URBAN FRINGE DEVELOPMENT PATTERN IN KATHMANDU VALLEY

(A CASE OF IMADOL AND SITAPAILA VILLAGE DEVELOPMENT COMMITTEE)

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CERTIFICATE

This is to certify that this thesis entitled, "**Urban Fringe Development Pattern in Kathmandu Valley**" submitted by Ms. Manisha Rana has been examined and declared it has been successful for the fulfilment of the academic requirement towards the completion of the Master of Science Course in Urban Planning.

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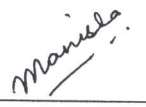
DECLARATION

I declare that this thesis has not been previously accepted in substance for any degree and is not being concurrently submitted in candidature for any degree. I state that this dissertation is the result of my own independent work / investigation, except where otherwise stated. I hereby give consent for my dissertation, if accepted, to be available for photocopying and understand that any reference to or quotation from my thesis will receive an acknowledgement.



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ABSTRACT

We live in democratic society, wherein people's expectations are high. Urban centre are magnets that promise to meet these expectations. This urbanization has brought a significant change in the physical, social and environment of the urban area.

To cope up with the urbanization pressure, people have started to migrate towards the fringe area. Urban fringe areas are the localities where cities are expanding. The urban expansions towards the fringe areas have both positive and negative impacts. The urbanization in the fringe area provides economic opportunities to the local inhabitants and discourages the migration pressure of urban area. On the other hand, it is also creating problems due to haphazard growth and rapid changes to the agricultural land. Similarly it weakens the essence of traditional settlement pattern and life styles.

Urban fringe areas are categorized as the alternative places of settlement as an alternative to the urban core. The study has concentrated on the physical, social and economic development pattern of the urban fringe area, with its reasons, characteristics, impacts etc. in connection with other fringe area.

There is ample evidence that areas are developing along the major arterial road (Ring Road). Imadol VDC in Lalitpur and Sitapaila VDC in Kathmandu, both are experiencing urban pressure and undergoing changes, through various phases of developmental process. The present population growth is attracted towards the fringe area because of low land price (preferably provision of further investment etc) and easy rules and regulation of VDC. Also, people are motivated towards the fringe area for better environment.

Major finding indicates that the development is happening fast but in an unplanned way. The major impact is on the land use pattern. Buildings are emerging on the agriculture land without proper infrastructural services are another characteristic of the urban fringe. Private developers' plays a vital role in raising the prices of the land of the fringe area.

The development patterns are categorized into three main components, namely, physical, social and environment. The physical development is through the change in the land use, and is marked by a reduction of land holding, development of roads and availability of infrastructure services. In social development, it is the change in the tradition, and occupation. With regards to the economic aspect, it is the change in the income level, status and commercialization of the area.

Basically, the scenario indicates that government has so far, little direct participation in the whole context of development process. People themselves are developing the area on their own ways. Consequently, there are unregulated plots, deteriorating infrastructure services, lack of social interaction, social integrity etc.

Hence, upon analyzing the development pattern of the urban fringe, there are indication that there is a need for plans and policies to stop the haphazard growth. The infrastructure provision should be formulated and the land use pattern has to be designated with development control. Strong implementation and monitoring system should be formulated for the further control of haphazard growth of the urban fringe.

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ACRONYMS AND ABBREVIATIONS

CBS	Central Bureau of Statistics
DHPP	Department of Housing and Physical Planning
DUBDC	Department of Urban Development and Building Contruction
Ft	Feet
GIS	Geographical Informational System
HMG	His Majesty's Government
Km	Kilometre
KMC	Kathmandu Metropolitan City
KVTDC	Kathmandu Valley Town Development Committee
NG	Nepal Government
RFP	Regional Framework Plan
SPSS	Statistical Package for Social Survey
UGB	Urban Growth Boundary
VDC	Village Development Committee
Wrt	with respect to

GLOSSARY

Anna	4 Unit of Land Measurement
Ropani	Unit of Land Measurement

CONVERSION

1 *Ropani* = 5476 Sq. Ft or 508.73 Sq. M.

1 *Anna* = 342.25 Sq. Ft or 31.79 Sq. M.

Note: All the italics words used are Nepali words

CHAPTER I INTRODUCTION

1.1 URBANIZATION TREND IN DEVELOPING COUNTRIES

Urbanization is understood as the process of growth in proportion of population living in the areas that were formerly rural in character. The nature of urbanization is different for the developed and developing countries. In the developed countries, it is accompanied by declining rates of population growth, increasing average age and the decreasing family size. But in contrast in the developing countries, there is a high population growth rate and exceptional rural –urban migration characterize urban explosion (Joshi, 1991). "In the context of urbanization may be defined as a societal process accompanied by:

- Rural to urban migration
- Changes from agricultural activities to non agricultural activities with a shift in occupational structure to industry and services,
- A change from sparse settlement pattern to a dense settlement pattern ,
- Increased interactions among centers of population concentrations
- Changes in behaviors, values and institutions and
- Changes in physical environment with increased modern amenities and facilities."[i]

In the cities of developed world, the dispersal of the urban population in the form of suburbanization has been one of the most important trends (Bryant, Russwurm, McLellan, 186) but not in the developing countries.

Developing countries is facing towards urbanization in a rapid way. But still most of the populations in Nepal live in rural areas. Urban population growth of developing country is increasing at the rate of 8%. The figure indicates that the cities population will be doubled in ten to fifteen years. It is termed as the urban revolution in developing countries. The writer identifies three main facets of the urbanization process in the developing countries. The first is the demographic, the second one is economic and the third is the social aspect. It is further explained the demographic aspects into two folds;

1. Cities grew rapidly in the developing capitalist world from 1800 onwards, and
2. The total proportion of population residents in the cities increased compared to the residents in the rural area (McGEE T.G; 1971).

The term 'urban growth' will mean the same as city growth. The term 'urbanization level' will mean simply the proportion of a country's total population 'resident in urban area'.

S. Devis describes the demographic components have vital role leading to urbanization in the industrialized nations. There are three ways of city growing according to S. Devis (T.G McGEE; 1971):

a) Because of population growth, settlement previously classified as rural are reclassified as urban;
b) Through an excess of births over deaths (Natural increase); and
c) Because people have moved from non urban to urban areas;

Out of above three ways, the third aspect is the most important factor of urban growth in the developing countries. To understand why this rural-urban migration occurred, one must evaluate the economic facets of the urbanization process. The principal economic feature of the process was the shift from agricultural to non agricultural occupations. This was experienced by western industrialized country, only difference was the varying rates of economic developments.

"The term 'Urbanization' has often been used, quite naturally, to describe, this process of infiltration of the fringe by non-farming elements, and has been frequently used synonymously with non-agricultural land-use development".

"Urbanization, in its most general sense, refers to the complex set of process by which the proportion of fringe's population concentrated in the urban areas increases over time."[ii]

1.2 URBANIZATION AND KATHMANDU VALLEY

Kathmandu Valley, the Capital city of Nepal; like other capital cities of Asian countries is undergoing urbanization at a very high rate. The increased urbanization coupled with regional imbalances (Centralization in the name of decentralization) and

the hope of employment opportunity, centralized political set up, trading concerns, institutional services and better life has lured the people towards the urban centers. This concentration of services has accentuated unsustainable urban development in the valley. Due to rapid urbanization, Kathmandu Valley is facing unplanned urban sprawl (particularly in the urban fringe area) and the concerned agency has failed to pace up with the development of the haphazard growth.

Kathmandu Valley lies under small cities of developing countries which are in high demand for urban growth. Apart from this, rising urban population and change in economic policy from agriculture to trading and service sector; that has played major role in attracting many people in the capital city. The overall population growth of the country is 2.24% whereas the population growth of Kathmandu valley is recorded as 5.66% (CBS, 2001).

Table1.1:Population Growth rate of the Valley

Census Year	Population	
	Annual Growth Rate Kathmandu Valley	
	Nepal	Kathmandu Valley
1971	2.07	3.01
1981	2.66	1.81
1991	2.1	3.83
2001	2.24	5.66

Source: Central Bureau of Statistics

The implication of such alarming population growth can be seen in the expansion areas in the valley. From the perspective of total land occupied for urban expansion was experienced from 1996 to 2000. During the seven years period of 1984 to 1991, the rate of increase was 70% (Source: Pradhan (International Workshop on Population & Environmental Implication, 2001).

Cities like Kathmandu and Lalitpur are expanding in the horizontal haphazard direction. The effects can be seen in development of the periphery area. Basically, there are two main reasons of haphazard urban sprawl in the urban fringe, first is the lack of implementation of the previous planning and policies in the valley, and secondly, lack of proper government management, skilled man power and various political and administration weaknesses.

The rapid urbanization of the valley is a reality. A great portion of the future population growth seems to reside in the Kathmandu valley. It is likely that the uncontrolled population growth and inadequate services and facilities will eventually destabilize the urban management system. These increased populations will reside in the urban fringe, thus expanding the city towards the fringe area. So, the fringe area should be taken as the dynamic development of the city.

Urbanization in the Kathmandu Valley is largely responsible for the unorganized development which is due to the urban sprawl. Urban sprawl refers to a low-density haphazard development pattern arising due to the scattering and leapfrogging of residential as well as non-residential development into the agricultural land in the urban fringe and beyond (M. Subba 2003).

Table 1.2: Municipal and Peripheral population Growth Trend in Kathmandu Valley

District	Location	Population			Annual Growth Rate	
		1981	1991	2001	81-91	91-01
Kathmandu	Municipal	262,094	458,384	712,681	5.75	4.51
	Peripheral	160,147	216,957	351,140	3.08	4.93
	Total	422,241	675,341	1,063,821	4.81	4.65
Lalitpur	Municipal	79,975	115,865	162,991	3.79	3.47
	Peripheral	95,609	116,743	144,893	1.99	2.21
	Total	175,484	232,388	307,884	2.85	2.86
Bhaktapur	Municipal	74,548	93,375	120,294	2.28	2.57
	Peripheral	69,872	79,577	105,661	1.31	2.88
	Total	144,420	172,952	225,955	1.82	2.71
Entire Valley	Municipal	416.517	667,624	995,966	4.83	4.08
	Peripheral	325,628	412,007	601,694	2.41	3.83
	Total	742,145	1,080,631	1,597,660	3.83	3.99

Source: Subba Thesis 2003, CBS 2001

In Kathmandu Valley, there has been rapid increase in the population growth in the suburbs as compared to the municipal area. The table indicates that the peripheral increase is far more than the municipal in the year 1991-2001 than 1981- 1991. This

indicates that the urbanization is growing in the rapid way in the fringe area. The decrease in the municipal growth rate suggests that it may be due to the decline of the availability of the land in the municipal area and also may be due to the cheaper land price in the fringe area.

1.3 RATIONALE OF THE STUDY

Fringe area has the future expansion potentiality for the city. City is dynamic in nature; hence the existing fringe area will definitely turn out to be a core city in the future. And, ultimately the outer fringe area will be developed into inner fringe area. Then, this will cause problem of road access as the flow of vehicle will eventually rise. Therefore, to develop the city and to stop the possible hazards in the later time, the urban fringe areas have to be managed in a proper way in order to make a planned city for future.

The present urbanization trend has pressurized on the development of the fringe areas. Recently the fringe areas are developing in a fast pace, this is the prime time that the fringe areas should be developed in a planned way. The development of the urban fringe area will give adverse effect to urban core area as well. If not properly planned then all the fringe areas will develop in the haphazard way which in the later time will be converted into the unhealthy city.

Even there are different plans and policies for the development of Kathmandu Valley, lack of proper regulation in the fringe area can be seen. The fringe area has grown in an uncoordinated and unguided process leading to unplanned urban sprawl causing adverse effect on the whole environment. So, the study will be helpful in reviewing the policies and efficient measures required for making the planned city.

1.4 PROBLEM STATEMENT

The urban fringe or the suburban crisis is an indivisible part of urban crises. The urban fringe does not stand alone but is the integral part of the great metropolitan area (Kathmandu Valley). The development of the fringe area as well as the urban centre should go parallel in order to make a perfect planning. But this is not happening in the reality. The fringe area of the city is developing in a haphazard growth due to the lack of proper planning policies or land use pattern or the proper infrastructure development. Due to lack of policy for the development of the urban fringe, has been the cause of creating a haphazard growth.

Due to large number of migrants in the urban area, the land value being high in the urban centre, the migrated people reside in the fringe area where land price is lower. There is lack of basic infrastructure. Later as per their demand, the infrastructure is developed but not in a planned approach which creates a haphazard city. The development along transportation corridor is creating problem for the future expansion of the city.

The unsystematically developed area creates social problem in the fringe area due to lack of planned urban infrastructure.

1.5 STATEMENT OF PURPOSE STUDY

1.5.1 Objectives

The major objectives of the thesis work is to **scrutinize and analyze the development pattern of urban fringe area in the Kathmandu Valley** in reducing further development of unmanaged urban fringe.

The other Objectives:

- To examine the factors of urban sprawl in the urban fringe.
- To study the urbanization trend, urban growth, physical and social characteristics of urban fringe.
- To identify the problems and opportunities of the development pattern of the urban fringe.
- To help in defining a perspective of urban fringe scenario and look into possible planning intervention.

1.5.2 Main Research Question

- What is the emerging physical and social development pattern of urban fringe in the Kathmandu Valley?

- What interventions can be applied to achieve guided development which will lead to the planned development of the urban fringe?

1.6 SCOPE OF THE STUDY

- The study will focus on the growth of the urban form, physical as well as social sector, land-use pattern and level of infrastructure and services of the urban fringe area.
- The study incorporates the fringe areas of Kathmandu Valley in general and focuses on the selected area for case studies. The focus is given in problems related in the haphazard development of the fringe area and analysis will be carried out to find the solution for the better management.

- The study covers some aspects of policy measures for the better management of the fringe area.

For the purpose primary data will be collected from the field survey and some secondary data will also be used from the previous studies and available literatures

1.7 LIMITATION OF THE STUDY

- The study will be based on secondary data and primary sample data due to time limitations.

- The research area is limited to the two case studies of similar type of fringe development, first will be the urban fringe area of Kathmandu Municipality and other will be the fringe area of the Lalitpur Municipality. These two case studies will be relevant to characterize the other fringe areas of Kathmandu Valley.

- It is basically limited on the study on the physical and social aspect of urban fringe area.

1.8 EXPECTED OUTPUT

The expected outputs of the research study will be as follows:

- The clear scenario of the development of the urban fringe from the physical as well as from the social perspective point.

- New perception of the fringe area could be visualized.

- The comprehensible picture of the development trend of the urban fringe can be notified and will be helpful in adding a clear concept about the development pattern.

CHAPTER II THEORETICAL FRAME WORK

2.1 FRINGE AREA: AN INTRODUCTION

2.1.1 Urban Fringe: Evolution and Concept

The different scholars from different disciplines have defined fringe area in their own requirements and uses but there is not a precise definition for it.

The term 'urban fringe was first time used by T.S. Smith in 1937 to describe the built up just out side the Corporation limit of the study. In early 1915, Gaplin used the word 'urban' as synonymous to the fringe for 'rural' in the process of conversion to urban (Lohani, 1999).

The urban fringe area has become a no man's zone as it is termed the rural area by the urban municipalities and rural authorities consider it urban because of the change in the physical set up. The town planning regulation, which is responsible for development control in urban areas, does not consider it as urban and it also falls outside the administrative boundaries of the municipality. (Lohani, 1999) Sinha says "The constant change interchange of culture in the urban fringe, the shifting of land use and the gradual absorption into municipal borders gives the urban fringe a personality of its own. This personality which does not allow the urban fringe to be defined as rural neither urban and hence lack of authority and responsibility in terms of development control allowing development in the urban fringe areas to occur in a haphazard manner." [iii]

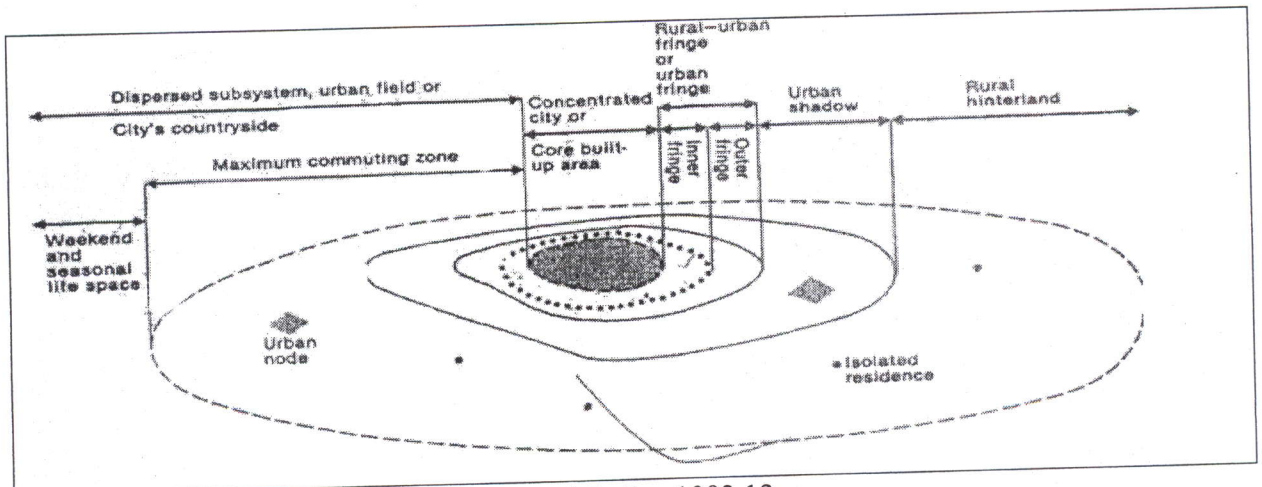
"Fringe is sometimes interchangeably used in different terms such as 'fringe', 'inner fringe', 'rural-urban fringe', 'urban shadow', the 'exurban zone', even 'rurban fringe'. But consent exists, however, over the broad conceptual notion underlying the immediate countryside of our cities. As, Wehrwein noted over 30 years ago, the 'fringe' is: 'the area of transition, between well recognized urban land uses and the area devoted to agriculture.' A more precise, but equally generally acceptable statement is given by Pryor who states that it: 'is the zone of transition inland use, social and demographic characteristics, lying between (a) the continuously built-up urban and suburban areas of the central city, and (b) the rural hinterland,

characterized by the almost complete absence of non-farm dwellings, occupations and land use, ...' The notion of 'transition' or admixture of uses is explicit; however, we should not be led into assuming that this area is temporary - quite the contrary, for it is clear that such areas have become a permanent feature of the landscape around many cities, even though their inner and outer boundaries may be dynamic."[iv] The real definitional problem lies in the exact interpretation of this notion of transition, and in the choice of indicators with which to measure the extent of the 'fringe'.

2.1.2 Types of Urban Fringe

The urban fringe area can be divided into three major type's inner fringe, outer fringe and the urban shadow which (Russwurn and Bryant) schematically as shown in figure (2.1). It is particularly helpful to understand the field between urban area and rural hinterland. "The inner fringe is characterized by land in advanced stages of transition from rural to urban uses – land under construction, land for development, land where there is little doubt over much of its area about its urban oriented functions and ultimate conversion to urban uses. The outer fringe, together with inner fringe, forms the urban fringe. It is an area where although rural land uses dominate the landscape, the infiltration of urban dwellers because of its cheaper land costs."[v] Urban shadow is an area where physical evidence of urban influences on the landscape is minimal. Finally, it merges into the rural hinterland; even there, metropolitan and urban influences do not stop.

Figure 2.1: The Form of the City



Source: Adapted from Bryant, Russwurm, McLellan 1982:12

2.1.3 Characteristics of Urban Fringe

As stated above the urban fringe has a character of it's own As explained by Golledge, in his study, he has defined seven major characteristics of urban fringe, which are categorized as, constantly changing land use pattern, small size farms, inadequate services and public utilities, speculation of land and buildings, rapid residential expansion and mobile population with low and moderate population (Lohani, 1999).

In addition to the clearly visible land uses, the rural-urban fringe is characterized by many other changes much more difficult to perceive directly in the landscape. The fringe area is dynamic is nature. What today is rural and within the rural - urban fringe, may tomorrow be entering the final phases of the development process of urbanization. Small plots may be bought up by people hoping to build their own home one day. Even more subtle is what can happen to farmland owned by fanners, who, anticipating some future development opportunity, may decide not to maintain the same, level of investment in their land or to 'mine' the fertility of their soil (Bryant, Russwurm, McLellan, 1982). The inner fringe may convert to the outer fringe and the urban shadow into the outer fringe area due to the rapid change in the urbanization process.

2.1.4 The Essence of Urban Fringe Management

The management of urban fringe areas is becoming more complex. There are dynamic developments and changes in the form, structure and practices of urban settlement. There are huge influx of people and built up area into the large areas of the cities. It has caused a zone of transitions between rural and urban landscape. This is also known as "urban fringe". In this area, urban functions and housing activities go much more than expectation. Therefore, it is difficult to keep up with regular boundaries on the fringe. This has caused problems of changes of aspirations of former inhabitants' extensive increase in residence, deteriorating agriculture output, new hopes of inhabitants, substitution of land uses etc.

Consequently, urban fringe area has to adopt the changing mode and style of urban land use, function and population. This is the first stage of invasion of urban life style. Thus, it is the product of reality with the mixture of rural-urban way of life. Urban fringe areas are taken as outside city areas, which are newly developed. It is also accepted as transitional zone. Later it is hoped to be turned out to be a city in near future. Therefore, it includes urban rural characteristics. Thus, it has strong socio-economic and functional bondage with the city centre (Lohani, 1999).

2.1.5 Features of Urban Fringe

There are various terms used to understand urban fringe. But, more accurately accepted is, as an area near by city or rather attached to city area. What we can conclude is that fringe urban instead of "urban fringe" is supposed to be area directly a closely attached to cities. Thus, their features could be as follows.

- Area apart from Core city
- A kind of dependency towards the city
- A process of deviation towards urban fringe
- Tendency to change in land use pattern and regulated development process
- It is a kind of free zone (Lohani, 1999).

2.2 FACTORS INFLUENCING GROWTH IN THE URBAN FRINGE

In the developing countries the evolution of the fringe area falls within the ambit of the rural-urban migration. The role of rural to urban migration in the developing countries plays a vital role in the development in the urban fringe (Timothy, 1995), argues that new city immigrants with low income could not be absorbed by the city and hence they had to look for affordable accommodation within the fringe of most countries. Other factors that influence the urban fringe growth are the **population growth, transportation and land**.

Population: Improvement in the technology has enhanced longevity of life, which is major cause for the population increase. The other factor of population growth is the migration.

Transport: Improvements in the transportation system, which increases an individual's ability to commute, like the advent individual car ownership, contribute to the growth of the fringe in developed countries (Bryant, Russwurm et al. 1982). Those with high incomes who could afford to commute from the city's periphery bought land and developed the fringe much faster. Similarly, it has been observed that with the improvement of the public transport system low-income groups could also afford to commute to and from the urban fringe.

Land: Land economics also plays a major role in the development of urban fringe area. The factors below indicate how the land related issues affect the growth towards the fringe from the city:

- Inadequate housing in the city
- Shortage of serviced plots in the city
- Inefficient land delivery mechanism
- Tough planning law and regulations
- Tax evasion
- High land values in the city

2.3 LAND MANAGEMENT

Since land is also the major factor in influencing the growth in the urban fringe, it is taken as the vital aspects of the developing process.

2.3.1 Land as the basis of Planning System

"Land is considered as the morphology and power which come together to form a large part of the basis of town planning. Town planning process largely synonymous with the land use planning."[vi]

Population growth is a prime cause of urban growth/expansion. Due to increase in the population, more urban land is used by the people and spread towards the fringe areas. Not only is the crude population increasing but additional demographic changes such as divorce, changing marriage patterns and an ageing population are all contributing

in the cause. Each of the reason is causing higher demand of land. Urban land use must be seen as a constantly evolving pattern rather than a static entity; it is also important to view land as a multifaceted aspects of urban development, not simply serving as a neutral space or container of activities and objects but as an intrinsic part of virtually all aspects of urban life (Kivell, 1993).

Above all, land is the key understanding of two important aspects of urban development. First, it is vital in explaining the shape, layout and growth of urban forms. Second, it is at the centre of the city's activities, influencing economic development and determining the relationships between different social groups and activities. The outward movement of population alone has considerable land use implications, in terms of decline in the residential densities, the diminishing attractiveness of the land in the inner cities and the growing demands for the land on the urban fringe (Bryant, Russwurm, McLellan, 186).

Different land use types occur in the urban fringe rather than any where else. "City spread out into the fringe like an advancing wave on the beach, and land in the inner fringe, be it farm land, grass land or forest, is converted to urban use"[vii]. But it is not just the built up edges. Like a wave breaking on a rocky shore, irregular patches of urban and urban-associated land uses also develop well beyond the built-up edge with ribbon development, at least in the early stages of development of high way and roads leading out from our cities. It is this ribbon and scattered development that can best be labeled' urban sprawl' and which generates most land-use conflicts (Bryant, Russwurm, McLellan, 1982).

2.3.2 Land use and methods to control its use

The most commonly used planning tools include comprehensive general plans, master plans, strategic plans and structure plans. The broad objective of these plans is to guide the development of the city for a specified time period and to promote the land-use pattern which most efficiently fulfils the objectives of the government. However, experience has shown that general and master plans tend to be static or assume slow-growing cities. These two plans also tend to be too time-consuming, detailed and costly as well as failing to consider the full consequences of economic demand for

space. They also tend to ignore how households and the commercial sector alter their demand for land as prices change.

A more appropriate and dynamic planning tool for developing countries is structure planning. This approach highlights the critical issues and prioritizes infrastructure investments which are the key issues for shaping a city growth. It provides a broad framework for local decision-making and it involves public participation. The structure plan includes some practical actions which are necessary to influence development towards the defined objectives.

The plans discussed above, use different forms of zoning and regulations. Courtney (1983) defines zoning as "the demarcation of a city by ordinances and the establishment of regulations to govern the use of the zoned land. It also includes general rules about location, bulk, height, and thus defines the plot ratios, shape, use, and coverage of structures within each zone". Zoning regulates the use of land in areas for residential, commercial, industrial, agricultural or other land use. Earlier on, zoning ordinances used a scale of intensity which ranged from single-family residential (least intense) to heavy industrial (most intense). This system of detailed designation has proved impractical and modern zoning systems are more flexible.

Some zoning ordinances apply "bulk" control over land and buildings. They aim at controlling the density of population, production and traffic; as well as providing adequate daylight, air, open space and privacy.

Zoning can be a very powerful planning tool as it permits the government to select which land uses should be allowed. However, zoning is very difficult to implement effectively as, contrary to regulated zoning ordinances, land in Asian cities is frequently used for other or mixed purposes such as residential and commercial use. Mixed-use zoning has been introduced in some large-scale projects for a more comprehensive and flexible approach to zoning, partly to provide a legal process to accommodate the need for using land for mixed purposes. This technique permits significant physical and functional integration of project components. As it is, zoning will work most efficiently as a planning tool when it is complemented with other control mechanisms at the more detailed level such as and subdivision and building regulations.

2.4 URBAN GROWTH MANAGEMENT

As from stated above that the urbanization in the fringe is due to several reasons, basically the population growth. Growth of the city is unavoidable; the city is dynamic so the growth is inevitable. The fringe developed as the growth was high and the city started to expand into the fringe area. The growth management as well as the fringe management can be interrelated. If the growth is managed properly then the fringe will be managed in the long run. As in the developing countries due to the lack of land in the city core the growth is happening in the fringe.

2.4.1 Definitions of Growth Management

For some time it seemed that 'growth management 'was synonymous with growth control, but how ever with time, growth management came to be accepted as a planning administrative approach to dealing with development. It evolved as a positive tool to guide urban development.

About the definitions, so far growth problems task force defined effective growth management as "A dynamic process for anticipating and accommodating development needs thorough **vision** and **observation**" that balances competing land use goals and coordinates local with regional interests."[viii]

It includes the following causes

a) Growth management is a continuing and changing process. Growth management is a plan and an action program. It is process of evaluating current trends and management results and updating both objectives and system
b) Growth management provides a means of anticipating and accommodating development needs. In reality growth management program accommodate instead of facing expected development
c) Growth management program provide a forum and process for determining an appropriate balance between competing development goals. So, growth management must coordinate chores related to emphasis, priorities, and coordination's. These all help to refer workable plans for future action.

It recognizes local needs in relationship to regional concern. It deems necessary that individual understanding reflect within a context of metropolitan economic and social activities, goal and needs (Porter, 1996).

2.4.2 Problems of unplanned urban growth

The misunderstanding between the government's and the residence about the actual needs and the government response causes mutual non cooperative attitude.

In reality local government's expenditure is much less than the actual need for building community infrastructure. In the name of building infrastructure much expense are incurred in connecting the existing deficiencies of the system. With the raising expectations, problems increases on the side of the government for more funds.

Usually, local governments are slow in catching up the potential growth and change. Knowingly or even in the lack of adequate funds or political decisions in the lack of proper planning; the local government miss to gain from long term stability and provide efficient facility system. Subsequently, unplanned growth is not welcome. They demand stoppage of the flow. So, the local officials take up abrupt steps as fine and punishment which is negative again. In the long term, this result in a more complex problem with added community conflict, causing such steps more ineffective.

2.4.3 Economic and social objectives can be achieved by growth management

Growth Management deals with land use and development concern in urbanizing areas. It later turns out small cities and suburban communities. Growth management programme also include housing elements. They also include employment opportunity, housing assistance, social and economic problems. Thus, it means a comprehensive set of physical, economic and social concern. Later in the central city outer redevelopment activities, infrastructure, renovation, neighborhood up roaring and outer public actions can be coordinated through development management programme.

2.5 POLICY AND PRACTICE (GOVERNMENT PLANS AND POLICIES)

2.5.1 Kathmandu Valley Long Term Development Plan 2020

The long term development plan is prepared by KVTDC and DUDBC in the year 2059. The development plan of Kathmandu valley tends to provide guidelines to minimize the external influence in the process of urban expansion and development. The fact that Kathmandu valley has to be developed with the intention of integrated and long term vision plan which has been accepted from long time but till now, the process is lacking.

The two strategies have been proposed by the Kathmandu 2020 plan. The first strategy is to transfer the centralized economic opportunities and capital investment within the valley to other parts of the nation. The second strategy has tried to classify the extent of urban growth and development in the valley. This strategy will help in the planned development and decrease the negative effect of the external factors in the development process. Based on the two strategies the 2020 plan mainly focuses in the growth control through the demarcation of the urban and rural boundary as well as the preservation of agricultural land. This will make land management easier and effective in the urban and rural context. This will also end the unmanaged and uncontrolled land management system. Taking certain factors into consideration like the environment management, habitable community and a good living condition for the people various concept plan have been prepared for urban growth.

It is seen that the settlements which is a periphery to the valley have now started to become the periphery of the developing urban centers. The main aim of preserving the farmlands is to halt the urban sprawl extension towards the agriculture areas of the peripheral settlements.

The 2020 plan also intends to control the urbanization within the certain boundaries as large chunks of agriculture lands been converted to the other uses. The process of urbanization has definitely generated pressure in the land use as well as in the social and economic activities with the loss of the agricultural land.

2.5.2 Future Growth Concept for the Valley

With the close study on the existing policies and planning and analyzing their impacts in the urban development of the Valley, Development Plan of 2020 of the Kathmandu Valley was prepared by KVTDC under HMG/ MPPW in 2000. The main focus of this study is to propose the urban form for the valley so that to provide environmental sustainability, liveable community and the overall quality of life. The planning strategy advocated is the Growth Concept which aims for; regional approach, hierarchy of development nodes, land- use and transportation linkage, land use efficiency, proximity and accessibility based planning, Access to functional open space, livable Community, carrying capacity of the natural ecosystem of valley to counter urban development.

The study recommends growth management in various fields. Planned rural to urban transition can also diminish the levels of haphazard development which can be done by providing urban reserves. Urban rural land delineation would separate the rural area from getting urbanized. These areas are of high nature resource areas facing depletion hence policy intervention is important in this field. It is recommended that the edge of the rapidly growing V.D.Cs can be taken as the delineation line and public and private capital investment is encouraged in these areas. Another similar field is the Preservation of Agricultural Land which should be maintained as it is the life support system of the entire valley. Here, containment policies to control urban sprawl are recommended and discouraging public capital investment in rural land as well. In addition to this; it recommends for high mixed land uses and infill in the urban areas.

Thus, the physical form for the 2020 is developed with growth concept where the infill of urban areas inside the urban core, and the urban fringe with primary and secondary nodes already are developed to cater the future growth. The future development density of the Valley is aimed not less than 300 persons per hectare; which is to be made possible by infill areas and identifying urban reserves.

There are two major sections discussed above. The first part is the discussion on the urban indicators and their influence on the urban development of the Valley. The second part is the discussion on policies and strategies undertaken to counter negative impacts of urban sprawl and some future perspectives. Both of the sections give a

combined overview of the urban development of the Valley. To validate the information gathered through various reports and documents; in-depth interview were undertaken with the professionals of this field

2.5.3 National Urban Policy

The proposed National urbanization policy is expected to be a land mark towards framing positive directions in a planned in an integrated and coordinated way in solving the unplanned urbanization process and its challenges. The presented National urbanization policy is the outcome of concerned intellectuals, experts and the expression of several interactions in different occasions from 2061, including written suggestions and ideas.

By the decade of 1970 urbanization process added challenges city population is still 15% but due to haphazard urbanization has proved to be a national problem. Due to centralized urbanization in Kathmandu, National urbanization structure is shaky. All physical, social and economic infrastructures are centered in Kathmandu Valley along with other Municipalities. Therefore, the flow from rural sector and small cities is faster towards city centers. Physical infrastructure is insufficient. Employment opportunities have not been increased. Condition of the environment is deteriorating without adequate management of physical and institutional infrastructure. This has made the problem more complex by assembling villages and declaring municipality. There is confusion between local agencies and central agencies about whom and what should be done towards urban development.

The present National Urban Policy has maintained three objectives, first, obtain national urban feature by developing infrastructure services and direct the investment, secondly, improve the living standard of the city inhabitants by developing healthy, secured and welfare city environment. Thirdly, by consolidating local agencies in legal and institutional way and develop of the cities is a coordinate way and develop the sense of partnership among the concerned agencies and make the city management influential.

Some of the government's policies towards the development in the infrastructure development are as follows:

- Encouraging local agencies to operate in a planned way in promoting urban infrastructure and development of service facilities thereby directing to frame the urban activities in an agreed frame work, up dating yearly planning.
- Discouraging development of scattered settlement it is to encourage infrastructure militated dense city, thereby stopping depreciation of natural resources and lessening investment towards infrastructural resources.
- Activities contrasting urban development have to be diverted to outer alias and valley, especially there which affect natural, cultural, tourism and political aspects of the Kathmandu Valley.
- Establish Kathmandu valley development council as to Kathmandu valley development Act. To make Kathmandu Valley Development in one unit and make integrated development planning in a coordinated way.
- Sketch local physical development planning under integrated regional planning to systematize Kathmandu Valley process of urbanization. For this, a long term approved planning will be framed and executed.
- To minimize the existing pressure on urbanization process in the Kathmandu valley; emphasis will be given to the development of nearby city centers.

2.6 Land Use Practice in Kathmandu Valley

Urban demography and urban economics are the major indicators of the urban land use in the Kathmandu Valley. As discussed earlier, a change in economy from agriculture to trading and business sector have heavily influenced the change of use of land from rural lands to urbanized lands. As described in HMG/ KVTDC (2000), to understand land use and its spatial distribution, land use has been classified in three categories i.e. agricultural, non- agricultural and forest. The trend of urbanization in the Valley has extremely affected the agricultural land use areas which occupied 64% of the total valley area in 1984, 52.1% in 1994/96 have now decreased to 40 % in the year 2000. While on the other hand, the non- agricultural sector which covered only

5.6 % in 1984 increased up to 15.2 % in 1994/96 which now increased up to 27.6% in 2000.

Table 2.1: Land Use trend of the Kathmandu Valley

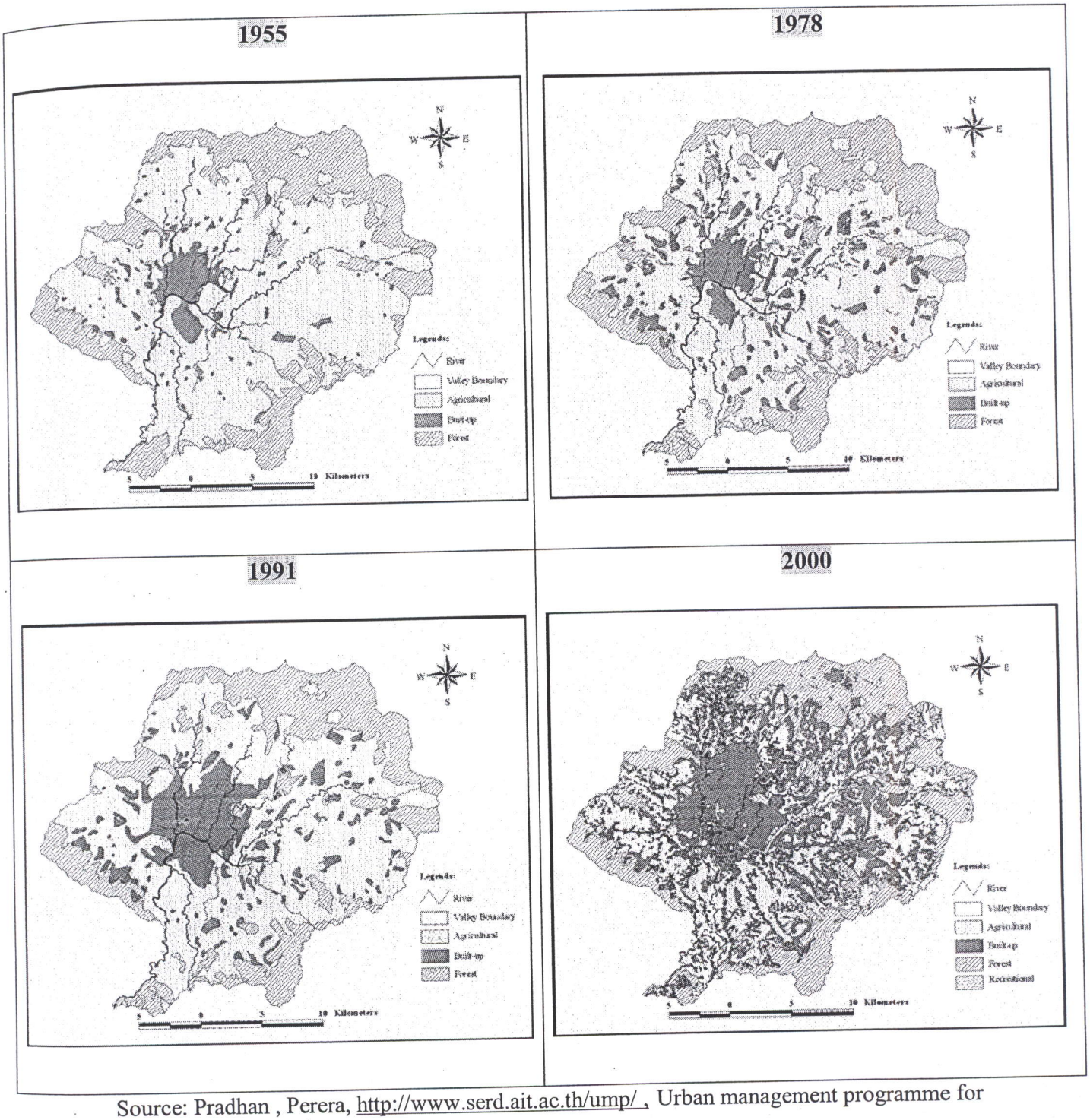
S. No.	Land Use	Area in hectares for years			Land use by type in %
		1984	1994	2000	
1.	**Agriculture**	40, 950.3 (64.0%)	33, 308.3 (52.1%)	27,570	41.4%
2.	**Forest**	19,438.7 (30.4%)	20,945.2 (32.7%)	20,677	31.0%
3.	**Non-Agriculture**	3574.7 (5.6%)	9,710.2 (15.2%)	18,408	27.6%

Source: HMG, KVTDC. 2000

The non-agricultural sector indicated in the above table, are the urban areas which are residential, commercial, mixed residential/ commercial, public areas, military areas, industrial, institutional etc.

According to the HMG/ KVTDC (2000), urban development has occurred mainly along the arterial roads forming the strip development. This development has led to the haphazard residential sprawl in the rural areas which in current situation contains the old rural settlements and new residential areas. With this current trend, the agricultural land of the Valley would not be there within the year 2025. Here, it is indicated that the agricultural land in the urban shadow area acts as a life support system to the metropolitan area. The land use map indicates urban sprawl into the fringe area and gradually spreading the build-up area.

Map 2.1: Map Showing the Expansion of Built up area of Kathmandu Valley



Source: Pradhan , Perera, http://www.serd.ait.ac.th/ump/ , Urban management programme for Asia and the Pacific Urban Resource Network for Asia and Pacific (URNAP) ,2005

2.7 EXAMPLE IN INTERNATIONAL CONTEXT

2.7.1 A Case Study of Portland, U.S.A

Background

Portland is a city located in the U.S. state of Oregon with a population of 562,690 and metropolitan population of two million people. It is Oregon's most popular city. (Wikipedia, Portland.2007). The Urban growth Boundary is very popular urban growth management tool in the U.S. Portland's UGB was proposed in 1977 and approved by the state in 1980 (Jun, M. 2004). Metro is the managing body of Portland's UGB and in 1992; the region's voters gave Metro the legal authority over the Portland's metropolitan concern and a Regional framework Plan.

Historical background

Oregon has a long history of planning for the urban growth. It began in the year 1973 when Oregon adopted growth management legislation. (Metro, 2000) This paper further explains that this legislation aimed for certain land use goals i.e. setting UGB, using urban land wisely and protecting the nature areas. This growth management was envisioned so as to control urban sprawl in this region. In 1978, the voters approve to create Metro to manage the urban growth in this region. The land use laws required Metro to establish an Urban Growth Boundary. Metro defines UGB as a legal boundary separating urban from rural land where the boundary controls urban expansion onto agriculture and nature lands. (Metro, 2002, p1). Land inside the UGB supports urban services such as roads and utilities and promote efficient use of land. This UGB includes 24 cities and urban areas of three counties i.e. Clackamas, Multnomah and Washington and contains 237,000 acres of land. (Metro, 2000)

Urban population growth

Rising urban population in this region indicates that the land use schemes of 1990 are not enough to protect the agricultural lands and urban fringes and to provide sufficient public services. The region have experienced population rise of 131,000 people from 1992 to 1997 and it is projected that 497,000 people would reside in this area from 1997 to 2017. The threat of over population inside the UGB has led the planners to

focus urban development from low- density planned development to effective use of urban land.

Urban Development

Urban Growth Boundary plays a vital role in the urban development of this region. The UGB in Portland is the containment policy to control any urban expansion onto the agricultural and nature areas. Jun, M. (2004) explains in her article that there are usually three co-ordinate measures in managing UGB. The first one is the Phased development; which encourages continuous development in the open land inside the boundary. If the development is taking place inside the UBG and fulfils the urban densities planned by the Local Government then the permit processes are quickly responded for those projects. The second one is limiting development outside the UGB. In this case, the counties are given rights to zone rural lands for exclusive farm use and forest conservation. The last one is the Flexible boundary of the UGB; where the author describes that the Portland's UGB has changed with the metropolitan population increase.

As discussed earlier, urban development of Portland is handled by Metro with their Regional Framework Plan. This RFP address not only manages the UGB but also provides protection of land outside UBG for natural resources, urban design and housing densities, mass transit system, parks and open spaces, co-ordination with the neighboring counties etc. (Metro, RFP. 2005).

Land Use Policies and Planning

(Land Use, Metro. 2005) have indicated the policies regarding the policies of land use. There are various policies formed under various sections. The first section is **urban form** which aims for balanced regional growth through compact urban form and mixed centers with commercial and residential land uses. It is followed by the **built environment** which aims for the equitable economic growth in the region and provision of public transportation system which facilitates jobs housing balance and less dependency of cars. Another section indicated is **housing and affordable housing** which aims for providing all diverse ranges of housing types and form an affordable housing fund and draw support and interest of state, local Government and business groups. Under the **economic opportunity and vitality**; the UGB expansion

areas are to be located for industrial and commercial purposes if it fits under the regional framework plan and increase jobs among the poor neighborhoods. Another major section is the **urban/ rural transition**, which aims for the clear transition between urban and the rural areas, locating Metro UGB with natural and built features and designating the urban reserve areas. Another section included is the **developed urban land;** where redevelopment and urban infill are encouraged. Among of all, the major policy included is the UGB; where its expansions should be compatible with the long term future growth plan, should be done for the enhancing the centre areas etc. These changes in UGB should be made through legislative process.

2.8 SYNTHESIS OF LITERATURE

The review clearly states that growth is inevitable; and the city is always expanding. The people tend to move towards the city and the land use is always changing. The planning should always be the first priority for making the city livable. The fringe are of the city has become an integral part of the city and these two parts are inseparable from each other. Land is the basic factor for the development towards the fringe area. The people migrate to the fringe as land is scare in the city core and the value of the land is less in the fringe. The people with low income group also can afford to buy the land and settle there. Making the population access to the required physical infrastructure and preserving the social need is responsibility of the nation. When the nation does something towards this perceptions, that will be helpful in reducing the haphazard growth and the city will grow in the planned way. If the nation does the planning beforehand and sets the policy guidelines for the development of the infrastructure then the city will grow into a planned city. The strict regulations should be incorporated by the government.

The review has also cleared the definition of the fringe area, characteristics and the facts of the urban sprawl in the fringe area. The effects of the growth and its consequences are also cleared in the study.

The urban fringe (adjacent V.D.C. of the Municipality) lacks the proper policies and regulation. The growth management of the fringe area will help in proper development in the further outer fringe area and as well as the urban shadow. Basically the concentration is given in the physical infrastructure only.

The policy and the regulation is lacking in the development in the urban fringe area. In practice, though the fringe has become as the urban area but still such area is not considered within the municipal boundary. The review of the government's plan and programmes indicate that there is not separate planning process for urban fringe area. The practices indicate that the growth is happening in a very fast pace, there is an urgent need of implementation of policy for making better city.

CHAPTER III RESEARCH METHODOLOGY

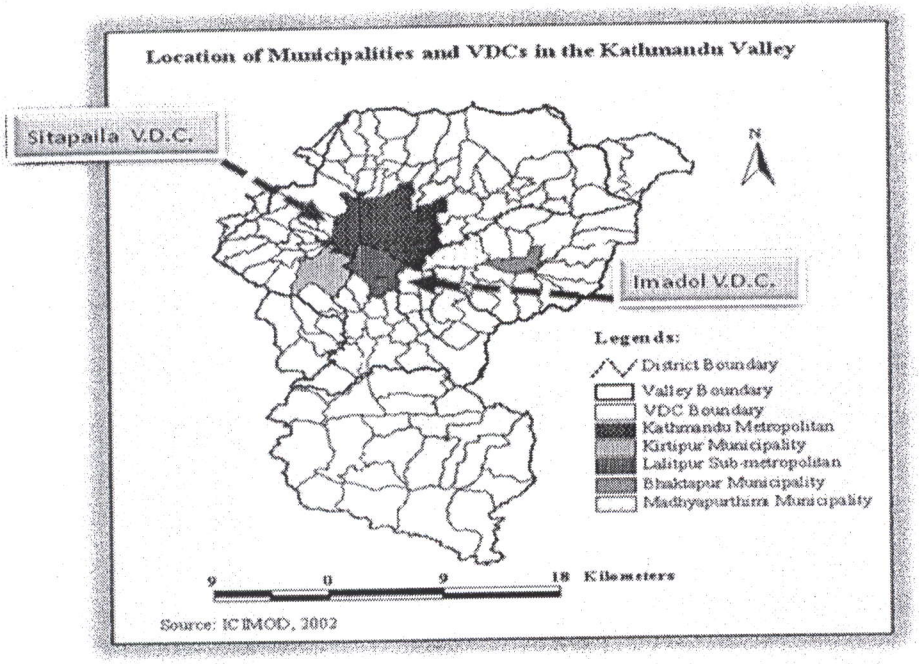
3.1 RESEARCH STRATEGY

The research strategy is obtained by maintaining the distinction between the empirical and the normative research questions. The empirical investigation will provide information on the physical as well as social development in the fringe area. The knowledge will be informative and applicable to different locations. The empirical data is gathered in answering the first question. More information on the subject will be explored, for the in- depth study as well as to make the thesis output in the systematic process to obtain the given objectives. The normative question in the other hand will be guided by the empirical investigation and examines the policy context and the prevailing practices.

3.2 SELECTION OF THE CASE STUDY

The two case study areas are selected adjacent to the close vicinity of major arterial Road of Kathmandu Valley. The two sites which appeared to be growing in the similar pace have been selected. The two different fringe areas, Sitapaila VDC and Imadol VDC; one located adjoining the Kathmandu Municipalities and other adjoining the Lalitpur Municipality respectively, are taken as the case study areas. These two sites are selected with the goal to obtain the development pattern of the fringe areas of the valley. Both the selected areas are recently developed areas and the development pattern is of similar types. In the research process these two fringe areas are taken into consideration as this area is rapidly transforming and is swiftly changing into urban form. The built up area is high and urban activity is growing in the massive way. The two sites are of the similar development pattern are taken into consideration so that it gives the clear picture of the development patterns of the urban fringe of the Kathmandu Valley. The study of the similar types of developing VDC foretells the vivid scenario of the other similar areas also. The two sites have selected either for the reinforcement or for different conclusion. It depends on the study of the two areas.

Figure 3.1: Location of the two case studies



Source: ICIMOD 2002

Due to rapid urban growth and congestion in the Metropolitan city, the city is expanding towards the fringe area and new concept of urban expansion area has been introduced by the government. Imadol and Sitapaila have been identified as the urban expansion area by KVDUP in 2006 (Appendix- III/ 1).

3.3 SOURCE OF DATA COLLECTION

The research includes both secondary and primary data. Primary data comprised of both quantitative data and qualitative data. The primary data was collected doing field surveys through questionnaires to the selected member of the household, as well as the member of the society in the group discussion. Other primary data included are the interviews with key informants. Checklist of questions were prepared for the key informant's interview, which included VDC secretary, Ex-Secretary, proprietor of the private land developers as well as the members of the local clubs. Secondary data collection is the literature review, collection of data form other sources.

Literature Review

The literature review is used to get the theoretical understanding of the research topics. Wide range of data will be collected through the literature review on the subjects such as process of urbanization, process of urban land management, various urban fringe structures to support the research topics. Literature review includes collection of relevant maps, thesis, scientific books, other publications such as journals, reports, Acts, manuals and internets and relevant materials under similar topics and throughout understanding of the related issues and problems.

Primary Data Collection

Data collection is one of the basis to gather the information on the existing situation of the study area. The data exhibited the reality of the study area. For the primary data collection several field visits were done. Several methods were followed such as Reconnaissance Survey, Questionnaire Survey, physical observation Survey and interview with the key informant were included.

Reconnaissance survey

Reconnaissance survey was carried out in order to study the condition of the area and to find out the location attributes. In a reconnaissance survey, the features, boundary and development pattern as well as the location of different attributes were examined. The conditions of the visible physical attributes were also examined.

Physical Observation Survey: Observation was done to view the current urban development pattern, and change in land use types. During this observation; the land use types and physical structures was observed. The urban deficiencies of the areas were also observed. Various photographs were taken to understand the current condition. This observation method is not undertaken in isolation. To validate the results of observation; this study was carried out by using conjunction of two methods i.e. Observation and Questionnaire survey.

Sampling Procedure for questionnaire survey

After the observation, random sampling method was used. The sampling was taken considering the number of to the household number stated in the CBS 2001. For the sample, the sampling size is taken as the mean of the total household by number of ward in both the VDC. Then the 2% from the mean is taken as the sample size. For the better understanding of the development pattern the area is divided into two parts, for the validity of the sample survey extra one number is taken making it the total of five. The sample of five numbers is taken in each of the ward in both the VDC's

After the sample size is determined, the sample is categorized into the same strata as that of the household. Finally, Accidental sampling method was then used to select a required number of samples from each stratum while selecting the respondents for each category. The respondents were selected with an accidental sampling method as per their availability for interview and willingness to participate in the research process. Accidental sampling refers to the unplanned meeting and interview with the informants.

Household Survey: A set of questionnaire was prepared guided by the research question. The random sampling method is adopted to get the information. And according to the sample size the house hold survey of the area was done. Basically the data were taken from the owner themselves.

Interview with the Key Informants: A set of questionnaire is prepared for the interview with the different bodies. The intense interview will be helpful in visualizing the concept of the developers and the local bodies in the study area. The persons to be interviewed will be particularly divided into three parts viz. the people living in the study area, the developers who are spending a great deal of investment in the area and the local government who are the key persons in the developing the V.D.C.

Secondary Data Collection: For the secondary information, base map, aerial photographs and V.D.C. maps are collected through the different related institutions. The land use data from the ICIMOD and KVDTP has been used for the analysis of the land use of the two VDC. The Village profile and the data from the CBS and from the different reports are used.

Data processing

Analog data were collected in data processing stage. The form of questionnaire was converted into digital format by putting the information into SPSS software. Similarly, in GIS, shape files were created digitizing over the Google image and IKONOS satellite image and attributes were loaded into the shape files.

3.4 DATA ANALYSIS

After the compilation of the data and information, the analysis of the data is done. The methods used in analyzing the data are divided into two parts. The first part is the qualitative analysis and the second part is the quantitative analysis.

Qualitative Analysis

The qualitative analysis is one of the major methods undertaken in the case study research. This analysis consists of analysis undertaken in the theories, secondary data and the in-depth interviews. Literature review was the main method used for data collection for the theories and strategies in accordance to the research questions. In the theories various issues are discussed and argued with the viewpoints of different authors on the same subjects. Hence, this process of discussion on specific topics resulted in the development of various arguments.

In the problem analysis of the fringe area of the Kathmandu Valley; secondary data i.e. policies and planning from the study reports were discussed with the supporting and contradictory views from the In-depth Interviews.

Quantitative Analysis

The quantitative analysis is done by using descriptive statistical tools and doing cross-tabulation options in SPSS software to analyze the data, similarly maps were created in AutoCAD, for the land use analysis GIS was used. Microsoft Excel and Microsoft

word was also used for data processing and analysis. The data were also analyzed with the image of different decade.

3.5 CONCLUSION AND RECOMMENDATION

After the compilation and analysis, the final phase is the synthesis phase where conclusions and recommendations will be made. Before this; the finding are summarized, where issues and problems are analyzed. Apart from this, the limitations on the theories are also sorted out. The final outcome of the research will be in the form of suggestions and guidelines for the planning and the infrastructural development aspects for the urban fringe of Kathmandu Valley.

CHAPTER IV OVERVIEW OF THE STUDY AREA

4.1 IMADOL CASE STUDY AREA

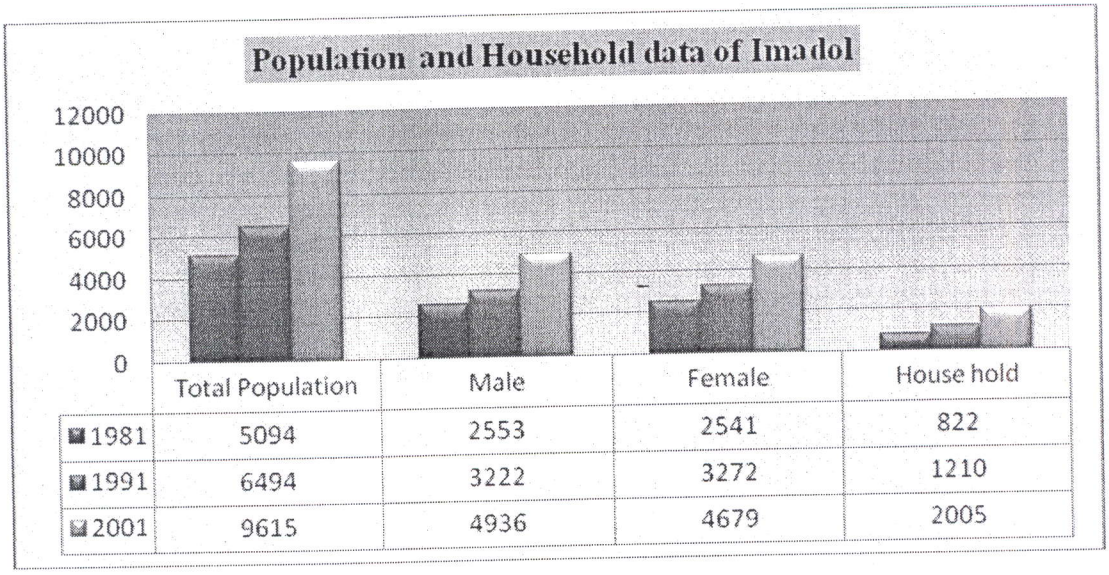
4.1.1 Introduction

Imadol case study area lies in the eastern fringe of Lalitpur Municipality and is located just outside Ring Road area. To the west, is the main market of the district of Lalitpur; Mangal bazaar crossing, the village development committee, has Tikathali to the east, Harisiddhi in the southern and Kathmandu Municipality to the north. This is situated in $20^0$40 latitude North and $80^0$20 East longitude, it has it's lowest level 4245ft. from the sea level and the highest level is 4292ft. Ward no 9 is at the highest level. The difference between the highest level and the lowest level is about 47 ft. As to the survey observation of the geographical situation, it is surrounded by rivers in semi circle shape from the south reaching to the north through west side. The topographical study shows it has lower level plains towards north to the south. It has the highest level sector among the village development committee area and low lands. To the south west portions there are brick industries, so enough soil is extracted every year. This has caused the area getting lower gradually. Length of North-South and East West width has its no consistency in the length and breadth of the village. North south length ranges 2.1 km to 2.8 km and the east west width 1 to 2 km. (Ward Profile, VDC). Its total area is 41209291 sq. km, as to statistics of maintenance survey section; total land area is 8100 *Ropani* 4 *Annas*. (Local unit of land)

4.1.2 Demography

The 2001 census indicated the total population of 9615 in 2005 household indicating average household size of 4.9 person and male to female ratio of 1.03. It has the population growth rate of 2.2 % (CBS 2003). In 1981, the population and households ratio indicates average household size of 6.1 persons. In 2001, the population has significantly high from 1991 data as compared to the change of 1991 and 1981.

Chart 4.1: Population Data as of years 1981, 1991 and 2001



Source: CBS 1981, 1991 and 2001

The rise in the growth indicates that the population is growing at a higher rate and is the main cause of urbanization is in the fringe area. The data also indicates; with the increase of the population there is great increase in the household number. The ratio between the year 1991 and 2001 indicates, that the rise is almost double.

Table 4.1: Ward wise Household number and Population by Sex for the Year 2001

Ward No.	House hold	Male Population	Female Population	Total Population
1	197	476	446	922
2	125	291	274	565
3	198	446	453	899
4	203	647	557	1204
5	294	690	622	1312
6	347	799	784	1583
7	180	459	437	896
8	182	467	458	925
9	279	661	648	1309
	2005	4936	4679	9615

Source: CBS 2001

The ward wise population distribution also indicates, the density is towards the road side whereas ward number 9 occupies larger area, the population density is lesser. The ward no 4 and 5 are proximity to the Ring Road, so the population is higher in that area than any other wards (Appendix-III/ 2). The ward number 6 and 9 are the new emerging settlements, now it seems that slowly the area is converting into the residential area.

4.1.3 Social Structure

The majority of the religion of this VDC is Hindu consisting of 94%, where as 3% of the population is Buddhist and 1% is Christian. The other religions are negligible in the VDC. The other religion includes; *Islam*, *Kirat*, *Jain*, *Shikha & Bahai*.

4.1.4 Settlement Pattern

The area as stated comprises of the sloping gradient in some of the wards. It is seen that the older settlements area is basically located on the elevated part. In the past all the lower parts were used as the agriculture fields for easy irrigation facility. In older settlements areas similar castes of people lived making a community but the new settlements are emerging as the mushrooms in the agriculture fields in the mixed pattern.

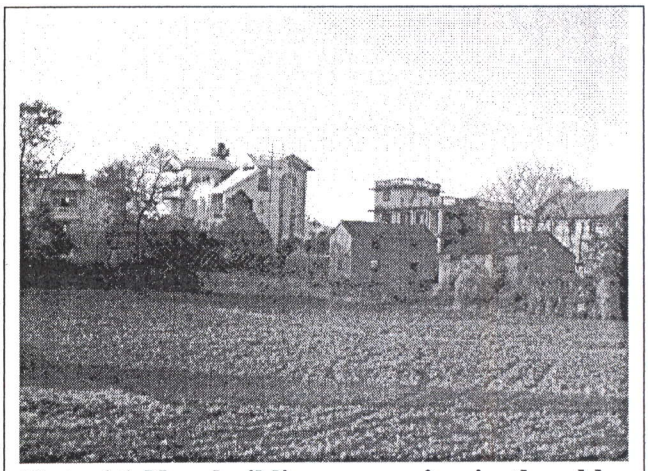


Plate 4.1:New buildings emerging in the older settings

4.1.5 Recent Developments

The growing urbanization of the valley has shown great deal of impact in the area. The area has shown signs of changes. Recently the area saw a sharp increase in the residential land transaction and building construction with the roads opening up for the access to the land. The road development is rather with the collaboration among the community rather than with the government (from Survey). The major change in the area is the growing of the building in the agricultural field and haphazard road network and lack of proper services. This will later create problem in the

development. An over view of expansion of Imadol can be seen from the aerial maps of two different periods. (Appendix-I/ 1 &2) The change can be seen as the increase of the buildings in the area and the development of the road network in the area. Recently there are two private developer involved; Oriental Housing (with the developing area of 80 *Roapanis*) and Cozy Homes with 40 *Roapanis* of land. The former is developing at the Northern entry point whereas the later is developing at along the major road passing through the area.

4.1.6 Land Value:

The major reason for the urban sprawl in the fringe area is due the availability of land and cheaper land price. The change in the land value basically indicates the demanding nature of land in the urban fringe. The value of the land according to government rate indicates that the trend has been in the increasing over the years. The value of the land is categorized upon the type of the road. With the inquiry with the local people, they gave information about land value of 10 to 15 years back.

Table 4.2: Changing Land Value (Government)/ *Ropani* over 4 Years

	061/062	062/063	063/064	064/065
Black Topped	16	24	26	29.5
Gravel	6	9	10.25	11.5
Track	3.5	5.25	5.75	6.25
Without Road	2.5	3.75	4	4.25

Source: Land Revenue Office, Lalitpur

Table 4.3: Changing Land Value (Local Price)/ *Ropani* over the years

	050/051	053/054	061/062	062/063	063/064	064/065
Black Topped	4.75	14	40	52	65	78.5
Gravel	4	10	28	36	42.25	56
Track	1.75	4	9	13.5	18	28.8
Without Road	0.40	1	6	7	9	14.75

Source: Survey, 2007

The land value allocated by the government as compared to the current rate of land is very low. Here, the Value of the government land has increased smoothly whereas the local price has increased abruptly.

This shows that the government is charging tax at a very low price. Such system will be not beneficial for the government. "Before ten years ago, the land price was very cheap and transaction was very low, but from the last 5 to 6 years the demand increased as well as the price increased. (Mr. Jagadish Kharel, Local Resident)

4.1.7 Institutions and services

In the study area there are seven schools, 3 governments and 4 private schools among them "Little angles school" has the higher impact on the urbanization process and recently opened a new college "National College". There are six clubs, these clubs are basically for the social & sports activities with the little work done in the development of the area (Appendix-IV/1). Apart from two clinics, there is government run health post in the area. There is one police post for the security of the area.

4.1.8 Cultural Aspects

There are eight numbers of temples present in the area. Among them *Shree Krishna Pramari* Temple is the most significant one. (Appendix-IV/ 2)

4.2 SITAPAILA CASE STUDY AREA

4.2.1 Introduction

Sitapaila VDC is situated to the west of Kathmandu valley. It is a legend, as to Hindu mythology, once the main heroine of *Ramayan* happened to step in the locality that is why, it has been named as steps of *Sita*; a Sitapaila. Now, the foot print is in ward No. 5, the village development committee used to be known as the main entrance towards the western part from Kathmandu to Pokhara, Manakamana and other western part, before the construction of Pritivi Highway. In the long run, the importance of Sitapaila deteriorated with the increase in facilities of roads and transportation. Favorable geographical situation, healthy environment and climate consisting Kathmandu Municipality to the east (Swayambhunath area), to the north is Ichangu Narayan, Ramkot to the west and to the south is Suichatar VDC. In comparison to Kathmandu Municipality, the climate of this area is colder and static hot. There is not much difference in daily temperature. It can be vividly witnessed as

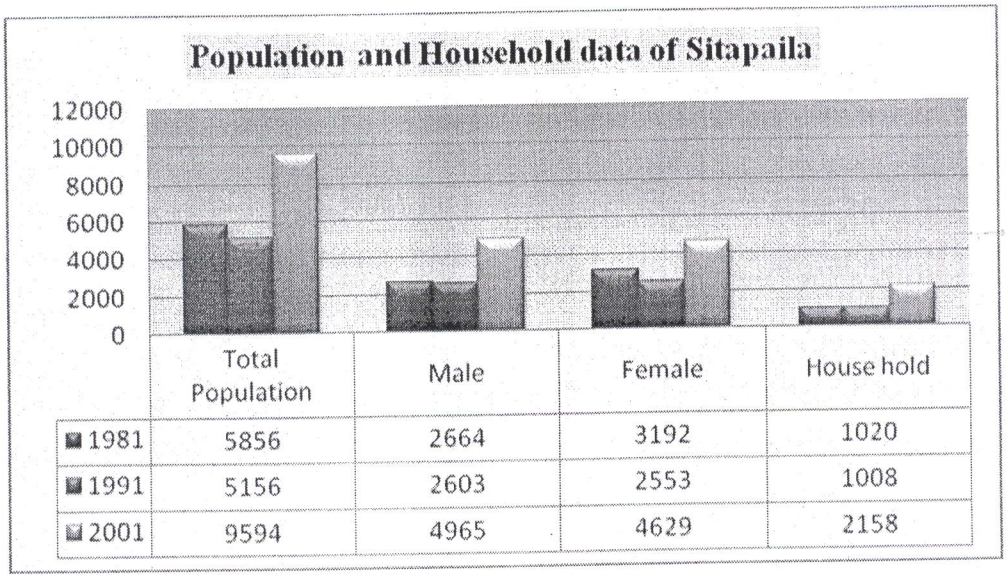
population spillover from Kathmandu due to the attached location of Ring Road of Swayambhunath area.

Some 25% land of Sitapaila VDC is 4500ft above sea level and are plains, the rest are in slopes. It is situated in $85^0$17' latitude and $27^0$4' longitudes in the Kathmandu valley. The specialty of this village Development Committee is its small pits, mountain, leveled plain (plateau) and sloppy lands._ It is situated between 4300 ft to 8000 ft. above sea level.

4.2.2 Demography Details

The population distribution in the year 1991 census indicated that the population has decreased in 1991 and in 2001 the rate has been gradually increasing with an population growth rate of 1.8% and male to female ratio of 1.07 .The population and household ratio indicates average household size of 4.45 persons in the year 1991. In 1981, the female to male ratio is of 1.19, indicating that female population was higher, with household size of 5.74 persons.

Chart 4.2: Population Data as of years 1981, 1991 and 2001



	Total Population	Male	Female	House hold
1981	5856	2664	3192	1020
1991	5156	2603	2553	1008
2001	9594	4965	4629	2158

Source: CBS 1981, 1991 and 2001

Table: 4.4 Ward wise Household number and Population by Sex and area in hector

Ward No.	House hold	Male Population	Female Population	Total Population	Area (in Hector)
1	896	1962	1702	3664	108.05
2	184	441	423	864	35.8
3	131	340	330	670	34.5
4	242	587	594	1181	58.3
5	151	380	398	778	134
6	110	243	245	488	69.5
7	53	120	114	234	7.3
8	174	391	379	770	41.66
9	217	501	444	945	75.5
Total	**2158**	**4965**	**4629**	**9594**	**564.91**

Source: VDC Office

4.2.3 Social Structure

In this VDC, 84% of the population consists of Hindu where as the second majority of the religions are 14% Buddhist and 1% Christian. The other religions are negligible in the VDC. The other religion includes; *Islam, Kirat, Jain, Shikha & Bahai.*

4.2.4 Society & Social characteristics

In the study area, the similar caste of people lives forming a community. Basically the *Chettri* caste dominates the settlement patterns. In the older settlement, the traditional practices can be still seen. In the study both rural and urban settings can be visualized. Some of the old inhabitant's still uses wood and '*Guintha*' (Dried Cow-dung) as fuel which categorizes the rural aspects. The southern area is not much developed than the northern part of the area. The mutual understanding between, old and new inhabitants are not so strong in some of the area. Especially the new habitants comment that, the local inhabitants give lesser interest in the infrastructure development.

4.2.5 Recent Developments

Since last ten years, it has been experienced the pressure of urbanization. The increase in the demand of land also shows potential development in the area. Recently, the private developers are the major factors of creating change in the area. Due to involvement of private developers there has been an immense change in the land price. As according to the demand the price of land is increasing. Some of the commercial and institutional land uses are also visible in the area apart from residential one. The commercial development is basically along the major road and at the junctions of the area. There is some institutional land use in the area but in a scattered way. Recently this area has been developed as the monastery area. There are three monasteries and two more are in the constructional phase. One of the monastery occupies 120 *Ropanies* of land, is considered one of the largest. An Over view of expansion of Sitapaila can be viewed from the aerial maps of two different periods. (Appendix-I/ 3 &4)

4.2.6 Land Value:

The value of the land according to government rate indicates that the trend has been in the increasing over the years. The value of the land depends upon the road category. With the inquiry with the local people, the people gave information about the land value of 10 to 15 years back. Informants informed that the rise in the land price is from the last 5 to 8 years back.

Table 4.5: Changing Land Value (Government)/*Ropani* over 9 years

(Land Value in Lakhs)

	050/051	054/055	057/058	058/059	060/061	061/062	062/063	063/064	064/065
Black Topped	2	2.5	4.4	5.6	7.2	12	12	13.2	16
Gravel	0.8	1.25	2.24	2.88	4	7.2	7.2	9.6	12
Track	0.5	0.3	0.96	1.28	1.6	1.96	1.96	2.08	2.22
Without Road		0.1	0.4	0.48	0.64	0.8	0.8	0.96	1.08

Source: Land Revenue Office, Kalimati, Kathmandu

Table 4.6: Changing Land Value (Local Price)/ Ropani over the years

	050/051	054/055	061/062	062/063	063/064	064/065
Black Topped	4.5	16	50	76	82	88
Gravel	2.25	12	36	43	56	62.5
Track	2	4.5	14.75	16	20.5	21.75
Without Road	.50	1	10	11.75	13	16

Source: Survey 2007 (Land Value in Lakhs)

The land value allocated by the government as compared to the current rate of land is very low. The rise in the land value between the government and the local value differ in a great deal. The difference in the value indicates that the government value is just for taking the tax, it does not effect in the increase in the local price. This shows that the government is charging tax at a very low price. Such system will not be beneficial for the government.

4.2.7 Institutions and Services

In the study area, there are seven schools, two governments and six private schools in and around the VDC. There is a health post established by H.M.G. and two private clinics. Through this, primary health treatment facility is being provided to the inhabitants. For other facilities, they have to depend upon hospitals in Kathmandu and Nursing Homes. There are two large industries in the area. One is Nepali paper factory and the other, cold storage; spread in the larger area. These two industries are helping the local people in getting the employment opportunity in the area. Apart from these industries, there are many small construction industries emerging in the area.

4.2.8 Cultural Aspects

In the past, the road connection to the western region was from this VDC, due to which there are many rest house and traditional water conduits. As 84% of the inhabitants are Hindu, there area 11 small temples located in and around the VDC. As there are significant numbers of Buddhist, three monasteries are located in the VDC. (Appendix- IV/ 3) apart from this there are two monasteries which are in construction phase.

CHAPTER V COMPARATIVE ANALYSIS OF IMADOL AND SITAPAILA VILLAGE DEVELOPMENT COMMITTEE

From the household survey, observation and informal talk with the local inhabitant's of both the study area the following data are gathered and analyzed.

5.1 PHYSICAL AND ENVIRONMENTAL ASPECTS

5.1.1 Road Network

There are three entry points from the Ring Road in Imadol VDC. One is the major road leading to Lubu; connecting Bhaktapur Municipality. This is planned road of 11meter wide and black topped through out. The other two roads are also the connecting roads; the entry point is connected by 3m wide narrow bridge. The black topped road is around 4.2 Km in the whole VDC. 13% of the surveyed household has access from blacktopped road, 60% graveled, 16% pedestrian and 11% track.

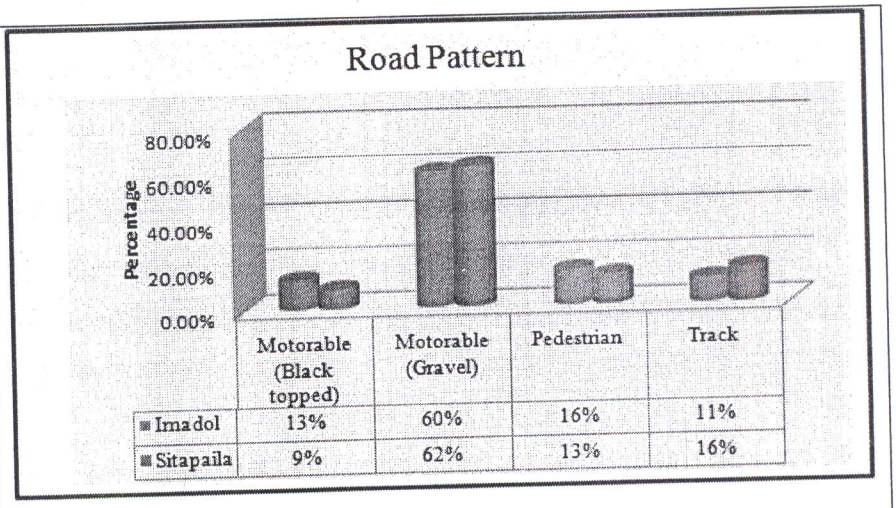


Chart 5.1: Road Pattern

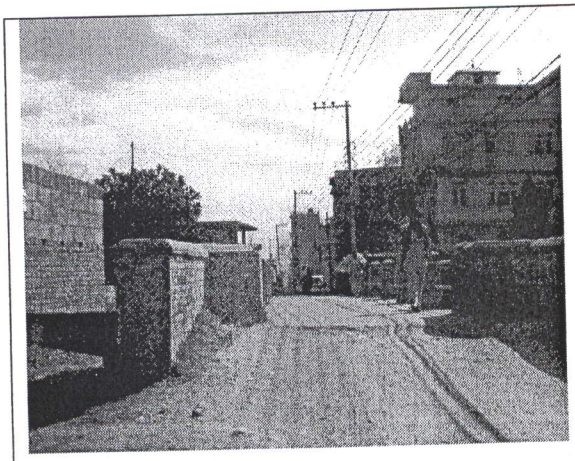


Plate 5.2: Narrow entry point of Imadol

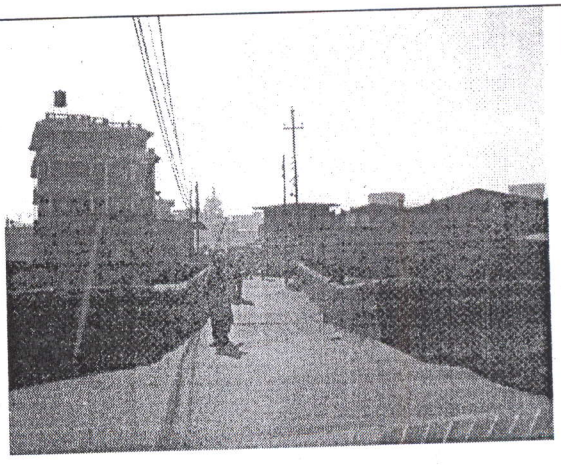


Plate 5.3: Narrow entry point of Imadol

In Sitapaila VDC, there are three entry points from the Ring Road. The main road is black topped through Sitapaila and leads to Ramkot VDC and connects Dhading District. The black topped road is 4 Km in the whole VDC. Apart from these roads all other roads are graveled. The entry points are wider. From the survey, only 9 % of the household has access from black topped, 62% gravel, 13% pedestrian and 16% track roads.

The black topped and gravel road is in fair condition whereas the track and pedestrian are roads have been deteriorating. Among the surveyed households, 42% of the roads are in fair condition and 40% in bad condition with 18% worse in Imadol. In Sitapaila, 49% of the roads are fair, 38% are bad with 13% of the road in worse condition. This indicates that though there is road access in most of the households but the condition of the road in both the areas seems to be unsatisfactory.

Table 5.1: Condition of Road (In %)

	Fair	Bad	Worse
Imadol	42	40	18
Sitapaila	49	38	13

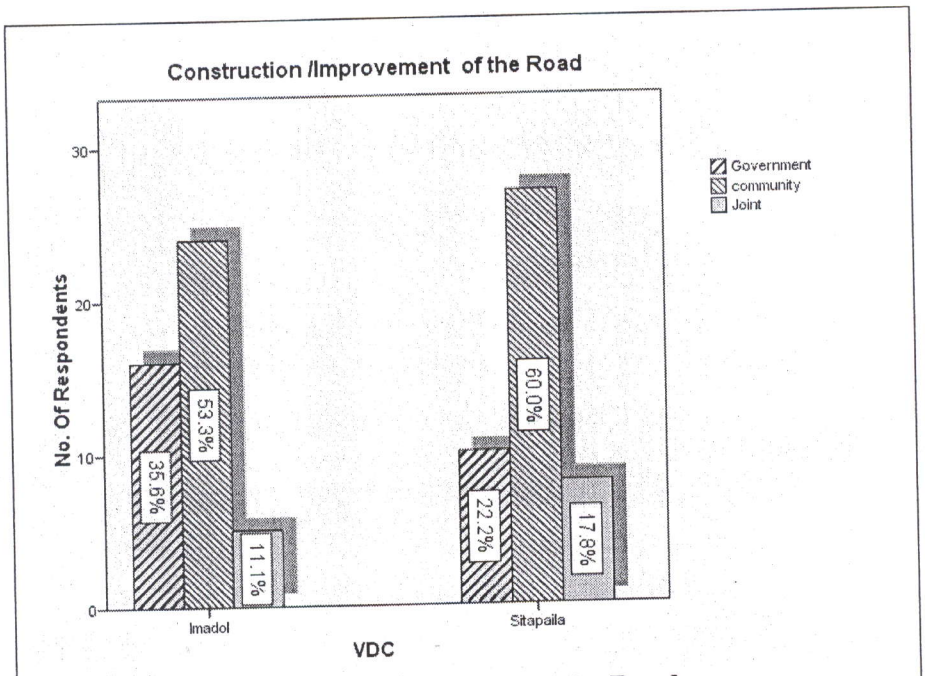


Chart 5.2: Contruction /Improvement of the Road

Here the figure indicates that in Imadol VDC, 53% of the people said that government does not help in the construction or for the maintenance of the road and community it self does the construction and maintenance of the road. Whereas 36% said that

government themselves does the work and 11% said that such works are done with the joint venture of the community and the government. In Sitapaila area the similar kind of data can be visualized, here 60% of the population have constructed or maintained the road with the help of the community whereas 22% of the surveyed people said that the government is responsible for such work. The data indicates that the government role in the construction and maintenance of the road are minimal and mostly the work has been done by the community or the developers themselves. There is very minimal area where the VDC has been investing for the physical infrastructure as well as for the social aspects.

5.1.2 Transportation

There are two roads that provide public transportation in the whole of Imadol VDC; one is the highway leading to Lubu and other internal road leading to Tikathali VDC. 49% of the respondents have to travel five minute for the public transportation, while 27% have to travel 5-10 min walk and 9% falls on the more than 20 min walk category. But in Sitapaila area there is only one road that runs the public transportation. Travelling time is 5-10 min for 29% of the respondents. However 3% of the respondents have to travel for more than 20 minutes. The Road network and transportation route can be visualized from the map (Appendix-III/ 3 & 4). The transportation facilities in both the areas are in poor condition. Usually most of the people have to reach all the way to Ring Road to get the proper transport facilities.

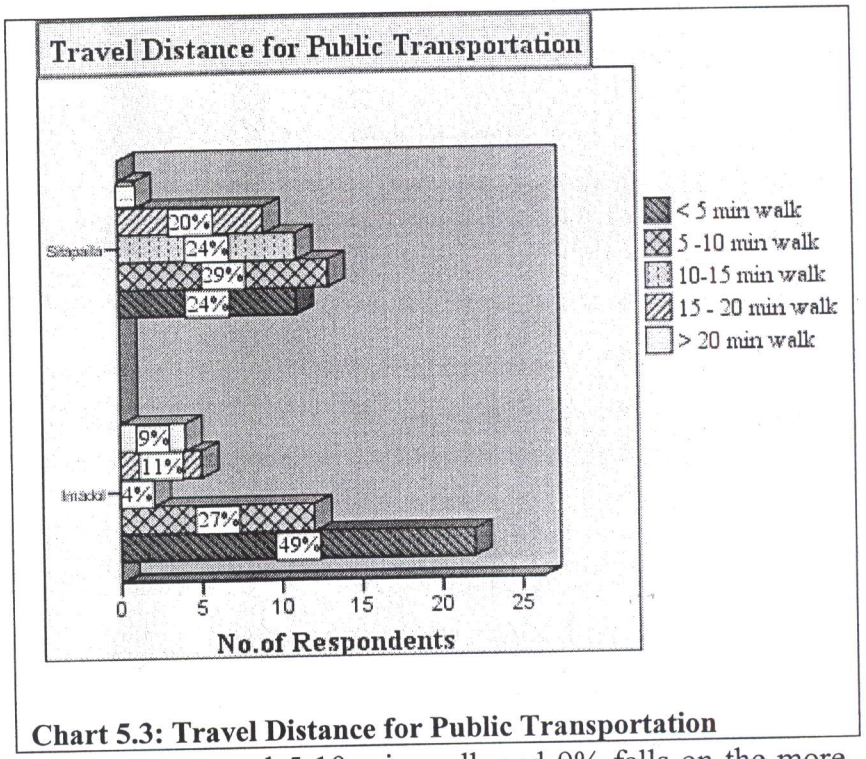


Chart 5.3: Travel Distance for Public Transportation

5.1.3 Mode of Transportation

The Data indicates that in Imadol area 69% of the people use public transportation, where as only 7% use private vehicle and 24% of the people use both types of transportation. In Sitapatila area 64% of the surveyed people use public transport, 11% use private and 24 % uses both the type. This indicates that the most of the population depends on the public vehicle and public transportation is also one of the most necessary aspects for the settlement. This also indicates that in both the areas, especially in the Imadol area the higher classes of people are in less number as compared to the middle income group. This also effects in the development of the urban fringe area.

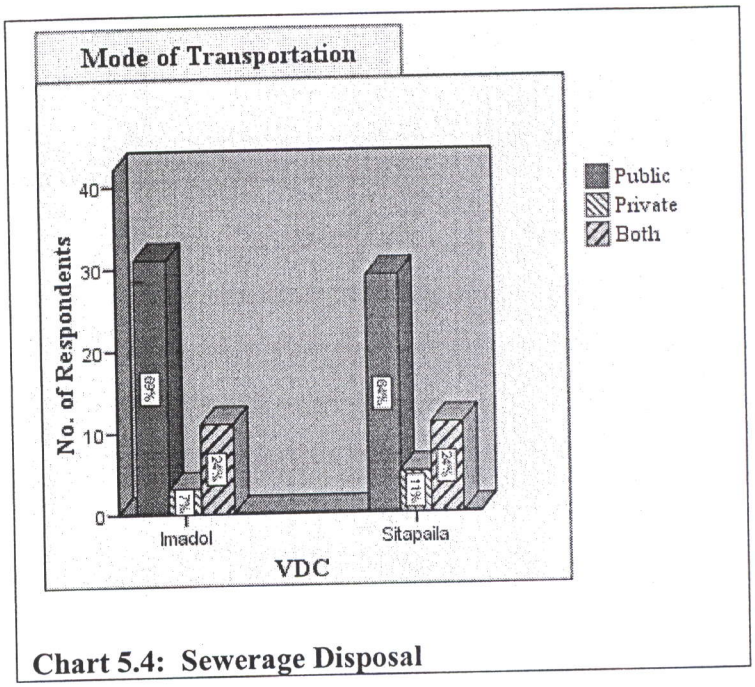


Chart 5.4: Sewerage Disposal

5.1.4 Buildings Details

Building Type

In Imadol VDC, out of 45 household surveyed 58 % were frame structure and 42 % were load bearing. Similarly, in Sitapaila area, 54% are frame structure and 46% are load bearing or traditional type. The new technology has greater influence in the area. All the migrants are constructing buildings using frame structure. The construction technology used is RCC, as observed the use of the technology is not structurally sound.

Table 5.2: Type of Building

	Load Bearing	Frame Structure
Imadol	42%	58%
Sitapaila	46%	54%

Building Use

The main use of the building in both the study area is residential. The other higher percentage include mixed type of use; residential and commercial with shops in the ground floor of the house. The houses along the major road access and secondary access have shops in the ground floor. Only few percentages of the households have used the building for fully commercial purpose, indicating that the area has not been fully commercialized.

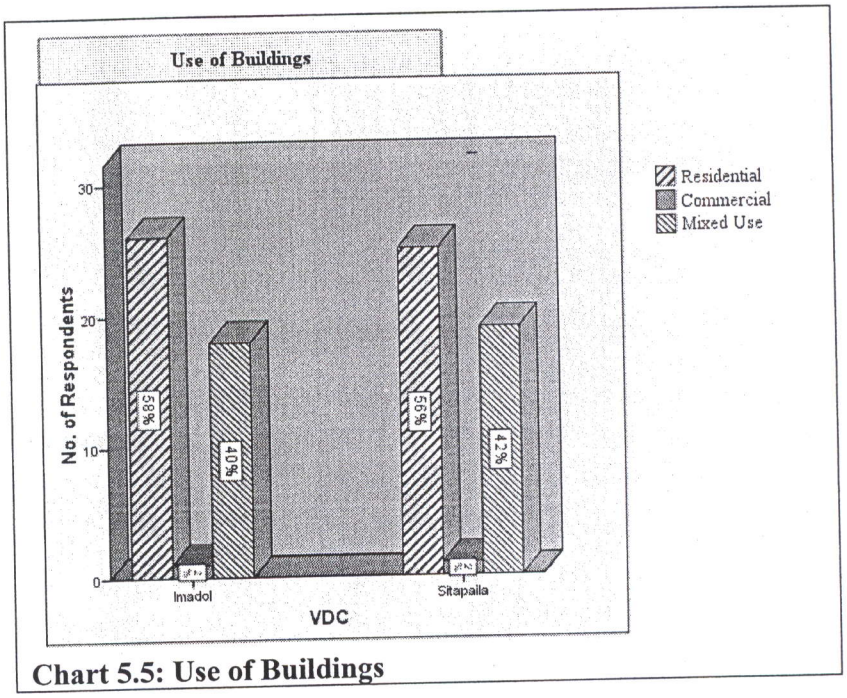


Chart 5.5: Use of Buildings

5.1.5 Water Supply

From the sample survey the present scenario of the water supply sources are studied. The major problem in both the V.D.C. is the drinking water. In both the study areas, the major sources of supply is hand pump or well. In Imadol, 78% of the respondents and 49% of Sitapaila depend on the hand pump or well. In most of the area of Imadol, the people have even paid for the supply of water and the pipeline is laid out, but supply is not there. But in the old settlement there is piped water supply in some of the residents but that is not enough for the use.

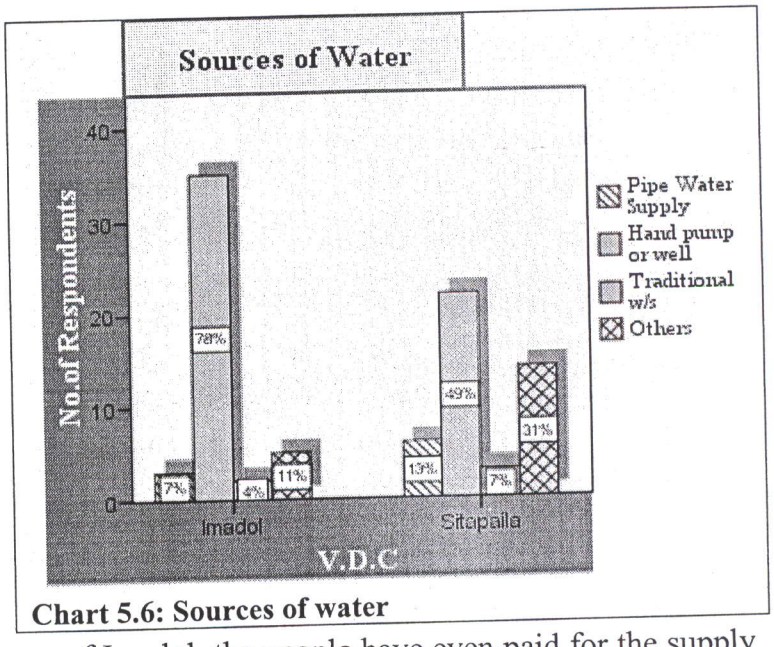


Chart 5.6: Sources of water

In Sitapaila, there is public tap in ward no1, 2 & 4. Some of the people use tanker water supply for the drinking purpose.

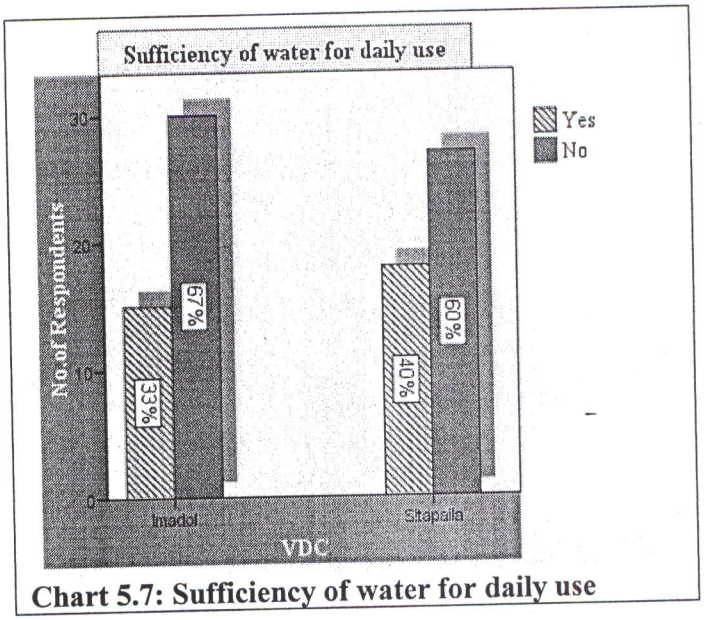


Chart 5.7: Sufficiency of water for daily use

The chart 5.7 indicates 67% of the people of Imadol Study area does not have sufficient water supply for the daily uses and in Sitapaila area 60% of the surveyed people lack sufficient water supply for the daily use. This indicates that though water is one of the important requirements for the settlements but the study in both areas indicates that people are living even with the lack of sufficient supply of water.

5.1.6 Solid Waste Management

Solid waste is another aspect taken into consideration in the context of infrastructure. In Imadol 58% of the respondents say that the solid wastes is taken by the organized group whereas 38% is used as manure in the agriculture fields, whereas in Sitapaila area 56% of the respondents use the waste as manure or burn the other materials. 27% throw their waste on the road. Only 16% solid waste is disposed as an organized way.

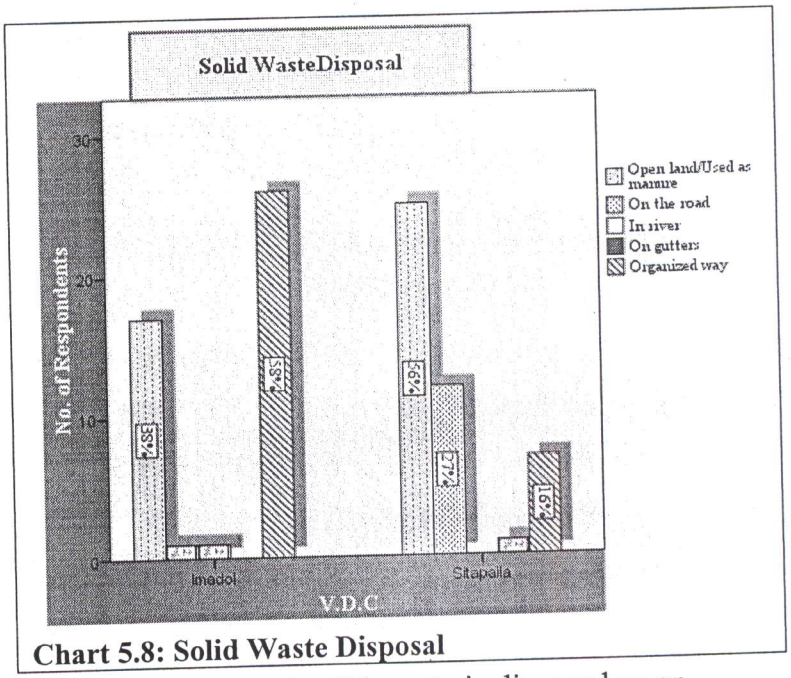


Chart 5.8: Solid Waste Disposal

Most of the degradable wastes are used as the fertilizer for the agriculture. The non degradable material is burned in both the study area. This indicates that people can be self sustainable but some are polluting the environment by throwing the garbage on the road.

5.1.7 Sewer Disposal

The other major issues in both the areas are the sewerage disposal system. Around 88.9% and 66.7% in Imadol and Sitapaila areas have septic tank and lack sewer connection. Only 8.9% of Imadol VDC & 13% of Sitapaila VDC have sewer connection. Some of the household near the river in Imadol VDC have direct connection to the River. Due to the lack of drainage system in the both the area, in the rainy season the conditions of the gravel road gets worse. Slowly people near the river side or canals are now using as the disposal system and polluting the area in the long run.

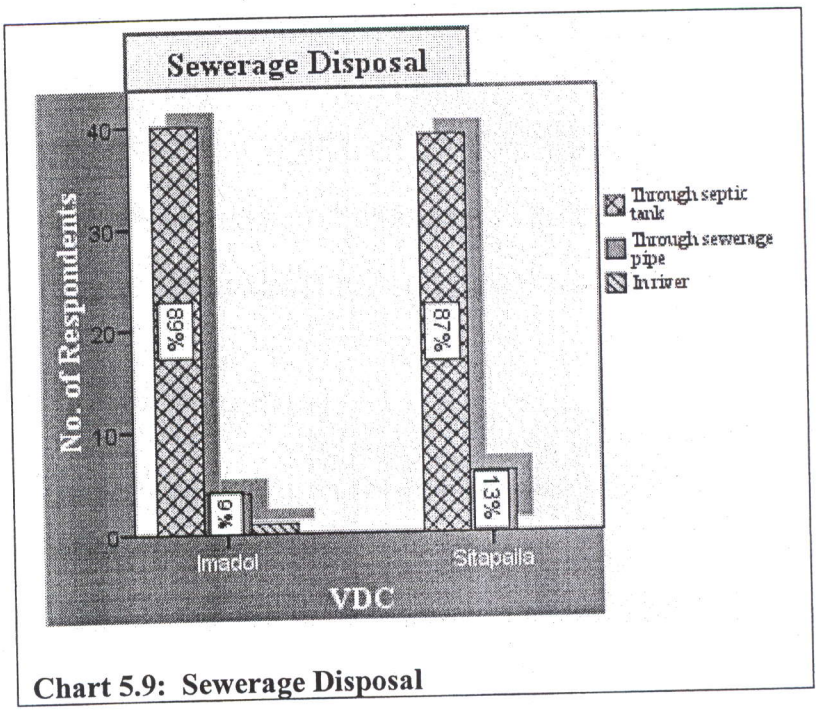


Chart 5.9: Sewerage Disposal

5.1.8 Electricity

The entire households of both the VDCs have the electricity connection. Apart from the technical problems there are no other problem relating electricity in the study areas. As other village Development Committees of the Kathmandu Valley, all inhabitants of the village committee seem to have electricity. As to household survey 100% population are utilizing electricity facilities through 10 transformers established by electricity authority.

5.1.9 Use of Modern Technology

The technology like solar water heater, telephone services are the common features of the urban setting. There are telephone connections in almost 85% of the households in Imadol Area whereas almost 90% of the household have connection of telephone services in Sitapaila area. From the observation it seems that only few percentage of the household in both the study area have the facilities of the solar water system. This

may be because of the scarcity of the water availability and as well as the low income level of the people. But later days such facilities will be common features, so while doing planning availability of the sunlight and ventilation should be taken into consideration.

5.2 SOCIAL AND ECONOMIC STRUCTURE

5.2.1 Migration

In Imadol VDC, about 44% of the sample population is local residents and 56% are migrated, which shows that the in-migration rate is more. But the migrant rate is 51% in Sitapaila and 49% are local residents. The migrant people are more in percentage than the original residents in both the study areas. The major portion of the migrant is from within the Kathmandu Valley. The trend shows that the area is urbanizing due to the increase in the migrant people. From the sample survey 49% Nos. of people are migrated in both the areas. In Imadol area 76% migrants are outside the Valley but in Sitapaila, 58% of the migrants are from within the Valley.

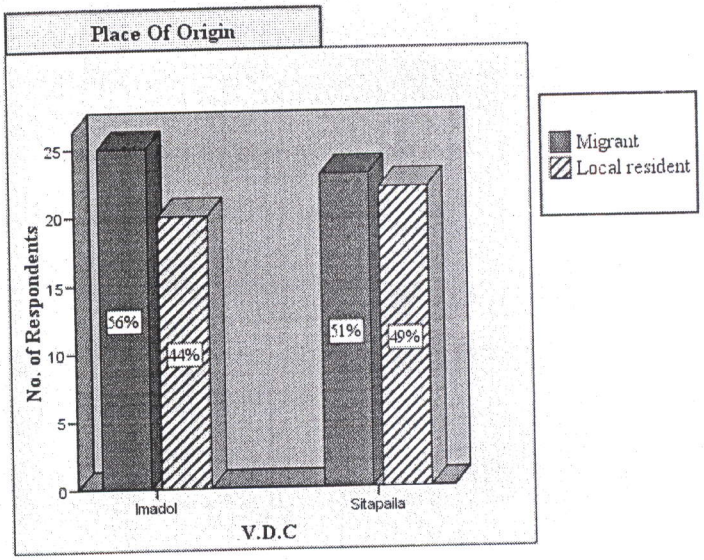


Chart 5.10: Proportion of household wrt places of origin

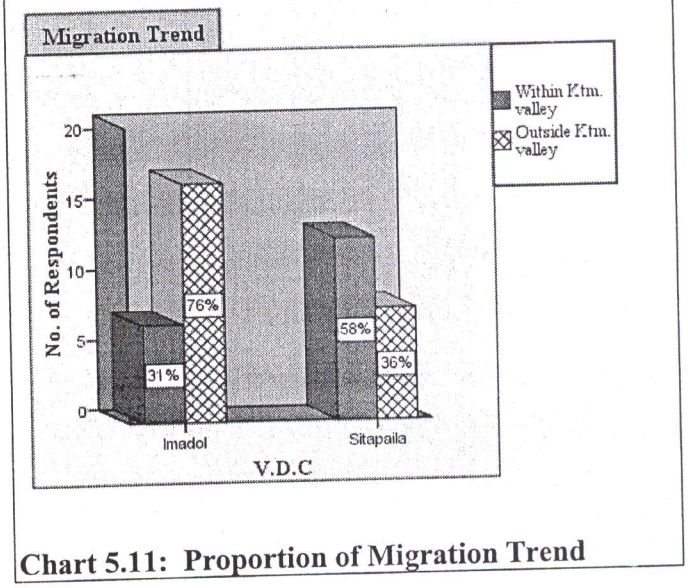


Chart 5.11: Proportion of Migration Trend

It was also witnessed that, in Imadol 63% are the newly settled migrants, who have migrated only within 5 years ago. With 29% of the people migrated only 6-10 years ago and 4% migrated 11 to 15 years ago and 16 % more than

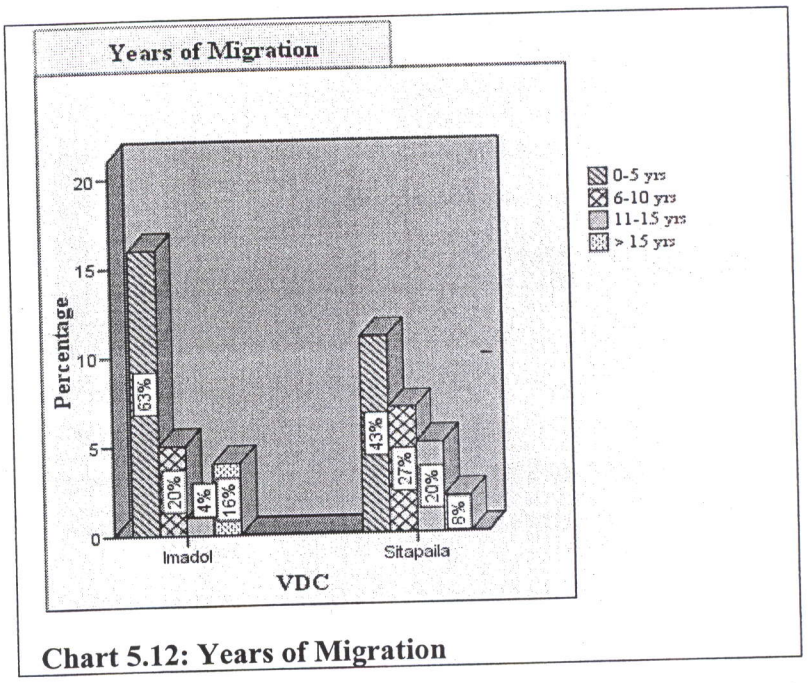


Chart 5.12: Years of Migration

15 years ago. This shows the clear picture of the abrupt increase in the population in the recent years due to the political instability and insurgency as well as high cost price of land in the urban core. Similarly, in Sitapaila area 43% of the people migrated to this area less than 5 Years ago, 27% migrated within 6-10 years, 20% of the population migrated in 11-15 years and 8% migrated more than 15 years ago to the urban fringe. The figure shows that in the Imadol area there has been recent increase in the migrant population as compared to the Sitapaila area.

5.2.2 Reason for migration

Among the migrants from Imadol, seven respondents migrated due to the availability of the land in cheaper rates and affordable price and five stated that they migrated for the better environment in the fringe area. Whereas in Sitapaila area, basically people migrate for the better environment, this may be because of the sloppy and greenery surrounding area. Mostly people migrate, due to proximity to Swayambhunath, as migrants can be nearer to the religious place especially Buddhist migrants.

Table: 5.3 Proportion of migrated household's reason for migration

	Reason for migration								
	Cheaper and affordable land price	**Better environment**	**Availability of land**	**Proximity to family and friend**	**Business/ commercial potential of area**	**Proximity to occupation**	**Both environments of town and village**	**Nearby place of previous stay**	**Total**
Imadol	7	5	3	3	1	3	1	3	**26**
Sitapaila	2	4	3	3	3	3	3	2	**23**
Total	9	9	6	6	4	6	4	5	**49**

Some migrate as the suitable land is available in the area. The table above shows the range of preferences of the people while shifting to the present urban fringe.

5.2.3 Education

In Imadol VDC, the percentage of the people having primary education is higher having 31%. However, the percentage of people having education higher than intermediate level is quite low. The degree holders are only 2%. The illiterate rate is 29%. In Sitapaila VDC, the percentage of illiterate is high having 40% of the total respondents, whereas degree holders comprises of 11% which is quite higher than Imadol VDC. The data indicates that Sitapaila Area has more number of educated people than Imadol Area. But the recent phenomenon is that almost all the children go to school for education.

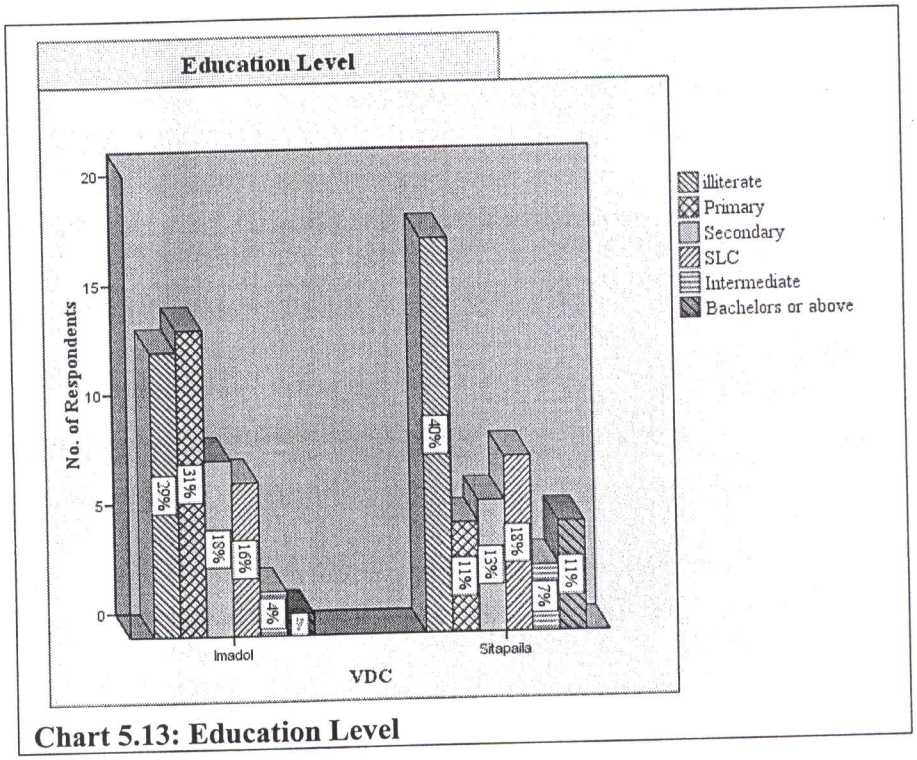


Chart 5.13: Education Level

5.2.4 Occupation (Past)

The major occupation is the agriculture in both the VDCs the percentage is 54% and 56% in Imadol and Sitapaila respectively. Besides agriculture people are also engaged in business, services and waged labour. In Imadol, 26% of the people had services. Whereas in Sitapaila, about 28% of the people involved are the business and 21% are service holder.

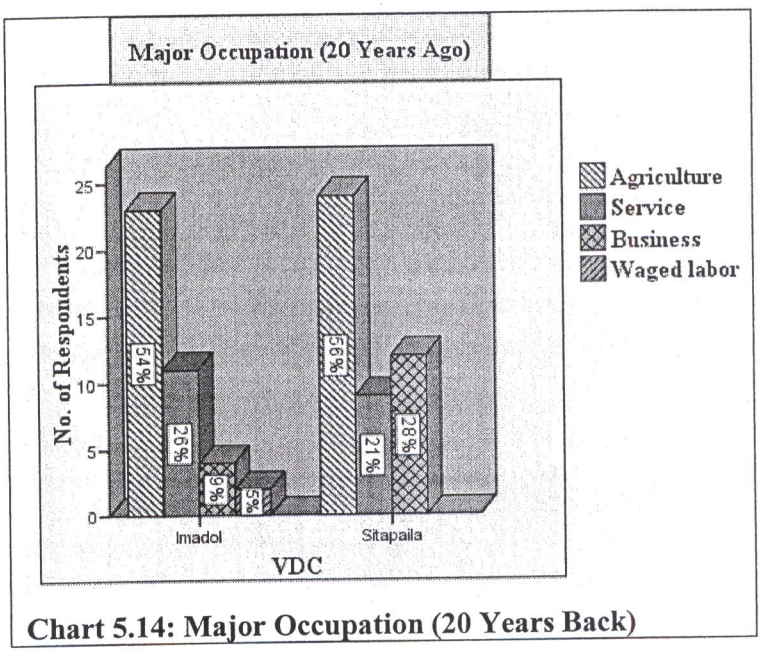


Chart 5.14: Major Occupation (20 Years Back)

5.2.5 Occupation (Present)

From the survey, it is found that 22% of the house holders are still involved in agriculture, 40% involved in services and 33% in the business in Imadol VDC, whereas the 44% of the household major occupation is business, 36% involved in service and 13% are still involved in agriculture. About business sector, business is basically limited to the small grocery and small shops.

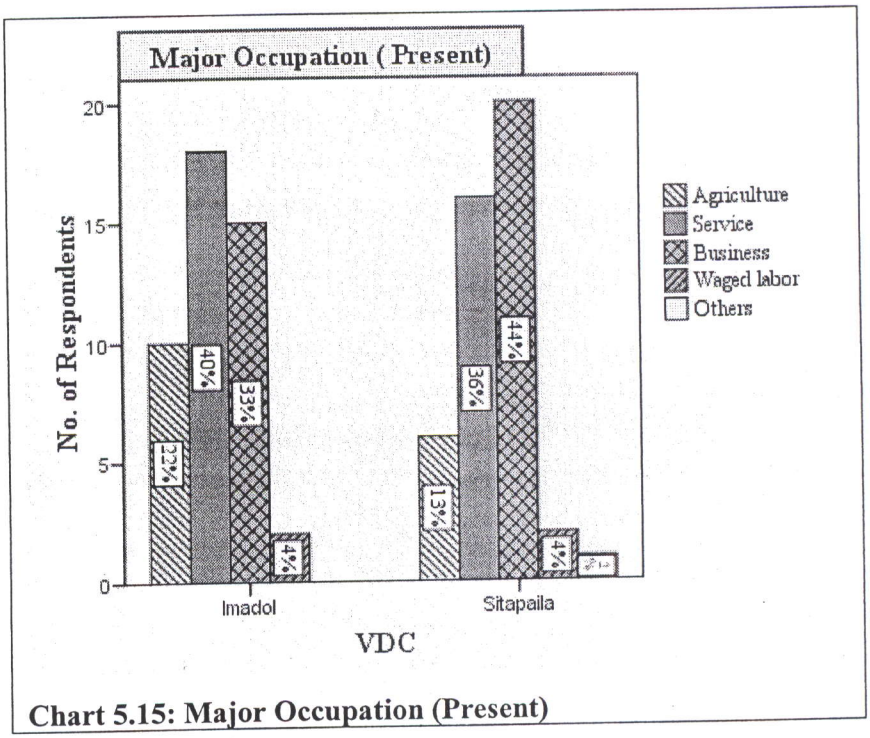


Chart 5.15: Major Occupation (Present)

5.2.6 Income Level

The graph indicates that most of the surveyed household falls on the lower income category. The trend of decreasing income level shows that the higher income group people are lesser in the area with the percentage ranging from 49% in the lower to 4% in the higher income group. But, in Sitapaila 18% falls on the higher income group and 36% falls on the lower income group. This shows that the people of Sitapaila area have higher income group than that of Imadol area.

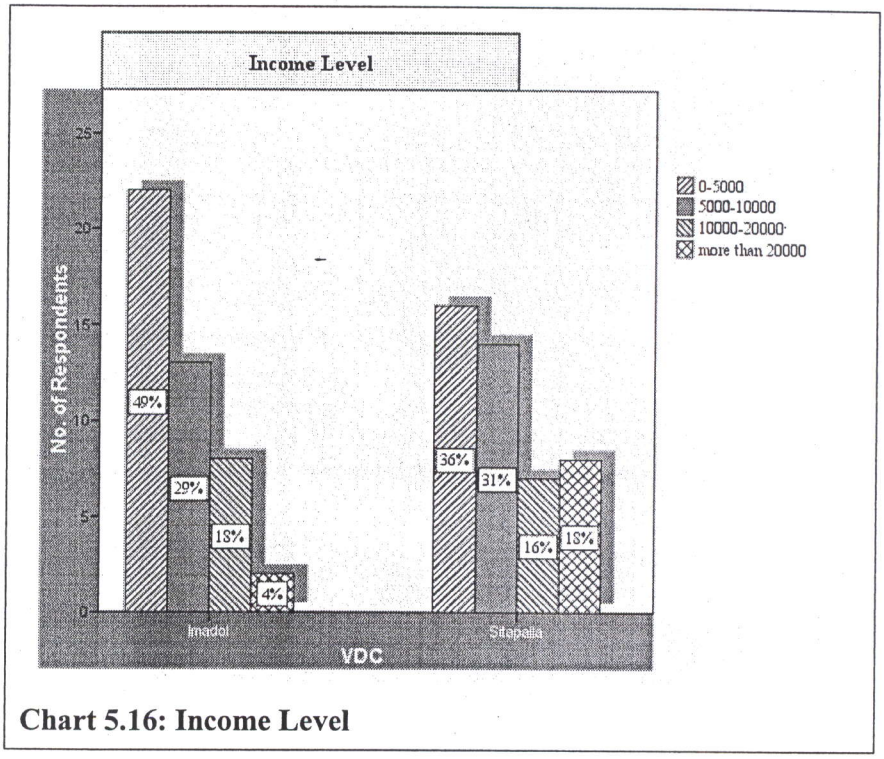


Chart 5.16: Income Level

5.2.7 Family Size and Income Level

In Imadol study area, the following chart indicates even with the family size falls on the more than 15 category, the income is very low. Where as people with the family size 5-10 has a higher income level. The chart shows that in the area people with lesser family

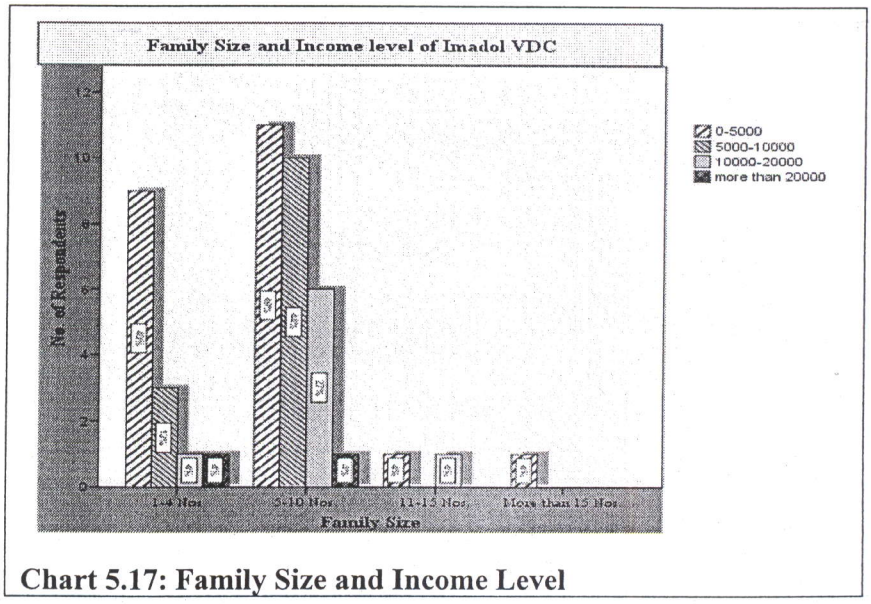


Chart 5.17: Family Size and Income Level

size have higher income level compared to level. The graph indicates that the area is mixed zone with the composition of high income group and lower income group.

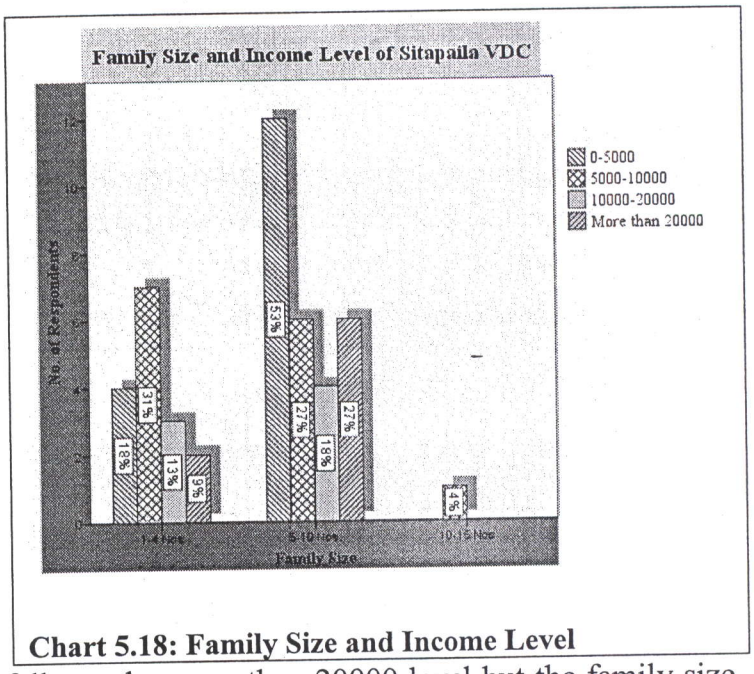


Chart 5.18: Family Size and Income Level

From the surveyed data 18% of the family size 1-4 falls on the 0-5000 income category, whereas 31% fall on the 5000-10000 income level, 9% falls on the more than 20000 level but the family size of 10-15 numbers posses only 5000-10000 income level. In the family size of 5-10 the highest range is 0-5000, but it also incorporates 27% of higher income. From the cross tabulation of the income level and family size shows that the area has a mixture of high income group as well as lower income group.

5.2.8 Family Size and Land Holding

The family size and land holdings indicate that the family size of 5-10 numbers hold 76% of land up to 1 Ropani. Basically the graph also indicates that the more no of people have land

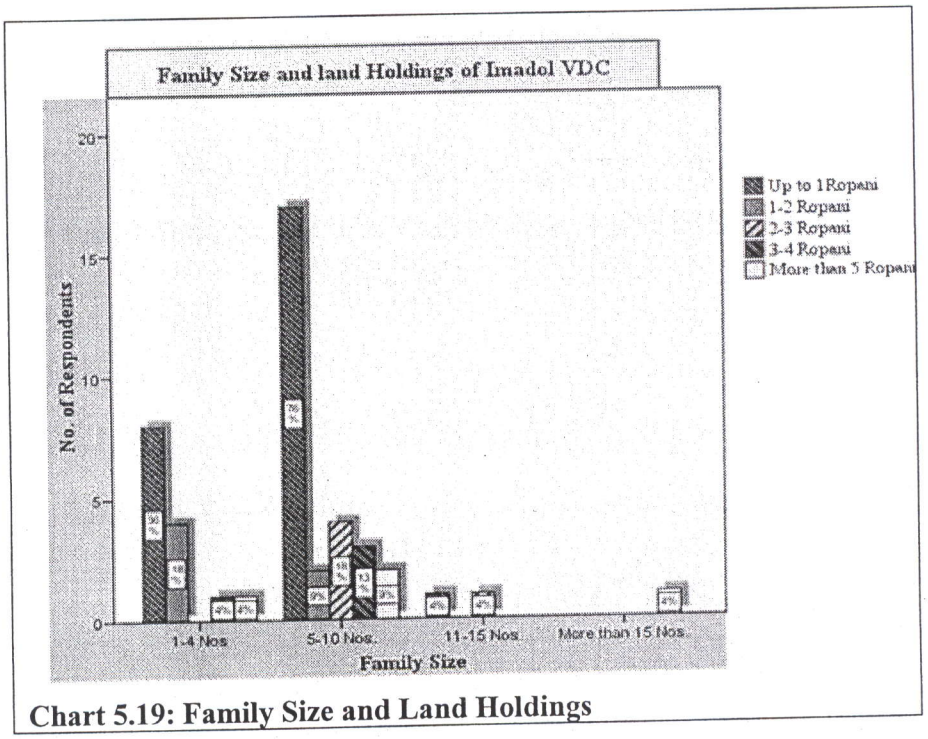


Chart 5.19: Family Size and Land Holdings

less than 1 *Roapani*. It shows that higher the family size they have more land. The joint family has more amount of land than the lesser number of families.

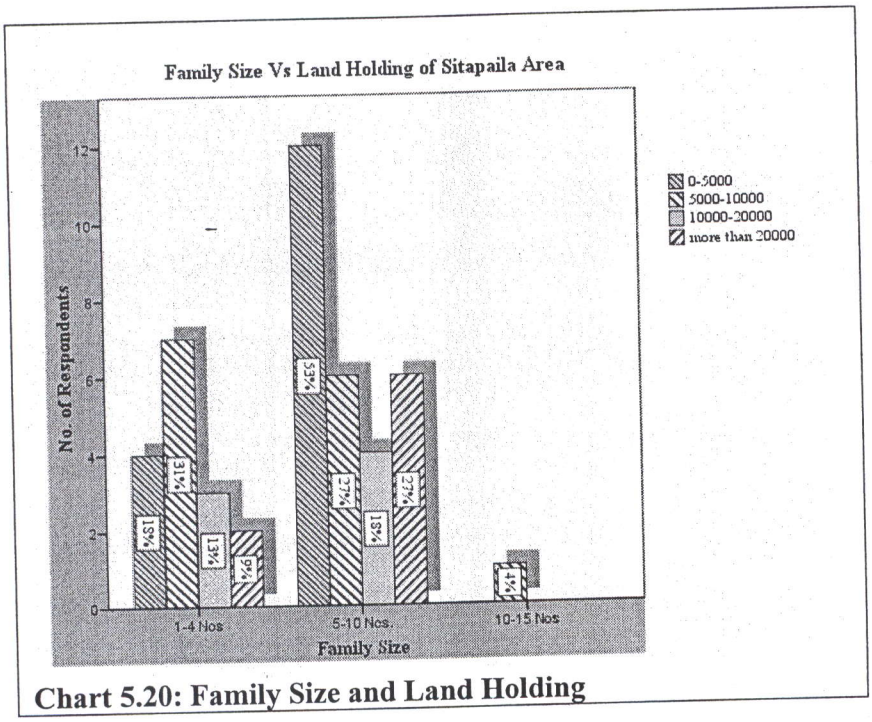


Chart 5.20: Family Size and Land Holding

In Sitapaila, the family size of 5-10 members hold 49% of land up to one *Ropani,* whereas the other maximum number of the land holding is of 36% of 1-2 *Ropani* and 18% hold more that 5 *Ropani* of land. This shows that the people of Sitapaila does not posses large amount of land. The distribution of the land holding is not in the same ratio as that of the family members. There are families with 10-15 members having only 2-3 *Ropanis* of land whereas family size of 1-4 has more than 5 *Ropanis* of land in their belongings.

5.3 VILLAGE DEVELOPMENT COMMITTEE BEHAVIOR FOR THE BUILDING REGULATION AND BYE-LAWS

The capability of V.D.C. is very critical in both the case studies area. There are only three staffs that look after the office. They basically are not efficient as it should have been. The institutional capacities are poor in both the VDCs. This is also because of the absence of the elected bodies and a fixed policy.

Table: 5.4 Building Approval fee charged by V.D.C

V.D.C	Amount	Description
Imadol	Rs. 3 Per Sq.Ft.	
Sitapaila	Rs. 5 Per Sq.Ft.	The rate is compromisable.

Source: V.D.C. Office

In Imadol, the price is fixed and is charged 30% extra as the penalty if building approval is requested after the completion of the building. The staffs are strict in the rules and regulations. In Sitapaila V.D.C., the rate is higher, but the rate is compromise able for the local people and the other *dalits* and low income group. There is no such provision of penalty for those who donot take approval before the construction. Furthermore they send the late file to the local government for the approval in later time. Compared to both the VDC, Sitapaila VDC is more organized as compared to Imadol VDC.

Table 5.5: Number of building permit taken

V.D.C	063/064	From shrawan2064 till date
Imadol	354	56
Sitapaila	131	15

Source: V.D.C. Office

Usually people were not aware of the provision of building approval. In recent years, it has increased awareness and the people who had built their building 3-4 years or more than that, usually come for approval if they have to take loan from any institute or agency. But nowadays, people are becoming aware of the building approval from, the V.D.C. Secretary says.

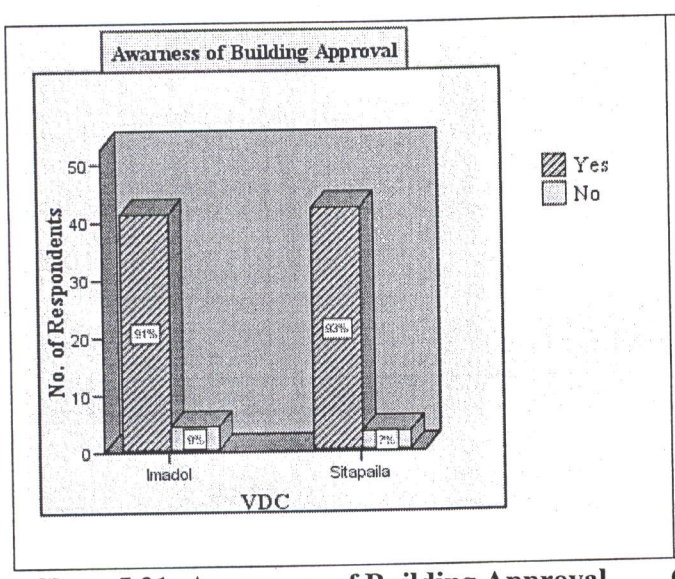


Chart 5.21: Awareness of Building Approval

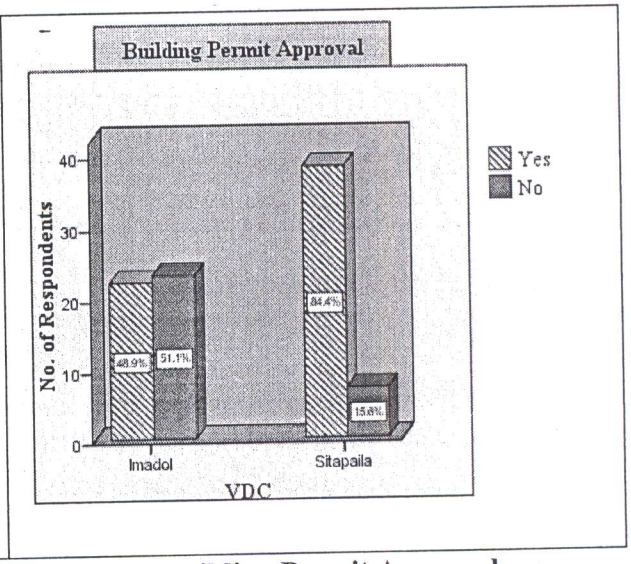


Chart 5.22: Building Permit Approval

From the Survey the majority of the respondents seem to be aware of the building approval. In Imadol, 91% people are aware of the rules but 51% have not taken building permit approval from the VDC. In sitapaila, 93% of the people are aware of the rules and 84% have taken building approval, only 16% have not taken the approval. Mostly, local people do not take the approval. But now a days people are taking approval as they are aware that in the future time the area will be converted into Municipality and that time rate will be higher than the present days.

Standards of building by-Laws

By-laws are prepared in keeping conformity to the by-laws of the KMC prepared by KVTDC. Some of the features of the by-laws adapted by both the VDC are as follows.

1. Compound wall should be built leaving 11meters from the centre point if it is the main road,(This provision is applied in Imadol VDC only). If shutter is to be kept it should be 1 meter away and constructions of the house are allowed at 5 feet distance from the edge of all types of motorable roads.

2. If there is dead end, there should be turning back space about 6 meters with the approval of attached boundaries residents.
3. Building can be built away 1.5 meters from the neighboring land, but in the old settlement of the village development committee, the former trend of monitoring distance to the left and right has to be maintained.
4. Construction can not be done in the site of public places, toilets, roads etc. The wastage coming should be treated in one's safety tank and construction, shock-point.
5. Construction should be completed within 2 years of the date of approved mapping.

Monitoring and the evaluation of the by-law by the VDCs are limited. There is no provision of the field visits until and unless someone complains at the office.

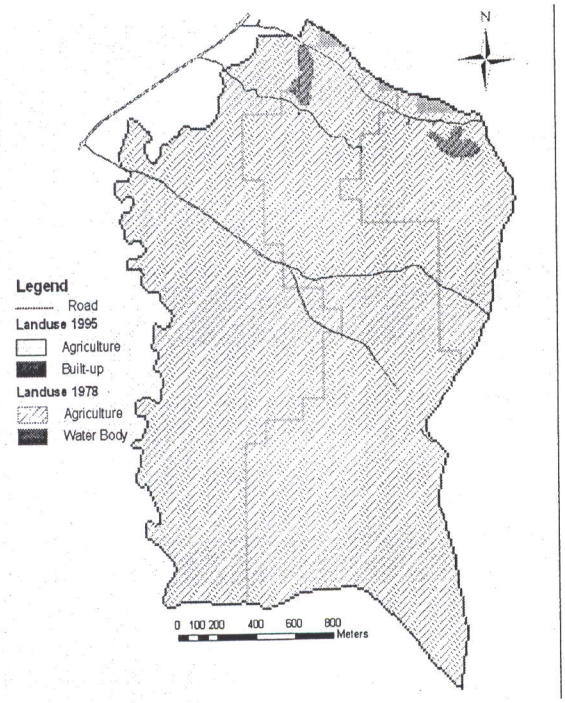
CHAPTER VI DEVELOPMENT ANALYSIS

6.1 LAND USE CHANGE ANALYSIS

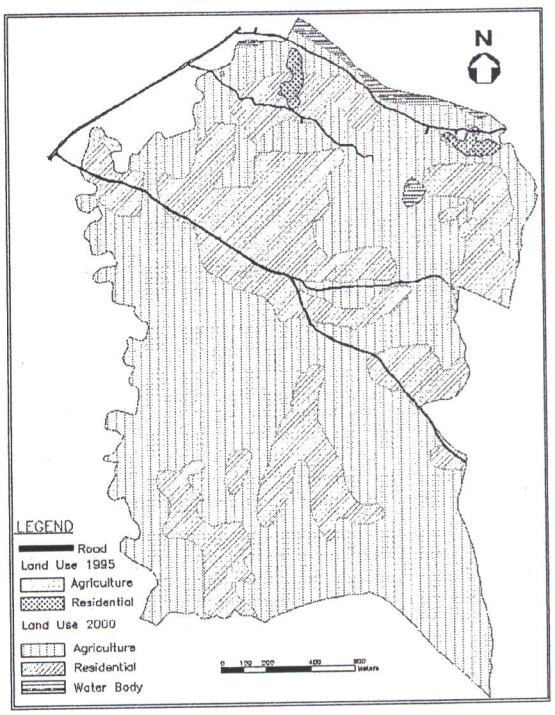
For the land use change the study was done with the availability of the GIS data for the year 1978, 1995, 2000 and 2006 for both the study area. The images from 1978 and Google 2006 also shows the change in the built up area. It has been noticed that the conversion of agricultural land into built-up area has been happening. GIS analysis shows that the built-up area has expanded gradually along the major roads in both the study area.

The overlay Map of the Imadol Area

Map 6.1:Overlay Map Of the Year 1978 &1995

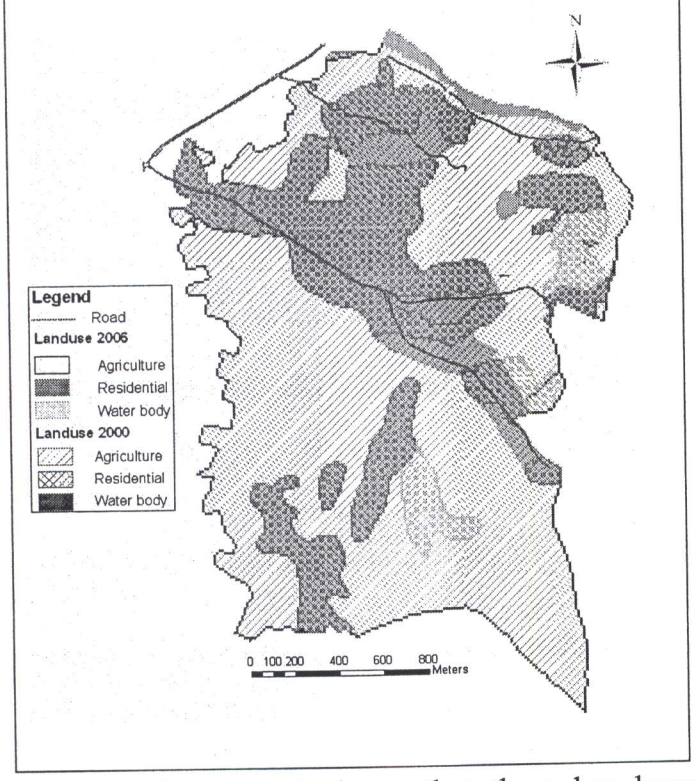


Map 6.2:Overlay Map Of the Year 1995 & 2000



The Changes can be vividly seen from the overlay of the map. Basically the settlement is more vividly seen in the major roads. In the overlay map 1 the settlement is not as distinct as in the overlay map 2, it does not indicate that the settlement was not present in the area, but indicates that there were not much noticeable settlements in the area. The overlay map 2 indicates that there has been rather fast urbanization in the year 2000 than 1995.

Map 6.3: Overlay Map Of the Year 2000 & 2006



In the year 1978 & 1995 the data for the settlement was not available. Slowly the residential started along the road leading to the ribbon development in the year 2000 and rapid development in the year 2006.

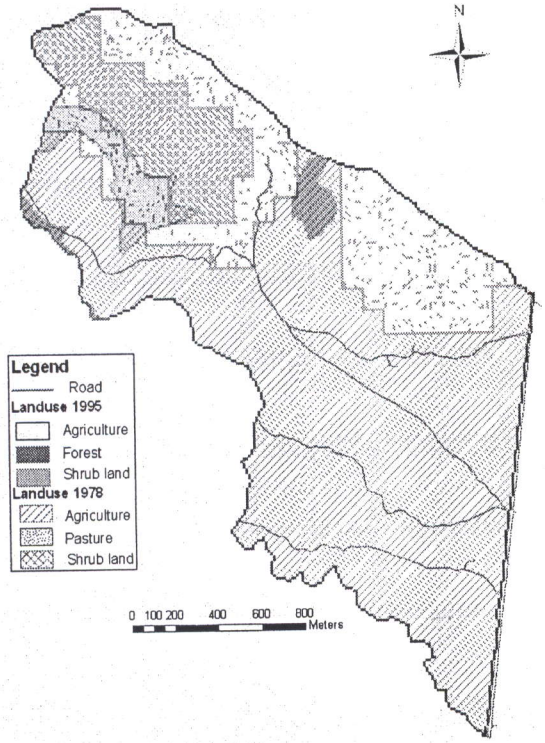
The overlay map 3 shows that there has been immense residential development occurring along the major road leading to the other VDC as well nearby areas from the Ring Road. The pocket developments are happening in the agricultural field. The land use (Appendix-III/ 5) refers to the decrease in the agriculture land and increase in the built up area. The residential building area is randomly placed in the area. There are four brick factories in the southern part of the area. The buildings constructed are in and around the brick factory. The construction of the building is basically due to the road access. Around the major roads there are mixed kind of zone. Usually in the lower floor it is used for commercial purposes and the upper floor is used as the residential purposes. Only in some cases all the floors are used as commercial purposes. There are two areas where private land developers have purchased the land for development. It is under construction phase.

The development trends are comparatively lower in the southern part. This may be due to the presence of brick factory and other factories. The institutions / services are not much present in the southern part so the density is not as higher than the other areas.

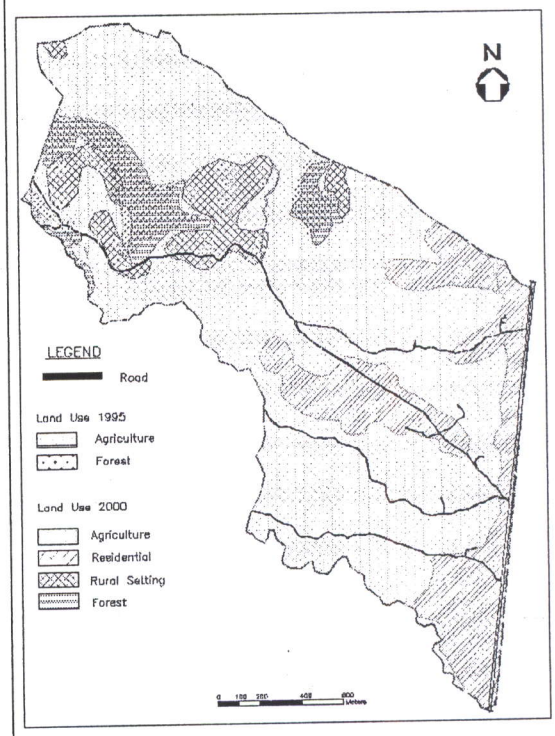
The overlay Map of the Sitapaila Area

In general, GIS analysis shows that agriculture and forest land is shrinking and built-up area is increasing in Sitapaila area. The increase in the built-up is along the Ring Road and the major crossing of the VDC. From the data the rural settlements are on the hill side and further from the major road. The pattern of land use change is happening at a very fast. However, uncontrolled and unplanned growth has had negative impact on the whole community.

Map:6.4 Overlay Map Of the Year 1978 & 1995



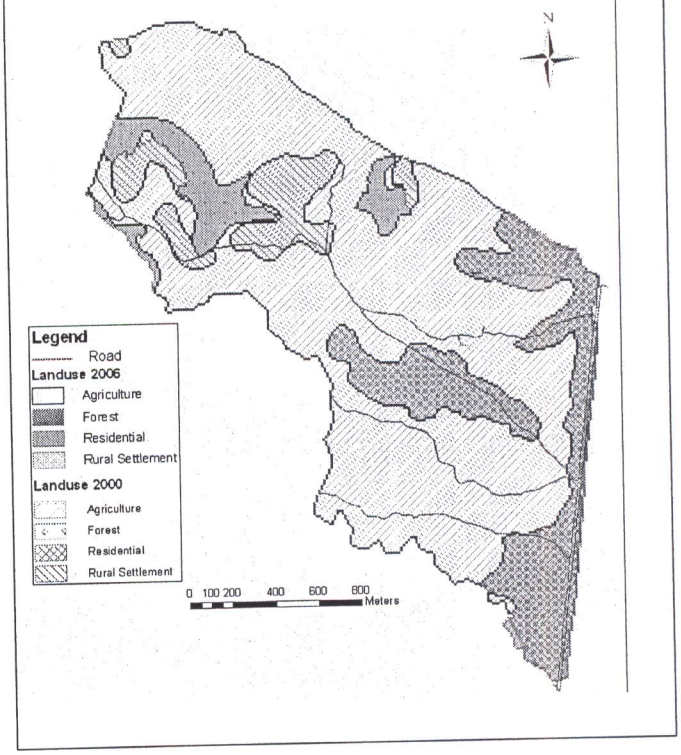
Map:6.5 Overlay Map Of the Year 1995 & 2000



In the year 1978 & 1995 the data for the settlement was not present. In the year 2000 the built-up area started along the Ring Road, and 2006 data indicates that the increase of the built-up area is developing in a fast pace.

The land use map (Appendix-III/ 6) indicates the decrease of agricultural land and increase in the built up area. The institution building area is randomly placed in the area. From it can be vividly seen that the residential building are emerging in a haphazard way. The major numbers of residential uses are nearer the distance of the road side. In major roads there are mixed kind of uses. The building adjoining Ring Road is commercial zone. With in 1 Km from the Ring Road along the road it is semi commercial area. There are five private land developers involved in the development process. Here, in the area monasteries are also seen. Here factories are in the middle of the residential area.

Map:6.6 Overlay Map Of the Year 2000 & 2006



6.2 SETTLEMENT AND LAND USE PATTERN

Despite the larger area of Imadol, there is more number of households as compared to Sitapaila area. From the two land use map (Appendix-III/ 5&6) it can be visualized that topographical features as well as the VDC area are different in the two study areas. Even though, Imadol is in relatively flat as compared to Sitapaila (which has only 25% flat land), the pace of urbanization is faster than Imadol area. This is because of the better natural scenes of the area, involvement of private developers and proximity to the famous Swayambhunath temple.

In Sitapaila VDC, there is gentle undulating slope. Two small hills are found in the northern direction which is occupied by two Monasteries. Though, the area has sloping hill, however it is suitable for the settlements. The older settlements as well as newer settlement are found in the hill side, in Sitapaila. Small streams and canals flow from southwest direction to southeast direction. These are in the lower level and have

steeper slope, where settlements are not possible. Basically newer settlements are found on the flat land. For the better environment and visual aspect, people (especially of higher middle class) are also found to prefer to settle in the hilly areas in Sitapaila. Though Imadol VDC, mostly being in the flat plains, the development or the increase in the urbanization is not there as compared to Sitapaila VDC.

6.3 IMPACTS OF ROAD NETWORK ON THE SETTLEMENT

The newer settlements have given priority for the road development. Therefore, distribution of the settlement is mainly concentrated along the road side. Wherever there are tracks, gravel roads have been constructed and buildings are emerging. It is observed that the newer settlements have at least, graveled motor able road whereas, in most of the older settlements, road access is through pedestrian with 1m wide road. Road Network plays a vital role in development of the area. Even the government rate is allocated on the base of different types of road access. Settlement and road network seems to be interdependent as nowadays people are more concerned with the road access, while buying the land. The major commercial activities are concentrated along the major road, connecting the other VDC and other district, such as Dhading district of Sitapaila VDC and Bhaktapur Municipality of Imadol VDC. Most of the facilities and services are found along this roadside. The major commercial activity happens along the node of the roads.

The settlements are decreasing as the distance from the Ring road increase. The distance from the Ring road also affects the development of the area on the settlement pattern. The density decreases along with the distance. Even the commercial activities are reduced along the road with the distance. The shops are not easily rented and the value of the rental price also decreases with the distance. The rental price as well as the land value is higher nearer to Ring Road as compared to other areas. As the distances increases from the major roads, the trend of settlements decline. The land use map indicates that the level of urbanization of the urban fringe is increasing with the distance and over time. The study also indicates that the amount of land covered by settlements is more close to major roads.

Public transportation takes advantage of such road networks to provide services to the settlement. Basically, residential locations are based on accessibility of household

facilities. The migrants are not much concerned about the travel distance but rental price differ with the distance. Most of the new settlements developed in areas where there are no transport routes. This may be because along the road side the lands are expensive or lack of residential plot.

6.4 STREET PATTERN

In the past, there were major linear streets leading towards the other VDC in both the areas. The roads were distinct and a linear pattern was followed. Now, most of the tracks have been developed as motorable road. The street patterns are developed without proper planning; consequently haphazard, irregular street patterns can be visualized in both the study areas.

6.5 SOCIAL CHANGE ANALYSIS

6.5.1 Transition from rural to urban

The rural-urban fringe is an area characterized by a mixture of urban and rural features. As a result the influence of the expanding city, the rural character of the fringe is gradually or sometimes very abruptly replaced by more urban profile in terms of land use, occupation and services. During this process of rural-urban transformation, pressure on land is rising because of migration from the core city and other areas and natural population growth. The pressure on the land is further motivated through the use of land for urban purposes, such as construction of buildings, emerging institutions and industries. The result of increasing pressure on land in the urban fringe is not only changing the land-use character, but also causing a degradation of natural resources of the rural area. Households and their members in the fringe areas adapt their socio-economic behavior by abandoning agricultural profession, by seeking local non-agricultural employment and/or by out-migration. For some groups of the urban fringe, this means more options for living a better livelihood; others are confronted more with negative aspects of this change. Due to unplanned and unstructured land-use planning, lack of adequate civil services and inability of the administrative system to handle the institutional and problems of the changing rural-urban fringe, living conditions of the old habitants are sometimes further negatively affected due to change in the rural setting.

6.5.2 Changes in Occupation

The decrease in agricultural land and increase in various choices of other occupation in recent days, inhabitants are changing their occupation as agricultural to non-agricultural areas. The change in the occupation is, may be, due to increase in the educational standard of the people in the newer generation and various other opportunities arising due to the urbanization in the valley as well as in the VDC.

In both the study areas the most essential reason for the change of occupation is the loss of agricultural land and increase in the building construction. The people are motivated to sell the land for various different reasons. Some of the inhabitants sell their land as they are being offered better price and several others sell due to personal reasons such as; for education of the children, for building construction etc.

The cause of rapid urbanization in the urban fringe areas especially in Sitapaila area, there has been emerging construction industry in the area, thus people are better motivated in construction work. Thus, people are keeping agricultural profession as the secondary occupation. Mostly, new generations do not prefer to have agricultural profession as their occupation in the recent days. One of the reasons for the change in occupation, in Imadol area, is due to brick factory located in the agricultural area. Brick factory is taking the mud for making bricks. So, for the six months, these lands are rented and the fertility of land is lost, due to which the agricultural production decreases, which is also the declining reason of people's interest in the agricultural occupation.

6.5.3 Change in Land Holdings

From the present land holdings as per the data analysis, it is observed that, the most of the people inhabit within lesser amount of land. The majority of the new settlements are occupied by middle income group which cannot afford larger land holding, because of that reason; most of the plots are smaller in size. Some of the local residents still occupy larger land holdings. In Sitapaila, migrants also occupy larger plots because of better environment higher income group are found settled in the area. It is observed that compared to Imadol, in Sitapaila area, there are fairly large amount of higher income groups and their land holdings are relatively larger. This is also

because of the better environment of later than the former area. Thus, mixed kind of land holdings are observed in the area. In recent days, the old inhabitant's are selling their land for various reasons for personal household reasons, for construction of the buildings and for education, so decrease there is in the land holdings.

6.5.4 Change in the traditional settlement pattern

The effects of urbanization are seen distinctly in the settlement pattern. Traditional settlements were on the elevated part and a community was formed within the settlements. The recent change indicates that the settlements are developing in scattered pattern in the agriculture land and the community feeling is not present now as it was in the past. The scattered settlements are due to the unregulated land transaction and lack of proper policy for the land use development. In Sitapaila area some immigrants prefer to settle on hillside. The higher income group seems to prefer such areas, for better visual aspects as well as for better environment.

6.5.5 Urban Services Accessibility Analysis

From the survey with the local residents, almost all of the people appear to depend on the nearby Municipal area. The daily shopping is done within the V.D.C. but for all other services people tend to go to the urban areas. People of Imadol go to Mangal Bazzar and Sitapaila VDC had to depend on the urban core of Kathmandu municipality. For the higher and better education and for the health check up the inhabitants have to depend on the urban area. In Imadol, there are three clinics, but most of the inhabitants still prefer to go to municipal centers for such services. Most visit local clinic for minor check ups only. Similar example can be observed in Sitapaila area too. It is a give and take relationship between the urban and urban fringe. As in the urban fringe, due to the availability of the agriculture land, they provide agriculture product to the municipal area.

6.5.6 Development in the institutions and services

Due, to the increase in population and rapid urbanization in the area, the social structure of both the areas seem to have developed or improved a lot in recent days. As stated earlier, education is one of the factors for the occupational change. However education does not limit to that, it changes the whole scenario of the settlement pattern. Education awareness is the main key to development. There has

been immense change and improvement in the educational level of the people in both the study area. Almost 99% of children go to schools for acquiring better education. Initially, there has been drastic increase in the number private institutions which signify positive aspects of the development. For the last ten years there has been rapid increase in the opening of the school but all the new institutions are opened by the private sector, serving the locals as well as the neighboring settlements.

6.5.7 Changing demands for infrastructure

The increasing number of housing units and increase in the population has resulted in the increase demand for the infrastructure services. Apart from the educational institution due to the increase demand of services like shops, co-operatives, health clinics, clubs etc are also emerging into the area from the last ten years. There are six cooperatives, three health services including the government health post in Imadol area. In Sitapaila there are four Co-operatives, three health services, recently large complex has been developed at the major nodal point. The availability of such services makes the city grow in a sustainable way. The increase in the services and the institutions play a vital role in the developmental process. But, as these are emerging in an unplanned way, so in the later phase, these may create zoning problems. The development of services and institutions can be taken as a positive change in social aspects. The demand of the transportation services has increased in Imadol area more than Sitapaila areas due to which, there have been a new public facility route incorporated in Imadol area.

CHAPTER VII URBANIZATION AND ITS IMPACTS

7.1 PEOPLE'S ATTITUDE TOWARDS URBANIZATION

7.1.1 Local Inhabitant's Perspective

91% of the surveyed houses have positive thoughts towards the urbanization in Imadol area, where as 9% think that it is negative. In Sitapaila, 93% have positive

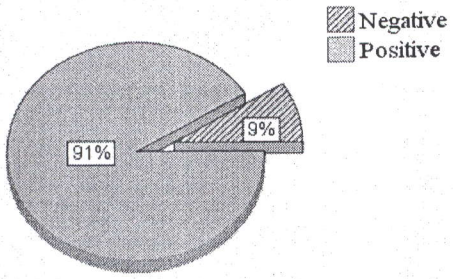


Chart 7.1: Imadol Study Area

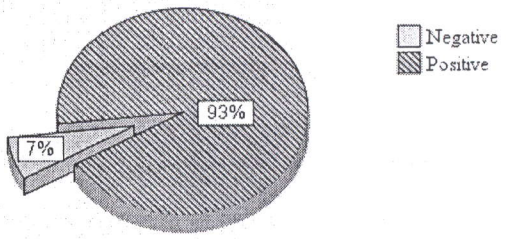


Chart 7.2: Sitapaila Study Area

attitude and 7% have negative views. The people having negative attitudes basically dislike the haphazard growth. Some of the local inhabitants think that due to the urbanization, social conflicts grow between existing agriculture households and newer residence.

In Imadol and Sitapaila, 36% of the respondents think of urbanization as a positive development, due to the availability of urban infrastructure. Similarly 31% in Imadol and 47% of respondents of Sitpaila say

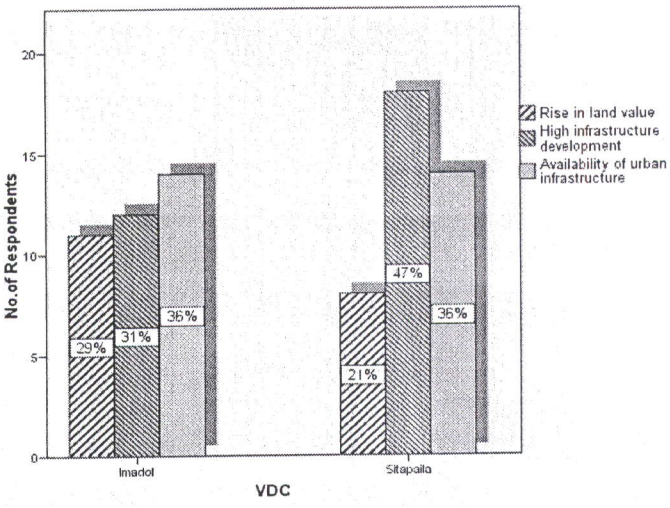


Chart 7.3: Urbanization Aspect

that because of high infrastructural development. In Sitapaila, 21% take urbanization as positive aspect because of increase in the land price. Where as, in Imadol 29% of the respondents thinks so. The inhabitants think that government is not investing as per the demand on the infrastructure development of the area.

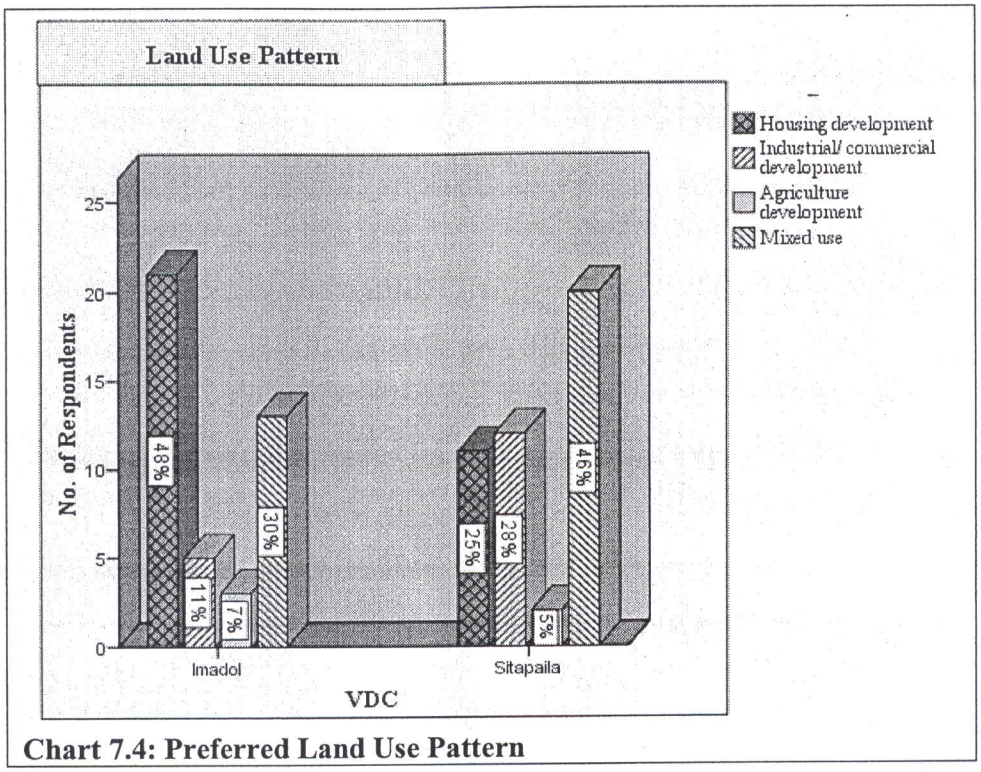


Chart 7.4: Preferred Land Use Pattern

This study examines the extent to which local citizens prefer various development patterns for both the study areas. From the surveyed data the people's perceptions on the land use is taken for the development of the fringe area. The data indicates different scenario in both the case study areas. 48% of the people of Imadol think that for the betterment of the area housing development should be incorporated so that the development of the area will increase, where only 25% thinks so in Sitapaila area. 7% and 5% of people of Imadol and Sitapaila respectively suggest that the area should be developed as an agricultural land use. In Imadol area 30% prefer mixed land use and in Sitapaila area 46% think that mixed land use is the better land use pattern. They prefer mixed land use as they think, that way, the VDC will be self sustainable and if the industries and commercial activities are opening up, then the people will also be economically strong. If all the activities are available in the area then the people do not have to depend on other areas for services. The less percentage of the people's

view on agricultural development indicates that the urbanization has urged people to change their perception towards the development.

7.1. 2 Developers' Perspective

In both the areas, influences of private developers are present, particularly in Sitapaila, where there are five major developers involved in the developing process. The developers' perception is that they are the ones' helping the area to develop in a planned way. They are not just earning profit but are also contributing to the society. The developers think that they are doing impressive work. The reason for development towards the fringe area is basically because of the availability of the land in large chunks and cheaper land price. The developers of Sitapaila, think that because of the housing development and plotted land developments, people are fascinated in migrating toward the fringe area. The local inhabitants' are also in the advantages as their land price increases due to the nearby housing colony or developed land plots. The developers do contribute to the society by developing the land with proper planning and providing proper infrastructure services. They have notion that the government as well as the local inhabitants do not cooperate in the developmental process.

7.1.3 V.D.Cs' Perspective

The Sitapaila V.D.C secretary takes urbanization process as a positive aspect around the urban fringe. But to cope with the urbanization, there are no proper tools or policy at present. They cannot stop the haphazard growth at their level. The lack of elected bodies is also creating problems for the proper management. The Secretary of both the areas are positive about the new private developers emerging in the area, but also concerned about the fact that they are more ever creating fast growth than the area could handle. They are concerned with their property only and do not bother to contribute towards the development of the overall community. The V.D.C's main problem is the budget they attain. With the limited budget, it is difficult to fulfill the demand of infrastructure development process but still they area trying to provide services with whatever budget they receive from the government and VDCs' own income. The urban fringe is expanding in a vast pace but the VDC of the both areas are not able to cope up with the demand of infrastructural development of the area.

But the secretaries, of both the V.D.C seem positive towards the urbanization as, this expansion shows a better future of the area but added that the growth should be in a planned way.

7.2 THE IMPACTS OF URBANIZATION

7.2.1 Positive Impacts

Imadol and Sitapaila area are categorized as the expansions zone by KMC as probability of expansion is very high in these areas. People from the urban core are attracted towards the fringe area due to the availability of land and comparatively lower land price. Consequently, the major impact has been in the rise of land price of both the area.

The other impacts are the new commercial activities, services, industries and institutions which are emerging so that people tend to get access to such services within the VDC. People can fulfill their daily needs and services within the VDC area. Dependency ratio on the municipality area is decreasing day by day. Due to increase in the household services, new small businesses are blooming. The level of commercial activities has increased along 1.5 km from the Ring Road in both the areas, especially, in Sitapaila area, where big builders are involved in the developing process. The involvements of private developer are other major cause of increase in the land price. More number of small construction industries is emerging into the scene due to rapid increase in the building constructions.

7.2.2 Negative aspects

The major negative impact is the haphazard growth. Though there has been increase in the number of houses; the infrastructures services like water supply, sanitary pipelines and other emergency facilities are lacking in the area. The agricultural land is being converted into concrete jungle without any planning, law and principle. A majority of the affluent migrants from the countryside have started to settle in the fringe area of the Valley. Usually these migrants develop unpaved road networks in the areas on their own. This may not be a good practice for future development.

The developers are concentrated in their confined area. They are only providing services to the confined area. The developers are now using "canal" or "river" as the

sanitary disposal area. This will later cause the environmental problems. For the construction of road, people need not seems to take permission from any agencies. There are no rules or planning for opening up the road net work, which will gradually convert the area in a haphazard growth. The people are selling the land for their own personal use especially for construction of the building and people are phasing out from agricultural practices. And, for those who are still practicing agricultural as their occupation are facing problem of getting labōr for the work.

CHAPTER VIII PROLEMS, ISSUES AND FINDINGS

8.1 PROBLEMS AND ISSUES IDENTIFIED FROM THE EXISTING SCENARIO

The problems observed in physical aspects are higher than social aspects in both the study areas. The traditional fabric is changing to a great deal. The old settlement pattern of living has changed. The agricultural land is being converted to the build-up land. The life of the people has changed due to the urbanization of the urban fringe area. This chapter includes the identified problems and issues in different aspects of development in the urban fringe. The problems and issues are derived after the analysis of current physical as well as social development trend. The identified problems and issues are discussed in the following aspect.

8.1.1 Infrastructure Inadequacy

Road: Between the urban infrastructures and services condition, the road problem is found to be most severely affected due to lack of proper planning and scientific construction of the road, particularly in Imadol area. In both the study areas, major road problem, is due to lack of drainage system specially the graveled road which causes difficulty in walking and driving in rainy season. In dry season, due to the graveled, it causes dust effluence in the area.

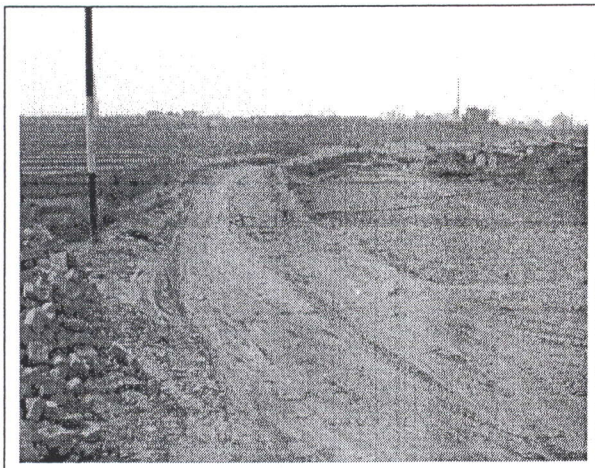


Plate 8.1: Condition of Gravel Road

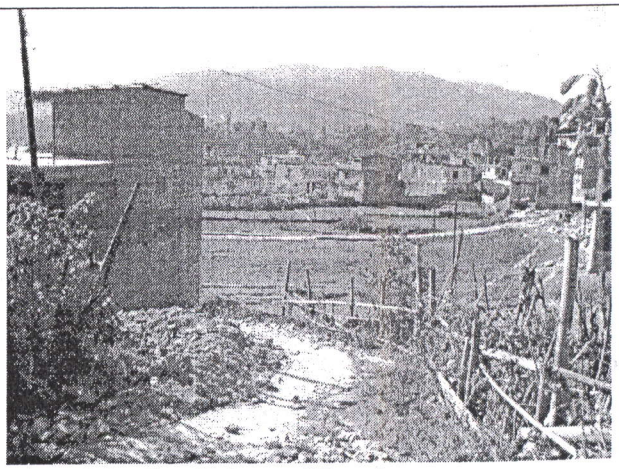


Plate 8.2: Conditions of Road

Drainage System: Another major aspect of infrastructual problem is the sewerage problems. The majority of the people feel that water and drainage problems are the

major problem in the area. The people are constructing building in the agricultural land and the tracks have been converted into the road. The traditional method of irrigation was the flow of water from one level to another level, so that all the agricultural fields get the supply of water, but now a days instead of the agricultural production, buildings are erected. So the traditional irrigation pattern has been distracted and due to the lack of drainage system in the road access, specially in the rainy season the roads gets worse making it very slippery and difficult to walk and drive.

Water Supply: Water supply is the major requirement of day to day life, but in both the study area this is the major problems. Most of the householders lack piped water and have to depend on the well or boring water. In dry season, such water supply is insufficient. The quality of such water system is also not good in some of the area, causing health hazards, but still people have to depend on such system of supply.

Haphazard and unregulated land and buildings developments

Lack of comprehensive land use planning in urban fringe areas, it has resulted in haphazard, unplanned and unregulated land developments. Due to the lack of policy for such work is also the major draw back for the proper planning. The lack of proper manpower capacity constraints has resulted in the lack of monitoring and enforcement of development and zoning laws. Lack of proper legal authority for the monitoring of the building construction is also the major cause for the unregulated design in the fringe area. The by-laws are also not followed by the people who are constructing the building in the fringe area. The law is not explicitly strict in the area and the institutional capacity is also limited to the three persons only, which has caused problems in monitoring of the building construction and implementing by-laws. Most of the construction in urban fringe areas took place without permission. Thus the consequences of ineffective land use control in the urban fringe areas will cause problem in the later time. For Example,

-Uncontrolled development scenario

-There are no standardized plot sizes.

-The private developers housing is the only proper planned area in the area.

-The development process is not limited

Inappropriate Land use pattern

The arguments made in the land use are; change in land use over time, migration of people from centre to fringes and from other region. The above discussion on change of land use show high density urban sprawl in the urban fringes is due to migration of people in the search of more privacy and social status and these fringe areas also cater much of the people who have migrated from other neighboring regions or within the valley. The lesser land costs and less building construction rules and regulations have triggered the unplanned sprawl in the urban fringe, thus pressurizing to change of the land use pattern. There is drastic change in the land use pattern and haphazard pattern is developing.

8.1.2 Loss of Traditional Pattern

Due to availability of other occupation, in the urban fabric people are losing their interest in agricultural profession and it is difficult to find helping workers for agricultural job. As a result, people are also changing their profession. The rise in land price is another aspect of people, motivated in selling the land and fulfilling the daily needs and other requirements. The level of social interaction between the people is lacking. There is no co-ordination between the locals and the migrants. The local people and migrants have clashes among them selves for the development purposes. There is lack of interaction between the neighboring people; from the survey it is observed that there is no common stage for the interaction of the people. The clubs are there but they are not enthusiastic on the social as well as physical development aspect of the area. The lack of interaction is due the lack of proper development of the open spaces or the park for the people, especially between the higher income group and the middle or lower income category. Due to the rapid urbanization, the traditional sustainable way of living pattern are changing in fast pace and the modern way of living has evolved.

8.1.3 Environmental Degradation

The fertility of the agricultural land is deteriorating as the upper portion of the land is being used by the brick factory. If they do not grant mud to the brick factory then

their land will be in higher level as compared to the level of other land and there will be problem for the canalling system in later time.

The brick factory near the residential area is another major environmental problem in Imadol area.

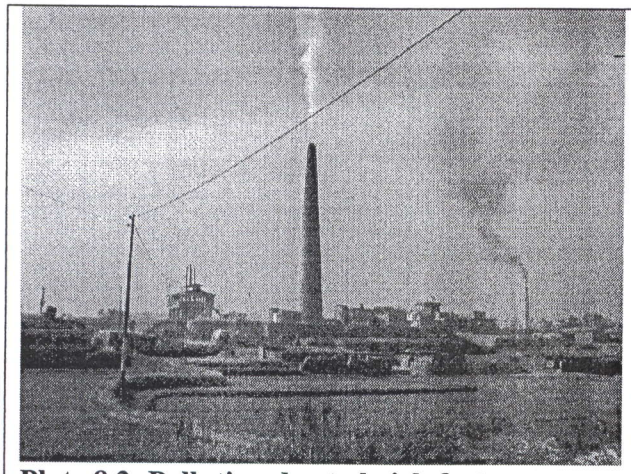


Plate 8.3: Pollution due to brick factory

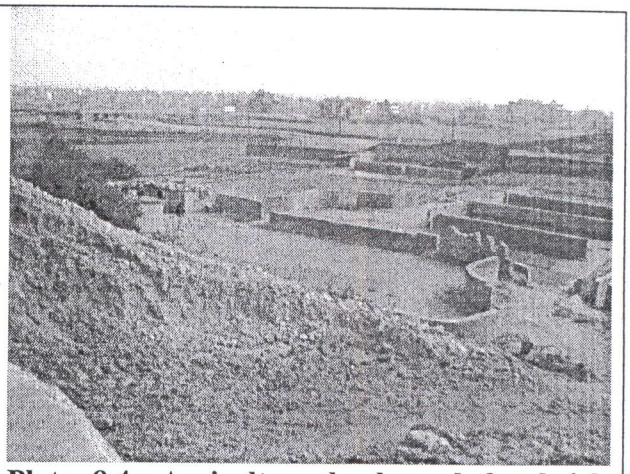


Plate 8.4 :Agriculture land used for brick construction

In Imadol area, Manahora River flowing on the northern side of the area is getting polluted day by day due to the disposal of the sewerage and solid waste. The river `the private developers are using the river or canal as the disposal area thus creating pollution in the river.

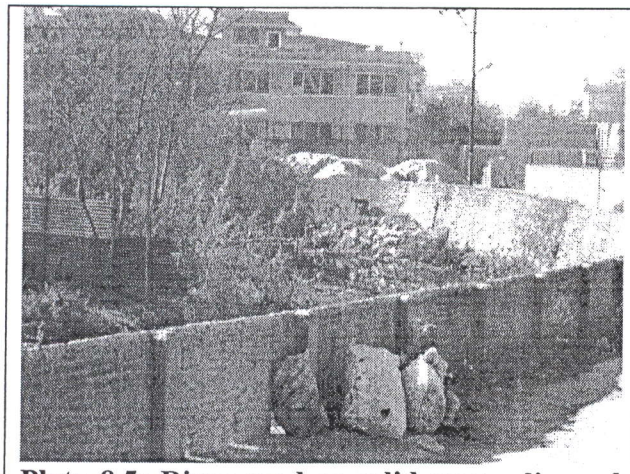


Plate 8.5: River used as solid waste disposal site

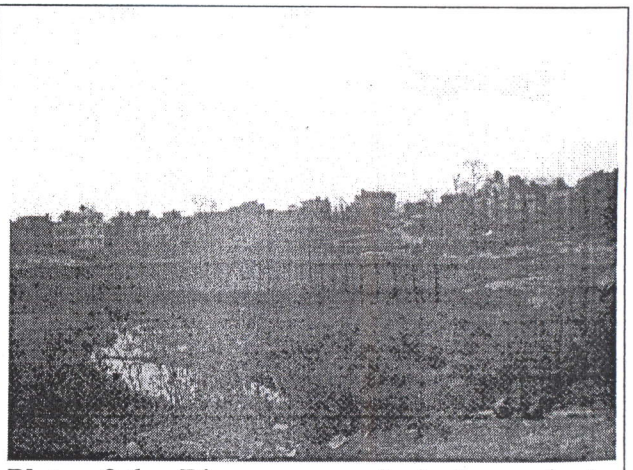


Plate 8.6: River encroached by private developers

8.1.4 Lack of Institutional Capacity

The major problem in managing the urban fringe area is the management aspects. The VDC office is the one and only institution to look after the whole VDC, they have to work in all the aspects. The lack of technical staff for proper monitoring of the area is the major problem for not following the by-laws. The lack of proper budgeting for the development of the urban fringe is also the major aspect of the lack of proper infrastructure development in the area.

8.2 FINDINGS OF THE STUDY

From the extensive study and the extent of the discussion in the earlier chapters, finding of the study can be summarized as follows:

8.2.1 Physical aspects

- The fringe area in both the case studies has grown rapidly in the last few years. Basically the growth is observed as occurring along the major roads. The density differs with the hierarchy of street. Building concentrates on the junctions and gradually reduces as it moves away from the junctions. The growth in urban fringe settlement has resulted change in land use. The agricultural land as well as the barren land is converted into the residential area.

- Expansion is oriented towards the areas of high mobility. Buildings tend to accumulate towards the mass generating activities.

- People are settled without proper infrastructural services. It seems that large proportion of the population just wants a roof over and later thinks about the proper infrastructure services. A large proportion of the population is living without proper drinking water and sanitary system. Almost, in the entire newly developed road, there is lack of proper drainage system.

- The plot size seems to be largely dependent on the capacity of the migrants. In both the areas, majority of the migrants / new inhabitants have smaller landholdings ranging from 4-8 *Annas*, the reason for this is that the higher

number of middle income group reside in these areas. In Sitapaila, migrants with relatively larger landholdings are seen, which indicates that the higher income group also prefer to settle in the urban fringe, for the better environment or so.

- The major infrastructural development is the haphazard road network, due to unplanned selling of the plots. The new settlements have at least graveled motorable road in most of the areas. For the opening of the road, the people need not take permission from the VDC or the authorized government agency. Because of this, the access roads have been randomly opened up. The tracks have been converted into motorable roads thus; haphazard road network can be seen.

- Most of the built up area expand along the junction where there is better economic /commercial opportunities and also, built up area is concentrated, with relatively better utilities like, road, water supply, sewerage, electricity. Most of the houses along the major road side have provision for the shutter in the ground floor for the commercial uses and upper floors are used for the residential purposes.

- Lacks of open spaces for social gathering or community, people are using the public land/idle land for such activities. The government owned lands are not properly utilized and are being encroached by industry and landholders close by. Land market in both the study area is governed by the land brokers and the private developers. The government rate is considered criteria for paying the taxes.

8.2.2 Socio-Economic aspects

- More percentage of the migrants is middle income group occupying smaller landholdings. Compared to Imadol, Sitapaila area has more percentage of higher income people acquiring larger landholdings.

- The new settlements are emerging into the scene in a scattered way. The pattern of staying together of similar caste in one settlements has been broken.

Now, newer settlements are emerging where there is no such togetherness but still some people are making a new community by themselves. The gap of interaction level is higher in Sitapaila area than in Imadol area.

- The new areas are developing in the ad hoc basis, because of, the lack of planning and lack of integrity of the individual efforts. The process is dominated by individual need, desire and requirement rather than community feeling and urban form.

- Rapid growth at the fringe has resulted in increased commercial development along arterial roads. As the distance decreases from the Ring Road the commercial development as well as the land value, rental value as well as the build up area decreases.

- Due to change in the lifestyle of the people, the new services like the restaurants, club, and new commercial complexes are developing, especially in Sitapaila Area.

- It is observed that service development is in fast pace in the newer settlement than the old settlement as new inhabitants are more enthusiastic about the development of the added services. In some of the older settlements, due to the family conflicts development is not happening. The new migrants are better off with the development rather than old habitants.

- Almost 90% are migrated from the different districts or other municipalities. Especially the migrated populations have nuclear family. Mostly old inhabitants are living in the joint family. At present there has been increase in the services or facilities within the VDCs along with the increase with the population.

- Ownership and affordability of the land are major influential factor for the emergence of the unplanned built up area. There is general tendency of preferring cheaper land for building when choice is to be made, among the alternatives, other things remaining same.

- In Sitapaila, the value of the land has increased drastically rather than, that of Imadol area. Because, of the major religious place (Swayambhunath) near by

and better environment than Imadol area, the former is emerging as fast urbanizing VDC than the later one.

- Private developers' involvement has increased in the commercial value of the land, basically in Sitapaila area. Private developers are the positive aspect in the development of the fringe area.

8.2.3 Policy Aspects:

- Proper policies and implementation plays a greater role in shaping the urban form of the city. The example of the city expansion policies with land readjustment programs of the Kathmandu valley shows that the policies form in isolation does not cater most of the issues of urban fringe development.

- Building by-law is a single policy which is applied at present, apart from that there is no further individual plan or policy for the development. This is the major reason for the development of the haphazard planning in the urban fringe area.

- Imadol VDC charges 33% of the fee of the total building square feet as penalty for the people for not taking building permission, such provision are not seen in Sitapaila VDC. Each VDC has its individual rules and regulations for the building construction process.
- The development plan for the Kathmandu Valley tends to provide guide lines for the growth through the demarcation of urban and rural boundary. This is a better way to preserve the rural agricultural land but in the urban fringe such is not possible, the unmanaged growth should be handled first then the boundary should be established between the two.
- The lack of proper policy and implementation of the existing policy is also the major cause of the growth of the unplanned development in the urban fringe area.

8.3 EXISTING PLANS & POLICIES AND CURRENT PRACTICES

First and foremost there is no separate category of plans or policies for the urban fringe area. Kathmandu Valley Long term development plan 2020 and national urban

policy have mentioned the development of the valley with various plans and policies. But the implementations of such plans are not occuring in these both the study areas.

These plans are basically focused on preserving the agricultural field, urban rural land declination. The urban national policy aims at the three objectives; developing services, improve the living standard of the city inhabitants by developing healthy, secured and welfare city environment and thirdly, by consolidating local agencies in legal and institutional way and develop of the cities in a coordinated way and develop the sense of partnership. But in reality the scenario is just the opposite, as from the study, it is understood that there is lack of even the basic service like water supply services in both the VDCs. Though there are various kinds of policies for the development of the urban expansion. In the present scenario, it is not found implemented in both the study area.

Now, in the adjoining urban fringe area, preservation of the agricultural field has become an important aspect for the betterment of the future. But, there is no sign in both the VDC, about the process of implementing in the scenario.

The planning intervention seems, not in a prioritized base or the real needs and there is development pressure of the urban fringe. Though, they are so many plans and polices for the urban growth of the Kathmandu Valley, till now, in the study areas, such plans are not put into operation, as in the later phase, it will still more difficult for enforcing the plans in future.

CHAPTER IX CONCLUSIONS AND RECOMMENDATIONS

9.1 CONCLUSION

The study attempted to analyze the development pattern of the urban fringe areas of the Kathmandu Valley, e.g. Imadol (Adjoining Lalitpur District) and Sitapaila (Adjoining Kathmandu District). They are both fast developing fringe areas which have resulted in rapid change of the scenario. This is primarily due to increasing pace of urbanization, thus the change is inevitable. The two study areas have been observed in terms of change in the land use, expansion of the built up area (building) change in urban form(a lift up from traditional touch), change in physical and socio-economic standards.

It is evident that the developments in the physical and social aspects are not occurring in a planned way. Thus, haphazard growths of settlement with improper infrastructural services are emerging, in both the study areas. This kind of unplanned developmental tendency is increasing day by day, thus, making the fringe area grow in a haphazard way, lacking of required urban services.

The study shows that the rapid urbanization has great influence on the urban fringes to develop in an unplanned way, rather in a negative way. The government and its agencies can take initiatives steps on its own and its local level, which can make the development in a planned way or, so to say, in a positive way.

It is the reality that the rate of population growth of the urban fringe has increased along with the growth of density of population in the valley. The population growth in the urban fringe has converted a large portion of agriculture land into built up area. The land use analysis of the two study areas confirms that the change is typically seen in the area. This indicates the repulsive picture of the land use pattern. The significant factor influencing the land use, is confirmed due to the proximity to the main roads. This is an important factor for the development of urban fringe. Based of the findings of the study of the development pattern, following conclusions have been drawn:

Since 1990 AD both Imadol and Sitapaila have grown rapidly in course of urbanization. More particularly, the growth is observed as developing along the major roads. The growth has resulted in the change of land use pattern differently. It is also

distinct that the rapid expansion is along the road axis and at the nodal point. In both the study area, Ring Road has a great impact on the urban expansion.

The characteristics of the development pattern of the urban fringe of Imadol and Sitapaila areas points out that the settlement are primarily access driven. The other subordinate factors are the topographic availability of infrastructure and social services. Apart from these, the essence of affordability is also a major factor for settlements.

The fast pace of sprawl in the urban fringe area of the valley is due to the weak central government policy, recent policy crisis (lack of people's representation), and security problems etc. Therefore people tend to migrate to the Kathmandu valley. Mostly people migrate to fringe areas due to the availability and affordability aspect of the migrants. The development patterns for both the areas are of similar pattern, the differences in the reason for migrating to the particular.

In the study, efforts are focused on the urban fringe area. The results indicates the development pattern of Imadol and Sitapaila VDC and these two studies gave the contribution in understanding the general scenario of the urban fringe of the valley. The comparative study is useful for better understanding the differentiation and similarities between the two. From the data and the findings, it is concluded that despite the lesser percentage of relatively flat land in Sitapaila the urbanization is taking place at very fast pace and development is happening in a better way than Imadol Area. The proximity to any major religious place nearby and the involvement of the private developers in Sitapaila area is also the positive aspect for the better development that Imadol area.

Similarly, we can conclude by stating that the other fringe areas can be considered as developing in the similar pattern and the following recommendations can be useful for the development of other fringe areas. Consequently, the controlling measures for the other fringe areas can be planned in reference to Imadol and Sitapaila. After analyzing the overall development pattern, suggestions have been provided for overall physical, social and environmental development to improve the conditions of other urban fringe area.

9.2 RECOMMENDATIONS

On the basis of findings, it is concluded that unplanned and uncontrolled urban growth are the main causes for quality and quantity of agricultural land use change. Therefore, there is need to change and stop existing practices, which are not suitable to maintain sustainable development. Government bodies have to take sincere initiatives to improve the situation. They have to improve their plans and policies, and implement them effectively at the local level through public and private involvement. The information sought in this research would be useful for planners and policy makers. To maintain the sustainable balance in between land-use sectors and to minimize the haphazard growth, some specific recommendations are as follows:

9.2.1 Land Development Plan

- The urbanization process cannot be stopped, as it is positive aspect of the development. The remaining inbuilt land should, especially the southern part of Imadol and south-western part of Sitapaila VDC, should be developed, with proper planning and policies to reduce the haphazard development. Development of the land should be made by land-pooling and guided line development system. Land pooling ensures better utilization of land by providing road networks and basic urban services. So that, the remaining inbuilt area will develop in a proper planning way with the proper infrastructure, services and required open community spaces.
- As per the literature review, zoning is very essential for the development of a planned city but it has been found that it is very difficult to implement in both the study areas. Instead, zoning should be incorporated in certain parts and the law, used in the procedure has to be enhanced more. For example, the nodal points should be categorized as commercial area, so that, all the commercial activities are concentrated in one nodal point. Slowly, this process should be incorporated in other type of zoning like industrial zoning, residential zoning etc. The set-back along the future high way should be planned, so that, it does not affect the future growth of the inner fringe areas.
- The proper effective land use plan for both the study areas could be helpful, at least, in locating the industry away from the residential area to reduce the

pollution pressure on the residential zone. Apart from that, the land use plan should be carefully planned so that already built up area is not disturbed in the planning phase.

- As compared to western planning and policy on the urban growth, it is not possible to provide the urban growth boundary. Growth management measures should be taken which is one of the tools for managing the growth. It not only manages the growth, in a proper way, but it also deals with the land use development essential.
- Government should play active role as facilitator, for the private development. Private developers should be encouraged and motivated in the development of the city. But concerned authorities should have strong and continuous monitoring system in the planning phase. The private developers should pay tax to the VDC also so that the income level of the VDC also increases. A strong government policy should be incorporated in developing the surrounding area of the property, rather than, just concentrating on their own property. Government should have strong policies on the development of the area or huge amount of tax should be taken by concerned VDC for development.
- Updated local land market price record should be established by the Government. So that, it discourages the speculative intention and unproductive land holdings and also helps the buyer as well seller to get the reasonable amount of land value. Valuation of land by the government should be more scientific and reasonable as compared to the local land price. It helps in collecting more revenue. A regular land market survey should be established by the government to quote the proper land value.

9.2.2 Infrastructure Development Plan

- Form the findings and the issues; the lack of infrastructure services is the major problems in both the study area. Providing services to the people is the first and foremost important aspect. Preparing the local area plan, the problems should be evaluated and with the priority basis, the infrastructure services should be provided. To make the city environment better and inhabitable, the infrastructure services plays a vital role. The infrastructure

services like water supply, drainage system, sewerage system etc. should be developed in a sustainable, as well as, in an economical way. The proper planning should be implemented quickly and efficiently, so that, problems are solved timely and result is traced quickly which will create a positive essence of planning on the people and people themselves will be encouraged.

- Promote and develop public land (present in both the study area) as the open space, or a community space, built to encourage the children to play in a specific area as well as to promote interaction level between the people. This development of open space in the public land will help in reducing the encroachment problem as well as provide open areas for the interaction.
- The size of the plots should be made affordable to the middle income group. But consideration should be given to lights, ventilation and road network.
- The track has been converted to motorable road with out the drainage system. The drainage problem can be solved as the agricultural land is usually in an undulating slope for the flow of water. So, that the pattern of flow should be followed and the drainage system should be systematized. In both the study areas, due to the presence of river and canal in the area and being in the adulating slope, the drainage system could be properly developed along the road side.
- The mud taken for the brick manufacturing should be controlled, as the level of the land is decreasing and the constructed road level will be higher level. Thus, causing drainage problem in the later time.
- The Environmentally sensitive areas (especially in the Sitapaila area) like forest, river diversion lands, river and canals flowing along the study areas should be kept away from the encroachment and from polluting. Such, existing natural beauty should be explored and its potential should be used for the development of the fringe area.
- It is also inevitable that there is a need for the protection of the rural tradition and agricultural land to make a sustainable city. So, due considerations is a must for the VDC to have certain percentage of land for agricultural use. It can be fairly achieved by incentives like compensations (as provided by the

village or city councils in developed countries), awarding or through certain regulations.

- As people are quite aware of the needs, most people are liberal to contribute, if VDC demands participation or contributing for the project as is happening around metropolitan areas of the valley. The VDC itself can take the initiative in planning and demand for the contribution for the development of the infrastructure services with the involvement of the inhabitants, for this, peoples elected bodies can make more contribution.

9.2.3 Enforcing by-laws

- VDC should take adequate effort in enforcing by-laws and regulations. Strong monitoring system should be established. This will help to promote, not only planned settlement but also to increase revenue from the building permit fee. The government should increase technicians in the institutional working bodies of the VDC. The technically strong person on planning / design should be assigned in each VDC for the proper monitoring and implementation of the building by-laws. The set-back should be strictly applied in the area, so that later on, the difficulty in the expansion road will not occur.
- Proper monitoring should be done on the budgeting of the VDC. The people of the VDC should be involved in the budgeting. Transparency should be maintained.
- The well-formulated plans and programmes have no meaning if its implementation part is weak. The past experience has clearly indicated that even the well-formulated plans and progammes also suffer during the implementation phase due to a number of causes, such as lack of budget and uncertainty of funding, lack of effective inter agency coordination, non-availability of appropriate manpower, lack of political commitment and so on.

9.3 RECOMMENDATION FOR FURTHER RESEARCH

Due to the limitation of the time and scope, the data set used in this analysis can be made more comprehensive and there exists an additional scope for the further research.

- It is recommended that future research be conducted on incorporating observed data on the existing nature and pattern of land occupancy arrangements and urban fringe land use dynamics into the conceptual framework. This will provide a more complete picture and understanding of the habitual urban fringe development.
- Further research is needed in the understanding of the people's need for land and their traditional land rights.
- Recent Local area plan for both the VDCs will also provide the better information of the area.

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Appendices:

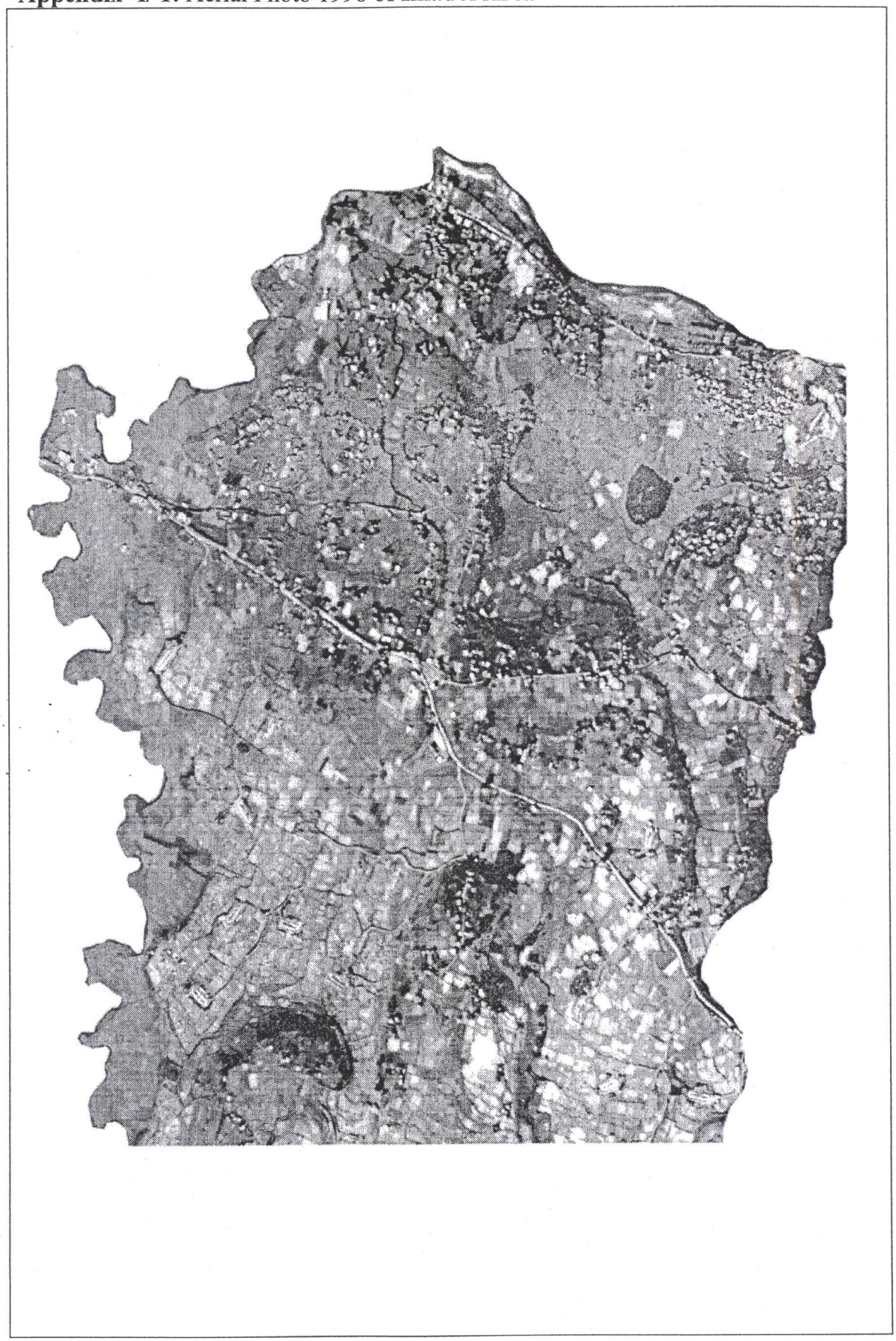
Appendix I: Time series Photographs/Images

Appendix II: Questionnaire

Appendix III: Maps of the Study Area

Appendix IV: List of Temples and Clubs

Appendix- I/ 1: Aerial Photo 1998 of **Imadol Area**



Source: Department of Survey

Appendix- I/ 2: Satellite Image 2006 of **Imadol Area**

Courtesy: Genesis Consultancy

Appendix- I/ 3: Satellite Image 2006 of **Sitapaila Area**

Source: Google Earth, 2006

Appendix- I/ 4: Aerial Photo 1998 of **Sitapaila Area**

Source: Department of Survey

Appendix- II/ 1

Survey Form No:
Date:

TRIBHUVAN UNIVERSITY
Institute Of Engineering
Department of Architecture & Planning
M. Sc. Urban Planning
Pulchowk, Lalitpur

Questionnaire Survey for Thesis Work of M.Sc in Urban Planning
(Questionnaire for Household Survey)

General:

1. Ward No._____2. Street/ Locality _____ 3. House No. _____

I. Introduction:

House Owner's Name:_____

1. Name of the respondent: _____
2. Age:_____
3. Gender: Male ☐ Female ☐
4. Education: 5.Household size: _____ Pers.

II. Physical Infrastructure Details

Building Description:

1. Type of Building?

   a) Load Bearing ☐ b) Frame Structure ☐ c) Others ☐

2. Use of the Building

   a) Residential ☐ b) Commercial ☐

   c) Mixed ☐

3. Access to Building?

   a) Motorable (Black Topped) ☐ b) Motorable (Gravel) ☐
   c) Pedestrian ☐ d) Track ☐

4. Width of the Road:

   a) Less than 1m ☐ b) 1m -3m ☐ c) more than 3m ☐

5. Condition of the road

   a) Fair _____ b) Bad _____ c) Worse_____

6. Road Construction/ improvement done by:

a) Government ☐ b) Community ☐ c) Joint ☐

7. Are you aware of the fact that you have to take building permit from V.D.C.?

a) Yes ☐ b) No ☐

8. Have you taken building permit from the V.D.C.?

a) Yes ☐ b) No ☐

i) If not, why? _____

9. Source of Water supply

a) Pipe water supply ☐ b) Hand pump / Well ☐

c) Traditional Water supply ☐ d) Others ☐

10. Is the available water enough for the daily use?

a) Yes ☐ b) No ☐

11. Quality of water:

a) Good ☐ b) Medium ☐ c) Bad ☐

12. Are you willing to pay more if the water supply is enough of what you get?

a) Yes ☐ b) No ☐

13. How is the Garbage disposed from the House?

a) Open Land ☐ b) On the road ☐ c) In River ☐

c) On gutters ☐ d) Organized way ☐

14. How is the sanitary waste disposed from house?

a) Through septic tank ☐ b) Sewerage pipe ☐

d) River ☐ e) Others_____

15. Are you willing to pay for the better services if provided?

a) Yes b) No

16. Is the electricity line available?

a) Yes b) No

17. What is the source of fuel for cooking?

a) Electricity b) Gas c) Kerosene

d)Wood e) Traditional method f) Bio-gas

18. How much distance do you need to travel for the public transportation?

a) Less than 5minutes walk ☐

b) 5-10 minutes walk ☐
c) 10-15 minutes walk ☐
d) 15- 20 minutes walk ☐
e) More than 20 minutes walk ☐

19. What means of transportation do you use?

a) Public b) Private

20. Utility services used:

Facility	Distance	
	Within or nearby V.D.C	Outside V.D.C
For daily shopping		
Shopping Center		
Health Check up		
Education ▪ Nursery ▪ Primary Education ▪ Higher Education		

21. Vehicle Ownership

a) Car/ Jeep b) Motor Bike c) Bus d) Cycle
e)Others

III. Social and Economical Aspect

1. Current Resident

a) One's home b) Rent

2. Place of Origin_____

a) Migrant b) Original Resident

3. If Migrated,

a) Migrated from,

i) Within Kathmandu Valley ☐
ii) Outside Kathmandu Valley ☐
iii) Outside the country ☐

4. Years of Stay in the fringe Area

a) 0-5 Years b) 6-10Years c) 11-15 Years d) Above 15 years

5. Reason for Migration

a) Cheaper and affordable land price ☐
b) Better environment ☐
c) Availability of Land ☐
d) Proximity to Family and Friends ☐
d) Proximity to the job place ☐
e) Business/ commercial potential of areas ☐

6. If resident

a) How much land was owned before 20 Years? _____

b) How much land do you own now? _____

7. If you have sold the land, reason for selling the land you owned?

_____

8. What is the prime source of income present and 20 years ago?

	At present	20 years ago
a) Agriculture		
b) Service		
c) Business		
d) Waged Labor		
d) Others		

9. Please indicate the income if your income falls under following category:

a) 0-Rs. 5000 ☐ b) Rs. 5000-Rs. 10000 ☐

c) Rs.10000-Rs.20000 ☐ c) More than 200000 ☐

III. Perception on Urbanization

1. How do you feel in terms of development into the fringe area?

a) Negative ☐ b) Positive ☐

2. If positive in what sense?

a) Rise in the value of land ☐

b) Infrastructure development is high ☐

c) Due to availability of urban infrastructure ☐

3. What do you think is the aspect of development?

a) Road Access

b) Rise in the land price

c) Availability of the infrastructure Facility

e) Better living Environment

IV. Problems and Prospects

1. Which are the most critical problems affecting your household?

a) Social Problem

b) Inadequate Water Supply

c) Inadequate Drainage System

d) Lack of proper road services

e) Inadequate public transportation

d) Inadequate response form the local authority

2. What will be the best land use pattern for the study area?

a) Housing development
b) Industrial / commercial Development
c) Agricultural Development
d) Mixed Use

3. Do you have any suggestions for V.D.C or the national government for the long term development strategy for the area? _____

Appendix- II/ 2

TRIBHUVAN UNIVERSITY
Institute Of Engineering
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M. Sc. Urban Planning
Pulchowk, Lalitpur

Questionnaire Survey for Thesis Work of M.Sc in Urban Planning

(Questionnaire for Private Developers)

1) What are the causes for developing in the fringe area?
   a) Cheaper land price
   b) Easy for doing administration work
   c) More easier for selling the plots
   d) No option of getting land in the core area

2) What is the general comment of the buyers?
   a) Expensive
   b) Inappropriate
   c) Good but impractical located
   d) Satisfied to get property cheaper than city area

3) Have you given any contribution in the development of the whole V.D.C or rather concentration given to the own developing area?

4) Have you considered the land use planning or practiced any general zoning within the developing plots?

5) In the developing process have you given consideration for the surrounding Environment?

6) Do you consider the after effects of the developments?

Appendix- II/ 3

TRIBHUVAN UNIVERSITY
Institute Of Engineering
Department of Architecture & Planning
M. Sc. Urban Planning
Pulchowk, Lalitpur

Questionnaire Survey for Thesis Work of M.Sc in Urban Planning
(Questionnaire for VDC staffs)

Question for the V.D.C.

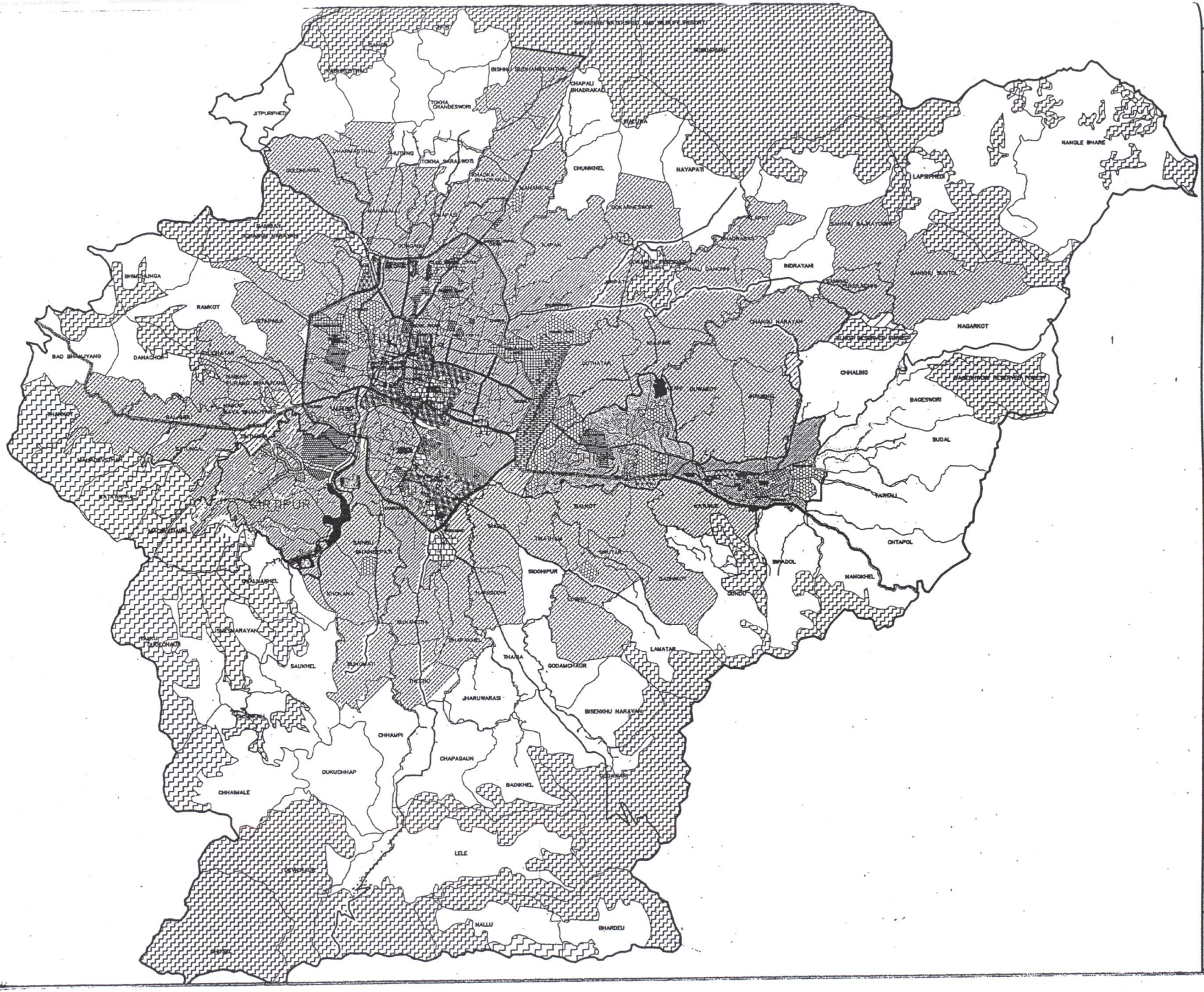
1) How has the organization dealt with the rapid urbanization in the area?

2) Do you have any planning provision for managing the haphazard growth and making a livable city in the fringe area?

3) Have you given any consideration in providing infrastructure development facilities to the growth of the area?

4) Who are involved in the development of the infrastructure in the V.D.C?
   i) The citizen them self
   ii) The V.D.C does it
   iii) With the co-ordination of both parties

5) Does the V.D.C aware of the haphazard development in the fringe area?



LANDUSE ZONING MAP

N

200 100 0 200
Meters Meters

LEGENDS

CULTURAL HERITAGE CONSERVATION ZONE
- PRESERVED MONUMENT SUB ZONE
- PRESERVED CULTURAL HERITAGE SUBZONE
- MIXED OLD RESIDENTIAL SUB ZONE

RESIDENTAL ZONE
- DENSE MIXED RESIDENTIAL SUB ZONE
- OTHER RESIDENTAL SUB ZONE
- PLANNED RESIDENTAL SUB ZONE
- COMMERCIAL SUB ZONE
- COMMERCIAL SUB ZONE
- URBAN EXPANSION ZONE

INSTITUTIONAL ZONE
- GOVERNMENT/SEMI GOVERNMENT
- POLICE/MILITARY
- EDUCATIONAL
- HEALTH

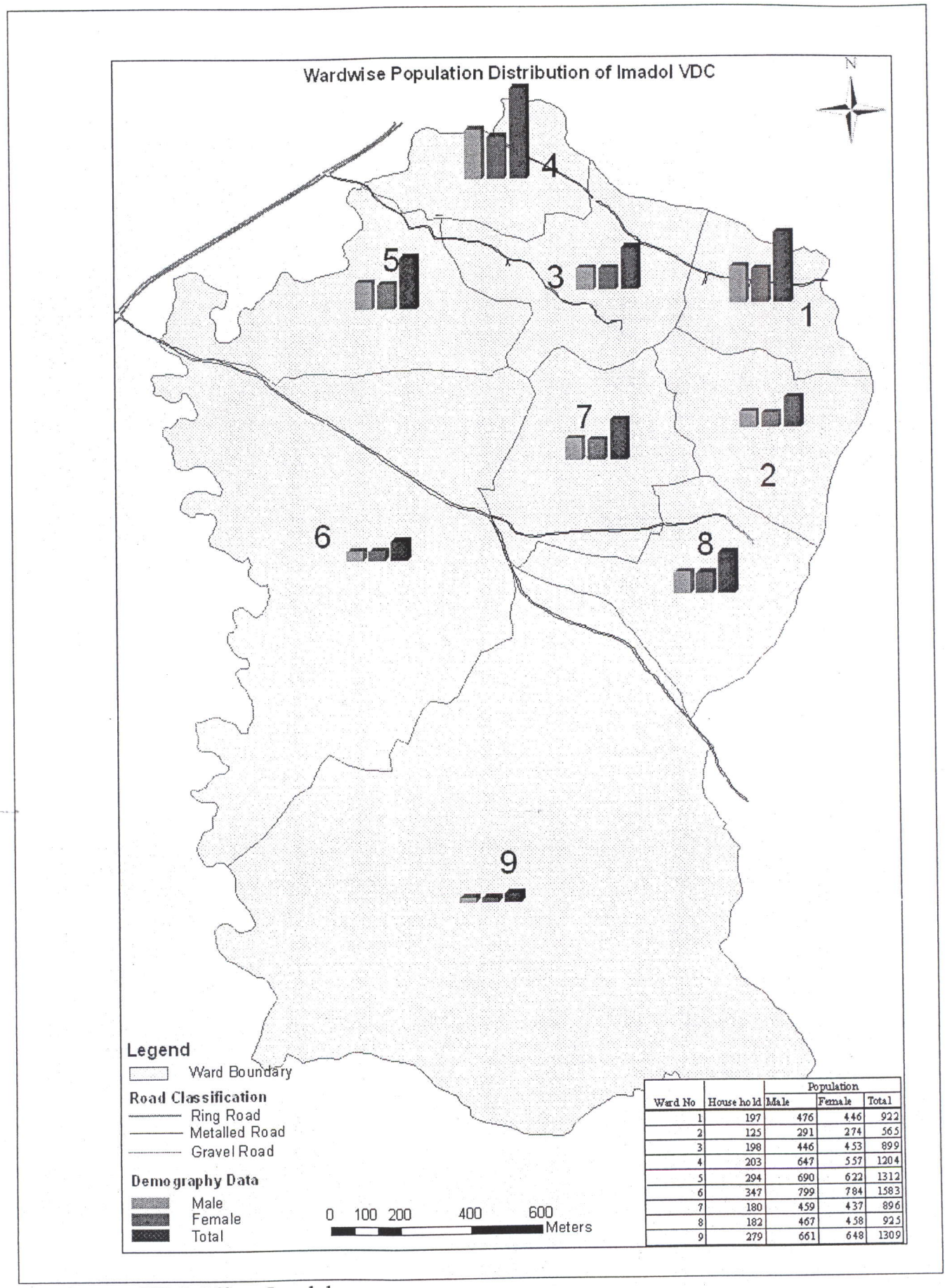
RECREATIONAL ZONE
- SPORTS
- GREEN ZONE

PHYSICAL INFRASTRUCTURE & UTILITIES ZONE
- BUS PARK
- ROAD
- AIRPORT ZONE
- INDUSTRIAL ZONE
- SPECIAL ZONE
- RESERVED ZONE
- FOREST AREA
- VILLAGE BOUNDARY
- RESIDENTIAL SUB ZONE (BHAKTAPUR AND THIMI)
- BUFFER SUB ZONE (BHAKTAPUR)
- RIVER
- POND

Government of Nepal
Ministry of Physical Planning & Works
KATHMANDU VALLEY TOWN DEVELOPMENT COMMITTEE
Anamnagar, Kathmandu

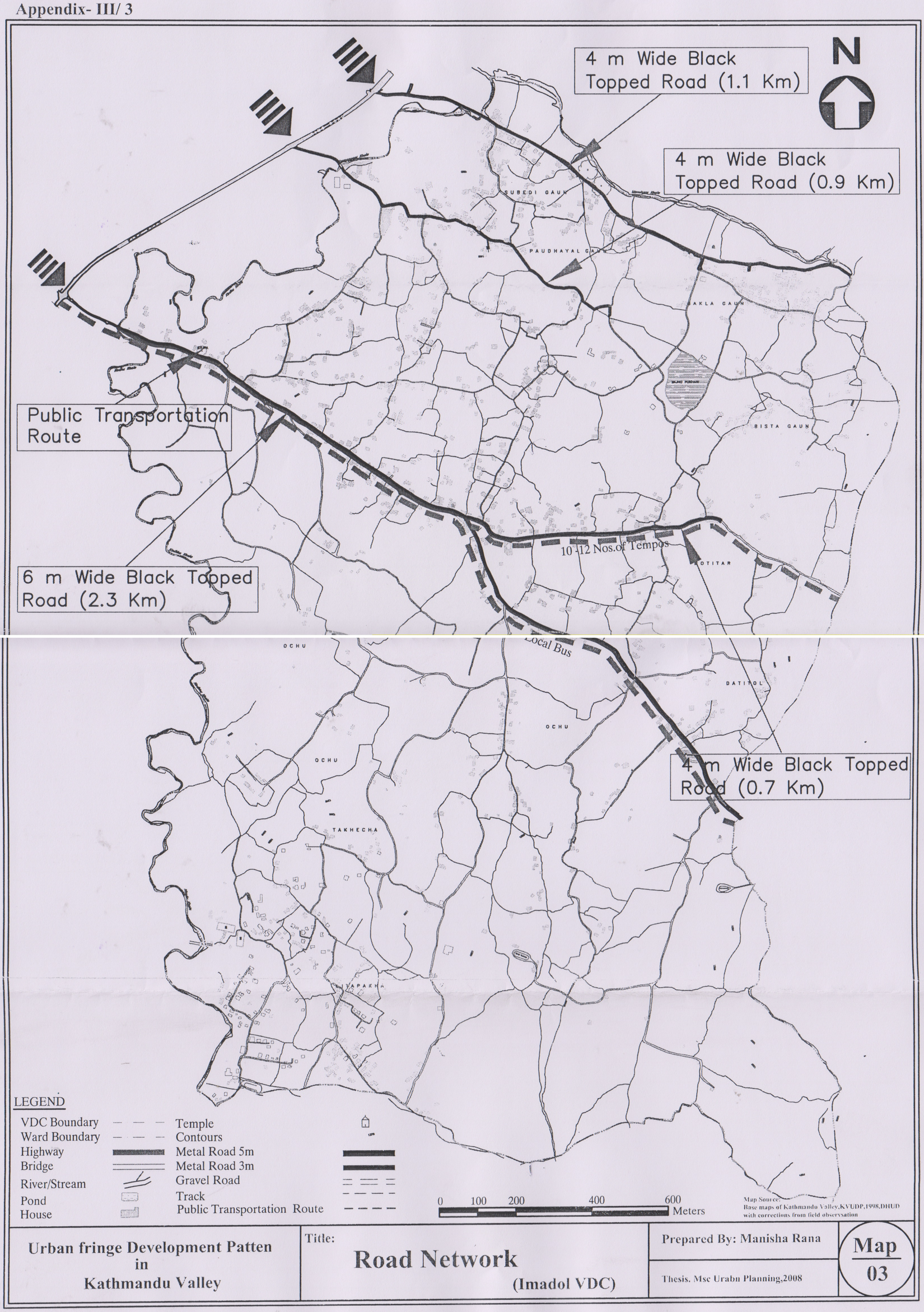
SOURCES:
DUDBC , BABAR MAHAL
KATHMANDU METROPOLITAL CITY
LALITPUR SUB-METROPOLITAN CITY
BHAKTAPUR MUNICIPALITY KIRTIPUR MUNICIPALITY
MADHYAPUR THIMI MUNICIPALITY ICIMOD, NEPAL

Appendix- III/ 2: Ward wise population Distribution of Imadol VDC

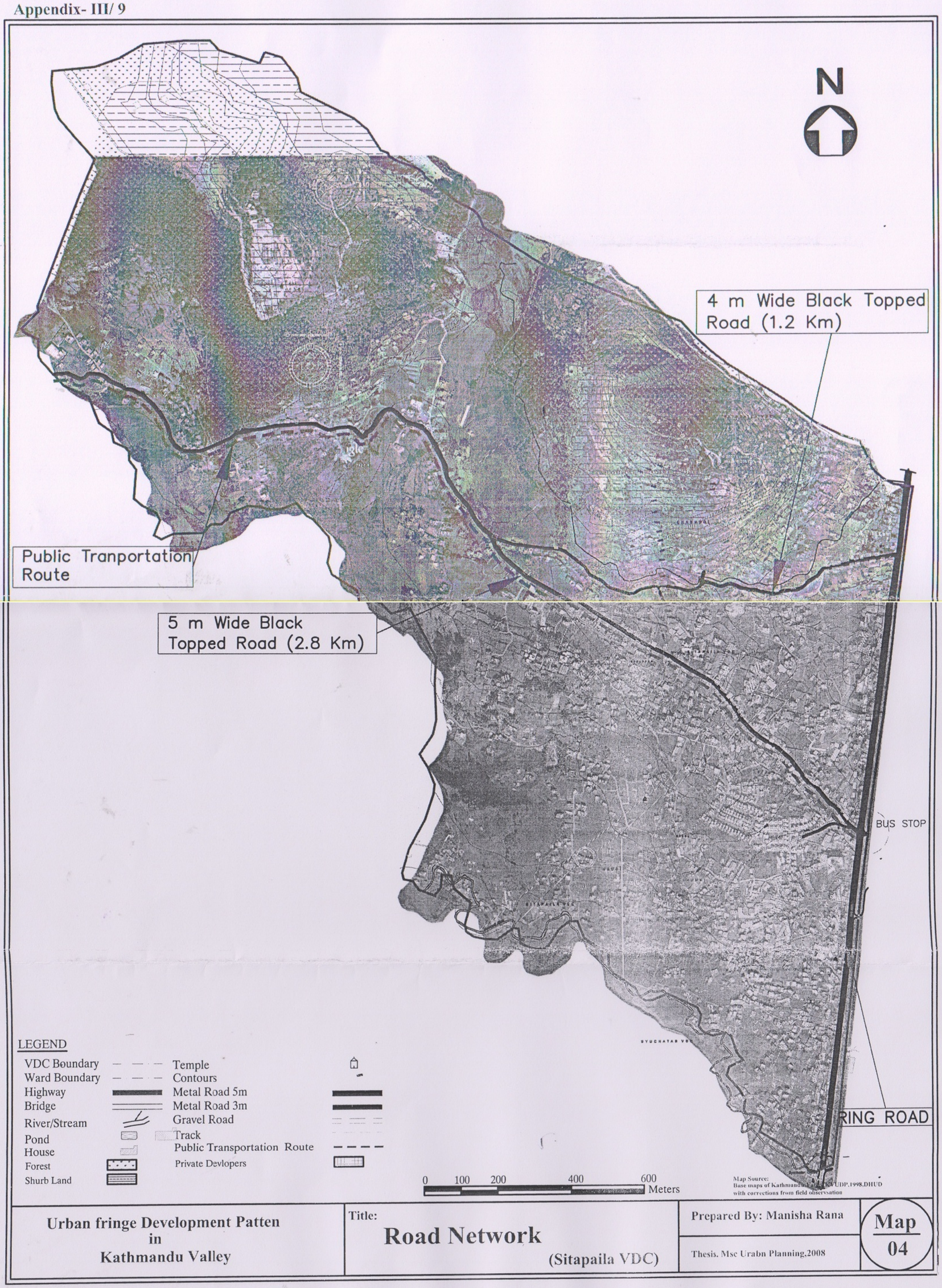


Ward No	House hold	Population		
		Male	Female	Total
1	197	476	446	922
2	125	291	274	565
3	198	446	453	899
4	203	647	557	1204
5	294	690	622	1312
6	347	799	784	1583
7	180	459	437	896
8	182	467	458	925
9	279	661	648	1309

Source: VDC Office, Imadol


4 m Wide Black Topped Road (1.1 Km)
N
4 m Wide Black Topped Road (0.9 Km)
SUBEDI GAUN
PAUDHAYAL GAUN
BAKLA GAUN
BISTA GAUN
Public Transportation Route
10-12 Nos.of Tempos
6 m Wide Black Topped Road (2.3 Km)
OCHU
Local Bus
DATIPOL
4 m Wide Black Topped Road (0.7 Km)
TAKHECHA
LEGEND
VDC Boundary
Ward Boundary
Highway
Bridge
River/Stream
Pond
House
Temple
Contours
Metal Road 5m
Metal Road 3m
Gravel Road
Track
Public Transportation Route
0 100 200 400 600 Meters
Map Source:
Base maps of Kathmandu Valley,KVUDP,1998,DHUD with corrections from field observsation
Urban fringe Development Patten in Kathmandu Valley
Title:
Road Network
(Imadol VDC)
Prepared By: Manisha Rana
Thesis. Msc Urabn Planning,2008
Map 03

Appendix- III/ 9

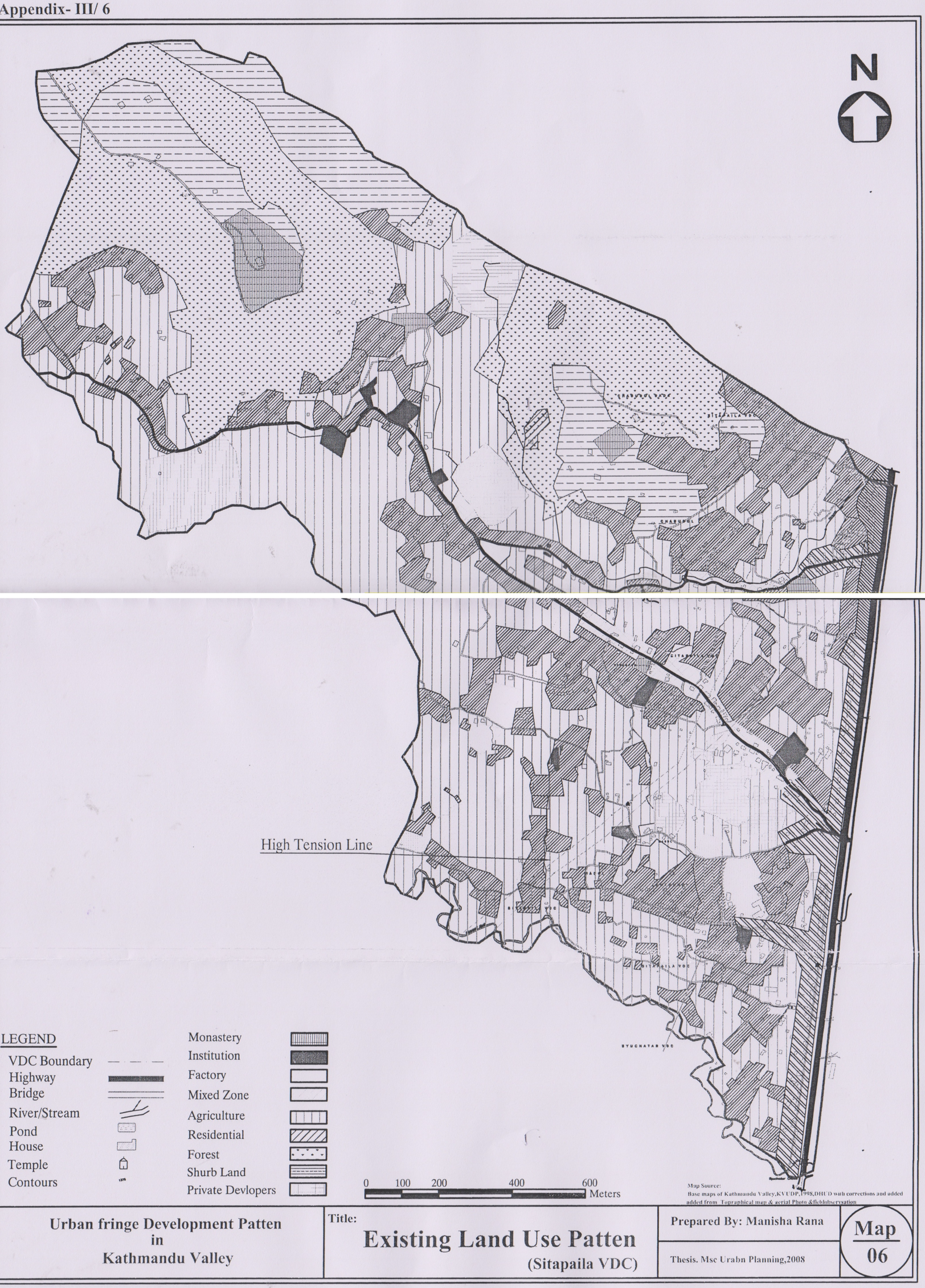


Urban fringe Development Patten in Kathmandu Valley	Title: **Road Network** (Sitapaila VDC)	Prepared By: Manisha Rana Thesis. Msc Urabn Planning,2008	Map 04

Appendix- III/ 5

Urban fringe Development Patten in Kathmandu Valley	Title: Existing Land Use Patten (Imadol VDC)	Prepared By: Manisha Rana Thesis. Msc Urabn Planning,2008	Map 05

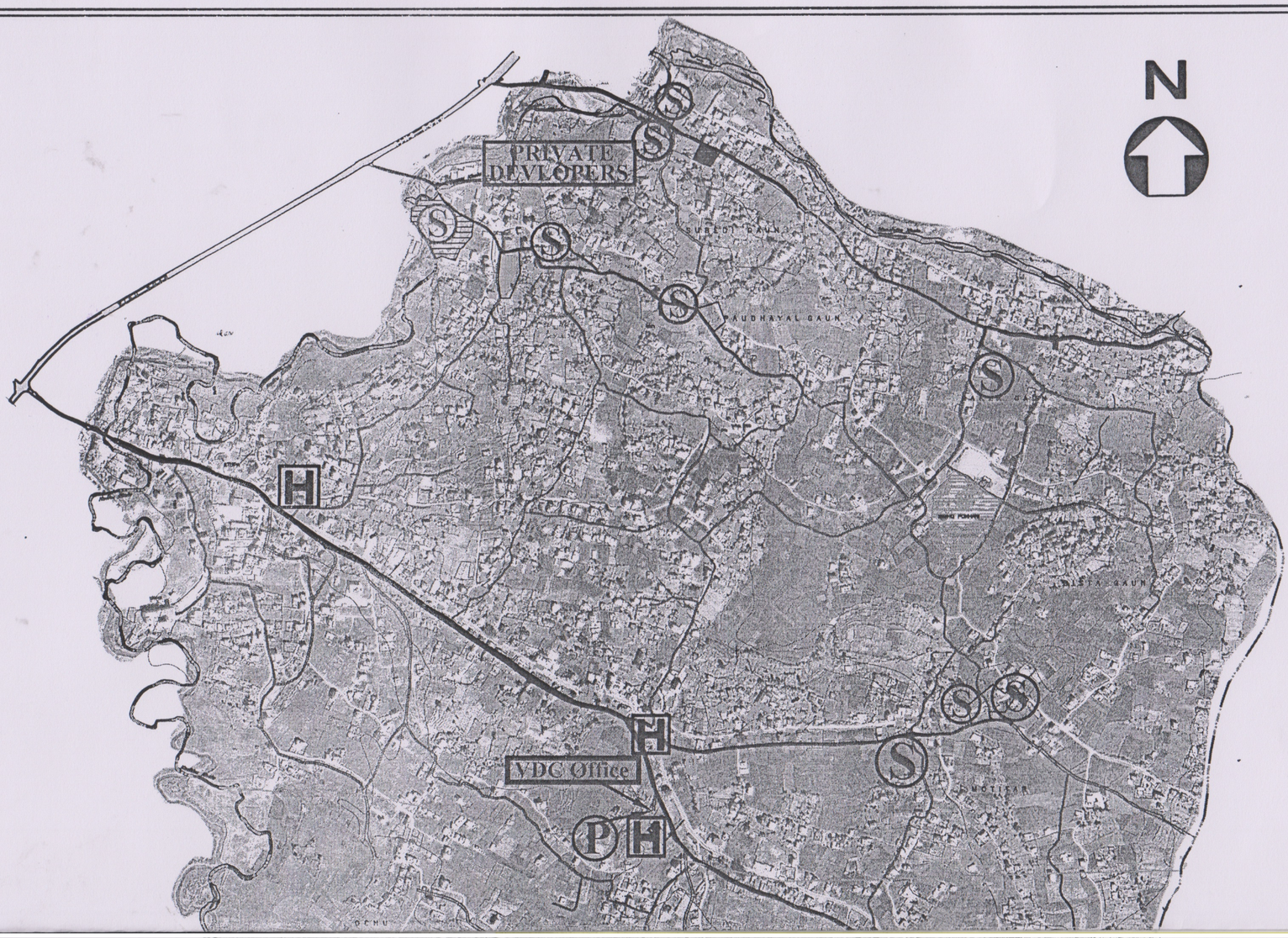
Appendix- III/ 6



Urban fringe Development Patten in Kathmandu Valley	Title: **Existing Land Use Patten** (Sitapaila VDC)	Prepared By: Manisha Rana Thesis. Msc Urabn Planning,2008	Map 06

Appendix- III/ 7

Urban fringe Development Patten in Kathmandu Valley	Title: **Existing Industries** (Imadol VDC)	Prepared By: Manisha Rana Thesis. Msc Urabn Planning,2008	**Map 07**



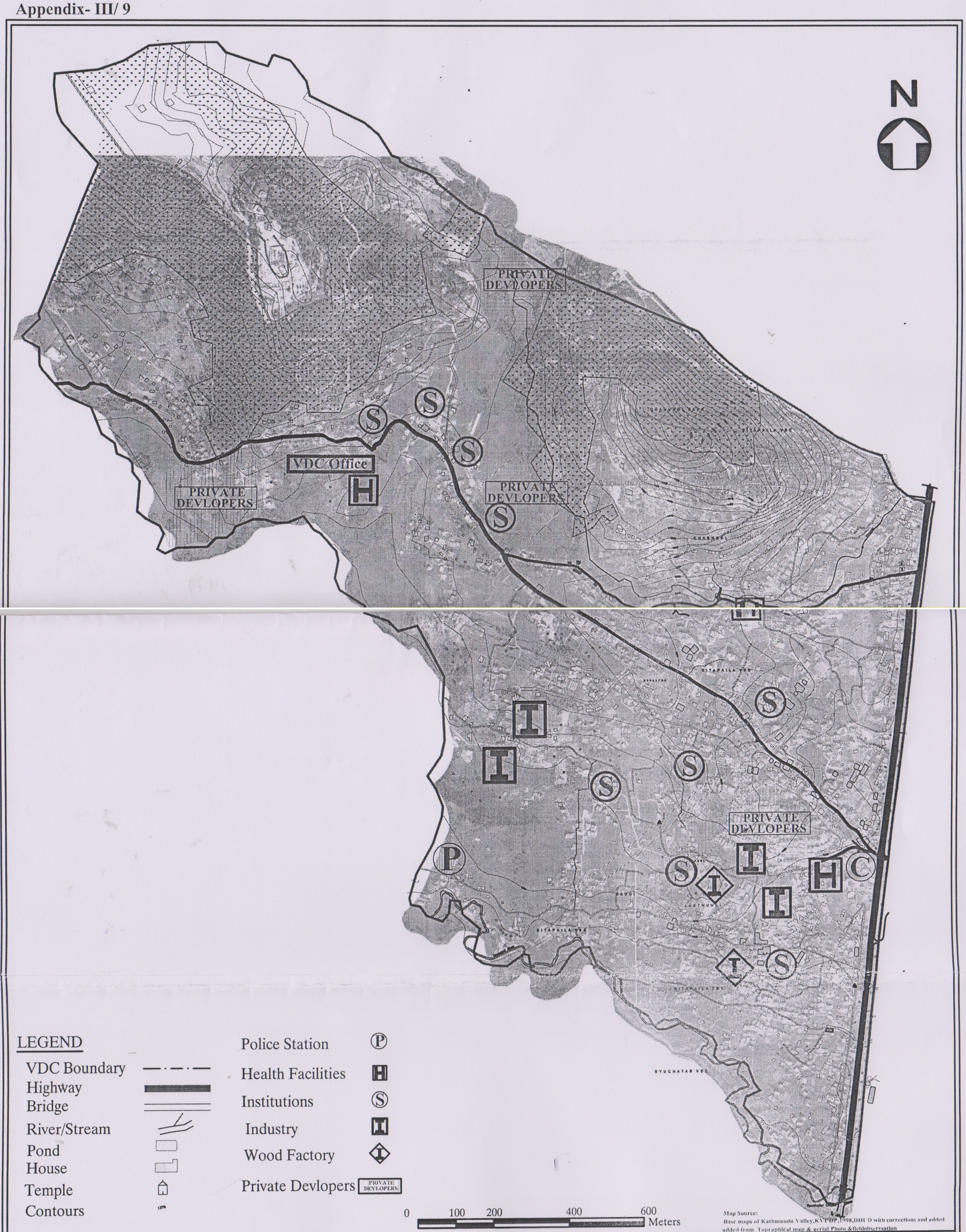
LEGEND

VDC Boundary		Police Station	P
Highway		Health Facilities	H
Bridge		Institutions	S
River/Stream		Water Body	
Pond		Private Devlopers	PRIVATE DEVLOPERS
House			
Temple			
Contours			

0 100 200 400 600 Meters

Map Source:
Base maps of Kathmandu Valley,KVUDP,1998,DHUD
with corrections from field observsation

Urban fringe Development Patten in in Kathmandu Valley	Title: **Existing Services** (Imadol VDC)	**Prepared By: Manisha Rana**	**Map 08**
		Thesis. Msc Urabn Planning,2008	



Urban fringe Development Patten in in Kathmandu Valley	Title: **Existing Services & Industry** (Sitapaila VDC)	Prepared By: Manisha Rana Thesis. Msc Urabn Planning,2008	Map 09