. N.	Name of Markets	Name of Havelies	Location of Market
	Chowkari Ramchandraji		
1.	Munshi Shopping Centre	Munshiji ki Haveli	Ramganj Bazar
2.	-	Chaudhary Bhawan	Sireh Deori Bazar
	Chowkari Purani Basti		
3.	Ashiyana Complex	Barion ki Haveli	Govindraoji ka Rasta(Chandpole Bazar)
	Chowkari Topkhana Desh		
4.	Dadheech Market	Dadheech Bhawan	Khajanewalon ka Rasta(Chandpole Bazar)
5.	Roliwal Market	Roliwal Bhawan	Khajanewalon ka Rasta(Chandpole Bazar)
6.	-	Tatar Khane Walen ki Haveli	Baba Harish Chandra Marg (Chandpole Bazar)
7.	Agarwal Market	Agarwal Bhawan	
	Chowkari Modikhana		
8.	Bichoon Market	Bichoon House	Kishanpole Bazar
9.	-	Raja Udaisingh ki Haveli	Tripolia Bazar
10.	-	Kishore Niwas	Tripolia Bazar
11.	-	Basant Bhawan	Natanion ka Rasta (Tripolia Bazar)
12.	Radha Govind Hardware	Nasmal Lalchandra ki Haveli	Natanion ka Rasta (Tripolia Bazar)
13.	Darnodar Market	Uttam Tamboli ki Haveli	Lalji Sand ka Rasta(Chaura Rasta)
14.	Dhamani Market	Raja Jaikumar ki Haveli	Chaura Rasta
15.	-	Alooda Bhawan	Chaura Rasta
16.	Mahalakshmi Market	Dooni House	Natanion ka Rasta

	Chowkari Vishwesar Ji Ki		
17.	Kamla Market	Thakur Raghuveer ki Haveli	Hanuman Ka Rasta (Bapu Bazar)
18.	-	Dhoola House	Hanuman Ka Rasta (Bapu Bazar)
19.	Jain & Saveti Market	Thehtera House	Bapu Bazar
20.	Baradia Market	Baradia Building	Johari Bazar
21.	-	Tedkion ki Haveli	Gopalji ka Rasta
22.	-	Digpalji ki Haveli	Gopalji ka Rasta
23.	Jewellers Market	Patodia Bhawan	Gopalji ka Rasta
24.	Katla Mahantji	Mahantji ki Haveli	Kashinathji ki Gali Gopalji ka Rasta)
25.	-	Vyas Bhawan I	Choura Rasta
26.	-	Vyas Bhawan II	Choura Rasta
27.	-	Nawab Sahab ki Haveli II	Tripolia Bazar
28.	Kotha Wala Market	Nawab Sahab ki Haveli I	Tripolia Bazar
29.	-	Purohitji ki Haveli	Purohitji ka Katla (Johari Bazar)
30.	-	Malpani Bhawan	Purohitji ka Katla (Johari Bazar)
31.	-	Darjion ki Haveli	Purohitji ka Katla (Johari Bazar)
32.	-	Sooraj Bhawan	Purohitji ka Katla (Johari Bazar)
33.	-	Laxmi Narainji ki Haveli	Purohitji ka Katla (Johari Bazar)
34.	Agrasen Market	Nana Sahab ki Haveli	Johari Bazar
35.	-	Haldia House	Johari Bazar
36.	-	Bulian Building	Haldion ka Rasta(Johari Bazar)
37.	Lal Katra	Surana Bhawan	Haldion ka Rasta(Johari Bazar)
38.	Dadda Market	Dadda House	Johari Bazar
39.	Champawat Market	Champawat Bhawan	Dada Bazar (Haldion ka Rasta)
40.	Lunawat Market	Sala House	Darha Bazar (Haldion ka Rasta)
41.	-	Noval Bhawan	Darha Bazar
42.	-	House No.2139	Darha Bazar (Haldion ka Rasta)
43.	Kanota Market	Kanota House	Darha Bazar
44.	Agrawal Complex	Sumerkaran ji ki Haveli	Ramganj Bazar

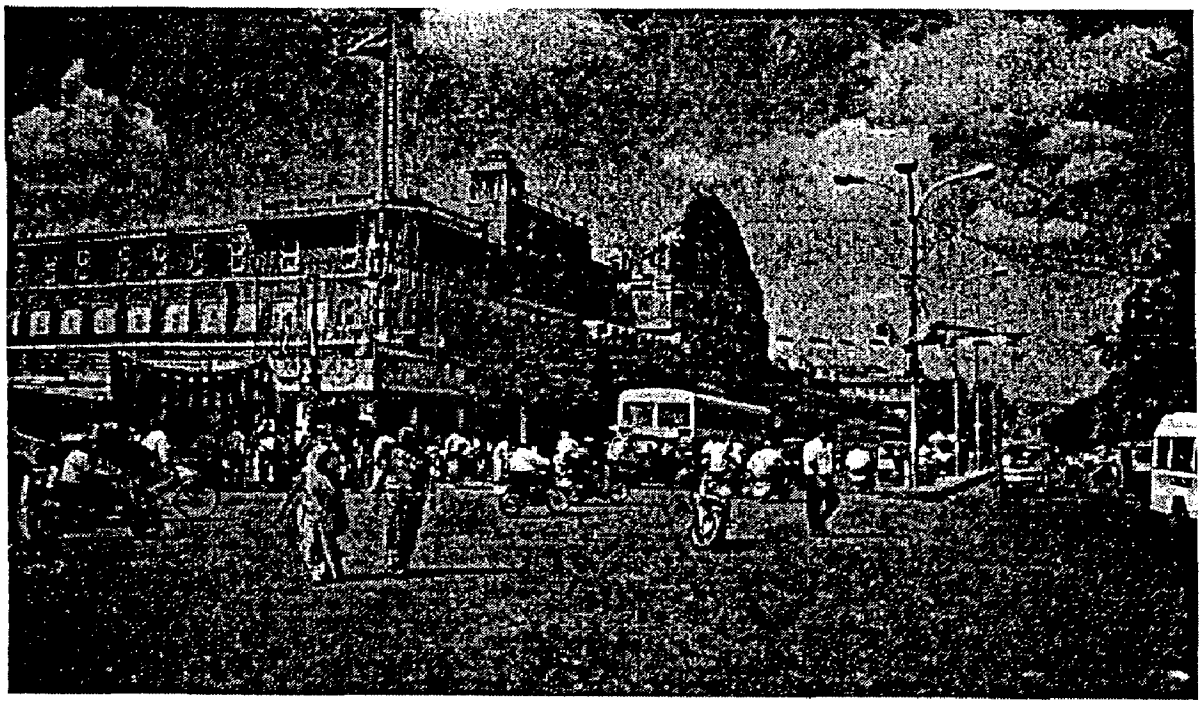
Table 7.8: Changes of Old Residential Havelies into Markets

S.N.	Name of Place	Name of Markets	No. of Shops
1.	Munshi ji ki Haveli	Munshi Shopping Centre	29
2.	Chaudhary Bhawan	-	6
3.	Barion ki Haveli	Ashiyana Complex	37
4.	Dadheech Bhawan	Dadheech Market	4
5.	Roliwal Bhawan	Roliwal Market	18
6.	Tatar Khane Walen ki Haveli	-	38
7.	Bichoon House	Bichoon Market	27
8.	Raja Udai Singh ki Haveli	-	29
9.	Kishore Niwas	-	67
10.	Basant Bhawan	-	13
11.	Nasmal Lalchandra ki Haveli	Radha Govind Hardware Market	30
12.	Uttam Tamboli ki Haveli	Damodar Market	7
13.	Raja Jaikumar ki Haveli	Dhamani Market	40
14.	Alooda Bhawan	-	10
15.	Dooni House	Mahalakshmi Market	88
16.	Thakur Raghuveer ki Haveli	Kamla Market	12
17.	Dhoola House	-	108
18.	Agrawal Bhawan	Agrawal Market	24
19.	Thethera House	Jain & Saveti Market	34
20.	Bardia Building	Bardia Market	34
21.	Tedkion ki Haveli	-	9
22.	Digpalji ki Haveli	-	27
23.	Patodia Bhawan	Jewellers Market	11
24	Mahantji ki Haveli	Katla Mahantji	19
25.	Vyas Bhawan I	-	12
26.	Vyas Bhawan II	-	8
27.	Nawab Sahab ki Haveli II	-	21

28.	Nawab Sahab ki Haveli I	Kotha Wala Market	28
29.	Purohitji ki Haveli	-	64
30.	Malpani Bhawan	-	6
31.	Darjion ki Haveli	-	2
32.	Sooraj Bhawan	-	16
33.	Laxmi Narainji ki Haveli	-	18
34.	Nana Sahab ki Haveli	Agrasen Market	29
35.	Haldia House	-	18
36.	Bulian Building	-	53
37.	Surana Bhawan	Lal Katra	27
38.	Dadda House	Dadda Market	23
39.	Champawat Bhawan	Champawat Market	20
40.	Sala House	Lunawat Market	12
41.	Noval Bhawan	-	6
42.	House No. 2139	-	6
43.	Kanota House	Kanota Market	45
44.	Sumerkaran ji ki Haveli	Agarwal Complex	187

Chapter 8

FINDINGS AND PROPOSALS/RECOMMENDATIONS



Photograph 8.1: View of Sireh Deori Bazar of Walled City, Jaipur (Dec., 2003)

Chapter 8 FINDINGS AND PROPOSALS/RECOMMENDATIONS

8.1 MAJOR FINDINGS

The findings / issues have been categorized into :

(i) Those pertaining to urban form of walled city of Jaipur and

(ii) Those pertaining to physical infrastructure (transportation) of walled city of Jaipur.

8.1.1 Urban Form

a) Loss of uniform traditional architectural character - on main Bazaar roads shops hitherto confined to ground floor are moving up in some cases up to G + 2 floors with no regard to traditional architectural character.**(Photograph 8.2)**

b) Commercial activity has proliferated inside Chowkries (residential sector). **(Photograph 8.3)**

(i) Secondary and tertiary roads of Chowkries have seen growth of both retail and wholesale trade. **(Photograph 8.4)**

(ii) Commercial complexes are getting constructed (up to G + 4 storeys) in residential streets of Chowkries, mostly by demolition of traditional houses. **(Photograph 8.5)**

(iii) Thari, Thela and Squatters are developed in the left out spaces within the walled city.

(iv) The shops pertaining to the food items are decreasing in numbers in the walled city, while increasing outside due to the limitation of space inside the city. And the shops of Fancy, Household, Miscellaneous and Services are increasing; Shops of higher order goods have found a site in the CBD, while the shops of lower order goods have either shifted to the tertiary market areas.

(v) Havelies are changing to shopping complexes and their courtyards are also being used for commercial activity/parking. **(Photograph 8.6)**

(vi) Whole sale trade has taken storage to the streets of residential sectors/open spaces of these sectors. **(Photograph 8.4)**

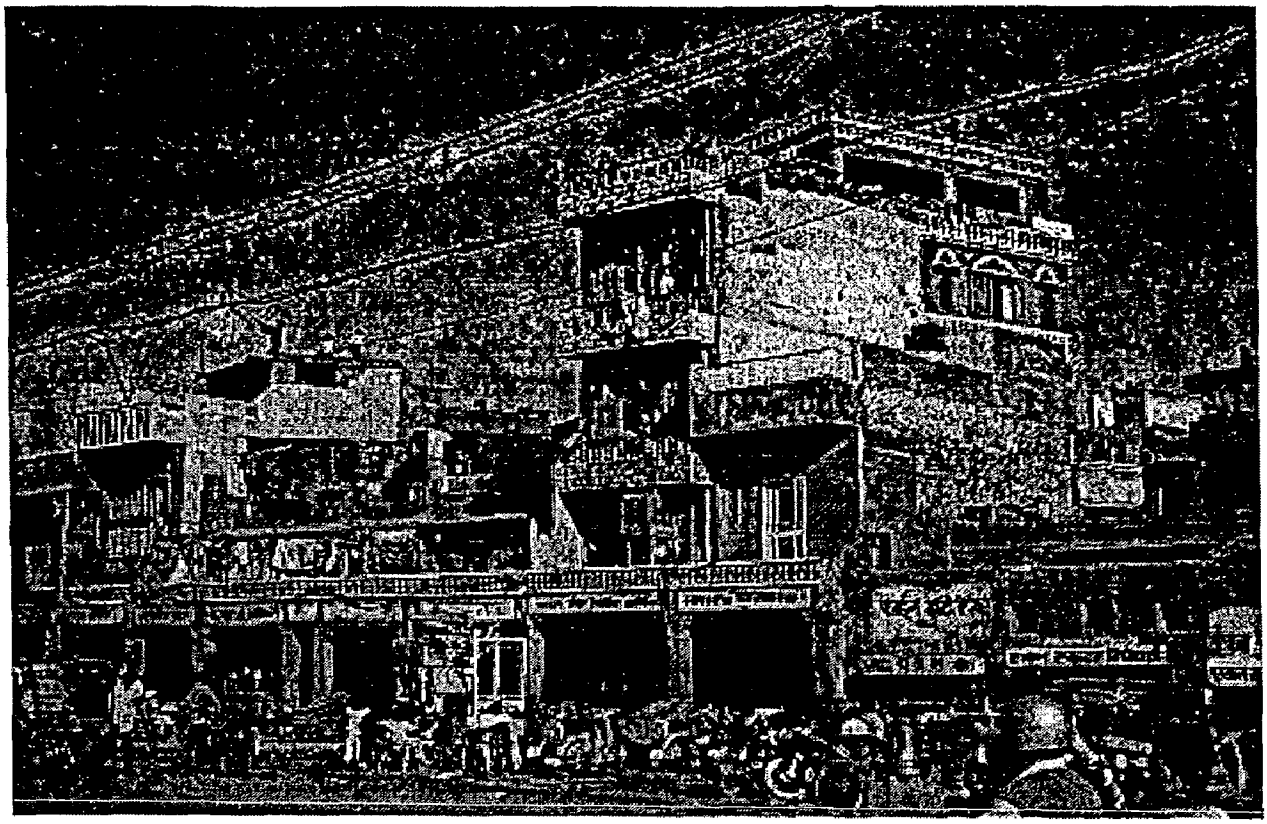
8.1.2 Physical Infrastructure (Transportation)

(A) TRAFFIC VOLUME

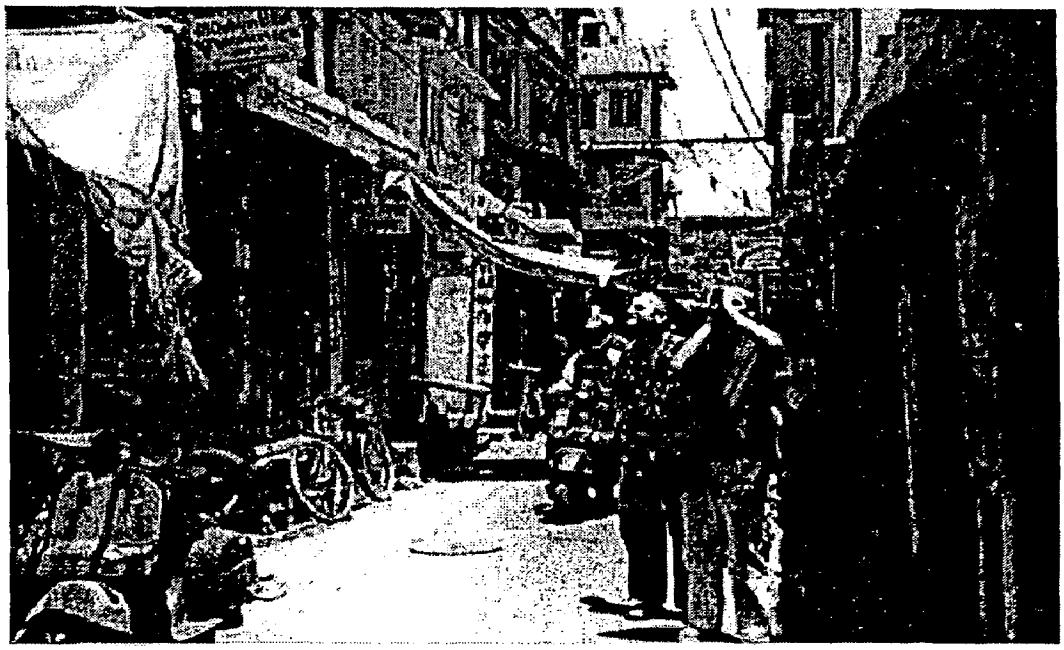
Main Bazaar streets are already carrying traffic 2-3 times their maximum capacity at peak hours. This is partially because their carriageway is being used for on street parking

(B) TRAVEL SPEED –

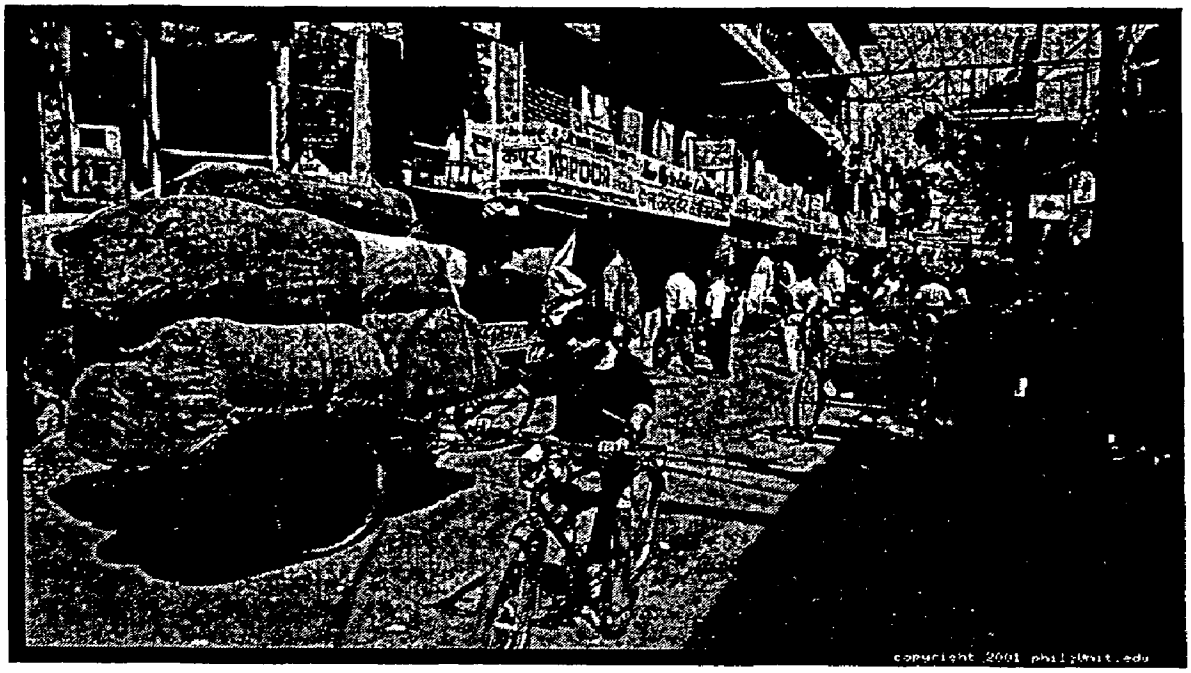
Average speed in main bazaar streets is about 20 K.P.H. this is because of mixed mode of transport plus heavy traffic volume.(Photographs: 8.7 & 8.8)



Photograph 8.2: View of Kishan Pole Bazar, walled City, showing loss of uniform traditional architectural character (Feb., 2004)

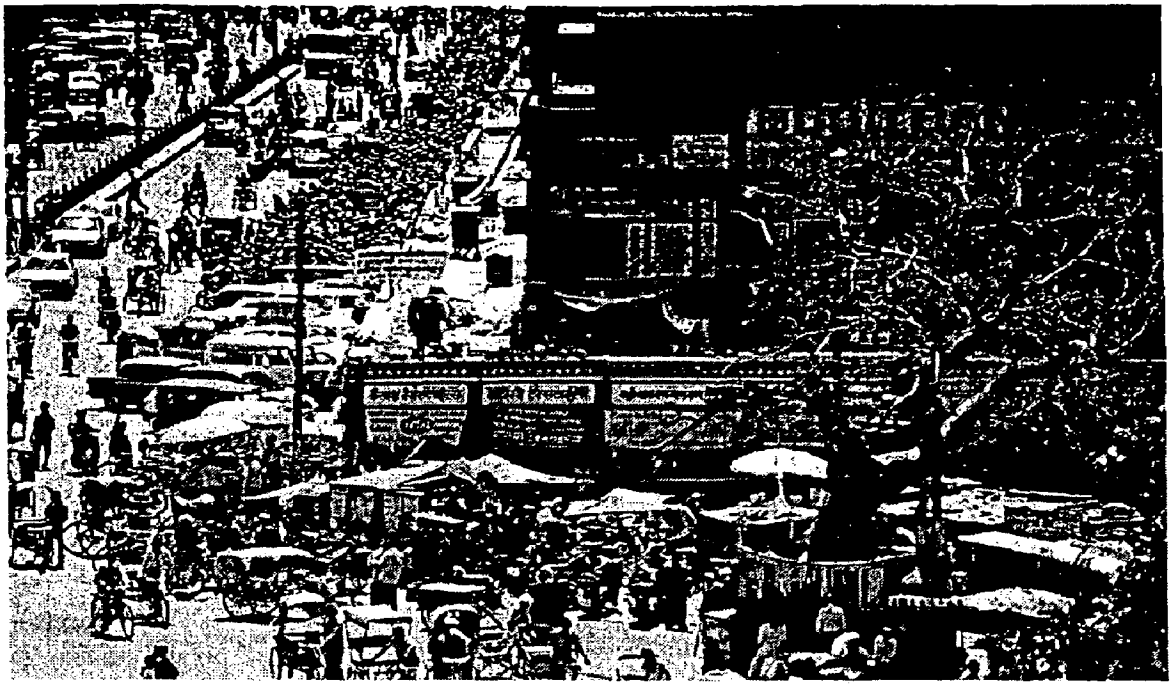


Photograph 8.3: View of Vidyadhar ka Rasta (Subsequent market), showing commercial activity inside Chowkries (residential sector). (Feb., 2004)

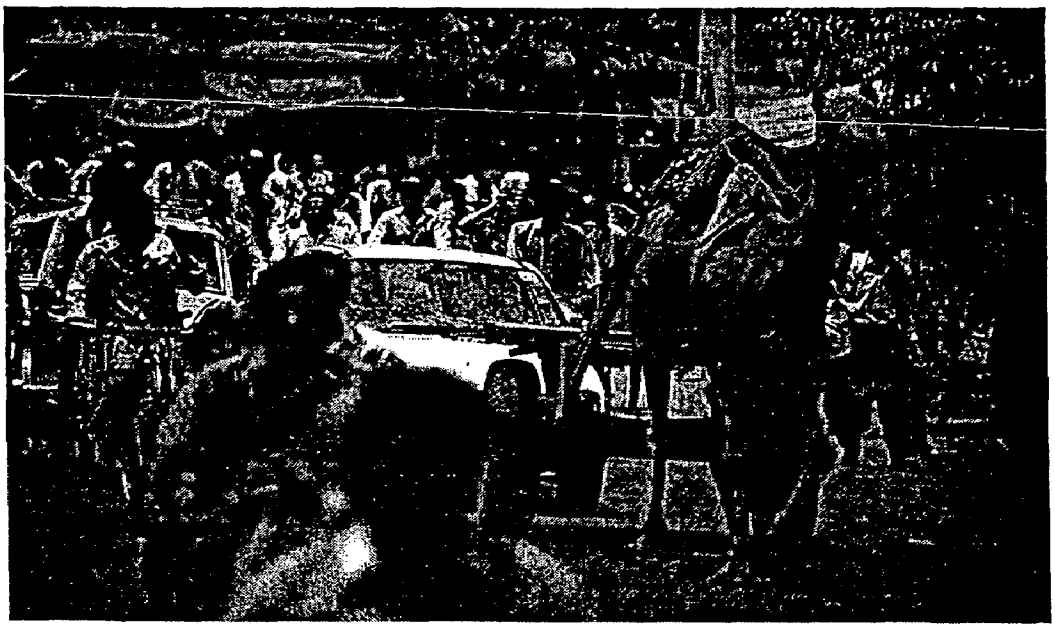


Photograph 8.4: Film colony Market of both retail and wholesale trade

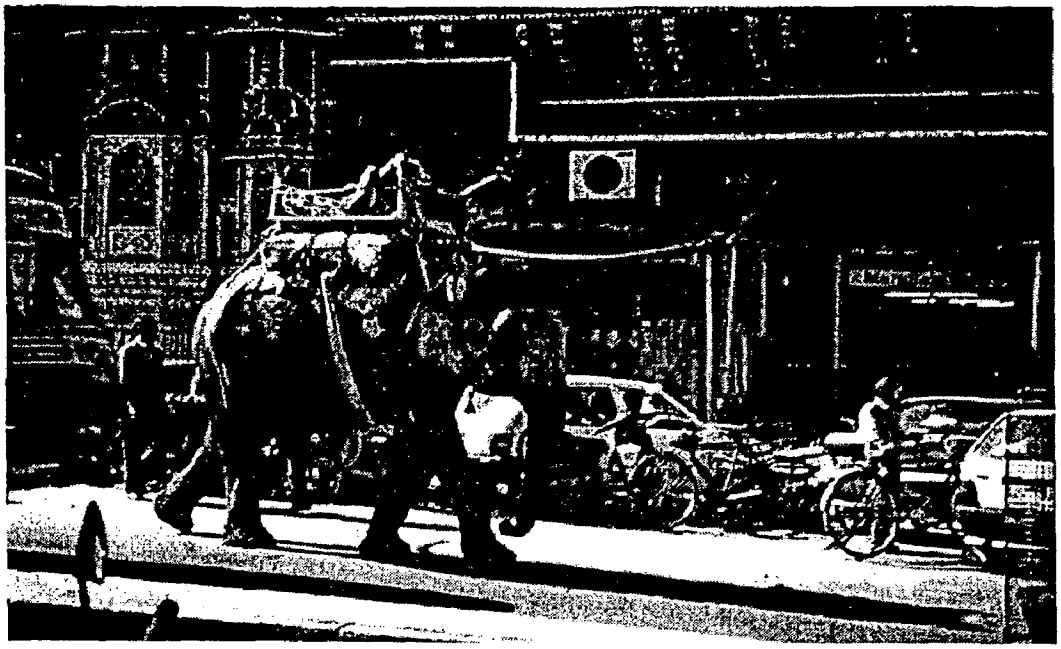
Photograph 8.5: Punjabi tower at Main Chaura Rasta, constructed by demolition of old Haveli. (Feb., 2004)



Photograph 8.6: Side View of Badi Chaupar shopping complex. (Dec., 2003)



Photograph 8.7: View of Sireh Deori Bazar showing mixed mode of transport (Dec., 2003)



Photograph 8.8: View in front of Hawa Mahal showing mixed mode of transport (Dec., 2003)

(C) PARKING:

(ii) Due to inadequate parking space and ever increasing parking demand the vehicles can be seen parked in two rows on the carriageway and even footpaths are occupied with parked vehicles.

(iii) The perceptions of the people visiting the area are that they face problems in locating a parking space and the restriction of parking to one hour duration is a problem.

(iv) The available spaces can meet only two-thirds of the demand thus leaving an unsatisfied demand of one-third.

(v) The existing off-street parking lots are ill managed and are lacking in design and suffer from the absence of systematic design and regulations.

(vi) The projected parking demand shows that the parking spaces have to be created in the form of off- street parking lots besides regulating the present kerb side parking.

(vii) Parking accumulation reaches maximum by 1200 h in the morning and comes down for couple of hours in the afternoon and again reaches maximum accumulation during evening hour.

(viii)Sixty percent of cars and 55% of two-wheeler are parked for less than half an hour.

8.2 PROPOSALS / RECOMMENDATIONS

8.2.1 General Scenario - Walled City of Jaipur

Relation between walled and extra walled city of Jaipur

The relationship can be studied along the following periods

1. 1727 A.D. - 1930 A.D.

From its existence till 1930 AD. walled city was the city of Jaipur and the seat of administrative and economic power.

2. 1930 A.D. - 1971 A.D.

Proliferation of commercial activity just outside the walled city (along M.I. Road) took place in this period.

Coming up of 5 residential schemes - A, B, C, D & E- up to 5 km. from walled city in 1940's and they were fully developed by 1970's. No appreciable commercial areas developed in these 5 residential schemes.Walled city had retained its primacy.

3. 1971 A.D. - 2004 A.D.

1991 – 2011 Master plan recognizes walled city as central business area.

Proliferation of private and Government housing colonies in 1990's.

Tremendous Increase in population but not commercial centers outside walled city.

Commercial centers developed in colonies more on an average 5 kms. from walled city and not in old 5 residential schemes, thus even now walled city is catering to day-to-day needs of around 5 lakh pop of nearby colonies.

Scenario for Proposals:

(a) Walled city will have a population of 4.38 lakhs by 2016 AD at and extra walled city's population will be 49.43 lakhs.

(b) Total increase in work force will be 80,000 in walled city alone.

(c) In retail trade major increase will be in fancy items, cloths and services.

(d) Danger of walled City becoming a total commercial district.

8.2.2 Thrust Areas for Proposal

Aim of the Proposal: "To retain city the walled city and to restrict proliferation of commercial activity in it."

Three "thrust areas" have been identified to reach this aim. These thrust areas are

(i) Conservation of unique Urban Planning character of walled city;

(ii) Regulation of commercial development inside the walled city;

(iii) Minimization of stress on transportation

8.2.2.1 Thrust Area- I:

Preservation of unique Urban Planning of walled city

At City Level

Present Status: Jaipur Urban Conservation Board (JUCB), which to be setup under JDA Act 1982 has not been constituted so far.

8.2.2.1.1 Recommendation 1:

J.D.A. is to prepare ZDP for walled city. JUCB to be setup with powers to identify plan urban conservation schemes and indicate the authority to execute them; ii) implement any scheme, entrusted to it by J.D.A. and exercise powers & functions delegated to it by J.D.A.

People's Participation

Present Status

Except for ward members of Municipal Corporation from the walled city there is no participation at any stage of development in walled city by the residents.

8.2.2.1.2 Recommendation 2:

Initiate Urban Community Development (UCD) projects through Municipal Corporation. Consultation with C.B.O's and traders association in any development project in walled city should be made mandatory. Facilitate entry of N.G.O.'s at macro-policy formulation and Program design level e.g. in JUCB.

8.2.2.2 Thrust Area- II

Regulation of Commercial Development inside Walled City or Development Control Measures (Commercial)

Present status:

Maximum height permitted is 3 m for commercial use and G + 2 for residential use- gross violation of this is being witnessed due to rampant corrupt practices on the part of development control authority's officials.

Same regulation applies for whole walled city, regardless of difference in character between various zones.

Architectural control of main bazaar roads as per architectural control sheet of Town Planning, Department.

8.2.2.2.1 Recommendation 3:

Detailed Building Regulations regarding height, F.A.R. , Ground Coverage , etc. to be prepared and difference in character of different zones of walled city to be identified and regulations made accordingly.

Incentives for Non Proliferation of commercial Activities:

Present status:

No incentive for people to not to change their premises from residential to commercial use.

8.2.2.2.2 Recommendation 4:

Financial incentive in form of i) Partial decontrol of rent, ii) Tax relief iii) Government should provide subsidized developed commercial land outside walled city for commercial establishments to move out and should increase conversion charges, for conversion from residential to commercial inside the walled city.

8.2.2.2.3 Recommendation 5:

Shifting of Whole Sale Trade

1. Shifting of iron trade from Chaura Rasta and Chowkri Modi Khana to near Kanakpura Railway Station as suggested by traders
2. Shifting of building material market from Atish Market to an already demarcated site near Mansarovar by J.D.A . Site in walled city thus falling vacant can be use as a parking lot.
3. Shifting of textile whole sale trade from Johari and Bapu bazaar to south of city as production centers (Sanganer and Bagru) are also there.
4. Grain market near Sanganeri Gate to be shifted in already developed Suraj Pole mandi and vacated to be incorporated in existing parking lot.

8.2.2.3 Thrust Area III

Minimization of Stress on Transportation

Table 8.1: Stress on Transportation

Market	Peak Hr. Traffic in PCU 2016 AD	Capacity in PCU(Present)	Parking Demand/ Supply (on Street parking) in EC,S.	Capacity in PCU if no on Str. Park
Chandpole Bazar	8423	2400	740/586	3600
Kishanpole Bazar	6640	2400	507/534	3600
Johari Bazar	10347	2400	1051/574	3600

Source: NATPAC, Jaipur Urban Conservation Study Report

8.2.2.3.1 Recommendation 6:

(i) On street parking on major commercial roads should not be allowed

ii) Parking lots should be developed at sites in and near the walled city.

(iii)Jaipur needs Mass Railway Transit System (MRTS) in next 15 years, which should cover walled city as well.

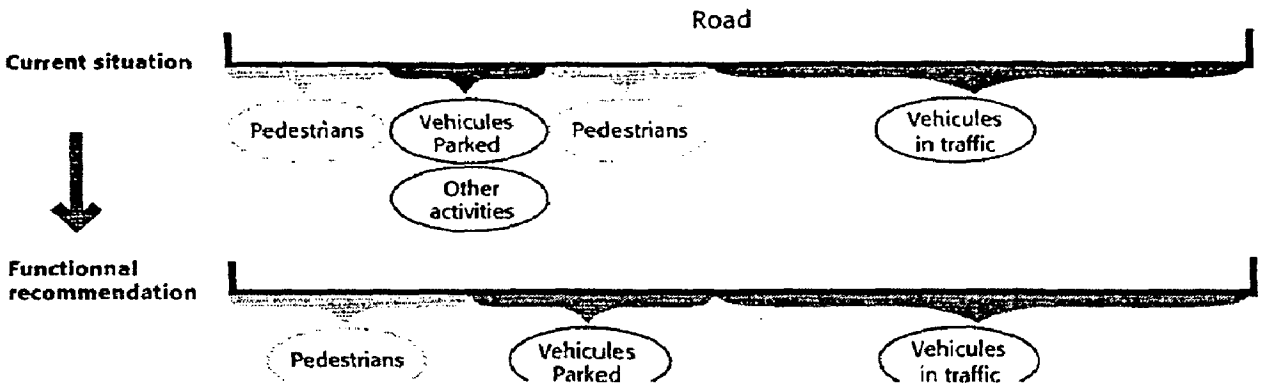
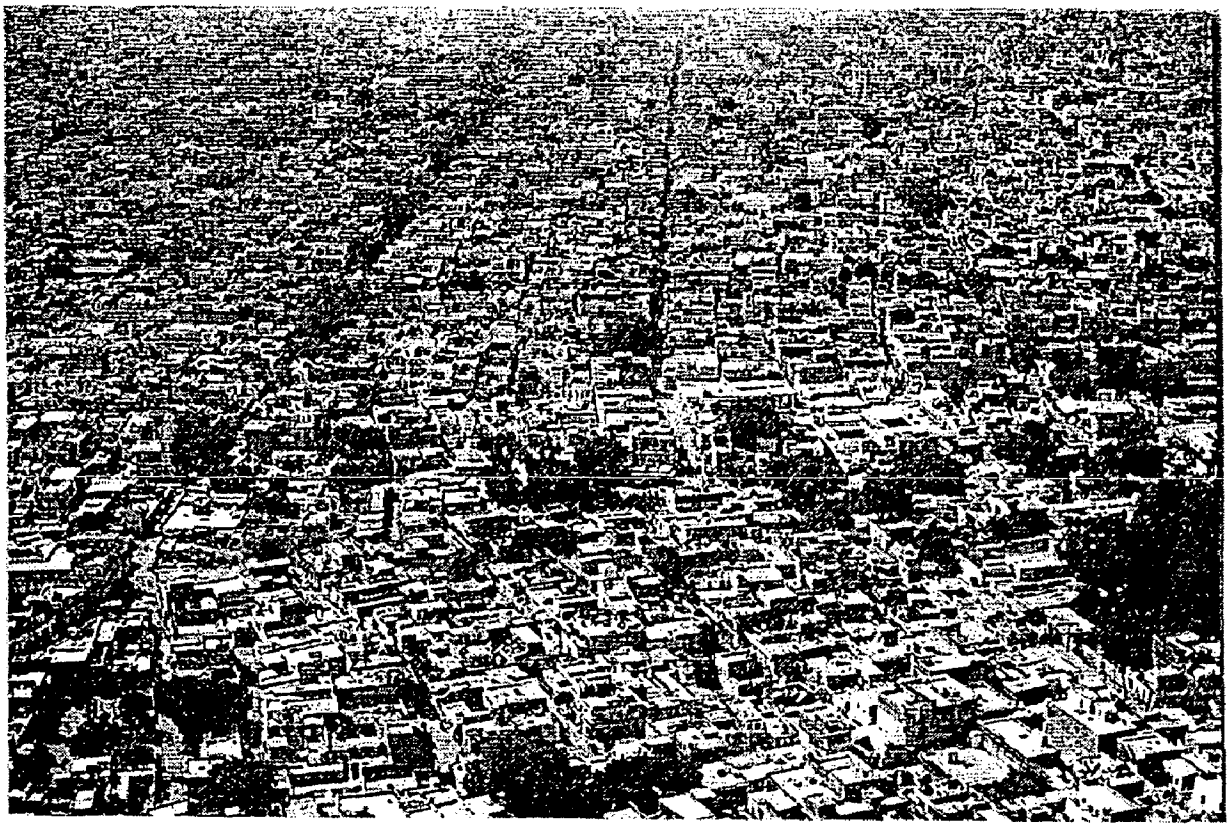


Figure 8.1: Functional Recommendation for Bazars

Chapter 9

CONCLUSION



Photograph 9.1: View of Walled City, Jaipur from Nahargarh Fort.
(Courtesy: Rajasthan Patrika)

Jaipur, the **"Pink City of India"**, founded by Sawai Jai Singh II during the medieval period. It was not designed for protection but as a habitat for diverse communities engaged in trade and arts and crafts of various kinds. It is the most outstanding city from the point of view of planning and design based on the principles of Shilpa Shastra and unique in several respects. It is squarish in shape with iron-grid pattern of streets. Its total harmony in shape, size, color, architectural design and symmetry etc., is found nowhere else. An almost uniform number of shops of uniform shape and size in all the main markets.

An analogy of the changing pattern of its market alignments with the trellised drainage pattern is another significant feature. That the main roads follow the natural and initial slope, helped to save the city from the deluge which took place in the monsoon season of 1982 when the extra-walled city suffered from the ravages of floods taking tremendous toll of life and property. This proves the dexterity of the unschooled masons that built this beautiful city. After the first quarter of the last century when the population of this living Jaipur started growing, the market pattern also initiated its growth. There was no alternative, but to extend it into the lanes which have half the width of the main markets. Here the first residence at the corner became the first victim and the landlord with a lure of an attractive rent converted the frontage of his residence into a shop and thus one after the other residences followed suit. Thus came into existence the subsequent markets and the "Rastas" also became the commercial arteries. The most important market, the Johari Bazar, had the greatest force for making a breakthrough and its lanes were the vulnerable (softest) avenues for residential erosion. So the first and significant change came into the side Chowkries. And thus not only the lanes but by lanes were subjected to a network of markets, secondary and the tertiary (the obsequent and secondary consequent). By the forties Sawai Man Singh, laid a new market in front of the gate of his palace and called it Chaura Rasta (the so-called Broadway) and another along the southern wall called M. I. Road. Thus the city started growing far beyond the walls.

In 1991, The Census of India put Jaipur the second fastest growing city in the country. So the developments fell short of the requirements of the recent trends in the commercial growth which accompanied the establishment of a series of industrial area and industrial estates, new residential colonies and the boosting of the tourist trade. Hence, the city undertook a vertical

growth by bringing the First and higher floors as well as the footpaths and pavements under commercial use to degradation of the landscapes in several main markets. Again for the rehabilitation for such squatters (Thari) and "Thela" a few more markets were developed in the left out spaces within the walled city.

The analysis show that the shops pertaining to the food items are decreasing in number in the walled city, while increasing outside. This is particularly due to the fact that big vegetables, fruits and grain mandis have been built outside. Similarly, the shops pertaining to household (which include building materials) have increased outside. The same is true about services which need mostly open spaces not available inside the city. In general due to the limitation of space inside the city, excepting the fancy articles, shops are increasing mostly outside.

A study of 14 main markets selected from the walled city, giving their shops under different groups of items and their percentage variations at different points of time, indicates that the shops of higher order goods have found a site in the Central Business District, while the shops of lower order goods have either shifted to the tertiary market areas.

It is significant to investigate the number of people in the city being served per Shop in different items. For example, one tailor shop serves 1200 persons, one hair dresser 2700 persons; one dhobi shop serves 8500 persons. Similarly, if the numbers of vehicles are known then their number per garage and per auto-parts Shops may also be ascertained. Or if the total number of students in Jaipur is spread over the number of book-shops, the number of students per shop may be calculated.

The big old and degraded Kothi, "Havelies" etc. belonging to the former "Jagirdars", "Nawabs", state-time officers and rich traders who do not find them worth living in modern times, and have vacated to reconstruct them as new multi-storied commercial complexes, irrespective of the land use zones in which they stand. The Havelies in Jaipur, a form of dwelling unit which is something between a palace and a small house, is an important aspect of Jaipur. Their access is invariably from the rear and not from the main roads, even though generally faces the main Bazar.

In recreational areas also shops of edibles, snacks, refreshments etc. are being provided as a necessity. The Ram Niwas Garden with the City Museum, Ravindra Manch and a zoo, is a glaring example of the same. Here there are some stalls in one of the blocks where the people in large number walk into in the evenings.

Last but not the least important is the commercialization of the religious and educational institutions, dharmshalas and compound walls of the residences in some of the newly planned

residences here a few shops have been established for rental income for the maintenance of the premises. The Palace Complex also developed a new market (MGD Market) with 156 shops in the space formerly used for the animal world like horses, camels and elephants, etc. Originally in the four main markets the layout plan had provided 1278 shops. When other main markets were completed the total had reached 3263. But when the shops entered into the secondary and tertiary areas, i.e., the lanes and by lanes the total rose to 11,620 in 1986 and to 10,931 in 1997. Finally, in 2004, the total number of shops went up to 14,929 and almost an equal number were outside the walls.

The analysis of shops by items shows that the number of shops has increased in all the items with a few exceptions but in some there is a remarkable increase. For example, there was 11 TV shop in 1986, but there were 165 in 2004. It is mostly the radio shops which have taken up the new trade in televisions. And there are no Computer shops in 1986 but in 2004 there are 121 shops. Similarly, remarkable increase is found in constructional items like building materials, cement, cement products and paints. Most of the crockery shops have taken up plastic goods, the electric goods shops have more than doubled. The number of coal shops has drastically gone down as offset by LPG Shops. Items under food articles have all Shown a relative increase except as those which deal as squatters. Under fancy articles, tremendous rise is seen in cloth shops, readymade garments, fancy stores, and general merchandise. Under services only dyers show a decrease. Services like cycle repairs, auto repairs, tailors, photographers, radio-TV repairers and painters have marked a phenomenal increase. Among the miscellaneous group the shops of medicines show a high growth.

Significant specialization and agglomeration have been found in jewelry, sculpturing, hardware, auto-vehicles and auto-parts, grain, textile, medicines and books etc., as well as trends of their decentralization. Retail affinities and significant associations in some of the items and the theory of distance decay have also been traced. Jaipur weekly market has been changing its sites from time to time. All these unorganised markets and the temporary stalls have been playing a significant role in the service and economy of the residents within the Jaipur urban region.

It has been discussed that the builders of the Jaipur city had not provided sufficient number of toilets and urinals. Probably there was no tradition for their provision in the settlements of the semi-arid climate. But in modern times and especially when sophisticated gentry throng the city centers in large number, this amenity has to be provided in the most modern style. In this respect it may be suggested to provide such facilities under the "Sulabh International" scheme

by providing toilets, urinals and bathing facilities at strategic locations at nominal rate. The Municipal Council should provide free sites for their establishment.

Sustainable development of commercial area for walled city, as an issue needs most attention and care. It cannot be reduced to some area of historic interest, nor can it be interpreted simply as a totality of the built parts. For effective sustainable planning of walled city, the interventions should from an integral part of a coherent policy of physical, economic and social development, for this an integrated & interrelated planning approach should be required.

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DEPARTMENT OF ARCHITECTURE AND PLANNING
INDIAN INSTITUTE OF TECHNOLOGY, ROORKEE -247667

TITLE: MORPHOLOGY OF COMMERCIAL AREA USING GIS FOR WALLED CITY, JAIPUR

Survey Questionnaire

(Information collected will be confidential & entirely used for the academic purpose)

Please 'X' the appropriate box (X).

Name of Chowkri (Block): _____ Surveyor: **Shashi Mohan Srivastava,** Student of M.U.R.P., IIT-Roorkee.

Ward No.:_____ **Resident of** Plot No.: 134, Himmat Nagar, Gopal Pura Mod,Tonk Road ,Jaipur-18

Name of Market: _____ Ph: 0141-2706220

Shop No.: _____

Date of Survey: _____

Ownership status: Govt. ( ) Rented ( ) Own ( )

1. PERSONAL INFORMATION

1. Name: _____
2. Age: _____
3. Sex: _____
4. Occupation: _____
5. You are Shop keeper or servant or any other, *please mentioned.*_____
6. Where is your residence? _____
7. You are resident of Walled City. Yes ( ) No ( )
8. How many members are in your family? Male_____ Female_____ Total_____
9. How many members are working? _____
10. How many members are working in Walled City? _____

2. INFORMATION ABOUT BUILT-UP OF SHOP

1.	Pucca Shop:	Yes ( )	No ( )
2.	Kuchha Shop:	Yes ( )	No ( )
3.	Semi-Pucca:	Yes ( )	No ( )
4.	Theri:	Yes ( )	No ( )
5.	Thela:	Yes ( )	No ( )
6.	Squatter:	Yes ( )	No ( )

3. INFORMATION ABOUT FLOOR STRUCTURE OF SHOP

1.	Ground floor shop:	Yes ( )	No ( )
2.	Ground floor with basement:	Yes ( )	No ( )
3.	Ground floor with balconies:	Yes ( )	No ( )
4.	First floor shop:	Yes ( )	No ( )
5.	Second floor shop:	Yes ( )	No ( )
6.	Third floor shop:	Yes ( )	No ( )
7.	More than third floor shop (multi-storied):	Yes ( )	No ( )
8.	Ground plus first floor shop:	Yes ( )	No ( )
9.	Ground to second floor shop:	Yes ( )	No ( )
10.	Ground to third floor shop:	Yes ( )	No ( )
11.	Ground to more than third floor shop:	Yes ( )	No ( )
12.	First to second floor shop:	Yes ( )	No ( )
13.	First to third floor shop:	Yes ( )	No ( )
14.	Second to third floor shop:	Yes ( )	No ( )

4. INFORMATION ABOUT FUNCTION OF SHOP

Type of Shop in 1986:

1. Food articles: Yes ( ) No ( )

*If yes, what item*_____

2. Household articles: Yes ( ) No ( )

*If yes, what item*_____

3. Fancy and novelties: Yes ( ) No ( )

*If yes, what item*_____

4. Miscellaneous articles: Yes ( ) No ( )

*If yes, what item*_____

5. Services: Yes ( ) No ( )

*If yes, what item*_____

Type of Shop in 1996:

1. Food articles: Yes ( ) No ( )

*If yes, what item*_____

2. Household articles: Yes ( ) No ( )

*If yes, what item*_____

3. Fancy and novelties: Yes ( ) No ( )

*If yes, what item*_____

4. Miscellaneous articles: Yes ( ) No ( )

*If yes, what item*_____

5. Services: Yes ( ) No ( )

*If yes, what item*_____

Type of Shop in 2004:

1. Food articles: Yes ( ) No ( )

*If yes, what item*_____

2. Household articles: Yes ( ) No ( )

*If yes, what item*_____

3. Fancy and novelties: Yes ( ) No ( )

*If yes, what item*_____

4. Miscellaneous articles: Yes ( ) No ( )

*If yes, what item*_____

5. Services: Yes ( ) No ( )

*If yes, what item*_____

5. INFORMATION ABOUT FACILITIES

1. Toilets: Yes ( ) No ( )
2. Urinals: Yes ( ) No ( )

If yes, No. of Male_____Female_____

3. Drinking Water: Yes ( ) No ( )
4. Water Hut (Payaoo): Yes ( ) No ( )
5. Parking: Yes ( ) No ( ), *If yes, than*
   - 5.1 Car: Yes ( ) No ( )
   - 5.2 Two wheelers: Yes ( ) No ( )
   - 5.3 Others: Yes ( ) No ( )

6. FROM THE QUESTIONS THAT YOU JUST COMPLETED

1) Do you have any suggestion /remarks/Complaints regarding shop, Market or any other, please suggest?*

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(Signature of responder)

Name: _____Age: _____

Occupation: _____

Date: _____

Place: _____

**Use separate sheet to fill the suggestion or any remarks, if required (Write in any Language Hindi/English)*