

4.0 DEMOGRAPHIC STUDIES AND PLANNING STANDARDS

4.1 POPULATION PROJECTION

Population projection is one of the most essential aspects in the preparation of a structure plan. The success of the entire exercise is pivoted on the correctness of the population projection. The complexity of the urban network is very closely knit with the size of population, and as a generalized statement one can say a larger population implies a higher degree of urbanization. However, it's not only the size of population, but also the complexity in the layers of services that define the degree of urbanization. Yet again the number of services provided is linked to the scale of economies which are in turn supported by the size of the population. For any service to be provided there must be a "threshold" of users to support it. A small population can only support a very limited range of services. Likewise low "ability to pay" for services is a limiting factor. As the users per service grow, so the range of services can also expand! Thus, it would not be wrong to summarize that the services to be provided for the present, as well as the future, if to be sustained in the long run will have to be in accordance with the number of users. The attempt to define the number of users in the future is the exercise of population projection.

Equally important is the "ability to pay" of users. If users have a low expenditure capability, even a large population can not "pay for" even essential services unless they are highly subsidized. A developing economy needs to invest in quality, long term economic infrastructure which generates more growth. A country can go bankrupt subsidizing services.

The population projection is based on a number of parameters which include physical, social, cultural, economical, functional, political, social, cultural, historical and other such aspects at the micro, macro and regional scale. The population of a geographic area grows, or declines, through the interaction of just three variables: fertility, mortality, and migration. Although approaches may differ, the assumptions used to produce population projections are based on expert opinion informed by current conditions, past trends, and theories about why and how much fertility, mortality, and migration are likely to change. The fertility and mortality have a lot of socio-cultural and natural environment bearings attached to them. To bring a change in their percentages needs some time and hence is quite gradual. However, the factor of migration can make a drastic change in the entire process of population projection and especially in the present day context one needs to study this factor with a greater attention.

4.2 POPULATION PROJECTION METHODS

A number of methods are available in the literature for population projections. Each has certain advantages and disadvantages, and the availability of data and the characteristics of the area

under study primarily determine their use. Some of these methods are discussed below for the purpose of population projections of Samtse.

TREND ANALYSIS METHOD

A city is assumed to have its own internal dynamics, largely insulated from the external forces. The trends observed in the past are therefore taken as indicators of the future. The statistical method of curve fitting belongs to this category. For a steady growth rate the Linear Projection Method is used. If there is a constant increase in growth rate the Exponential Curve Projection Method is used. Similarly the Modified Exponential Projection method is used when the town is showing a declining pace of growth rate after approaching an upper capacity limit. This method is more suitable for cities and towns which are not likely to be affected by any foreseen, or unexpected drastic change in its growth pattern.

INDUCED RATE OF GROWTH

In this case, the population is projected on the basis of the employment opportunities which are likely to grow on the basis of past trends, as well as due to committed proposals and the expected proposals likely to be sanctioned. In this method there is a need to conduct a close study of the induced activity and the effects that it can cause especially in terms of the secondary and tertiary level of opportunities that it can create and their economic implications. This will also include the additional possibilities of economic activities depending upon the availability of resources within the region. If the feasibility and impact study of the activity to be induced is not done properly this method can lead to absolutely misleading final figures and create chaos in the actual development process.

AREA RATIO METHOD

This method proceeds on the assumption that the ratio of population and its area of a city have a correlation with the ratio of population and its area of a city with similar city functions already built in the past. The trends of the change in the population growth of the older city is studied and based on the study the population projection for the latter city is done. As mentioned earlier, since this method of population projection pivots around comparative analysis of the two towns, it becomes very important to first identify as many parameters of comparison between them and then try to study the similarities and differences between the towns based on the identified parameters. The parameters of comparison would include physical, social, cultural, economical, functional, political, social, cultural, historical and other such aspects at the micro, macro and the regional scale. The success rate of this population projection method



would mainly depend on the degree of similarities between the outcomes of the comparison of the identified parameters between the two cities.

4.3 ANALYSIS OF FLOATING POPULATION

The population of a town at any given time is basically composed of two types of groups. One group is the residents of the town, who spend their life residing in the town, while the other is of floating types, who frequently visit the place for some reasons. The residing population of the town can be again sub-classified into two groups, one who permanently reside in the town for a considerably long duration of time like ten to fifteen years while others are those like hostel students and transferable government servants who might live for two to three years, as per their requirements, but are replaced by an equal number of new population for the same purpose. Thus, at any given time the number of people under this category remains more or less the same.

The floating population of a town constitutes mainly two types. The first category is those types of people who visit the place routinely but do not stay at the place. The reason for such visits is mainly for some job or work associated with the town. The second type constitutes visitors or guests who might live for a small span of time, but their duration of stay as well as next visit are not predictable. Often the second type of floating population is seasonal visitors, like tourists and people from hinterlands. They visit the place for specific kinds of activities and are related to the town with respect to its seasonal specialty, like climate or ceremonial occasions and events.

With faster and more convenient modes of transportation being easily available there is always a considerable increase in the number of floating population. In Bhutan some ten years ago the floating population may not have been of major concern. With the increasing road connectivity and the decision of Bhutan to selectively modernize infrastructure, the floating population factor cannot be neglected. Certain cities and towns have their entire economy closely linked to floating populations. The typologies of towns which belong to this category are market towns, towns where the mode of transportation changes, government and service centers, the tourist destination towns, border towns, etc. Another important factor in Bhutan is the necessity for both skilled and unskilled laborers from outside Bhutan. This particular component contributes considerably to the long term floating population. This sector of population consumes urban services, as well as contributes substantially to Bhutan's resources. It must be addressed during the preparation of the structure plan. One of the main sources of tracking these segments of the population is the Census and Immigration Department.

Samtse, because of its regional importance and as Dzongkhag Headquarters, will have a considerable floating population commuting, with a pattern of morning arrivals and evening departures. This type of population would have to be accounted for infrastructural facilities and

amenities like communication and transportation and restaurants, entertainment centers, etc. Samtse, being envisaged as a market and an industrial town of the south-western part of Bhutan would have to cater to the housing needs of this crucial sector of population considering their short term and medium term requirements. Both these activities are intensively service based and the related infrastructure and amenities would need to be specially planned taking these requirements into consideration.

4.4 CARRYING CAPACITY AND POPULATION PROJECTION

Carrying capacity is a relatively newer concept and at a very simplified level means comparison of the resources available as against resources consumed. The concept of carrying capacity is an expression of concern to indicate that if the rate of resources consumed is going beyond the rate at which they can be produced, then the place may face a problem of sustainability in the long term and perhaps may lead to a major collapse of the system, or even a disaster. In the case of structure plans the carrying capacity is directly proportional to the natural environmental factors and the infrastructural services and facilities provided. The first one is more important because it has a direct impact even in laying of the infrastructural facilities and services.

In planning of any sustainable town or city, the ecological and environmental aspects have a critical role to play in both the long term, as well as short term. Sustainable development is contingent upon the availability of natural as well as man-made resources and their judicious usage without much alteration and degradation on the environment in the short, as well as the long term. The dictionary meaning of the word 'sustainable' is 'that can continue and/or be continued for a long time'. The technical term for this in planning is 'Carrying Capacity'. Since we aim towards creating a sustainable community, the ecological and environmental aspects are the prime concerns and hence the 'environmental carrying capacity' would be the central theme of the approach for population projection of Samtse.

Before adopting any development strategy for Samtse it is crucially important to understand the 'carrying capacity' of the town specially with respect to the physical and ecological aspects. There are two main types of carrying capacities needed to be considered for population projection

4.4.1 Physical Carrying Capacity

The physical carrying capacity defines the limit of an urban system beyond which the wear and tear would start taking place and environmental problems would follow. This limit is defined by components like habitable land and accommodation possible, water supply, slopes, power supply and space for movement which have a finite limit to the population they can support. It is measured in two dimensions, which are per space unit expressed in terms of the number of persons per square hectare of land, and per facility unit, that is, the number of occupants in a



building, number of cars in the road, campers in a camp ground, and beds in a hotel. While assessing the carrying capacity of land two indicators have been taken into account, namely population holding capacity of developed land in terms of acceptable gross density and suitable land for physical expansion.

4.4.2 Ecological Carrying Capacity

The ecological carrying capacity defines the degree to which the ecosystems are able to tolerate human interference without a major impact on its natural course of sustainable functioning. The immediate indicators of ecological carrying capacity are levels of air, water and noise pollution created by the settlements, some of the medium and long term indicators could be changes in the micro climate and changes in the behavior of the natural elements around the settlement.

The socio-cultural, political and economic aspects are also to be considered, but again these are linked to the natural environmental factors with respect to certain concerns. It often happens that a town may have excellent livable conditions in terms of climate and natural setting, but may not have enough water supply to sustain a large population. In that case the carrying capacity of the place would be dictated by the available resources of water. One can attempt to increase the carrying capacity by harvesting water and using it as required, but if one attempts to withdraw excessive water from the under ground sources, it may lead to a drastic fall of the water table level, and thus leading to problems of survival of the natural flora and fauna. Over a period of time this may lead to the destruction of the natural ecosystem and leading to potential disaster of drought or land slides in hilly places. Similarly it could be with the excessive creation of garbage, thus leading to an epidemic of some disease, or cutting trees and damaging water shed areas in hilly region thus inviting major landslides as well as floods in the plains at the foot hills.

Thus, while projecting the population of a town it is also very important to take into consideration carrying capacities and the related factors, including the permanent and floating populations. Carrying capacity can be enhanced through environmental awareness and action. Stopping tree cutting and mining operations in the upper water sheds will stop flooding. Using water shed management techniques will gradually correct the damage already done, enhancing the carrying capacity and future growth potential.

4.5 POPULATION DENSITY

The population projection is based on the dynamics of the city as a whole, but while preparing a structure plan it becomes equally important to take the internal dynamics of the city into consideration. The distribution of population in the city depends on several factors like climate, topography, placement of economical activities, public and private institutions, transportation

linkages etc. A place with more infrastructural facilities and services would attract more population hence the density of the population at these places would be more.

Just as there are places where high density is desirable there would be places like eco-fragile zones or conservation zones where high density would not be desirable. In a town the population density would be at its maximum in the Urban Hub and areas adjacent to the Urban Hubs. The next high population density would be in the Village Squares and adjacent areas. The least density would be found in areas having large number of institutions, or near eco-fragile and conservation areas. The exact number for the population density would vary from town to town and area to area, but the population density could be controlled by rules and regulation as well as by restricting the infrastructural facilities and services to be provided.

4.6 POPULATION PROJECTION OF SAMTSE

Before starting with the actual work of population projections it is important to understand the factors that will have a bearing on the population count:

- Samtse is the administrative headquarter of the Dzongkhag, an important Service Center of the south-western part of Bhutan and the service provider for the nearby hinterlands, thus inviting a considerable amount of floating population.
- Samtse with the dual advantage of better and established connectivity with the sub-continent and its proximity to the proposed highway connecting India and China, coupled with the increased and strong connectivity provided by the proposed Sipsu-Daiphem highway with the other parts of Bhutan has a great potential for economic related development in the region. Feeder roads will develop to the Haa region, north of Samtse.
- The proposal of a Special Economic Zone between Samtse and Sipsu will increase future north to south migration rate and population of the region.
- Possibility of Samtse acting as an entrance for the Kingdom of Bhutan for commercial as well as tourist purposes.
- Proposal of economic development activities like a Dry port, industrial estates in Samtse.
- Creation of a railhead.

The population projection of Samtse, as put forth in this report, is an outcome of using a combination of the first two methods of population projection mentioned in the earlier part of this chapter. These are Trend Analysis Method and Induced Growth Rate Method. The first method would help us to project the population based on the current rate of growth, while the second method would assist us in adding to the population projection the increased population as an outcome of the induced activities like the Special Economic Zone, industrial estates, etc. What is equally important to be realized is the need for the population projection to be done in two parts; medium term planning and long term planning. The activities attracting the population would be added one by one as they are phased to be executed as per the final Structure Plan time schedule.



4.7 EXISTING SCENARIO AND BASE DATA FOR POPULATION PROJECTION

The population data provided in the pre-feasibility study conducted for Samtse by the Department of Urban Development and Housing (now Department of Urban Development and Engineering Services), Royal Government of Bhutan, during February 2004, for the purpose of Urban Sector Programme Support is considered as a base for all population studies including future population projections. The population of the Samtse urban area was mentioned to be 3,457. The source of this data was the Bhutan Living Standard Survey listing - 2002 conducted by the Central Statistical Organization, Thimphu.

Table 4.1 : Summary of the Population Distribution in Samtse Municipality and its extended limits

Category	Population
Main Bazaar Area	286
Cinema Hall, Chorten and Veterinary Hospital area	090
Dzong and Army Welfare Project Colony	258
Below Army Welfare Project and around carton factory	154
Devithan village till Central Jail	145
Hospital and Police Camp	460
Check Post area	265
Army Camp located to the north of Dzong	365
Post Office and Dzongkhag Staff Quarters	085
Damdhum river bed, National Jersey Breeding Center and Central Jail	196
Telecom Staff	064
BPC Colony, National Pension Board and NIE colony	284
High School area	097
Army Camp near Check Post	418
Forest Colony	092
Daragaon (east of Hospital Campus)	198
Total	3.457

The Gross Residential Density of the Samtse Municipality and its extended limit for the year 2002 was 12-15 persons per hectare with a major concentration of residential population living in the present Samtse Municipal Limit. In the exercise of population projection, understanding the past population growth trend of the town becomes very crucial, since this data will act as the base for future projections. However, due to the non-availability of any established past population growth trend or population count for Samtse town, the past population data of the town remains un-explained to the planning team. For the calculation purpose it is assumed that the past population growth in Samtse would have remained at a national average which

was around four percentage in the past two decade. Though the population of Army and Police establishments included in the above table will not grow as that of population of the residents of Samtse, the population of these establishments are also included as a part of the total population considered for the future projection, with the assumption that these will constitute to the floating population of the town.

4.8 SCENARIOS FOR DEVELOPMENT OF SAMTSE

As discussed earlier in the report, the region of Samtse, by the virtue of its location and on-going government's development initiatives, like the establishment of road connections between Samtse and other parts of Bhutan, holds a great potential for future development. The proximity of the town with the proposed Asian Highway connecting India and China opens up the door for major development activities in the region. In the future, with the improvement of infrastructure facilities and the town's image, there is a possibility for conceptualizing a smaller Special Economic Zone in the region. Samtse can be developed as one of the identified service center in the country with facilities catering to the adjacent hinterlands.

Just as it would be inappropriate to base the future of the town and its population on the assumption that all such activities would take place, it would also be unwise to rule out such opportunities and potentials the region offers. In order to arrive at a rational way of projecting the population of the town for another twenty years time, some possible scenarios for development of Samtse were assumed, and accordingly the population projection has been worked on. Such an approach will give flexibility to the implementing authorities towards the provision of infrastructure facilities for the growing population of the Samtse town.

4.9 GUIDING PRINCIPLES TO DETERMINE THE DEVELOPMENT SCENARIOS

The following are the guiding principles adopted, for deriving the possible alternative development scenarios for the town of Samtse:

- Optimum utilization of the flat lands and the locational importance of the region, as a resource and generator of economic activities.
- Increasing the competitiveness of the region in the country's economy and developing the region towards achieving an economic self-sustainability, contributing towards countries growth.
- Enhancing the existing healthy standard of living for the town's inhabitants, improving the socio-economic status of the town and providing facilities to sustain the life of the town in the long term.
- Developing the town to meet global standards towards inviting multi-sectoral investments in to the region.
- Conserving the eco-fragile areas of the region from urban development.
- Promoting North to South migration of Bhutanese youth seeking a better livelihood and future.



The government's initiatives and policies on incentives and investments for the growth and development of the town and the region are of crucial importance towards determining the alternative development scenario.

4.10 POPULATION PROJECTION SCENARIOS

The following potential scenarios were assumed for the projection of population of the town.

Scenario 1: Projecting the population of Samtse with the existing growth rate of population under the assumption that the future development in the region will not have profound effects on the population growth of the town.

Scenario 2: Projecting the population of the town with assumptions towards optimum utilization of the resources and space available in the town and in its immediate surrounding with an increased rate of migration statistics created as a result of induced economic activities/employment/investment in the region.

4.10.1 Scenario 1

The first alternative examined for the development of Samtse assumes that the future development in the town will continue with the present philosophy and attitude towards planning and population growth. The following assumptions are made with respect to this scenario:

- The policies towards the development of the town shall not be altered much which would have a major effect on the demographic character of the town.
- The population growth of the town shall follow the past trend, incorporating the corrections relevant to the present condition of the town in terms of additional provision of infrastructure, amenities, facilities and security. The changes in rate of fertility and mortality of the country due to the presence of higher level of health facilities will also be incorporated in this method.
- The employment growth and pattern shall remain the same following the past trends.
- The developmental activity in the region shall not have profound effects on the town, particularly in terms of its demographic characteristics.

Population Projection

In this scenario the population growth of the town, is projected (1) by considering the past trend of population growth in the town, and (2) by assuming that the population growth of the town in the future will be a normal compound rate of increase.

In order to calculate the past population growth of the town, because of the non-availability of any established population count or population growth trend it is assumed that the past

population growth of the town would have corresponded with the past two decadal national average urban growth rate which was around four percent.

Assuming that the population growth of Samtse in the future will continue in the same phase assumed for the past population growth and considering that both the town and civil servants population will grow at same growth rate, the population of the town would be 8,520 by the year 2025. Considering the present situation prevailing in the region and the inbuilt advantages of the town, together with the proposed infrastructure developments in the town, one can assume that Samtse, in future, would grow in relation to the present national average urban growth rate of 5% per annum. With respect to the above said assumptions the projected population for the town is as mentioned in the table below.

The base population considered for projection is 3,457 during the year 2002, derived from the Urban Sector Programme Support, Pre-Feasibility Study conducted by the Department of Urban Development and Engineering Services for the Samtse urban area during February 2004.

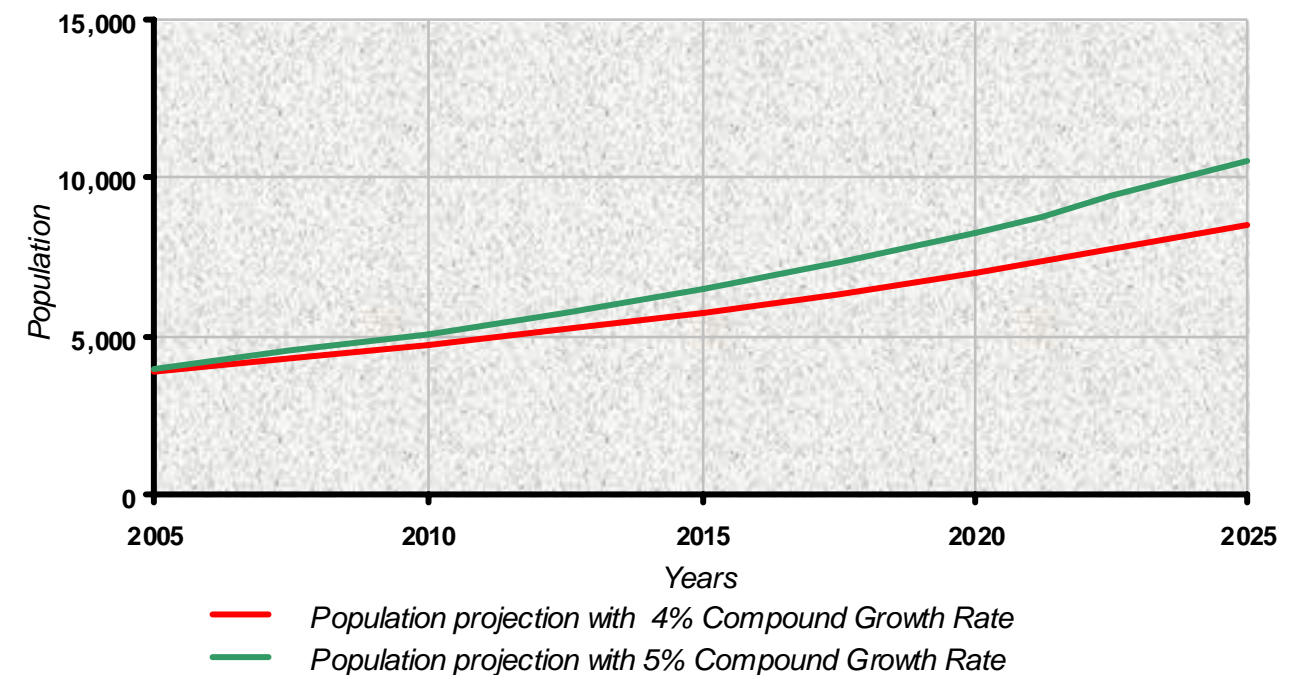


Table 4.2: Summary of the Population Growth in Samtse according to Scenario – 1

Year	Population projection with 4% Compound Growth Rate	Population projection with 5% Compound Growth Rate
2005	3,889	4,002
2010	4,731	5,108
2015	5,756	6,519
2020	7,003	8,319
2025	8,521	10,618



Impact of Scenario 1

- The existing extended municipal limit shall remain the same without any extension into the nearby areas of the town.
- The aggressive dynamism of development in the region would be absent in the town.
- The town would have low residential density, low population as well as limited activities.
- The spaces in the town would be under utilized without optimizing the land economics.
- The maintenance of physical infrastructure would be difficult, as it is today, resulting in meager source of income of the local body.
- The importance of the place within the given context of regional geography and physiographic character would not be comprehensively and advantageously used to attract and generate resources for the nation's growth.
- The socio-economic profile of the town would remain predominantly characterized by low and middle income households.

4.10.2 Scenario 2

The second alternative focuses on optimal utilization of the resources and space available in the town and in its immediate surrounding with an increased rate of migration statistics created as a result of induced economic activities/ employment/investment in the region.

The following assumptions are made for this scenario.

Land use and policy changes

- The proposed Sipsu-Daipham National Highway connecting Samtse with Phuentsholing and other parts of the country will be executed and will bring in all the much needed development activities for the growth of the town.
- The necessary policies, incentives and support required for promoting economic generation and employment generation activity in Samtse Town and in the region would be facilitated by the government at all necessary levels.
- The dry port development in the town will be promoted to facilitate export and import activities in the region and Samtse will be established as a port of entry into the kingdom.
- Positive development of the image of Samtse will be continued by the government towards attracting investment and population concentration.
- Economic activities and regional level institutional development in the town will be promoted considering the locational importance of the town.
- Space in the town will be utilized optimally and the land use distribution will be similar to that of an average town's of similar size in economically developed countries.
- Samtse will be developed as one of the identified Service Centers of the country provided with education, health and cultural facilities catering to the surrounding town.
- A region will be marked as a potential Special Economic Zone in the future.

- Several Satellite towns to cater to the spill-over needs of the Samtse town will be identified and developed in the region.

Transport facilities

- Public transport facilities connecting Sipsu–Samtse–Phuentsholing will be improved towards attracting the migratory population to settle in the town.
- Public transport connection between Samtse and other parts of the nation, as well as from India, will be improved.
- Road connectivity and accessibility to the surrounding villages and hinterlands of Samtse and with the sub-continent will be established and the town will start functioning as a major transportation hub of the region
- Connection between Samtse with the proposed Asian Highway connecting India and China will be strengthened.
- Separate cargo gateway, container center and enhanced vehicle management takes place.

Infrastructure Facilities and Amenities

- The town will be provided with the necessary modern infrastructure facilities including an under ground sewerage system, potable water supply system, electrical and telecommunications system.
- The town will be developed as an entertainment hub of the region. Modern amenities including open spaces will be developed in the town and given prime importance.

Employment Opportunities

- The proposed developments in the region will help in increase in employment opportunity. This will have a major implication on the population multiplier of the region.
- The occupational pattern of region will change. The administrative sector will not be the major source of employment in the region. The employment in the service sector will increase rapidly. Instead of government, the private sector will become a major source of employment in the region.

Development Control Regulation and Shelter Strategy

- New development control regulations for optimal use of the space will be proposed for the town. A shelter strategy accommodating the needs of all the segments of population will be proposed in the town. Strategic development of public housing will be proposed in the town.



Urban Fringe Development Control

- A strict peripheral urban control mechanism will be proposed in the town to control the development of urban fringe areas. The most practical modality would be to extend the municipal boundaries and bring these areas under an environmental precinct which restricts development.

Population Projection

The population growth of Samtse is projected;

- (1) by assuming that the population of the town in the future will grow with a compound rate derived from the past trends and applying corrections with respect to the present situations and development activities in the town; and
- (2) by assuming that the developmental activities in the region will have effects on the demographic status of the town by inducing the factor of migration into the town.

Taking the above criteria's into consideration the population growth of Samtse in the future could be assumed to be assured if not more but at least equal to the present national average urban growth rate of 5% per annum.

However considering the economic generation and employment generation activities envisioned in the region and the floating population due to regional importance of the town with assumed improved infrastructural facilities and amenities it would not be wrong to take an additional one percent increment in the population growth rate.

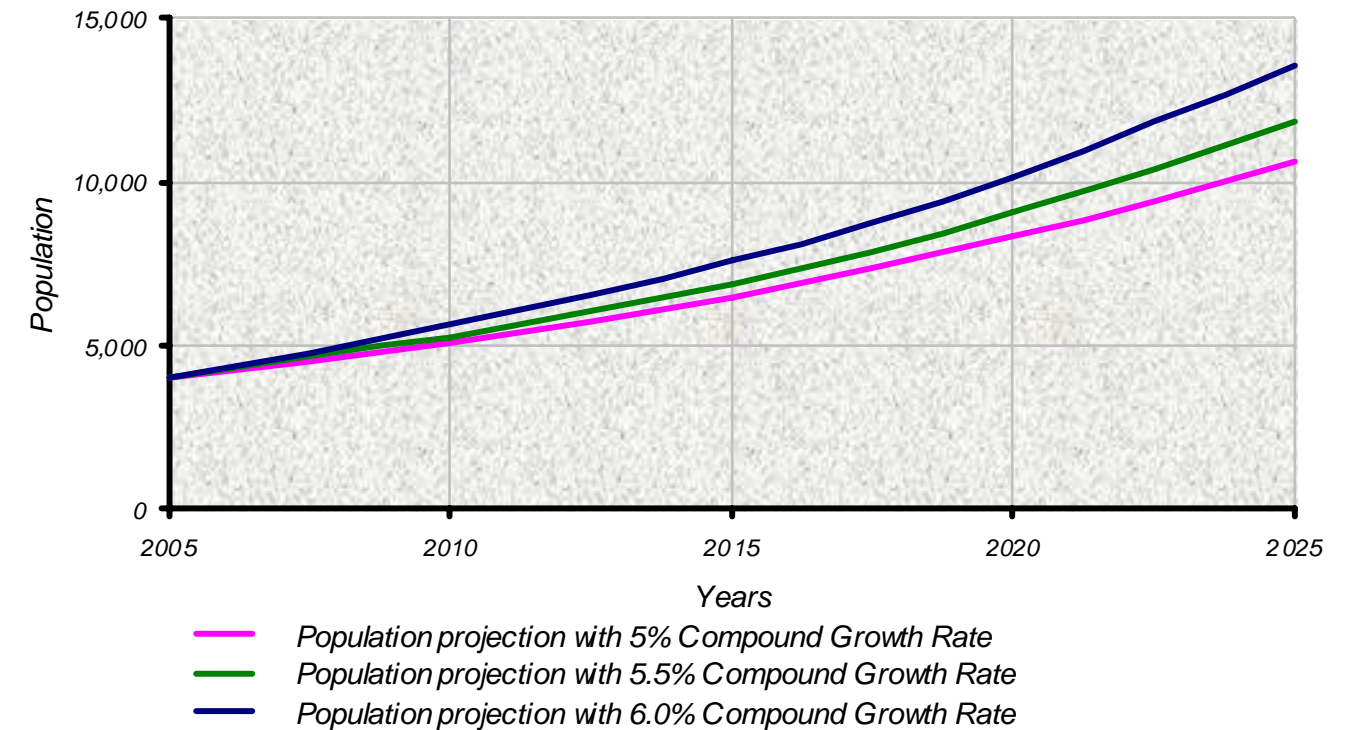
The Royal Government's initiative of developing an in-country road connection between Samtse and Phuentsholing, in the form of Sipsu-Daipham National Highway passing through Samtse, further adds up to the development potential of the town. Thus it would not be wrong to anticipate the population growth rate for Samtse as per the second scenario to be between five and half to six percent annually in the future.

It is also necessary that the population growth anticipated in this scenario should be a response of the phased growth of the envisioned development activities in the town and the region.

The base population of the town for future projections, and the current annual population growth rate, are as considered in the population projection of Scenario – 1.

Table 4.3 : Summary of the Population Growth in Samtse according to Scenario – 2

Year	Population projection with a Compound Growth Rate of		
	5% (National Average Urban Growth Rate)	5.5% (addition of 0.5% with the establishment of in-country connection road between Samtse-Phuentsholing)	6% (addition of 0.5% considering the envisioned economic and employment generation activities in the region)
2005	4,002	4,060	-
2010	5,108	5,306	5,677
2015	6,519	6,934	7,597
2020	8,319	9,063	10,167
2025	10,618	11,844	13,605



Impact of Scenario 2

- Samtse will be developed as a one of the highly potential urban areas in the country.
- There will be optimum utilization of the land, physical and social infrastructure of the town.
- The financial base of the town will increase.
- The local body will have well defined roles and responsibility, as well as powers to mobilize resources.
- The competitiveness of Samtse for urban development in the country will increase.
- Land will be used as a resource and generator of income in the town.
- The employment opportunity, the standard of living, and socio-economic status of the town will improve.



- Samtse will be an effective service center attracting catchment area population.
- Samtse would emerge as a new economic center of the South-Western part of Bhutan.
- There would be a need for a satellite town after 2030 as a response to population increase.

4.11 CONCLUSIONS

The science of Population Projection and Accommodation is one of the most controversial and debatable topics in Urban Planning. The primary aim of this chapter is to elaborate the possible urban growth scenarios for Samtse under varied assumed conditions, which will help the city managers and planners to plan the development strategies and related services and amenities for the future. In the process, what is important is to be aware of the factors which excel the population growth and to provide solutions for them. These include the area needed to house the future population, their work space requirements, the amount and level of amenities and facilities needed to serve the future population.

As a planning philosophy, the wrong thing to do is to under plan for the future, or conversely to spread the facilities out of the population concentration too quickly, making them uneconomical in terms of operational cost. Thus planned and well phased development of the town becomes very crucial for the success of the Samtse Structure Plan. For initiating such a process in the town, the proposals for action strongly suggests an alternative planning approach of breaking the town into a series of urban villages with specific population carrying capacities, which form the basic unit of planning and which have optimal populations and services, become the approach. These Urban Villages will be self-contained, independent units in terms of amenities and services provision, which will be directly proportional to the number of people living in respective Urban Villages.

4.12 PLANNING STANDARDS

How many primary schools should a town have? How many basic health units? How many hospital beds, etc.? These questions are answered by estimating how many people generate how many children in the primary school-going age. How many people generate a visit a day to a primary health unit? These “populations” which generate requirements for amenities are called “population thresholds”. Different societies have different thresholds. Where ability to pay and to travel to services increases there is more use, and therefore less people support more services; the “population thresholds” come down.

Another factor increasing the use of social and economical amenities is the travel distance. If people can walk to a basic service its use will increase and therefore the “population threshold” required to establish the service will come down. Higher densities of population

therefore not only augment more efficient utilization of infrastructure but also more use, and more efficient use of social services.

The basic objective of suggesting various norms and standards for urban development plans formulation is to provide a basis for taking decisions regarding correct distribution of various social amenities. For the purpose of Samtse Structure Plan, planning standards are extracted from two sources. The first document being ‘Urban Development Plans Formulation and Implementation Guidelines, 1996’ (U.D.P.F.I. Guidelines) by Institute of Town Planners, India and the second document ‘Planning Standards for Urban Settlements in Bhutan, 1999’ by the Urban Development and Housing Division, Ministry of Communications, RGoB. The data extracted is tabulated and compared with the existing facilities in Samtse.

Proposals made are on the basis of the shortfalls observed in the existing scenario when compared with these planning standards.

These suggested norms and standards are indicative and can be suitably modified depending upon the conditions. The standards drawn below are considering that Samtse enjoys a flat land and hence ideal place for development. The population thresholds considered for the standards mentioned below are about 10,000–15,000 souls. This is a “conservative” threshold because there are many users in the service center catchment area. Bhutan’s per capita net material income is also increasing, which will alter utilization rates in a manner where less population sizes can afford to support more services and amenities.

The following facilities and services have been considered for deriving standards:

- Education
- Health
- Open Spaces
- Recreational Facilities
- Commercial Establishments
- Social Infrastructure
- Other Amenities and Services
- Physical Infrastructure

Table 4.4 : Comparison of Planning Standards with the existing Amenities and Facilities available in Samtse as of year 2004

