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Supplementary Text

for Class XII



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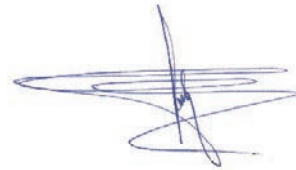
FOREWORD

Our education system is making all endeavors in fulfilling the directives issued by the Royal Government of Bhutan to make education meaningful and relevant to our children besides outlining the roles they are expected to play as the future citizens of the Country.

With the decision of the Ministry of Education to localize the class XI and XII courses with Bhutan Higher Secondary Education Certificate examinations in Bhutan being conducted by the Bhutan Board of Examinations with effect from 2006, new topics of global importance have been added. Therefore, Bhutan Geography supplementary text for class XII has been developed incorporating rich information on Population and Settlement of Bhutan, Resources of Bhutan, Transport and Communication in Bhutan as well as Nature Conservation in Bhutan. These topics would be indispensable for our children to cope up with the world of work as well as understand the current issues of national and global importance. The course would impart the values of not only appreciating nature but also sustaining it. It would also inform the necessity of using nature and the available resources prudently without exploiting it till it collapses with no hope of reviving. The awareness created through this supplementary text would also make the children preserve our pristine environment and ecological system.

In conclusion, we wish our teachers and students to learn from this book and contribute individually and collectively towards fulfilling His Majesty's vision of a strong, prosperous and sovereign independent Bhutan for all times to come.

Trashi Delek.



Thinley Gyamtsho
MINISTER
Ministry of Education

INTRODUCTION

The topics in the Geography Supplementary Text are on Bhutan and they are not treated in the main textbook. For instance, the topics in this text are the ones from Unit One, Unit Two, Unit Three and Unit Four. The topics which are not covered in this supplementary text are in the main textbook titled *ISC Geography for Class XII* by D.R. Khullar. Thus, it is important to refer to the syllabus time and again to ensure that no topic is left out.

The areas covered in the Supplementary Text focuses on population and settlement patterns of Bhutan in Unit One. Unit two introduces the students to the resources that are available in Bhutan. The resources discussed touch on agriculture and livestock, energy resources, Industrial resources, mineral resources and tertiary industries. The whole of Unit Three treats Transport and Communication facilities in Bhutan, while that of Unit Four covers Nature Conservation in Bhutan.

The topics in this supplementary text will inform our children on important aspects like the benefits of conserving nature, for instance. The interesting feature of this supplementary text is that the information provided is not exhaustive and it leaves ample room for students to explore through interviews, enquiry, observation and field work. Thus, besides providing information, the supplementary text also allows students to acquire the skills that are necessary in the world of work.

Dr. Jagar Dorji
Chairperson
Social Studies Subject Committee.

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UNIT ONE

POPULATION AND SETTLEMENT

1.1. Population

Introduction

The study of population forms an important component in Geography. Population is closely associated with demography. The term 'demography' is derived from the Greek word 'demos' meaning people and 'graphy' means study. The study of population is concerned with the size, structure and composition of population and its spatial distribution in a country. It also includes other related aspects of population such as fertility, mortality, migration and urbanization.

Population structure means the age and sex structure of the population, while population characteristics include various aspects of population such as the marital status, literacy levels of the population, occupational structure and income level of various groups of population living in different parts of the country/region. Hence, the study of population is multi-disciplinary in nature i.e. it requires some understanding of biology, genetics, mathematics, statistics, economics, sociology, cultural anthropology, psychology, politics, geography, medicine, public health, ecology etc., The multi-disciplinary nature of population and its relationship with other fields of study makes it an interesting field of study in social sciences.

1.1.1. Population of Bhutan compared with Major countries

Bhutan is relatively a small country in terms of the population size with about 734,340 persons in total (2004 estimate), according to the statistics provided by the National Statistical Bureau, Thimphu. In fact, in the region of South Asia, Bhutan is one of the least populated countries, compared with its other SAARC members like India, Pakistan, Bangladesh, Sri Lanka and Nepal. The following table provides a comparative population size of Bhutan with its neighboring nations.

Table 1.1: Population of Bhutan & its neighbors (Figures pertain to the year 1998)

Sl. No.	Name of Country	Population (in millions)
1	China	1238
2	India	979
3	Pakistan	132
4	Bangladesh	125
5	Nepal	23
6	Sri Lanka	19
	Bhutan	0.7 *

Note: * the exact figure is 734,340

Sources: i) *World Development Report, World Bank, New York, 2000.*

ii) *National Statistical Bureau, Thimphu, 2004: 3.*

The most fundamental source of statistics (data) on population is the *population census*. In fact, the very purpose of a census in modern times is to produce statistical data on various aspects of population in a country. A census of population is the total process of collecting, compiling, evaluating, analyzing and publishing demographic, economic and social data pertaining, at a specified time, to all persons in a country, or, in a well defined part of a country. In most countries, population censuses are conducted on a 5 or 10 yearly cycle. In other words, the census is taken at regular intervals. In several countries, the interval between two successive censuses is 10 years, while in some countries, for example, the United Kingdom and Japan – a census is conducted at an interval of 5 years.

The *census* provides data on demographic, economic and social data for every person within a well defined boundary, for a specified period of time. The data on demographic characteristics include fertility, mortality and migration. It provides the detailed picture of age and sex structure of the population, besides marital status etc. The census also provides data on the occupational structure and the income level of the population. The socio-cultural data pertains to the rural/urban distribution of the population, the level of education and the religious and linguistic composition of the population.

Knowledge about population composition is essential for ‘Nation-Building’. Thus, the first census was carried out in 1958. Then, the country’s first modern census was undertaken in 1969, which was followed by the 1980 census. The population census greatly helps in national economic development processes. The census data are widely used in all types of planning processes, both at the national level and also at the local level (like the GYT’s and DYT’s in Bhutan). The earlier censuses, which were conducted in 1969 and 1980, put the population of Bhutan in exaggerated numbers. This was

due to the large number of labour migrants from neighboring countries. The influx of migrants was so significant in those years because it coincided with the large scale economic development programmes such as the infrastructure projects in Chukha and Paro and the construction of roadways, large scale building constructions for business and industry. Hence, a country-wide census was conducted in 2005. This census is expected to provide a detailed picture of the population in Bhutan.

The second major source of population data is the *Vital Registration System*. The vital registration, generally, covers the registration of vital events such as the births, the deaths, still-births, marriages and divorces etc. These are compiled and the resulting data is known as the Vital Statistics. In Bhutan, the vital registration system, which is also known as the civil registration, currently provides only limited information on the population. However, the 2005 census would provide information on, inter alia, the date of birth, sex of the baby, age of the mother and number of her previous children, the order of the birth, and the residence of the mother etc.

The third important source of population data is the *Sample Surveys*, known as the National Sample Surveys. In Bhutan, so far, four special sample surveys were undertaken by the National Statistical Bureau (N.S.S.); the first one in 1984, followed by those in 1994, 2000 and the last one conducted in 2004, known as the Bhutan Living Standard Survey, provides economic and social conditions of households in 86 gewogs and 27 urban settlements, which are distributed in 18 Dzongkhags. The special sample surveys carried out at certain intervals provide the changes that are occurring in the population and its characteristics.

1.1.2. Population Distribution in Bhutan

The spatial distribution of population in Bhutan provides an interesting picture. Being a mountainous country and land-locked, the distribution of population is scarce. Unlike other countries in South Asia or in various other parts of the world, the settlements are scarcely distributed and the concentrated/densely populated settlements are not that common in Bhutan. The distribution is more or less similar in all the 20 Dzongkhags of Bhutan. Though there are marginal variations in the distribution of population between the northern Dzongkhags like Gasa and the southern Dzongkhags like Samtse or Chhukha, the variations are only minimal in other parts of Bhutan. The exact population figure for different Dzongkhags would be made available soon as the 2005 census results come out. However, in terms of population size, Thimphu, which also is the national capital, has the largest population in Bhutan. The Dzongkhags of Haa, Wangdue Phodrang, Pemagatshel, Dagana, Lhuntse and Tashi Yangtse are relatively less

populated. The age structure of the population is also quite interesting. Nearly, 42 % of the total population belongs to less than 14 years old and another 7 % are old-age people (more than 60 years). Thus, only a small percentage of adult population and a large number of dependent population rely on this small working adult population.

1.1.3. Age and Sex Structure of Population

The age and sex structure of the population in Bhutan provides an interesting picture. Nearly 42 per cent of the population belongs to the age group of less than 14 years. Out of which, 26.6 per cent is in school going age (5 – 14 years) while the remaining 15.5 per cent are children who are aged 0- 4 years. On the other hand, the senior citizens (aged 60 and above) account for 7.2 per cent of the total population. Thus, nearly 50 percent of the population can be grouped as dependents. Amongst the adult population 33 per cent of them are in the age category of 25 – 59 years, and, it is this population which is economically very productive and active.

The sex-ratio in Bhutan is one of the best in the SAARC region because in other countries in South Asia, the sex ratio is in favour of men. For example, in countries like India the sex ratio is about 960 women for 1000 men. But, in Bhutan it is almost 1:1. According to the N.S.B. Survey in 2003, there are 102 males for every 100 females. This can be taken as a good measure of development. Out of the total population of 734,340 persons, there are 363535 women and 370805 men, thus, the share of men and women in the total population is more or less equal. The male population accounts for 50.5 per cent and the women population accounting for 49.5 per cent of the total population.

1.1.4. Density of Population

Population density indicates the extent to which the resources are being put into use and the pressure on land, water and air resources. The density also helps in understanding the spatial variations in the distribution of population in a country like Bhutan. Normally, *density of population* is expressed as the number of people living in per unit area i.e. the ratio between population and the geographical area. This type of density is known as the *arithmetic density*. However, there is another type of density known as *physiological density*. They are expressed as follows:

- *Arithmetic Density*: It is the ratio of total population to the total area of the country or a part thereof. For example, the total population of Bhutan according to the National Statistical Bureau estimates in 2004 was about 734,340 and the total

geographical area of Bhutan is about 38,394 square kilometers. The arithmetic density of population =

$$= \frac{\text{Total Population}}{\text{Total Area}} = \frac{734,340}{38,394} = 19.1 \text{ persons/ sq. km}$$

Arithmetic density is the simplest and is used most commonly by scholars all over the world. But, it is a crude measure because it takes into account the entire area of the country while calculating the density. In fact, the entire area in a country may not be fully fit for human habitation. For example, the hilly and the rugged terrain, swampy, marshy and densely forested areas and those areas covered by water bodies/glaciers etc are unsuitable for human habitation. On the other hand, people tend to live only in areas which are agriculturally productive (cultivable), or where the natural resources are richly found and they are easily accessible. This concept becomes much more relevant for a country like Bhutan.

The geographical area is 38,394 sq. kms, but according to the Land Use Planning Survey, only 8 per cent of the total area is cultivable or available for human habitation. The rest (i.e. 92%) is not suitable for human settlements because of one or other type of topographical constraints. Hence, the second type of density measure becomes more relevant to Bhutan.

- *Physiological Density*: The *physiological density* of population is the ratio of total population to the total cultivable land available in that country.

$$= \frac{\text{Total Population}}{\text{Total Cultivable Area}} = \frac{734,340}{3071.52} = 239 \text{ persons/ sq. km}$$

From the above, it can be understood that the density varies with different methods of calculation. For Bhutan, the arithmetic density is about 19.12 persons per sq.km. On the other hand, if we use the second method i.e. the physiological density, then the density is 239 persons per sq. km., which is a high order. For a country like Bhutan, given its mountainous and land-locked with limited natural resources, the density is rather high.

1.1.5. Literacy and Education

The Literacy rate of a country is an important indicator of the over-all socio-economic development of a country. The levels of literacy have a close and positive correlation with the levels of development of the country, as a whole. In Bhutan, the National Statistical Bureau made a humble attempt to collect the literacy rates of the population through a special survey in 2004. According to this survey, the individuals are considered as literate, only when they reported that they are able to read and write, at least, in any one of the languages like Dzongkha, English, Lhotsham or any others. The average literacy rate for Bhutan as a whole was found out to be about 43 per cent, while the literacy rate for male was relatively higher with 54 per cent and the female with 33 per cent. The following table provides a brief information of the literacy rate for Bhutan.

Table 1.2: Levels of Literacy in Bhutan

Bhutan	Percentage	Urban	Percentage	Rural	Percentage
Persons	43	Persons	70	Persons	36
Male	54	Male	82	Male	47
Female	33	Female	60	Female	26

Source: National Statistical Bureau, 2004.

Bhutan being an agrarian country, the share of agricultural sector in employment is very significant. Nearly, 80 per cent of the work force is involved in agriculture and other related activities. The industrial sector accounts for 3 per cent of the total employees, and the tertiary sector for the rest. The service sector includes trade and transport, banking and finance and hotels etc. In fact, the tertiary sector is rather large in Bhutan as it incorporates a variety of occupations, including self-employment and artisans, etc. The following table provides a clear picture of the occupational structure in Bhutan.

Table 1. 3: Occupational Distribution of Population (Figures in %)*

Area/ Sex	Percentage share of population Employed in				Total
	Agriculture	Industry	Services	Others	
All Bhutan	79.5	3	4.5	13	100
Male	71	4	5	20	100
Female	89	1	4	6	100
Urban Area	6	11	21	62	100
Male	2.5	10.5	18	69	100
Female	13	11	28	48	100
Rural Area	91	1.5	2	5.5	100
Male	86	3	2	9	100
Female	95.5	0.5	2	2	100

Note: * Figures have been rounded to the nearest full number.

Source: "Bhutan Living Standard Survey", National Statistical Bureau, R.G.O.B., July 2004: 27.

1.1.6. Fertility

Fertility refers to the occurrence of birth. It needs to be differentiated from *Fecundity* which refers to the reproductive capacity of a woman during her entire reproductive period. Fertility is the actual number of children born to a woman in her entire life time. While calculating fertility, we take into account only the population of women, who are in the age group of 15 to 49 years. This group is also known as the women in reproductive age group. The following are some important fertility measures, which are widely used to understand one of the most important components of demography, namely, the fertility.

- *Crude Birth Rate:* The CBR is the simplest and commonly used measure in the world. It is expressed in terms of the number of births occurred in a year per thousand population. It is calculated as under:

$CBR = B / P \times K$; where B is the number of births occurred in a calendar year, and P is the total population of that specified area in that same year and K is constant, i.e. 1000.

- *Fertility Ratio (Child Women Ratio):* It is an useful index of fertility. It is computed by taking into account only the women population who are in the reproductive age group i.e. women aged between 15 to 49 years only. It is expressed in terms of number of children below five years of age per thousand women in reproductive age group.

$$CWR = \frac{P (0-4 \text{ years})}{P (F 15-49)} \times 'K'$$

Where P (0-4 years) stands for the number of children below 5 years of age, P (F15-49) stands for the women in child bearing age (i.e. the reproductive age group) and K is constant, i.e. 1000.

- *General Fertility Rate:* The GFR is the ratio of the total live births occurring in a specified year for a given area to the number of women in the child-bearing age (15-49 years), multiplied by 1000. The difference between fertility ratio and GFR is in the numerator, i.e. in GFR we take the number of live births occurring in a specified year while in case of fertility ratio it is the number of children below 5 years of age.

- *Total Fertility Rate:* The TFR is the total number of children born to a woman in her life time to the total number of women in child-bearing age groups.
- *Gross Fertility Rate:* The GRR is the number of daughters (girls) born to a woman in her entire life time. The difference between TFR and GRR is the following: In TFR we take into all children (both boys & girls), while in GRR it is only the number of girls taken into account.

1.1.7. Mortality

Mortality is defined as the permanent disappearance of all evidence of life at a time after birth has taken place (United Nations, 1953, p.48). A death can occur only after a live birth has occurred. Therefore, for the purpose of mortality, all deaths before births are to be excluded. The following are some of the commonly used mortality measures in many countries.

- *Crude Death Rate:* The CDR is the simplest and the most commonly used measure of mortality. It is easily calculated and understood even by ordinary people. It is the ratio of the total number of registered deaths occurring in a given place for any given year to the total population of that place in that year. For example, if we want to find out the crude death rate for Thimphu for the year 2004, then, we use the following formula:

$CDR = D / P \times K$; where D is the total number of deaths occurred. In 2004 (say, for example, D is ...1000.....), P is the total population of Thimphu in 2004 (80,000), and K is constant i.e. 1000.

$$= \frac{1000}{80,000} \times 1000 = 12.5 \text{ (the CDR for Thimphu is 12.5)}$$

- *Infant Mortality Rate:* The IMR is generally computed as a ratio of infants (babies under one year age) died in a calendar year to the total number of live births registered in that same year. The formula is:

$IMR = d / B \times K$; where 'd' is the number of deaths below age one, registered in a year; B is the total number of live births in that Year and K is constant, i.e. 1000.

- *Maternal Mortality Rate:* The MMR is defined as the ratio of pregnant women who die in a calendar year to the total number of live births occurring in that year for any specified area.

$$\text{MMR} = \frac{\text{Number of pregnant mothers who die in a calendar year}}{\text{Total Number of live births occurred in that same year}} \times 100,000$$

- *Child Mortality Rate:* The CMR is calculated as the ratio of deaths of children below 5 Years (from age 1 to 5 years) to the total number of children aged 1 to 5 years for the specified year.

$$\text{CMR} = \frac{\text{Number of deaths in a year involving children aged 1-5 years}}{\text{Total number of children aged 1-5 years in that same year}} \times 1000$$

- *Life Expectancy:* The average expectation of life at birth or average life expectancy is a good measure of mortality because it is not affected by the age structure of the population. It is generally computed from the “life table” which is worked out from the census reports. The life expectancy is widely used to compare mortality levels and analyze mortality trends in different countries. In Bhutan, the life expectancy has shown a significant increase from 46 years in the 1980s to well over 66 years in the recent years. This significant increase is the resultant of increased health facilities to the people at large and the over-all improvement in the standard of living of the Bhutanese population.

Table 1. 4: Major Demographic Indicators of Bhutan (1984 – 2000)

S. No.	Indicator	1984	1994	2000
1.	Crude Birth Rate (CBR)	39	40	34
2.	Gross Fertility Rate (GFR)	170	173	143
3	Total Fertility Rate (TFR)	6	5.6	4.7
4	Gross Reproduction Rate (GRR)	2.9	N.A.	N.A.
5	Net Reproductive Rate (NRR)	2	N.A.	N.A.
6	Av. Annual Growth Rate of Pop (in %)	2	3.1	N.A.
7	Crude Death Rate(CDR)	19	9	8.6
8	Infant Mortality Rate (IMR)	142	71	61
9	Maternal Mortality Rate (per 100,000 live births)	N.A.	380	260
10	Child Mortality Rate (CMR)	47	97	84
11	Life Expectancy at Birth	47	66	N.A.

Source: i)Demographic Sample Survey, 1984 ii)National Health Survey, 2000

1.1.8. Growth of Population

- *Growth Rate:* Growth of population is the change in the number of people living in a particular area between any two points of time. For example, if the population of Bhutan in 1980 was about 500,000. And, in 2000, if the population has reached 600,000, then, the growth of population in 20 years is about 100,000. This growth rate is expressed in terms of percentage. Here, the annual average growth rate of population for Bhutan between 1980 to 2000 is 2 per cent (i.e. 2% per year).
- *Natural Growth of Population:* The population growth takes place due to the difference between the birth rates and the death rates. When the birth rate is higher than that of the death rate, the population increase takes place. This kind of increase is called natural growth of population. On the other hand, if the population increase has taken place because of migration, then the growth is not purely because of natural increase.
- *Positive and Negative Growth of Population:* Population growth is said to be positive when the birth rates are higher than the death rates in any given area for any given two points of time. Positive growth results in population increase. On the other hand, if the death rates are higher and the birth rates are low, then population decrease takes place (provided there is no migration). For example, in Scandinavian countries like Finland, Norway and Sweden the population is growing negatively. It is because of very low death rates (6 or 7 per 1000 population) and still lower birth rates (5 or 6 per 1000 population).
- *Static Population:* This is a situation when the population of a country gets stagnated in terms of their number. It occurs when the birth and death rates in a country are perfectly equal. As a result, the population growth rate remains at zero per cent per annum. In fact, many over-populated countries, like China or India, are trying to achieve the Zero per cent population growth. In Bhutan, by the year 2020, the Royal Government of Bhutan is aiming to achieve this zero per cent growth rate.

1.1.9. Trends of Population Growth in Bhutan

Bhutan is an under-populated country. Given its small geographical size of 38,394 sq.kms, the population of 700,000 can be considered small. Even in the region of South Asia, Bhutan's population is very small, when compared with that of China or India. But, the population in Bhutan shows an increasing trend in the last 40 years or so. Because of many planned developmental works since the first five year plan in

1960-61, the population of Bhutan shows consistent increase. From about 500,000 in 1980, the population has crossed the mark of 700,000 in 2000. The average annual growth rate was around 2.5 per cent to 3 per cent in the 1990s. However, due to the planned efforts of the government through education and better health, the growth rate is showing decline in the recent years. Presently, the population growth rate is about 2.6 per cent per year, according to the C.S.O statistics of 2001.

1.1.10. Migration

Migration is the third important component of demographic studies. Unlike fertility and mortality (both are biological phenomena i.e. both birth and death naturally occur), migration is not biological. In other words, to migrate or not to migrate is the individual's choice and it is not natural. The migration plays an important role in the socio-cultural-economic life of a country. It helps in redistribution of population within the country. It also helps in redistribution of resources.

- *Internal and International Migration:* Migration can be defined as a process where the individual crosses the boundary of his or her place of birth and lives in another place. When the movement occurs within the geographical/territorial boundary of a country, it is called as internal migration and, when the movement occurs across the international boundary (moving into another nation), then, it is called as international migration. For example, a person from Trashigang changes place of residence from Trashigang to Thimphu, it is an internal movement or the process is known as internal migration. Instead, if that same person changes residence and moves into United States of America, then, it is international migration.
- *Out-migration and In-migration:* When people move out from their place of residence to some other place, it is called out-migration. This movement occurs within the country only and not across the borders. For example, if some people change their residence from Bumthang to Chukha in connection with trade or job transfer, then, they are out-migrating from Bumthang. And at the same time, they are in-migrating into Chukha. And, the process of 'moving-out' is known as out-migration and 'moving-in' is known as in migration. Similarly, the people involved in the movement are consequently called as out-migrants and in-migrants, respectively.
- *Emigration and Immigration:* When the above mentioned process occurs, involving movements between countries (crossing the international borders), then, the process is known as Emigration and Immigration. For example, if some people from Bhutan move into Japan, they are emigrating from Bhutan and immigrating into Japan.

Here, the same people are considered as Emigrants in Bhutan, while they become Immigrants in Japan. Similarly, if some Japanese come to Bhutan (may be, to work with organizations like the JICA etc), they are considered as Immigrants in Bhutan and the same people would be called as Emigrants from Japan.

- *Step-migration:* Sometimes, people move to other places in stages. In other words, they move to some nearby centres first, and then, from there they reach their ultimate destination. For example, some people from Lhuntse wanted to migrate to Thimphu in search of some better job and income, and, immediately, they do not go and settle down in Thimphu. First, they come and settle down in Mongar for some period, and later, they move to Bumthang and stay for some more time. Finally, when appropriate time comes, they move into Thimphu and settle there. This type of migration is known as “step-migration.” In fact, most of the internal movements occurring in many countries, particularly, the people coming to settle in big metropolitan towns like Mumbai or Delhi, in India follow this ‘step-migration’ principle. For example, migrants from rural Bihar, first come to the state capital Patna, and from there after one or two years, they migrate into cities like Calcutta or Delhi or Mumbai. Even in Bhutan, this may be happening if we look into the pattern of migrants coming from eastern Dzongkhags to Thimphu.
- *Sequential Migration:* In some cases, the people move because they have to accompany their parents. For example, children migrate with their parents because they are dependents on their parents. So, wherever the parents go on transfer, the children have to go, whether they like it or not. Similarly, in some countries like India, women go to their husband’s place after marriage due to the ‘custom’ there. Likewise, the old aged people also go with their sons/daughters. This kind of movement is known as ‘sequential migration’.

1.1.11. Migration Streams

The migration streams are the way people move in significant number from one place to another. For example, a stream of labor migrants coming into places like Chukha to work in the infrastructural projects there. Similar examples are the labour migrants from countries like Bangladesh, India and Pakistan into countries of Middle East to work in the petroleum oil fields there. This kind of movements can occur both internally and externally.

1.1.12. Major Types of Migration

There are four main types of movements. They are *Rural to Rural migration; Rural to Urban migration; Urban to Urban migration, and Urban to Rural migration.*

Rural to Rural involves movement occurring between villages either because of social or economic reasons, while the rural to urban migration is the most significant and important movement in internal migration. In countries like Bhutan, where the people from different parts of rural Bhutan migrate to cities like Thimphu, it results in rural-depopulation. The urban to urban movement occurs because of government transfer or trade related reasons, while the urban to rural movement occurs due to governmental policy in rural development programmes.

1.1.13. Migration Trends in Bhutan

Among the four types of migration discussed above, the rural to urban movement is playing an important role in Bhutan. Due to the development programmes that are taking place in many parts of Bhutan, the Dzongkhag headquarters seem to be attracting people from nearby rural areas. And, in this process, many villages are left with fewer people. There are not many to work in agriculture and other related works. Moreover, the land gets under-utilised in many parts of rural Bhutan. On the other hand, the cities like Thimphu are coming under increased pressure from these migrants. The ability of the city authorities in meeting the needs of the residents in Thimphu is under increased pressure due to the rural-urban migration. To reduce this pressure, the government has already started developing other major towns and cities like Paro, Phuentsholing, Mongar, Trashigang, Wangdue Phodrang and Bumthang, among others. This is going to be a big challenge to all the major city corporations in the years to come because internal migration cannot be stopped by any law. The people enjoy the freedom to move and settle down anywhere in Bhutan. Only through awareness campaigns and development policies aimed at regional growth and development of rural areas, can the rural to urban migration be controlled.

1.1.14. Causes of Migration

The *factors* causing migration are many. For example, a variety of factors such as *economic, socio-cultural, demographic and political factors* play significant role in the migration process.

The economic factors include better employment opportunities, relatively higher level of income and job security etc., particularly, the rural to urban migration. The diversified economic structure of urban areas provides ample job opportunities to people and

hence, the villagers move into urban areas. Besides, the wage rates are higher in cities like Thimphu or Paro, compared with the wages in Lhuntse or Tashiyangtse.

The demographic factors like population pressure, sometimes, play a role in people moving out of their places of origin. In many third world countries, the rural population pressure accentuated with limited natural resources and lack of amenities in rural areas result in people moving out towards greener pastures elsewhere. Sometimes, even under-population in rural areas also leads to out-migration. This can be seen in the case of Bhutan because in the rural areas of Bhutan, the population distribution is scarce. Hence, owing to lack of amenities the people may move out to towns/cities.

Socio-cultural factors include marriages. For example, in countries like India, women have to move to their husband's house after the marriage, since the custom demands that the wife should stay at her in-laws' place. The joint family system also leads to the movement of the whole family when the head of the family changes job or residence on transfer or business related affairs. For better educational facilities, or for better health facilities (since big hospitals are located only in big cities/towns), or for other facilities like good transport and communication system and entertainments etc., people move out from their place of normal residence.

The above mentioned factors can be grouped into two categories. They are:

- *Pull factors:* The urban centres like cities and towns function like magnets. They attract people from far off areas because they provide a wide range of facilities to the people residing there. Higher wage rates, better job opportunities, faster promotions, better educational and medical facilities, good transport and communication network, access to a variety of entertainment, better shelter and sanitation, electricity and safe water etc. are the pull factors that attract the migrants from different parts of the country. For example, Thimphu, being the national capital has all the headquarters of various ministries and government departments, the national assembly, financial and banking sector, trade and transport facilities, and so it naturally attract people from far and wide. These factors pull the migrants from different parts of the country.
- *Push Factors:* The push factors are those work in opposition to what has been explained in the previous paragraph. Generally, the push factors are unemployment and underemployment, low wage rates, lack of job security, lack of job diversification, lack of educational and health facilities, lack of basic amenities

like housing, water etc. They act as push factors in the rural areas, and, as a result, the people are pushed out from their rural areas towards areas of attraction. However, it is not always true that the rural areas push out and the urban areas pull in. In fact, in many cases, it is the combination of both pull and push factors that play a role in migration processes. Besides, the individual perception about the places also plays a role in migration.

1.1.15. Consequences of Migration

The consequences of migration are a mixed one. In other words, there are both advantages and disadvantages involved in migration. Generally, migration helps in cultural diffusion, increased exploration and exploitation of resources and helps in redistribution of population. It is a natural process whereby both people and resources are balanced over space. It helps in developing the areas of both origin and destination. The money sent back to their place of origin helps in investing in development activities. Similarly, their labour can help the development of the places where they have migrated into. Similarly, the disadvantages can also be mixed. Sometimes, migration brings in tension among the communities. It may also result in increased crime rates and other social evils. In some cases, it would invite political problems for the receiving areas/countries.

Student Activity

Divide the class into four groups. Each group will take one topic and conduct a field visit to collect information on the chosen topic. Present the findings to the class, followed by discussion:

- Visit a Gup's office and interview him/her about the ways in which the records/information/details of various components of population are maintained in the Gup's office.
- Visit a nearby village and collect information about the people (including the births, deaths, marriages, divorces, the level of education etc) living in that village. Tabulate the information and see their relevance with the concepts studied in the subject in the class.
- Visit the nearest town/city and collect information on the life style, income, level of education and occupation of people from ten households.
- Visit a nearby town or city (a particular part of a city) and observe the damage caused by the migrants to the environment.

1.2. Settlements

Introduction

People all over the world live in villages and towns of different shapes and sizes, distributed over the surface of the earth. The basic unit of residence is a house, which can be a small temporary hut to a luxuriously built mansion or apartment. Clusters of any of these with a certain layout plan meant for residential and other purposes such as storing machinery or for keeping animals, with streets and footpaths connecting them is known as a settlement.

1.2.1. Types of Settlement

The pattern or the shape of settlements vary widely across space, from region to region worldwide. Geographers have attempted to clarify these variations by classifying settlement layouts into several different types, which describe the overall shape and concentration of the settlement. Nucleated and dispersed settlements represent two contrasting types of morphology (shapes) but a linear pattern of settlement is also apparent in the landscape of Bhutan especially after the construction of the motorable network throughout the country.

A dispersed settlement is one where individual dwellings such as farmsteads or houses are scattered widely over a rural area. Two or more buildings may be collected together as a 'hamlet', but these concentrations, if present at all, are very small. Farms and hamlets are widely separated by open land from one another. Farms in eastern Bhutan are generally characterized by a pattern of dispersed settlement.

Nucleated settlement occurs when buildings are closely grouped together around common centres for defensive, economic or social reasons, forming larger groupings - villages and, later, some becoming towns. For example, some settlements originally developed on hilltops or other high land because these sites were easier to fortify and defend, like most of the Dzongs in Bhutan. Others have grown up because they were located at highly accessible points on transport routes such as crossroads, junctions, bridging points or waterways. Others have grown up around reliable sources of water supply or on mounds or terraces of higher land above flood level. Surrounded by their own farmland, such nucleation of settlement would traditionally have grown up at different distances from one another in an unplanned fashion. One good example of such type of settlement is Ura in Bumthang.

The degree of nucleation or dispersal of any settlement will depend to some degree on the local physical landscape and resources available to support a given population. Economic, social and political factors such as the stability of society and the nature of ownership, inheritance and distribution of land also affect the morphology of settlement in a given area. Some areas, display a mixture of both dispersed and nucleated settlement types.

Linear type of settlement is now becoming prominent along the roadways in Bhutan. In a linear type of settlement, there are usually two parallel rows of houses facing each other across a wide village thoroughfare.

Settlement can also be classified in two broad types based on size, population, occupation and the facilities found in the particular settlement. They are the rural and the urban settlement as shown below in the table below.

Table 1.5. Urban and Rural settlement

Rural Settlement	Urban Settlement
1. The settlement is small in size.	1. Settlement are bigger in size
2. Small Population living in the rural areas.	2. Large number of people living in these areas ranging from few thousands to few 100,000 people.
3. Density of population is less.	3. Density of population should be more.
4. People are engaged in primary activities (agriculture).	4. People are mainly engaged in secondary and tertiary activities.
5. Modern facilities are often absent.	5. Equipped with modern facilities.

1.2.2. Rural Settlements

a) Types

In Bhutan we basically have four types of rural settlement. They are:

- (i) *Clustered or agglomerated or nucleated:* In this type of settlement, the houses are very close together with narrow winding streets separating the houses. Very often, such types of settlement have a definite layout plan which may be linear, rectangular, or L-shaped. This type of settlement is generally found in fertile areas and they could also be found in this manner as a defensive purpose from their enemies or the wild animals or surrounding the only water source available or as an insurance from arson owing to jealous neighbours. Examples of such type of settlement can be found in pockets all over Bhutan like in Ura in Bumthang; Khaling in Trashigang; Simu in Thimphu and Laya in Gasa.
- (ii) *Semi Nucleated:* The semi-clustered settlements usually have a compact nucleus around which the other houses are dispersed forming a ring around the main settlement.
- (iii) *Dispersed or isolated:* In such types of settlements the houses are all scattered over a huge area.
- (iv) *Semi-nomadic:* This is a common settlement in the higher altitudes of Bhutan, where the people survive based on their Yak herds or the sheep. (Laya in Gasa and Merak-Sakten in Trashigang). The people live in tents during some parts of the year when they take their animals to the pastures. They move to lower altitude during the winters and to higher altitudes in the summers.

b) Factors determining the type of rural settlements

There are many factors which determine the type of rural settlement. These factors can be classified into three main groups. (Refer to *ISC Geography for Class XII* by D.R. Khullar)

1.2.3. Urban Settlements

The most important criterion in determining whether it is an urban or a rural settlement is based on the activities of the inhabitants. In the urban areas, majority of the population are engaged in secondary and tertiary activities. Not only that, there are facilities available for better living standards and comforts.

a) Urbanization

Urbanization in Bhutan began only in 1961 with the introduction of the first five year plan under the guidance of our late Majesty King Jigme Dorji Wangchuck. Under this developmental strategy Thimphu, the capital of Bhutan started to grow gradually. Construction of roads and establishment of infrastructure, and of educational and health facilities took place. The public sector gained momentum and this resulted in a chain of migration from rural areas – job seekers and entrepreneurs. As of 2002, Bhutan was one of the least urbanized countries of the world with only 21% of its total population living in the urban areas. However, it has been noted that Bhutan's urban population is increasing at a rate of 6 to 7 % annually and that this is becoming a growing problem. More than half of the urban population of Bhutan is residing in Thimphu and Phuentsholing, with the rest being divided in 28 towns with the population ranging from 500 to 10,000.

b) Major Urban Centres of Bhutan

The major urban centres are mainly located in the Dzongkhag headquarters except for a few.

- | | |
|-------------------------|-------------------|
| 1. Thimphu | 2. Phuentsholing |
| 3. Paro | 4. Haa |
| 5. Punakha | 6. Wangdiphodrang |
| 7. Trongsa | 8. Zhemgang |
| 9. Mongar | 10. Trashigang |
| 11. Trashigang Yangtse. | 12. Pema Gatshel |
| 13. Samdrup Jongkhar | 14. Sarpang |
| 15. Dagana | 16. Samtse |
| 17. Tsirang (Damphu) | 18. Gasa |
| 19. Jakar | 20. Lhuntshe |

c) Factors influencing location and growth of Urban centres in Bhutan

There are many factors which play important roles in the growth of urban areas in Bhutan. For instance, after the basic modes of transportation was put in place like the construction of motor transport, Thimphu started to grow since the roadways facilitated trade and commerce, resulting in economic growth.

Agricultural resource is another factor which has resulted in giving rise to urban centres. Take, for example, Paro which has grown in the last few years. It is because of the suitable climatic conditions and the fertile wide plains, which have boosted and attracted people to live in Paro.

Wherever mineral resources are plentiful people tend to flock and settle in those areas. For example Gomtu and Pema Gatsel have grown owing to the findings of limestone and Gypsum there.

Some of the towns have primarily developed as education centres; although some other economic activities have also commenced along with education. Example: Kanglung and Lobesa.

Industrialization is also very closely related to urbanization and one cannot survive without the other. Refineries in Samtse have enlarged the size of the respective areas. Climatic and other physical factors also play an important role in determining the location and growth of towns.

d) Problems resulting from the growth of large urban areas

Along with the growth of towns many problems like unemployment, growth of slums and squatter settlements, urban sprawl, traffic congestion, pollution and other miscellaneous problems arise.

- *Unemployment:* Many people from the villages migrate to the urban areas in the hope of better opportunities. Many of these people are of the misconception that once they come to urban places like Thimphu, they are going to have a good life. They do not realize that they are better off in the villages since they have the skills to live independently in the village. Once they are in the towns, they may not find jobs because there is a mis-match between the skills they possess and the jobs available in the town. As a result, an unemployment situation arises, which further instigates other social problems.
- *Growth of Slums and squatter settlements:* Slums and squatter settlements have grown and spread wherever there is urbanization. It is because the low income groups are not able to afford the facilities provided by the urban areas. They then tend to settle on the outskirts of the towns with the minimum facilities. For example, Kala bazaar in Thimphu.

- *Urban Sprawl:* It is another growing problem. As the population increases in the urban areas, built up areas tend to encroach on the nearby farmlands and beyond, thus bringing more areas under urban settlement.
- *Traffic Congestion:* Another growing problem is the traffic congestion in urban areas. As of the RSTA record, at present there are over 27000 vehicles registered in Bhutan. Out of that, over 10,000 are in Thimphu alone. This is probably why there is traffic jam in Thimphu town especially during the office and school hours. This trend is on the rise along with traffic pollution.
- Other miscellaneous problems are noise pollution, over crowding, housing problems, social problems, waste disposal, inadequate sewerage, water shortage and the over-usage of the existing facilities.

Student Activity

1. Reflect on the settlement pattern of your village and tell its settlement pattern and some factors that have affected its pattern. Also, make predictions with reasons on the possible changes.
2. Make a list of urban and rural areas in Bhutan and write down the reasons for classifying the settlements into two.

UNIT TWO

INTRODUCTION TO RESOURCES

2.1. Agriculture

Introduction

All things available on the earth's surface cannot be classified as resources. In fact, nothing can be termed as a resource unless some kind of utility is derived from it in the economic life of a man. Resources are those that have utility for human being. The things, which are helpful in meeting the endless needs of human beings are included in the class of resources. In other words, when we obtain utility from some organic and inorganic matter, we can call them as resources. As requirements increased, natural resources began to be exploited in some form or the other.

Resources satisfy human wants - be it individual want or social want. Resources relate to human being and they are functional. It is only a means to an end, the end being satisfaction of human wants or social objectives.

Therefore, it can be rightly said that resources are not but they become. To understand this statement it is important for us to study some of the characteristics of *Resource*.

2.1.1. Characteristics of Resources

The following are the characteristics of resources:

- *Resources give utility:* In the geography of resources, utility is in fact satisfaction of needs. The satisfaction a man derives from the use of things is called utility.
- *Accessibility of Resources:* The utility of resources will depend on human accessibility. If there are some minerals, for instance, in a place which is beyond human accessibility, it cannot be classed as resources. Similarly, mineral wealth lying buried in inaccessible areas cannot be included in the class of resources unless they are within human accessibility and some utility is derived from them. Therefore, accessibility is of great importance in the availability and utility of resources.
- *Adequate supply:* The next important quality of a resource is adequacy. A thing can be included in the class of resources only when it is available in huge quantities.

The minerals present in the various parts of the world have not been all included in the class of minerals as the quantity is not adequate. The deposits of minerals lying buried in the North and the South Polar Regions can be categorized as resources only when their amount is comparatively large and their mining may lead to the supply of human needs.

2.1.2. Refer to *ISC Geography for class XII* by D.R. Khullar for Wet and Dry agriculture, Crop Rotation, Crop combination and intensity of cropping and types of irrigation.

2.1.3. Problems of Bhutanese Agriculture

- *Farm constraints:* More than 50% of the farming community faces the problem of effective farming such as the use of modern technology, good seeds and new methods of farming. Constraints like drought, flood and hailstorm etc. are unpredictable and have been taken as non-remedial.
- *Wild animal damage:* One of the most rampant problems faced by the farmers is the wild animal, leading to substantial amount of food grain losses by farmers in rural areas. About 42% of the farmers have reported wild animal damage of their crops. Worst cases have been those caused by wild boars. Places like Bumthang, Ha, Trongsa, Zhemgang, Mongar, Yangtse, Pemagatsel, and Samdrupjongkhar experienced the maximum damage, where more than 50% of the farmers reported wild animal damage. Other troubling animals to the farmers are the monkeys, deer, elephant, bear, porcupines and birds. For instance, 37% of the farm households were affected by the wild bore while 22% by the deer, 24% by the monkey, 2% by the elephant, 5% by the bear and 10 % by other animals like porcupine and barking deer etc.
- *Accessibility to motor road/ Limited access to market:* *Accessibility* refers to how far a person can travel by vehicles to reach the village. Gasa and Zhemgang are the two most inaccessible Dzongkhags. About 58.2% of the households in Gasa and 56.2% in Zhemgang still take more than 8 hours to reach the nearest motor road point. At the outset, some of the Dzongkhags appear to be highly accessible, but still there are some areas, which are too remote. Places like Lingshi, Naro, Soe, Denchuka, Dungtoe, Mayona, Gongdue, Silambi, Dungme and Lauri have more than 90% of their households requiring to walk more than 8 hours to the nearest road heads.

- *Lack of irrigation:* Though Bhutan boasts of the water resource enough to produce approximately 30,000 megawatts of electricity, there is scarcity of water for irrigation. One of the main reasons of this scarcity is the terrain, which has river flowing in the deep gorges, while the agricultural land is on the slopes and valleys. Thus, about 31% of the farm household is constrained by lack of irrigation.
- *Labour shortage/ high labour cost:* The labour shortage is one of the problems faced by the Bhutanese farmers. This shortage is caused mainly by the people migrating from rural to urban areas where there are more opportunities to earn more. Approximately, 10% of the farm households suffer from labour shortage.
- *Steep terrain (Hill cultivation):* The steep terrain is another difficulty faced by Bhutanese farmers, as it makes farm mechanization almost impossible in most areas. Moreover, the percentage of cultivable land is very low in Bhutan due to steep terrain. For instance, only 7.8% of the total area of Bhutan is used for agriculture.
- *Lack of literacy among the farming community:* Since the farmers are mostly illiterate, they cannot adapt themselves easily to the new methods of farming. More over, it takes time to create awareness and convince them on the use of new methods of farming..
- *Storage problems:* The poor place of storing the agricultural products is another problem faced by the Bhutanese farmers.

2.1.4. Use of technology in agriculture

The agriculture sector in Bhutan has seen a great deal of development since the implementation of the Five Year Plans in 1961. Some indicators of progress are:

- Introduction of new and high yielding crop varieties
- Development of improved agronomy practices for both traditional and new varieties
- Improvement of nutrient management methods- use of synthetic fertilizers
- Improvement of weed pest control methods- integrated pest management and use of pesticides and herbicides
- Introduction of farm machinery, effective hand tools and equipments
- Introduction to post-harvest technologies such as storage, packaging and processing.

Student Activity

Imagine that you are working in the agriculture sector. Suggest some ways of overcoming any one of the problems of Bhutanese agriculture.

2.2. Major crops and Livestock rearing in Bhutan

2.2.1. Food Crops

In Bhutan, rice dominates as a food crop, followed by maize and wheat. However, many other varieties of crops are also cultivated.

- *Rice*: Rice is not only a cereal crop for the Bhutanese but also a source of income and livelihood. The demand for rice has been increasing with an increase in per capita income and changing food habits. Rice is grown in most of the Dzongkhags of Bhutan. The warm temperate and dry subtropical zones have very good potential for rice production. Under the current traditional subsistence farming, rice yield ranges from 3.12 tons per hectare in the warm temperate zone to 1.97 tons per hectare in sub-tropical zone. It has been estimated that if farmers in rice growing Dzongkhags adopt improved varieties and better management on 40% of the area, an additional 18000 tons of paddy could be produced.
- *Maize*: Next to rice, maize takes the place of being the second staple food. Maize is grown in different land use types and altitudes, which is an indication of its excellent capacity to adapt to diverse environments. Maize is grown in places ranging in altitude from 800m to 2500m, under rain fed and irrigated conditions, in cool, dry and very hot climates, with growing cycles ranging from 3 to 6 months. 99% of the country's maize is produced in 13 of 20 Dzongkhags.

Table 2.1 Maize growing Dzongkhags with area production and yield.

Dzongkhag	Area (acres)	Production (MT)	Av. Yield (tons/ac.)
Chukha	615	1807	0.472
Samtse	21,740	6447	0.296
Tsirang	9,933	5029	0.508
Dagana	15,470	8715	0.564
Trongsa	1,785	964	0.540
Zhemgang	7,596	3905	0.512
Sarpang	18,320	8184	0.448
Lhuntse	4,665	2586	0.556
Mongar	9,938	7465	0.752
Trasigang	21,443	14842	0.692
Yangtse	5,388	3728	0.692
P/Gatsel	4,898	3184	0.652
S/Jongkhar	12,213	7846	0.644

(Source: 9th five Year Plan. Ministry of Agriculture, May 2001)

- *Wheat*: Wheat occupies about 23,920 acres, with the national production at 10,747 MT and average yield of 0.448 tons/ac. The dry tropical zone has the largest area under wheat. Other minor cereals grown are millet, buckwheat, and barley.

Table 2.2. Cereal production in Bhutan

Crops	Area (acres)	Production (MT)	Yield (tons/ac)
Wheat	23,920	10747	0.448
Millet	25,798	9159	0.356
Buckwheat	18,225	6443	0.352
Barley	11,015	4849	0.440
Legumes	4,120	2098	0.508

(Source: 9th five Year Plan. Ministry of Agriculture, May 2001)

Table 2.3. Major and Minor crops

Major Food Crops	Commodity	Altitude in m	Varieties
	Rice	600-1500	IR46, Milyang 54, IR20913, barket, Chumro, Bajo map 1, Bajo maa 2, Bajo Kaap 1, Bajo kaap 2
	Maize	Upto 1800	Yangtsipa, Palmira and Suwan
Minor Food Crops	Wheat	Upto 1800	-
	Barley	1900-2800	-
	Buck wheat (sweet and bitter)	1900-2800	-
	Millet (foxtail and finger millet)	1900-2800	-
Oilseed	Mustard	1200-2500	T9 and M27
		600-1800	Bajo Peka 1 and Bajo Peka 2
	Soyabean	Upto 1800	Ags 258 and Bragg

(Source: 9th five Year Plan. Ministry of Agriculture, May 2001)

2.2.2. Commercial Crops and Market Gardening

With the introduction of new methods of agriculture as well as farming technologies and new varieties of seeds, the farmers in Bhutan now produce commercial crops and vegetables to complement their livelihood. Orange, apple, cardamom and potatoes are some commercial crops. Some examples of market gardening crops are chilli, cabbage, cauliflower, tomato and asparagus etc. The table below will provide an idea of the varieties of commercial crops and market gardening in Bhutan, but it is not exhaustive.

Table 2.4. Commercial crops and Market Gardening

Commodity	Altitude in m and Location	Varieties
Apple	2000-3000 (grown mainly in Thimphu, Paro, Bumthang and Ha)	Golden Delicious, Royal Delicious, Red Delicious, Red Gold, Jonathan etc.
Orange	600-1200 (grown mainly in Samtse, Tsirang, Sarpang, S/Jongkhar, Chhukha, Dagana, Zhemgang)	Mandarin (local)
Potato		Desiree, Kurfi jyoti and Yusikap
Ginger	Chhukha, Samtse, Tsirang, Sarpang, Trashigang, Mongar	
Cardamom	Chhukha, Samtse, Tsirang, Dagana, Sarpanag, Haa	
Chilli	Mid and High Altitude	Sha local and red Indian chilli
Cabbage	-do-	C. Market and Golden Acre
Onion	-do-	Nasik red, Shenshu red and Agri found dark red
Garlic	-do-	
Sag	-do-	
Radish	-do-	
Turnip	-do-	
Carrot	-do-	
Asparagus	-do-	Merry Washington, Hybrid excel and UC 72
Tomato	-do-	Roma, Cherry tomato and Nozoma
Apricot	-do-	Kaisha, New Castle, Nari, Army, Gokha, etc.
Peaches	-do-	Crowford early, Elberta, Sun haven
Plums	-do-	Stanley, Santarosa and Mariposa
Walnut	-do-	Chandler, Rita, Howard, Vina, etc.
Cherry	-do-	Royal Ann, Lapins, Makhmali glass, regina, etc.
Pears	-do-	William, China, Gola, etc
Strawberry	-do-	Douglus, Conifitura, Gorella ect.

Source: 9th FYP, Ministry of Agriculture, May 2001

The table below shows the amount of export of some commercial crops in 2001.

Table 2.5. Export of commercial crops.

Items	Qty (MT)	Value (Million Nu.)
Potato	25,453.000	158.000
Apple	2,965.000	64.000
Orange	15,568.000	126.000
Other fruits	9.000	0.070
Pulses/Spices	737.000	5.000
Vegetables	1,654.000	11.000

Source: PPD, Ministry of Agriculture, October 29, 2003:13

2.2.3. Livestock Rearing

In Bhutan, as in many developing countries, livestock is an integral part of the farming system. They are a source of draft power, manure, meat and dairy products. The livestock rearing in Bhutan consists mainly of cattle, yak, pig, poultry and sheep.

Box 2. 1: Details of selected livestock in Bhutan

i) Cattle development

- *Overview:* Cattle development activities have been going on for over three decades. Initially, with an objective of upgrading the local cattle population in the country, the livestock breeding policy of 1985 underscored the need to have a systematic cattle-breeding programme. It stated the need to emphasize on improving the genetic quality of our local cattle in order to increase the milk production capacity within the shortest possible time. The exotic breeds of cattle identified were the Jersey and the Brown Swiss. The policy recommended the use of Brown Swiss breed in the high altitude areas like the whole of Bumthang Dzongkhag, Gasa, Haa and in two gewogs (Nubi and Tangsibi) of Trongsa and four gewogs (Dangchu, Gangtey, Phobjikha and Sephu) of Wangdue Phodrang, while the Jersey was to be propagated in all other areas of the country. The final genotype proportion of the crossbred cattle at the farmers' level was stated as an exotic inheritance of 50%.

Traditionally, the cross breeding of Mithun with local cattle (Thrabum) was very common amongst cattle owners in Bhutan. The farmers pay huge costs to possess one for their herd. Pure Mithun, although not native to Bhutan, was introduced by the farmers themselves from the North Eastern state of India. The F₁ generation obtained after mating Mithun (male) and with Thrabum (female) is the most prized animal. The males, Jatsha are very huge and powerful and are an excellent draught

animal. The females, Jatsham are very good milk producers, having higher fat percentage in the milk. Efforts were also made to identify Siri breeding tracts so that the local Siri cattle can be conserved and also to initiate selection.

Credit facilities have been in vogue and many farmers have benefited from such schemes. Schemes for cattle insurance started in the 1980's. However, the high premiums made it unreachable to the common farmer. It is therefore existent in only a few select areas like Phuntsholing.

- *Current scenario*

Central level: Two cattle farms, the Brown Swiss farm at Bumthang and the National Jersey Breeding Centre at Samtse, and the National Artificial Insemination Programme at Wangchutaba cater to the demand of breeding Brown Swiss crossbred bulls, Pure Jersey bulls and Jersey crossbreds respectively. At Bumthang and Samtse systematic breeding is done with imported progeny tested frozen semen of the respective breed and, selection is done at various stages, so that disease free and reproductively active animals are distributed to the Dzongkhags. The two Mithun farms at Chukha and Arong cater to the demand of Mithun bulls while Nublang farm at Trashiyangphu supplies Nublangs as per the Dzongkhag demand. Research on cattle production is coordinated by RNRC, Jakar.

Dzongkhag level: Traditionally, farmers have benefited more from keeping larger number of animals than by keeping a few exotic animals. In spite of all valuable contributions from the livestock, the livestock population is yet under pressure from environmentalists in particular. Cattle migration is generally labeled as a menace to the environment. On the other hand, migration occurs as a need-based activity for the farmer's livelihood. Environmentally, migrating too has its positive effects. Besides providing nutrient to the soil, grazing areas are left fallow during the migration to other areas, enabling regeneration of the grazing areas. But, given the right livestock management strategies with proper use of the available natural resources base, one can see a visible balance and a prospective future for the small but growing livestock industry in the kingdom.

With the success in Mithun semen processing and, after field test, Artificial insemination (AI) with Mithun semen was made possible at the extension. However, even after the implementation of Mithun AI at the extension, the demand for Mithun bulls by the farmers is still very high. Breeding bulls supplied by the central units are placed at various gewogs as per the public demand and at the discretion of the District authorities. Usually, bulls are kept with Contract Bull

Keepers (CBK) identified by the District and sometimes with Private Bull Keepers (PBK). The geographical barrier to breed distribution as described in the breeding policy of 1985 was lifted in 1998, giving farmers the free choice of the breed. The result was the very high demand for purebred Jersey and Mithun bulls, which has exerted a lot of pressure on the government Jersey and Mithun farms. The Livestock Extension Centers (LEC), which are accessible by motorable road, Jersey, Brown Swiss and Mithun semen are kept for Artificial inseminations. While LEC's not accessible by motorable roads, have the provision of a breeding bull in the area, which is managed by a community and the bull keepers are called as CBK. A small financial assistance in terms of bull keeping allowances and progeny allowances are provided to the bull keepers.

To encourage farmers' participation in the livestock development programmes and also to supplement the government breeding bull production programme, contract bull production programmes have been initiated at Bumthang for Brown Swiss bulls and at Thimphu for pure Jersey. A similar programme for pure and crossbred Jerseys at Paro and Samdrup Jongkhar has been established recently. The cattle population as per the RNR Statistics (2000) is 320,509, which is about 45% of the total livestock population. About 11% of the cattle are crossbreds.

ii) Yak Development

- *Overview:* Yak rearing is an integral part of our pastoral system and is the only means of livelihood for the pastoralists. Yaks are reared in the alpine areas of Thimphu, Trashigang, Haa, Paro, Bumthang, Gasa and Wangdue Phodrang Dzongkhags. In summer, the animals thrive in the alpine areas and in winter they are brought down to the warmer areas, wherein the grazing areas often overlap with cattle. There are reports of rangeland ecology deterioration in the alpine areas due to lack of proper management. There is high competition from wild life herbivores such as the blue sheep, takin, deer etc. adding to the pressure of grazing resources. Most of the Yak rearing areas fall under the Nature Conservation Parks but no support is provided to Yak and its rangeland development. Over the years, the government has been discussing the provision of support to the rangeland development and its management but nothing has been done except some data collection from a research perspective. Research on Yak production is coordinated by RNRC, Jakar.

The support to Yak development is limited to the supply of breeding bulls only, procured mostly from Haa Dzongkhag. This appears to be a haphazard arrangement as inbreeding could occur. Artificial insemination trials in Yaks did not receive

encouraging results due to reasons associated with grazing and rearing practices. The Yak population is about 34,928 as per RNR Statistics (2000).

iii) Pig Development

- *Overview:* Pig husbandry at the backyard level is not very expensive due to its ability to convert waste food and offal into meat. However, they are usually kept in small numbers and are mainly raised to meet the needs of the household and as a capital to meet unexpected monetary needs. Therefore, they are crucial to the household's food security, not only in supplying the meat requirement but also serving as a source of capital when the need arises. The pig breeding policy of 1985 recommended the use of exotic pig breeds like the Large White, Yorkshire, Duroc Jersey, Large Black and Saddleback, which should be propagated in pig priority areas. Exotic breeds have therefore been brought and bred in breeding farms at Serbithang and Lingmethang and the hybridized piglets produced are sold to farmers. The demand for pork is very high, much beyond the production capacity of the country. However, for the simple reason of our peoples' sentiment against killing, pig enterprises in Bhutan have not been very favourable. In spite of these, there has been a sharp and steady increase in demand of piglets by the farmers.

- *Current scenario*

Central Level: The National Pig Breeding Centre at Serbithang and the Regional Pig and Poultry Breeding Centre at Lingmithang are responsible for producing and distributing the hybridized piglets to the Dzongkhags for future distribution to farmers. These farms currently maintain breeds like the Danish Duroc Jersey, Danish Hampshire and Saddleback and some Large Black. The breeding of the Large White in the farms has been phased out due to their white colour, which is not favoured by farmers. Pure line breeding and the production of hybrids between these pure lines are the breeding strategies at the farms.

Dzongkhag Level: The piglets distributed from the pig breeding farms are in essence to be used for breeding at the farmers' level. Crossbreeding with the local pigs is actually supposed to have ensued at the farmers' level after the exotic piglets attained breedable age. However, this does not usually occur and the pigs are used for fattening. In order to encourage farmer's participation in the pig development programme a Contract Pig Production Programme (CPPP) is on trial basis in the Eastern Dzongkhags. The objective is that CPPP would breed the exotic pigs and serve as an avenue for piglet distribution to the local communities. The concept and technical backstopping of such programmes lies

with the breeding farms, while the implementation of the programmes lies with the Dzongkhags. The pig population as per RNR statistics (2000) is 41, 401.

iv) Poultry Development

- *Overview:* Poultry rearing is a common feature in the Bhutanese system where almost every rural household keep some poultry birds to meet their day-to-day egg requirement. The birds are generally reared on a scavenging system for which no major inputs are required. However, strengthening of the poultry production programme from subsistence to a more market oriented production is required, since experience worldwide indicates poultry production as being profitable. These interventions mainly benefit women folk, as they are traditionally responsible for managing the poultry farming.

The 1985 breeding policy recommended the use of exotic birds like White Leghorn and Rhode Island Red since the indigenous breed of poultry were very poor layers. It had also recommended the trial on broiler strains to meet the increasingly high demand of broiler meat in urban areas.

- *Current Scenario:*

Central level: The two poultry farms at Paro and Lingmithang import the day-old commercial parent chicks from India. These day-old chicks are reared and bred at the farm and subsequently distributed as pullets to the farmers, at around 8 weeks to 12 weeks of age (as desired by the farmers). Due to farmers' preference for coloured eggs, only the Rhode Island Red varieties are imported and the use of the White leghorn birds were gradually phased out. The units have also a mandate to encourage and support backyard poultry farms and to disseminate poultry farming technology to the farmers and to create awareness on profitable poultry farming. Research on poultry production is coordinated by RNRC, Jakar and is done in close collaboration with the two central poultry farms at Paro and Lingmithang.

Dzongkhag level: Backyard farmers normally keep birds ranging from 20 to 50, while the semi-commercial farms rear birds ranging from 50-250 numbers. Thrust is being made on encouraging the establishment of more and more poultry backyard farms in the country. Starting commercial poultry farms would have been the most profitable and impact oriented, however due to religious sentiments poultry production is currently kept on a small scale. The RNR statistics (2000) indicates the poultry population to be 230,723.

Source: Dept. of Agriculture and Livestock Support Services, July2002: 10-11.

2.2.4. Dairy farming

The Bhutanese dietary ingredients compose mainly of butter and cheese. For instance, butter tea (suja) and chilly cheese (ema datshi) are consumed by almost all the Bhutanese, regardless of income. Though milk is converted into cheese and butter in the rural areas, the consumption of milk has increased overtime in the urban centres.

From the late 1970s milk processing plants have been established at Phuentsholing under the Highland Livestock Development Project and the Milk Processing Unit at Batpalathang in Bumthang under the Helvetas assistance. However, resulting from operational difficulties, both the plants were privatised. In Deothang, the Dungsam milk Co-operative was also formed with government support.

There are still large opportunities of expanding the milk processing plants as the demand highly exceeds supply in Bhutan. For instance, in 1997 Bhutan imported 84 metric tonnes of liquid milk, 467 metric tonnes of milk powder, 4 metric tonnes of condensed milk, 171 metric tonnes of butter and 23 metric tonnes of cheese.

Student Activity

Visit a nearby village and interview a farmer on anyone of the following topics.

- Views on the support given by the government on livestock rearing.
- Impact of commercial crops on the living standard.

2.3. Energy Resources

2.3.1. Refer to *ISC Geography for class XII by D.R. Khullar* for Renewable and Non-renewable energy sources; conventional sources; Origin, type and occurrence of coal; petroleum; and Non-conventional sources like Solar, Nuclear, Geothermal and wind.)

2.3.2. Coal Mining in Bhutan

The Eastern Bhutan Coal Company is the major coal producer. It is located in Samdrup Jongkhar and has a production capacity of 350 metric tonnes per day.

2.3.3. Major Power Projects of Bhutan

Bhutan has rich water resources in the forms of snow, glaciers, lakes, stream and five main river systems across the country. The five main river systems of Bhutan are Amochu (Torsa), Wangchu (Raidak), Puna Tsangchu (Sankosh), Dangme Chu (Manas) and Bada Chu. The permanent flow of most of the rivers has made the generation of electricity feasible.

- *Hydro Projects of Bhutan*

Bhutan got its first electricity in 1966 when a diesel generator of 256 kw was installed in Phuentsholing. In 1967, a 360 kw hydropower plant was installed in Thimphu. In 1968 Samtse, Sarpang and Samdrup Jongkhar were electrified with the supply from Assam and West Bengal.

The hydro power cooperation between Bhutan and India started with the signing of Jaldhaka agreement in 1961. The Jaldhaka power station was commissioned in 1972.

Bhutan's total electricity output as of September 2004 stands at 445 MW. Chukha which was commissioned in 1988 generates 336 MW; Kurichu which was commissioned in 2002 generates 45 MW; Bosochu (Upper) commissioned in January, 2002 generates 24 MW; Basochu (lower) which was commissioned in March, 2005 generates 40 MW.

The Tala project which will generate 1020 MW will be commissioned in July 2006.

The total potential hydro electricity power is estimated at 30,000 MW. However, the safe and exploitable water resource potential is estimated at 16,000 MW. The current domestic consumption is only 105 MW.

- *Revenue*

Hydroelectricity is the single largest important source of revenue for Bhutan. In 2003 to 2004 the GDP of Bhutan grew by 6.8%. In the same period, the power sector grew by 9.5% and its share to GDP increased to 12%. The total electricity export to India increased to Nu. 2.6 billion in 2004. The revenue will further increase with the rise of export traffic from Nu. 1.5 to Nu. 2.00. The CHPC alone has been earning more than 40% of the national revenue of Bhutan.

Bhutan would be exporting about 6,400 mega units of power annually by 2006 and the annual revenue from power and other sources could reach about Nu 15 billion.

- *New projects*

- i) Mangde chu Hydroelectric Project:

Memorandum of Understanding signed with Norway in August 1997 in which Norway committed Nu. 95.5 million for the technical, environmental and economic feasibility study of the project.

Feasibility study under Norwegian funding was completed and the power project of 360 MW capacity across Mangde chu was found feasible.

The construction is scheduled at the end of the ninth and beginning of the tenth five-year plan.

- ii) The Upper Sankosh Project (Kamichu)

The project has the potentiality of hydroelectricity generation capacity of 800 MW. With funding from the Government of India, the feasibility study is on the verge of completion.

- iii) Daga chu Project

This project has the generation capacity 150 MW.

iv) The Sankosh Multi Purpose project

The Sankosh Multi Purpose project could be the single largest hydroelectricity project. Its installed capacity is estimated at 4,060 MW. The cost is estimated at Nu 77.93 billion. The project is expected to take about 10 years to complete.

- *Market*

On September 18, 2003, His Majesty the Druk Gyelpo Jigme Singye Wangchuck addressed the Indian media in New Delhi and said, “Water is to us what oil is to the Arabs.” This is true as hydro power projects is already the biggest revenue generating sector of Bhutan. With neighbours like India where electricity shortage is at 30,000 MW of power, the export of hydroelectricity has big market.



Fig. 2.1. Harnessing water resource: A hydro power sub-station.

Student Activity

1. Discuss the advantages and disadvantages of hydro power over other forms of energy sources.
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2.4. Industrial Resources

2.4.1. Major Industrial Regions

Bhutan has launched itself on the path of development but guided by the Philosophy of Gross National Happiness. This Philosophy ensures that the development process does not lead to environmental, cultural and spiritual degradation. Thus, all industries established are carefully studied to protect especially the environment.

The manufacturing industries exist in all the Dzongkhags of the country except Gasa and Dagana. However, the major manufacturing industries are concentrated mainly in the Dzongkhags of Chukka, Samtse, Samdrupjongkhar, Pemagatsel, Sarpang (Gelephu) and Thimphu.

2.4.2. Industrial Development in the Five Year Plans

Although a few manufacturing industries like distillery, fruit products, saw mills, and Penden Cement existed in the 1960s and 1970s, it was only from the early 1980s that more attention has been given to industrial development, which led to the establishment of many manufacturing industries in the country. In its initial stage, almost all the industries were set up by the Government and later on joint collaboration with the private sector. It is only in those cases where there are no private sectors that the Government will involve itself in establishing industries.

2.4.3. Factors affecting localization of Industries.

The factors that affect the localization of industries are:

- Labour availability
- Market accessibility
- Transport facility
- Raw material (availability, source, etc.)
- Power availability
- Water availability
- Land availability

(Refer to *ISC Geography* by D.R Khullar on page 346.)

MAJOR INDUSTRIAL REGION

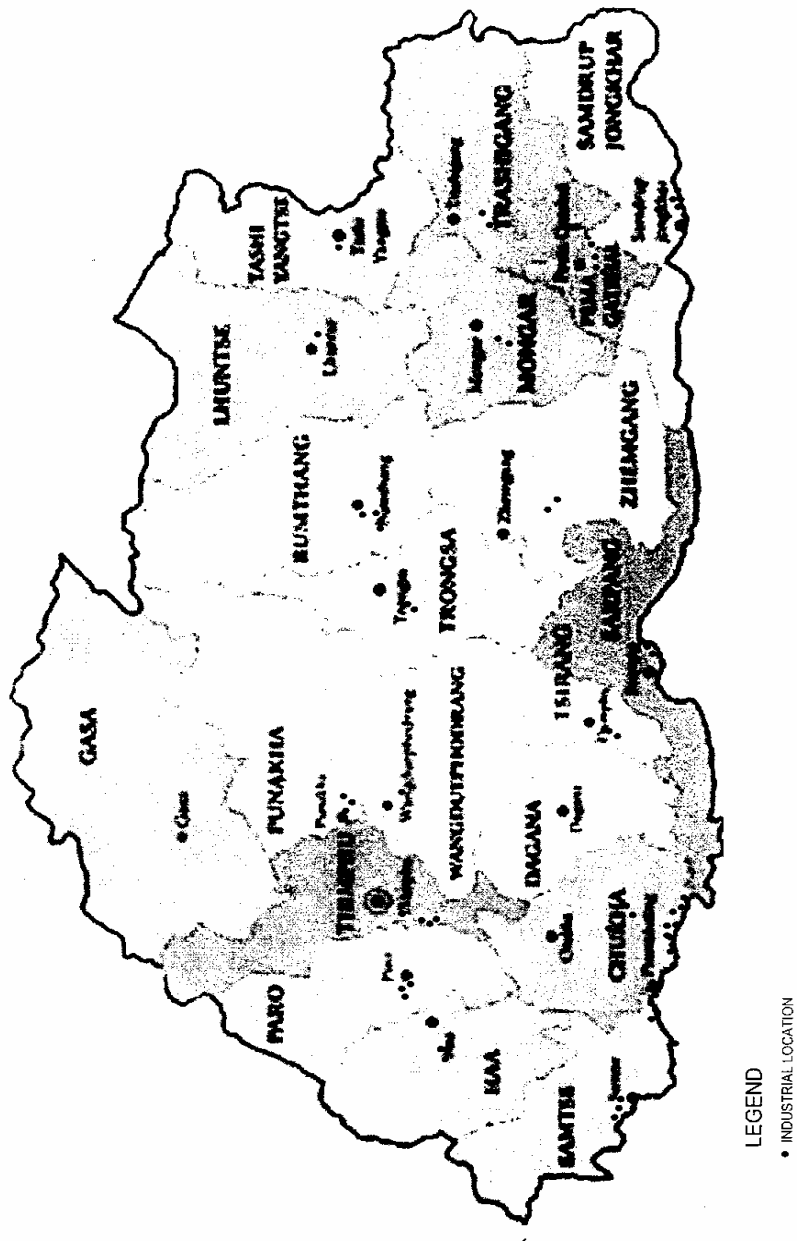


Fig 2.2. Major Industrial Regions (Source: Survey of Bhutan based on the sample provided by the Ministry of Trade and Industry)

Existing Industrial Estates

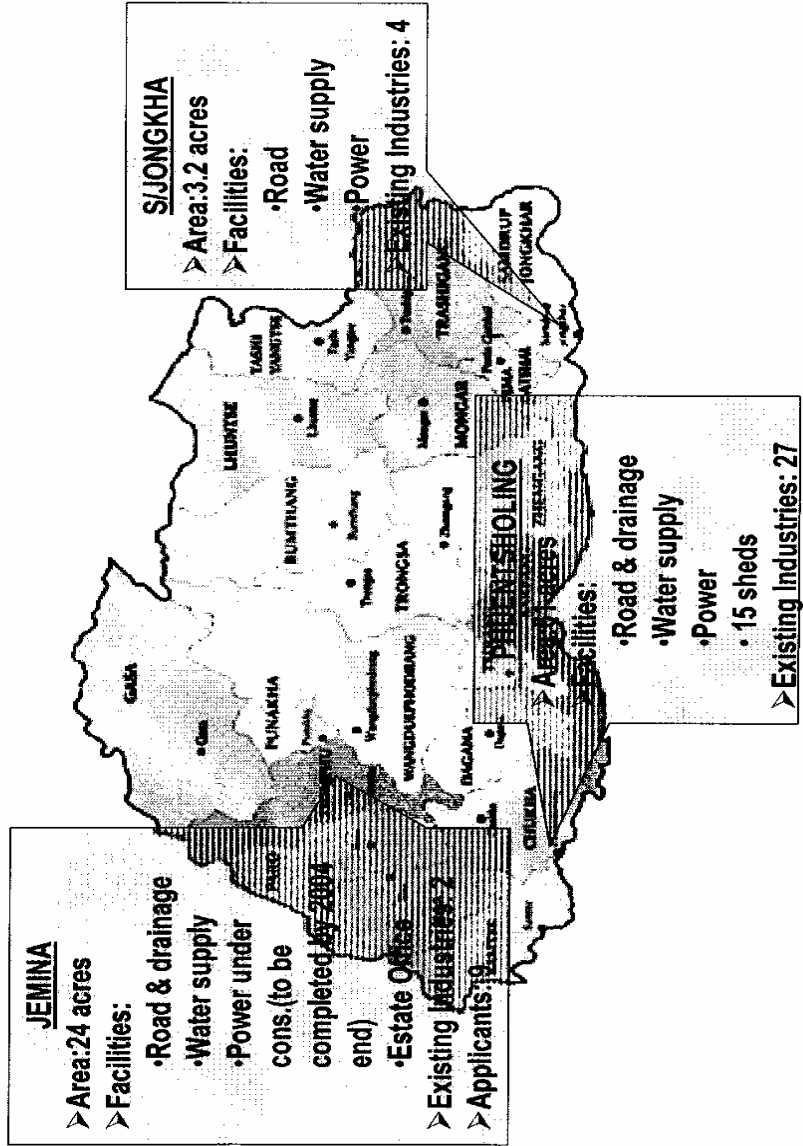


Fig. 2.3. Existing Industrial Estates (Source: Survey of Bhutan based on the sample provided by the Ministry of Trade and Industry)

Proposed Industrial Estates

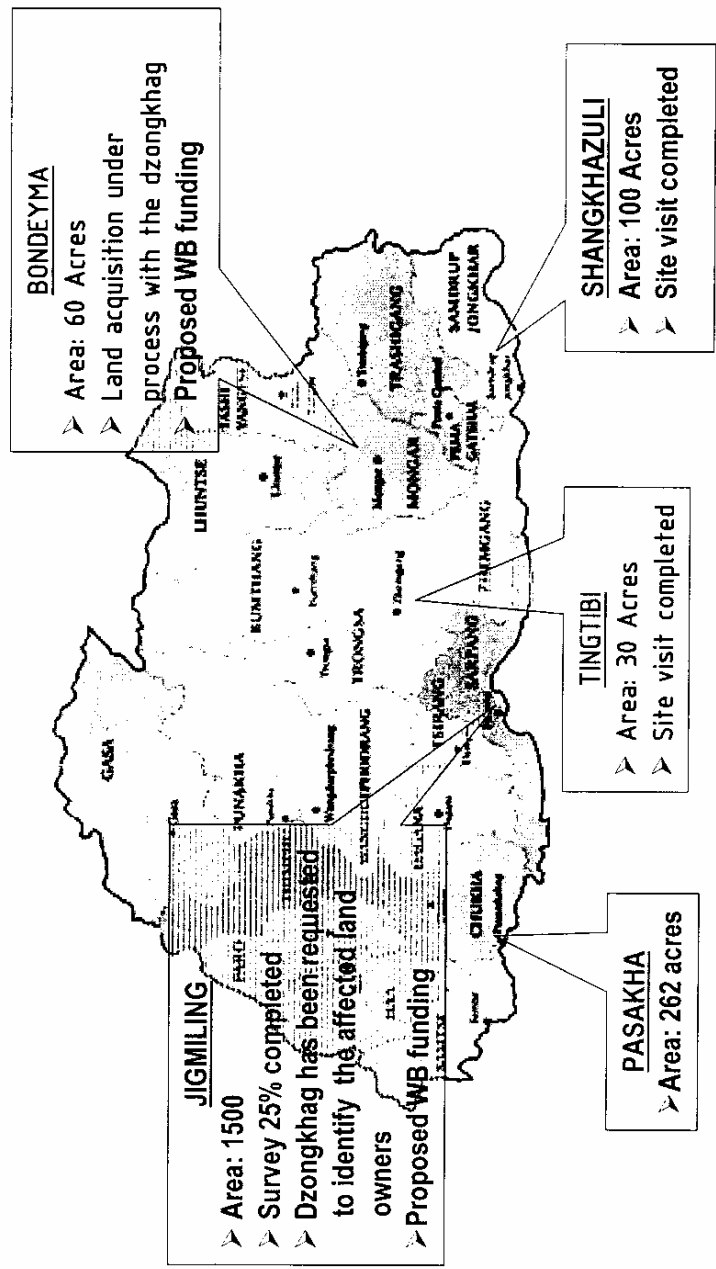


Fig. 2.4. Proposed Industrial Estates (Source: Survey of Bhutan based on the sample provided by the Ministry of Trade and Industry)

2.4.4. Major Agro-based Industries

The Agro-based industries mainly depend on the resources and raw materials that are produced in the agricultural sectors. The table below provides an overview of the agro-based industries, concerning their location and production capacity.

Table 2.7. Major Agro-based industries

Name of Industry	Location	Major Activity	Production capacity
Bhutan Agro Industries	Wangchuk Taba, Thimphu	Fruit processing & vegetable products and MS water	2,200,000 units per year
Bhutan Fruit Products Pvt. Ltd.	Samtse	Fruit processing & vegetable products	1000 MT per year
Army Welfare Project (AWP)*	HO at P/Ling	Liquor	2500 cases per day per shift
Bhutan Dairy	P/Ling	Milk processing	700 L per hour

* AWP factories are located at Samtse, Gelephu and S/Jongkhar.

2.4.5. Major Forest-based Industries

These industries mainly depend on raw materials from the forest. The table below provides an overview of the location and the production capacity of the major forest based industries.

2.8. Major Forest-based Industries

Name of Industry	Location	Major Activity	Production capacity
Bhutan Board products ltd.	Dala, Chuka	Particle Board & RTA furniture	24,000 cubic metre per year
Wood Craft Centre	Langjophakha, Thimphu		Nu.15 million per year

2.4.6 Mineral-based Industries

Most of the mineral-based industries in Bhutan are related to cement. For instance, there are currently 4 cement industries, all of which are located in the Southern parts of Bhutan. The two tables below will provide details of the mineral-based industries in Bhutan.

Table 2.9. Cement Industries (Mineral based)**

Name of Industry	Location	Major Activity	Production capacity
1.Penden Cement Authority Ltd.	Gomtu, Samtse	Cement	1.200 MT per day
2. Lhaki Cement	Gomtu, Samtse	Cement	300 MT per day
3.Yangzom Cement Industry Pvt. Ltd.	Tashijong, Samtse	Cement	100 MT per day
4.Druk Cement Pvt. Ltd.	Pasakha, P/Ling	Cement	150 MT per day

**One more cement plant is being proposed to be established at Nganglam

2.10. Other Major Mineral based Industries

Name of industry	Location	Major Activity	Production Capacity
Druk Satair Corp. Ltd.	Pemagatsel	Gypsum Mining	400 MT per day
Eastern Bhutan Coal Company	Samdrup Jongkhar	Coal Mining	350 MT per day
Bhutan Carbide & Chaemicals Ltd.	Pasakha/Ling	Calcium carbide	22,000 MT per day
4.Bhutan ferro Alloys Ltd.	Pasakha, P/Ling	Ferro silicon	18,000 MT per day
Bhutan Chemicals& Inustries Pvt. Ltd.	Samdrup Jongkhar	Plaster of Paris	30 MT per day
Druk Plaster& Chemicals Ltd.	Pemagatsel	Plaster of Paris	30 MT per day
Bhutan Gypsum Products	Pemagatsel	Plaster of Paris	40 MT per day
Barma Chemical Industry	Pemagatsel	Plaster of Paris	17 MT per day

Student Activity

1. Visit a nearby industry and interview a person(s) working there on:
 - Advantages and disadvantages of working in the industry.
 - Marketing strategies.
2. Development of Industries will ensure the achievement of Gross National Happiness. Divide the class into groups and debate for or against the statement. Present the arguments of the group to the class.
3. Interview any person(s) working in the Ministry of Trade and Industry on the Traditional paper Industry of Bhutan. If there is one nearby, make a visit. The interview or the field visit can focus on: location of the industry, source of raw materials, production capacity and marketing.

2.5. Tertiary Industries

2.5.1. Tourism

We will discuss a brief history of tourism development in Bhutan, tourist pattern, Natural and cultural centres, employment opportunities in tourism, and impact of tourism on environment.

i) A brief history

Tourism started in Bhutan in 1974, following the Royal Coronation, with the Royal Government initially permitting tours to the western part of the country. A policy of “high value, low volume” has characterized Bhutan’s tourism industry since its inception. The first group was American brought by the pioneer adventure operator Lars Eric Lindblad of Lindblad Travel New York who, with Dasho Tsetan Dorji the country’s first Director of Tourism, set Bhutan on a successful path of exclusive high-yield tourism.

As a Royal Government enterprise, the Bhutan Tourism Corporation (BTC) undertook all tourism operations from 1974 until October 1991 when the industry was privatized. Thirty-three private tour operators were licensed, many of whom were former BTC employees. The BTC itself was privatized to become a public company, the Bhutan Tourism Corporation Ltd.

After the privatization process, a regulatory body, the Tourism Authority of Bhutan (TAB) under the Ministry of Trade and Industry was established to guide, monitor and regulate the tourism industry. In 2000, the TAB was evolved into the current Department of Tourism (DoT) during a general RGoB restructuring.

The Association of Bhutanese Tour Operators (ABTO) was formed in January 2000, to represent the strengthening of private sector. Membership by all registered tour operators is currently obligatory. ABTO’s mandate includes using part of the Tourism Development Fund (TDF) as approved by the Tourism Development Committee (TDC) for tourism development activities in Bhutan..

ii) Growth of Tourism

Because of the controlled nature of tourism in Bhutan, visitor statistics is amongst the most accurate in Asia. They are regularly analysed by the DoT, which processes all tourist visas. The Ministry of Foreign Affairs (MFA) keeps detailed records of other foreign guests.

Table: 2.11. Tourist arrivals by Nationality from 1995-2000

Country of Origin	1995	1996	1997	1998	1999	2000	Increase over 1999
USA	865	963	910	1,471	2,122	2,754	30%
Japan	1,192	1,211	1,173	1,032	1,102	875	-20%
Germany	500	722	533	520	574	662	15%
U.K.	418	358	642	686	646	595	-9%
France	338	331	229	366	236	399	69%
Netherlands	100	131	234	370	362	359	-1%
Canada	55	57	89	82	149	194	30%
Australia	142	71	121	64	131	179	37%
Italy	202	242	186	218	276	156	-43%
Taiwan		32	83	135	179	157	-1%
Spain	22	49	33	109	118	141	20%
Switzerland	220	161	186	170	296	137	-54%
Austria	200	156	156	270	197	131	-34%
Belgium	79	77	75	95	107	95	-11%
Thailand	57	181	140	19	71	92	30%
Israel				81	80	68	-15%
Finland	8	15	21		5	60	1100%
Nepal		15	32	23	23	50	120%
Sweden	45	7	18	58	37	48	30%
Mexico					49	37	-25%
Turkey					49	34	-31%
Singapore		45	78	77	26	31	19%
New Zealand				28	22	31	41%
Others	322	314	424	329	301	274	-9%
TOTAL ARRIVALS	4,765	5,138	5,363	6,203	7,158	7,559	5.60%

Source: Department of Tourism: RGOB.

iii) Tourists visiting Bhutan

Recognizing that people travel with different reasons, tourism products and services can be developed to match products to markets, specifically to attract the “high value, low impact” markets most suitable for Bhutan’s requirements. Current and future international visitors to Bhutan are segmented and analyzed as follows:

- *Western General Interest Tourists:* Currently the most valuable segment with the greatest future potential for Bhutan is the Western general interest markets with their long stay patterns and strong interest in nature and culture. Estimated at 4,500 to 5,000 visitors annually, North America has reported 30 percent growth in 2000 over 1999, France 69 percent, Spain 20 percent and Germany 15 percent. Many of these visitors will be paying considerably more than the US\$200 per person per day rate.
- *Asian General Interest Tourists:* Almost entirely Japanese, the Asian general interest markets are estimated at between 1,000 and 1,500 visitors annually. Currently visiting Bhutan in larger-sized groups than Westerners, they are reported to have a considerably shorter length of stay.
- *Trekkers – All Nationalities:* Trekkers are reported to be currently mainly Westerners. Trekking offers excellent ecotourism opportunities by involving local people and requires minimal infrastructure.
- *Special Interest Groups – All Nationalities:* Currently a few special interest groups visit Bhutan, attracted by its uniquely strong culture, architectural styles, pristine environment, rich flora and fauna, and outstanding handicrafts. Numbers are hard to estimate but industry sources indicate special interest activities could be attracting 1,000 visitors annually.
- *Indian Groups – Families and Individuals:* No data exists for Indian leisure visitors. Other than business visitors, Indian leisure travel is currently focused on budget guesthouses, often making their own arrangements.

iv) Culture and Natural Centres of Bhutan

There are many cultural and natural centres in Bhutan for tourist visits. Some of the popular centres are:



Fig. 2.5. *Druk Wangyel Choeten at Dochula*

- *Tango Gompa (Thimphu)*: This monastery was founded by Lama Gyalwa Lhanangpa in the 12th century. The present building was erected in the 15th century by the ‘Divine Madman’, Lama Drukpa Kuenley. In 1616, Zhabdrung Ngawang Namgyal visited Tango and meditated in a cave near the monastery. The picturesque three-storied tower and several surrounding buildings were built in the 18th century by the eighth temporal ruler of Bhutan, Druk Rabgye.
- *Cheri Gompa (Thimphu)*: This monastery was built by Zhabdrung Ngawang Namgyal in 1620. A silver chorten inside the monastery holds the ashes of the Zhabdrung’s father.
- *Phajoding Monastery (Thimphu)*: The complex is situated high on the hills overlooking Thimphu valley. It was founded by Phajo Drugom Shigpo who introduced the Drukpa Kagyupa school of Buddhism in Bhutan in the 13th century. Phajoding was in former times one of the richest monasteries in the country.

- *Kila Gompa (Paro)*: This gompa, nestled in a craggy patch on the mountainside below the Chele-la pass, is surrounded by numerous huts, perched precariously along the rock face. Kila Gompa is the serene home for about 32 nuns (Buddhist nuns) who lead an undisturbed life of religious studies, prayer and meditation.
- *Taktshang Monastery (Paro)*: This most famous of Bhutan's monasteries is perched on the side of a cliff 900m above the Paro valley floor. It is said the Guru Rinpoche arrived here on the back of a tigress, and meditated at this place, hence the monastery is also called 'Tiger's Nest.' In April 1998, a fire severely damaged the main structure of the building. Restoration work has now been completed.
- *Talo (Punakha)*: The picturesque village of Talo is scattered along a ridge above the Punakha Valley at an altitude of around 2,800m. Talo Sangngacholing is built on a small plateau at the top of the village, and from there one can have a majestic view of the entire valley and surrounding villages and the high hills beyond Wangdue Phodrang, which mark the gateway to central Bhutan.
- *Kuenga Rabten (Trongsa)*: The 23 km. drive from Trongsa to Kuenga Rabten takes about an hour and passes through open countryside high above a river gorge. It was the winter palace of the second King and is now looked after by the National Commission for Cultural Affairs.
- *Thangbi Gompa (Bumthang)*: A walk of about 30 minutes north of Kurje Lhakhang leads one to this monastery, situated in the middle of a wide fertile plateau overlooking the river. Founded in 1470 by Shamar Rinpoche of the Karma Kagyupa religious school, the building comprises two remarkable paintings of Guru Rinpoche's heaven, and the Buddha Amitabha's heaven.
- *Ngang Lhakhang (Bumthang)*: This temple is a few hours' walk from Thangbi Gompa, situated about 100m above the valley floor in the small region of Ngang Yule (Swan Land). The site was once visited by Guru Rinpoche. A three-day festival is held here each winter, with masked dances, in honor of the founder of the temple. The other places of interest are Kurje, Jampa Lhakhang, Mebar Tsho, etc.

v) *Festival Dates and locations*

Festivals are annual features of Bhutanese lunar calendar. Each district has an annual festival. The dates of the annually held festivals vary from year to year, as they are set by the Bhutanese lunar calendar. Some of the important festivals and their dates are given below.

Table 2.12. *Festival Dates and places*

Time of the Year	Place	Festival
Feb. to March:	Punakha	Punakha Dromchoe & Serda (5 days)
	Tashiyangtse	Chorten Kora (2 days, 2 weeks apart)
March to April	Tashigang	Gom Kora (3 days)
	Chhukha	Chhukha Tshechu (3 days)
	Paro	Paro Tshechu (5 days)
April to May:	Bumthang	Ura Yagchoe (6 days)
June to July:	Bumthang	Nimalung Tshechu (3 days)
	Bumthang	Kurje Tshechu (1 day)
Sep. to Oct.:	W/Phodrang	Wangdue Tshechu (3 days)
	Thimphu	Thimphu Drupchen (7 days)
		Thimphu Tshechu (3 days)
	Bumthang	Tamshing Phala Choepa (3 days)
Tangbi Mani Cham (3 days)		
Oct. to Nov.:	Bumthang	Jamba Lhakhang Drub (5 days)
		Prakar Tshechu (4 days)
Nov. to Dec.:	Mongar	Mongar Tshechu (4 days)
	Pemagatsel	Pemagatsel Tshechu (4 days)
	Tashigang	Tashigang Tshechu (4 days)
	Bumthang	Nalakhar Tshechu (3 days)
Dec. to Jan.:	Tongsa	Tongsa Tshechu (3 days)
	Lhuentse	Lhuentse Tshechu (3 days)

Source: DoT, RGoB

vi) Trekking Routes

Some of the most popular trekking routes are:

- *Gangtey/Gogona Trek:* It is a three-day trek. The trek is to the beautiful Phobjikha valley (3,000m), one of the few glacial valleys in Bhutan, which lies in the mountains east of Wangdue Phodrang. This moderate trek visits the villages of Gogona and Khotokha, passing through meadows and fields, then forests of juniper, magnolia and rhododendrons in full bloom in April. It is one of the finest low level treks in Bhutan.
- *Druk Path Trek:* This is a short five-day trek, which leads from Paro to Thimphu or vice versa, crossing the chain of mountains that separates the two valleys. Although the route is sparsely inhabited, there are wonderful lakes teeming with fish and the area is famous for its spectacular rhododendron forests, which bloom in May.
- *Bumthang Cultural Trek:* It is a four-day trek. The lovely Bumthang valley is the religious heartland of the nation and home to some of its oldest Buddhist temples and monasteries. This three-day trek passes through several villages on its meandering route through Bumthang countryside, and provides an exceptional opportunity for a contact with Bhutanese rural life.
- *Dagala Thousand Lakes Trek:* It is a six-day trek. This is a short trek near Thimphu, passing by picturesque high altitude lakes. It is a moderate trek with mostly short trekking days, but includes a few steep climbs.
- *Nine days Jomolhari Trek:* Starting at Drukgyel Dzong, Paro, this trek passes through scattered hamlets and farmland into a deep and richly forested valley, which leads to a high alpine pastureland where yak herders graze their animals. The trek offers a taste of the great variety of Bhutanese landscape.
- *Nine days Laya Trek:* This route offers a great variety of trekking conditions, from picturesque farmland and forests to alpine pasture land and high passes. Spectacular campsites, beneath some of Bhutan's most impressive peaks, of which the most notable are Chomolhari and Jichu Drake, are also features of this trekking route.
- *Snowman Trek:* The trek is considered as the most challenging in Bhutan. It starts from Trashithang in Punakha and passes via Gasa, Laya, Gangkar Phuensum base camp and reaches Bumthang. It is a twenty-one day treks.

vii) Employment opportunities in Tourism

International Tourism can generate substantial economic benefits to the country in terms of employment, income, foreign exchange earnings and government revenue. Tourism acts as a catalyst for the expansion of other economic sectors, and to spread the benefits of tourism widely throughout the country and society.

Tourism is a highly labour intensive, relatively low skill industry, which has huge potential for the generation of employment. Although no reliable data are available to substantiate the argument, the international trends show that on an average, 3.5 additional tourists result in one additional direct job in tourist industry and 1.25 indirect job related industries. The tourism industry is the highest foreign exchange earner for Bhutan and one of the largest employers after the civil service. In 2004, more than 9000 tourists visited the country, which generated a gross revenue of US \$ 12.45 million.

Given the low volume of tourist flow and the huge potential for tourist industry, tourism could be a major generator of employment in the twenty first century.

viii) Impact of tourism on social and natural environment.

The unplanned and unrestricted growth of tourism has detrimental effects on the environment. The origin and the growth of tourism in Bhutan as in the case of other countries are distinctly urban in character rather than spread across the country. This is because of the availability of wide range of facilities and infrastructure well developed in the urban centres. The lack of holistic approach often fails to bridge the gap between environment and the pressure of tourists. Consequently, almost all popular tourist centres are under the pressure of annual visitors and thus often facing difficult situation. The unplanned and unchecked growth of tourist centres deprives them of their original charm and ultimately can prove disastrous. This is happening in many parts of the world and Bhutan need not be an exception.

Already, there are signs of desecration of religious shrines and images by tourists. Tourists also knowingly or unknowingly may take photographs or smoke in the area held sacred by the locals. Tourism may bring short term economic gains for a local area but sometimes the local economy becomes too dependent on the tourist industry and it might prove dangerous.

Major epidemics, political instability and natural calamities can bring adverse effects on the tourist industry. So, when the tourist industry fails, the local economy

collapses as in the case of Ladhak and Nepal etc. Erosion of cultural values, loss of antiques are some other side effects of tourism.

Therefore, the emphasis should be on threshold development, keeping in view the carrying capacity of the given environment.

2.5.2. Banking

The Central Bank or the Royal Monetary Authority of Bhutan (RMA), two Commercial Banks, the Bank of Bhutan (BOB) and the Bhutan National Bank (BNB), two Non-Bank Financial Institutions, the Royal Insurance Corporation of Bhutan Limited (RICBL) and the Bhutan Development Finance Corporation (BDFC), and two Other Financial Institutions, the National Pension and Provident Fund (NPPF) and the Royal Securities Exchange of Bhutan Limited (RSEBL) are the financial institutions of Bhutan.

i) The Royal Monetary Authority of Bhutan (RMA)

The RMA whose office is located at Thimphu is the Central Bank of Bhutan. Its basic functions are:

- Achievement and Maintenance of Price Stability in the Medium and Longer Term;
- The Bank of Issue; The Bankers' Bank; The Government's Bank;
- The Advisor to the Government;
- The Guardian of the Country's Reserves;
- Supervision of Banks and Financial Institutions; and
- Promotion of Financial Sector Development.

ii) Commercial Banks

Banking Institutions in Bhutan include two commercial banks viz., The Bank of Bhutan Limited (BOBL) and The Bhutan National Bank Limited (BNBL).

- *Bank of Bhutan Limited (BOBL)*

The Bank of Bhutan Limited is the oldest financial institution in Bhutan. It was established in 1968 under the Royal Charter with the paid-up capital of Nu. 100 million and reserves of Nu.351.29 million (Dec. 1999).

The Royal Government of Bhutan is the biggest shareholder with about 80 per cent of the shares, while The State Bank of India (SBI) holds about 20 per cent of the shares. The total assets stood at Nu.12, 351.433 million in December 2003.

As of December 2003, it operated with 26 branches. In 2003, the bank sanctioned loans amounting to Nu. 1047.404 million of which major financing (67 per cent) went to trade, commerce, and the manufacturing and industrial sectors.

- *Bhutan National Bank Limited (BNBL)*

The Unit Trust of Bhutan (UTB), which was established in 1980 with assistance from the Asian Development Bank (ADB) was renamed Bhutan National Bank Limited (BNBL) in 1997. As of December 2004, there are four branches located in Thimphu, Phuentsholing, Paro and Mongar and three extension offices located in Gelephu, Samdrup Jongkhar and Trashigang. The bank has a proposal to establish full fledged branches in Bumthang and Gelephu in the near future.

The total assets of BNBL stood at Nu. 5559.307 million as of December 2003. The general public is the largest shareholder, holding about 28.6 percent of the shares while Royal Government of Bhutan(RGOB) the second largest shareholder holds 27.2 percent of the shares. Asian Development Bank (ADB), Citibank (USA) and RICB hold 20.1 percent, 19.9 percent and 4.2 percent respectively. The BNBL's major share of loans and advances went to other large industries than small business industries like any other financial institutions. (*Source: Bhutan National Bank, Annual Report, 2003*)

iii) Non-Bank Financial Institutions

Unlike the banking institutions, the Non-Bank Financial Institutions do not accept deposits from the public. However, they grant medium and long term loans against collaterals or securities to individuals and business houses.

- *The Royal Insurance Corporation of Bhutan Limited (RICBL)*

The Royal Insurance Corporation of Bhutan Limited is the only Insurance Company and the second largest Financial Institution in the Kingdom. The Royal Government established RICB on 7th January 1975, under the Royal Charter of the Third King, His Majesty Jigme Dorji Wangchuck with HRH Ashi Sonam Choden Wangchuck as the founding Chairperson. It was established primarily to meet the insurance needs of Bhutanese citizens as well as to actively participate in the economic development of the nation.

The Corporation's authorized capital was Nu.50 million and the total assets stood at Nu. 2453 million, as of December 1999.

The major share is held by the Royal Government of Bhutan (RGOB) but has been divested to the private sector. The RICBL serves with nine branch offices, one regional office and one head office providing various types of insurance services in the country. In addition, RICBL also provides different types of lending. The Credit and Investment Division of the RICBL provides small loans to small business in industries and services. However, its major part of the advances/loans goes to huge industries requiring high investments. The Corporation provided various types of loans amounting to Nu. 1211.644 million as of December 2003.

- *Bhutan Development Finance Corporation Limited (BDFCL)*

The Bhutan Development Finance Corporation was established on 31st January, 1988 under the Royal Charter of His Majesty Jigme Singye Wangchuck as a development financial institution in Bhutan to promote and accelerate the industrial and agricultural developmental activities in the country.

The organization is divided into two Lending Sectors. In the Industrial Lending sector, the main aim of the institution is to act as a catalyst in the rapid industrialization process of the country, especially in the private sector. In the agricultural sector, its principal goal is to assist the small farmers to increase production and thus their incomes, thereby, improving their standard of living. The increase in production of food on a nation-wide basis will assist Bhutan become self sufficient, thus fulfilling one of the major aims of the government. One of the organization's specific roles is to meet the needs of the poor rural farmers and the small-scale entrepreneurs. Its incorporation was assisted by the Asian Development Bank (ADB).

As of December 2003, its total assets stood at Nu. 1242.09 million. The Royal Government and the financial institutions are the shareholders of the BDFCL. The BDFCL serves with 21 offices, one in each Dzongkhag. The Head Office of the BDFCL is in Thimphu with a Liaison Office in Phuentsholing.

iv) Other Financial Institutions

There are two institutions, viz. National Pension and Provident Fund (NPPF) and the Royal Securities Exchange of Bhutan (RSEB).

- *National Pension and Provident Fund (NPPF)*

The retirement security is an integral part of social development. However, until June 2002, the gratuity (established in 1962) and the Government Employees Provident Fund (GEPF established in 1976) were the only two *formal retirement schemes* instituted for the public sector employees- civil service, government owned corporations and the Armed Forces. The retirement benefits from these two schemes though *limited to lump-sum* played a vital role in shaping old age security in Bhutan. But a greater demand for retirement security was felt in the process of economic development and social disintegration because lump-sum provision from the two formal schemes:

- attributed to a minimal benefit;
- supply short-term income; and
- failed to guarantee a life-long income during old age.

The National Pension and Provident Fund (NPPF) is an autonomous entity, established in March 2000 to manage and administer the National Pension and Provident Fund Plan (NPPFP). As a result, on July 1, 2002 the Royal Government introduced the National Pension and Provident Fund Plan, replacing the Government Employees Provident Fund to provide more predictable and adequate income for old age consumptions. The National Pension and Provident Fund is operating under the direction and supervision of the Board of Directors called the “National Pension Board (NPB)” consisting of members from various stakeholders.

The basic purpose of the existing plan is to assure and promote a meaningful protection against the hazard of old age, disability and death of a member, resulting in the loss of income or financial burden. The current retirement plan envisages covering the entire salaried workforce in the country including private sectors. However, at present, the statute covers civil servants, employees of government owned corporations, financial institutions, joint sector companies and the Armed Forces, constituting about 5 percent of the population and 7 percent of the labour forces.

Currently, all civil servants contribute 8% of the monthly basic salary, while most of the employees of corporate and financial institutions contribute 10 per cent of the monthly basic salary, making a total of 16 and 20 percent contributions respectively.

- *Royal Securities Exchange of Bhutan Limited (RSEBL)*

The Royal Securities of Exchange of Bhutan Limited (RSEBL) was established in August 1993 under the technical assistance of the Asian Development Bank (ADB) and the Royal Government of Bhutan (RGOB), as a non-profit organization. Initially, there were only four companies listed on the Exchange with a total market capitalization of Nu. 393 million.

RSEBL, on the other hand, ensures that there is an organized and regulated place for market. It supervises and regulates the activities of the member firms (brokers) through regular inspections.

RSEBL has mainly two functions. The first function is to help the companies raise the capital by making their securities available for sale in the market, thereby increasing their financial capacity, which would ultimately lead to their growth and expansion. This service rendered by the RSEBL would especially benefit new companies. But to avail such services, the companies need to be listed with the RSEBL. The second function of the RSEBL includes trading of securities of the listed companies.

The members of RSEBL are called brokers, who are permitted to trade securities in the market. The brokers can be defined as the agents who buy and sell securities on a stock exchange on behalf of its clients for certain amount of commission.

2.6. Human Resources

Human Resource forms an integral part of development. In order to have an effective and compact civil service, it is extremely essential to have a small, productive, multi-skilled and competent workforce. It is clearly implied that civil service is an important tool for bringing about a change, provided major employment opportunities are created outside the civil service through suitable policy interventions.

It was observed that in order to streamline the focus and bring government closer to the people, bifurcating and re-organizing of ministries and government agencies was the first step to be talked about. In this connection, it was brought to light that the human resource development had to be responsive to changes in government policies through emphasis on training and re-training of personnel wherever required.

In order to develop appropriate skills at the national and sector levels, a systematic human resource developmental plans and procedures are some things that will have to be looked at seriously. This would further enhance promotion of efficiency, transparency, accountability and professionalism. The extract below provides the plans for human resource development and its importance.

In line with the priorities of the 9th Five Year Plan, appropriate human resource development interventions will be necessary to upgrade the capacities in the social service and infrastructure development sectors. Shortage of teachers and professional health workers continues to be one of the major constraints as the demand increases. Therefore recruitment and training of additional teaching and health professionals, upgrading the capacities of the existing personnel and retaining them through proper incentives will be important strategies to meet the shortage of skilled manpower in the social service sector.

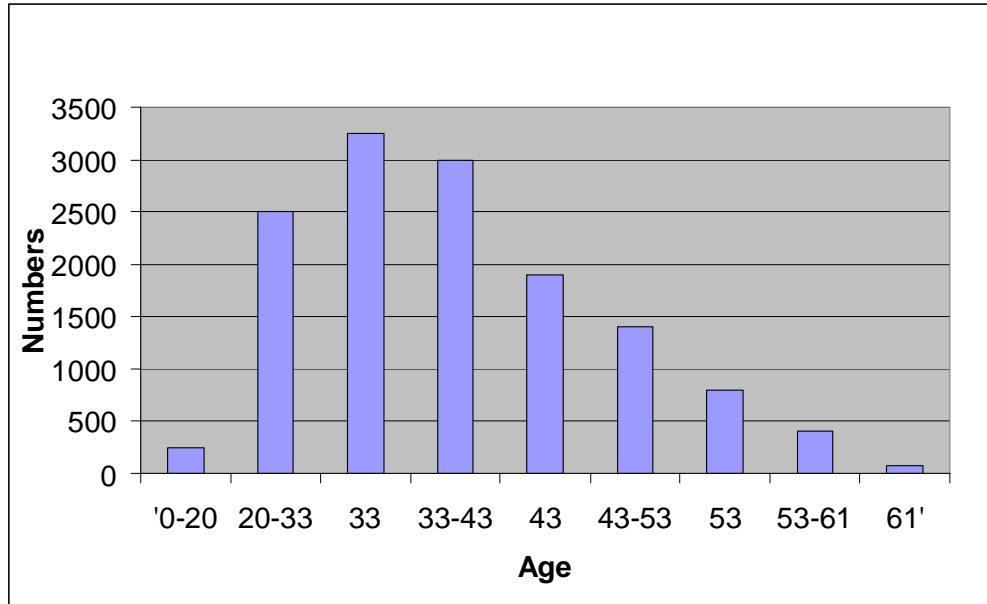
The education sector is the foundation of national human resource development. In the infrastructure sector, the human resource development should mainly focus on developing core group of professionals in the areas of urban planning, communication, architecture, engineering, hydro engineering, industrial development, and other priority areas. This becomes necessary in the absence of adequate number of trained professionals and to enhance the quality of infrastructure works in the kingdom.

The fruits of the consistent priority accorded on human resource development by the Royal Government are now visible with thousands of students graduating from various levels of the education system. Despite this phenomenal progress made in human resource development, the development efforts in the country continue to be constrained by shortage of qualified and skilled human resources. At the same time, unemployment particularly amongst the literate workforce poses a new challenge. There is a critical need to enhance the knowledge and skills of the growing workforce to meet the demands of the unemployment market and to create gainful employment in the non civil service sector." (Source: *Civil service Human Resource Development Master Plan: 2002-2007.*)

- *Human Resource Characteristics in the Civil Service*

The entire civil service in Bhutan comprises of 14, 258 personnel in BCSR Grades 1-17(Feb.2002). Of these, 5% comprises of expatriate workforce and 66.3% of the total workforce is below the age of 33.

Graph 2.1. Number of Civil Servants by age



(Source: Civil service Human Resource Development Master Plan: 2002-2007.)

The table below reveals that only 12% of the total civil servants have acquired their bachelor's degree and higher academic qualification. The rest are either Diploma or certificate holders. This does not t however account for the job-oriented skill up-gradation trainings undertaken.

Table 2.13. Civil Servants by qualification. (as of 2001)

Qualification	Percentage
Certificate	66%
Ph. D	0%
Diploma	9%
PG Diploma	1%
Bachelor Degree	11%
Master Degree	1%
Others	12%

(Source: Civil service Human Resource Development Master Plan: 2002-2007)

The largest employers are, as expected, the education sector followed by, agriculture, health, home affairs, trade and industry and communication. Similarly, the greatest number of expatriate workers are in the field of education and health. According to *Civil service Human Resource Development Master Plan (2002-2007)*, there has been a significant change in the employment pattern. It was observed that during the plan period, the number of expatriates has reduced substantially and the number of national civil servants have increased.

- *Implications on human Resource Development*

Review on the characteristics of existing civil servants identifies a number of issues that need to be addressed. These are briefly discussed below:

- A large majority of civil servants are below class XII. This implies that such personnel require not only job oriented skill development trainings, but also higher studies to upgrade their basic academic qualifications;
- Since the level of academic qualification also poses limits on getting admissions in higher education, short term training needs to be emphasized to upgrade the job related skills of the existing personnel;
- A large number of civil servants will be retiring by the end of 9th Five Year plan, with considerably higher number retiring during the 10th Five year Plan. This will have implications on retirement benefits and succession planning. Therefore, succession planning is vital in order to ensure that retiring civil servants are replaced appropriately. (Source: *Civil Service Human Resource Development Master Plan, 2002-2007: 18*)

Student Activity

1. Argue for or against the policy of *low volume and high quality tourism*.
2. There is a dichotomy between the policy of promoting tourism and the conservation of environment. How would you reconcile between the two?
3. There are various interest groups of tourists visiting Bhutan. Which group do you think will be highly beneficial to Bhutan in the near future and why?
4. Discuss the importance of the services provided by the financial institutions.
5. Visit a local office and prepare a list of occupation with maximum number of vacancies. Then, discuss in pairs the implication it will have on the human resource development in the long run?

UNIT THREE

TRANSPORT AND COMMUNICATION

3.1 TRANSPORT

Introduction

Transport is the system in which the passengers and goods move from one place to another. Development of cheap and efficient means of transport is necessary for the progress of a developing country like Bhutan. Transport system is a very important link between production and consumption. Transport routes are the basic economic arteries of the country. In the modern age, even ideas and skills move from one place to another with the help of transport system.

In the past, human beings often was the means of transport. Human portage was the chief means of transport in some of the areas in the Himalayan region. Animals were also used to transport goods from one place to another. Cattle, horses, and yaks are in use even today in many parts of our country, depending on the nature of the terrain, climate conditions and level of economic development.

Presently, the chief means of transport in our country is the road transport, though the air transport is gaining currency recently.

We can discuss the road transport, emphasizing on the development history, its importance, problems and distributions.

3.1.1. Road Transport in Bhutan

The Kingdom of Bhutan saw the birth of its first national highway in 1959 with the then public works Division (PWD) commencing the construction of 179 km of Phuntsholing–Thimphu-Dechencholing national highway and completing it in a record time of 14 months. This was followed by the construction of other national highways like Samdrupjongkhar-Trashigang (180 km) in the east and Gelephu-Trongsa (224 km) in the central region. Subsequently, the lateral road connecting Haa in the Extreme west and Trashigang in the east to provide transport links to a number of places in between such as Thimphu, Wangdue Phodrang, Trongsa, Bumthang and Mongar, was also constructed.

Road network has increased from 2336 km in 1990 to over 4152.7 km (including forest roads) as of June 2004. Major centres of socioeconomic activities, even in

many remote areas, are now accessible by road. This has greatly facilitated mobility of people, reduced travel time, helped in the marketing of agricultural, industrial and other products, and opened up economic opportunities thereby improving the quality of life of the Bhutanese people. Needless to emphasize, every development activity depends largely on the availability of efficient, reliable and adequate network of road infrastructure. In the absence of other modes of transport, the need for an efficient road system has assumed even greater significance for a land-locked country like ours as 90% of international trade and 100% of domestic trade takes place by road. Road has played a crucial role in stimulating domestic investment and promoting international trade.

Despite impressive achievements made in the sector, the present network of roads continues to be inadequate. Because of labour and budgetary constraints, maintenance and improvement works on the existing roads have been given priority with less emphasis on new constructions.

- a) *Categories of Roads in Bhutan:* A proper classification of the roads is necessary because of the multiple functions they serve and the multi-faceted problems they pose in construction, maintenance and administration. Roads are most commonly classified by the purpose they serve. In Bhutan, the road network is classified broadly into:
- National Highway (NH)
 - District Road (DR)
 - Feeder Road (FD)
 - Farm Road
 - Forest Road
 - Expressway
 - Urban Road

Farm Roads and Forest Roads are under the Ministry of Agriculture. The National Highway (NH), District Road (DR), Feeder Road (FR), Expressway and Urban Roads are described below:

- *National Highways:* National Highways are the arterial roads which interconnect/pass through 2 or more Dzongkhags. They are generally designed to carry traffic volume between 100 to 200 vehicles per day.
- *District Roads:* These are the arterial roads connecting the district head quarters with the National Highways. They are designed to a lower standard than National Highways and are generally designed to carry traffic volume between 50 to 100 vehicles per day.

- *Feeder Roads:* They are the roads branching out from the National Highways (NHS) and/or District Roads (DRs) and connect rural areas/settlements, areas of production, and social amenities such as schools and health centres etc. They also inter-connect villages and socio-economic centres to one another. These roads have lower design standards than NHs and DRs. They are generally designed to carry traffic volume of less than 50 vehicles per day.
- *Farm Roads:* These roads link agricultural production areas to national highways and other roads primarily to enable the transportation of inputs to the farm and agricultural produce to the market.
- *Expressways:* They serve as a superior highway facility with high volume of traffic. They are usually designed to have a divided carriage way, controlled access, and grade separations at crossroads. The Thimphu-Babesa Expressway which is under construction is an example.
- *Forest Roads:* These roads are mostly temporary roads constructed mainly for the purpose of logging operations. These roads are usually abandoned after the logging operations in the given area are completed.
- *Urban Roads:* The roads falling within the designated urban boundary of a municipality are referred to as urban roads. Depending upon the functions and purpose they serve, the roads are categorized as Primary Urban Road, Collector Road, Access Road, Footway, etc.



Fig. 3.1. Thimphu-Babesa Expressway(under construction)

Table 3.1. Existing road network by Dzongkhag as of June 2004

Sl.#	Dzongkhag	National Highway (Km)	District Road (Km)	Feeder Road (excluding Farm Road & Forest Road)(Km)	Urban Road (Km)	Farm Road (Km)	Forest Road (Km)	Total of all roads (Km)	%age
1	Bumthang	122	0	54.02	0	31.2	47.6	254.82	6.1%
2	Chukha	231.04	0	197.79	15.7	0	30.928	475.458	11.4%
3	Dagana	0	87	32.06	1.5	0	0	120.56	2.9%
4	Gasa	0	0	18.61	0	0	0	18.61	0.4%
5	Haa	16	25.6	32.923	1.6	0	36	112.12	2.7%
6	Lhuntse	0	45	32.9	0	11.2	0	89.10	2.1%
7	Mongar	177	20	60.85	2.21	14.5	44.8	319.36	7.7%
8	Paro	103	36.4	50.03	0	49.54	5.19	244.16	5.9%
9	P/gatsbel	0	23	31.58	0	16.66	17.6	88.84	2.1%
10	Punakha	9	0	87.7	0	18.02	59	173.72	4.2%
11	S/Jongkhar	59	50	52.62	6.04	11	0	178.66	4.3%
12	Samtse	0	89	25.35	8.98	0.5	7	130.83	3.2%
13	Sarpang	123.40	0	42.5	0	39.5	93.25	298.65	7.2%
14	Thimphu	111	0	87.56	71	14.55	1.3.86	387.97	9.3%
15	Trashigang	141	5	120.908	4	2.42	8.5	281.83	6.8%
16	T/Yangtse	0	40	36.6	0	13.1	10.48	100.18	2.4%
17	Trongsa	168	0	34.9	1.5	0	6.4801	104.88	2.5%
18	Tsirang	62	0	34.9	1.5	0	6.48	104.88	2.5%
19	Wangdue	150.8	0	101.48	3	11.42	19.6	286.26	6.9%
20	Zhemgang	104	38	70.61	1.89	5.86	41.6	261.96	6.3%
	Total	1577.20	459.00	1205.21	117.42	251.27	542.60	4152.70	

Source: Department of Roads, 2005

b) *Advantages and Disadvantages of Roads*

i) *Advantages*

- Roads play a very important role in the transportation of goods and passengers for short and medium distances.
- It is comparatively easy and cheap to construct and maintain roads, compared with railways.
- Road transport system establishes easy contact between farms, fields, factories and markets and provides door to door services.
- Road is the best form of transport in the hilly areas.
- Road transport is more flexible than the rail and air transport. Buses and trucks may be stopped anywhere and at any time on the road for loading and unloading passengers and goods.
- Perishable goods are more easily and quickly transported by roads.

ii) Disadvantages

- Roads are not much suited to long distance travel.
- Roads are more prone to landslides during summer and ice during winter.
- Roads cannot transport heavy and bulky commodities especially in mountainous terrain.
- The rate of road accidents has increased with increased in road traffic.
- The rapid increase in vehicles has resulted in air pollution.
- It is expensive to maintain roads in our country.

3.1.2. Air Transport

Druk Air, the National Flag carrier of the Kingdom of Bhutan was established by a Royal Proclamation on April 5, 1981. The Druk Air's operation began on January 14, 1983 after the German manufactured 18 seater Dornier 228-200 landed at the Paro airport, bearing the Royal Flag of the Kingdom of Bhutan. On the Dornier, Druk Air operated to Calcutta in India and Dhaka in Bangladesh.

a) Route Network: The Druk Air started its commercial operations with a single Dornier 228-200 in the month of February 1983, coinciding with the Bhutanese Water Hog year. The operations of the Dornier 228 were essentially limited to flights between Calcutta and Paro. In November 1986, Dhaka was linked to Paro. With the arrival of the BAe 146-100, Paro-Delhi route was started in December 1988, followed by Paro-Bangkok and Paro-Kathmandu in January 1989. The Paro-Yangon-Bangkok sector was introduced on January 6, 1997.

Druk Air upgraded its fleet by adding two new Airbus 319 and has been in operation since October 2004.

b) Importance of Air Transport

The importance of air transport are:

- Aeroplanes fly according to pre-decided time schedule.
- Air transport is the most suitable mode of transport for long distances.
- It is fast.
- Planes can transport light but costly and fast decaying goods.
- It is suitable for relief operations at any place at a time of calamities such as floods, earthquakes and accidents etc.
- Air power is very effective during the war.

- Air transport is suitable in hilly, desert, inaccessible areas where other means of transport are not much favourable.



Fig 3.2. The Druk Air getting ready to take off.

- c) *Factors affecting air transport:* Air transport has rapidly developed and is constantly becoming more important, but development has been very uneven in different parts of the world. There are several limiting factors which make it unlikely that air transport will ever become a universal form of transport. The major factors affecting the *present importance* and *future development* of air transport are discussed below.
- *Limited carrying capacity:* Lack of space in aeroplanes restricts the amount of freight they can carry. Many goods are either too bulky or of too low a value to merit air transport.

High air-freight rates will limit the role of air transport for many years to come to the carriage of passengers, mail and highly- valued articles.

- *Freedom of the air:* The air is less *free* than the sea, because though nations can only claim sovereignty over their territorial waters they can claim all the *air space* over their territory. Thus foreign planes cannot make use of the air space unless they have obtained permission to do so in advance. The battle to secure flying rights is often a long and expensive one. Many countries, especially those located at the world's crossroads of trade and communication, also demand exorbitant fees for *landing rights* by foreign planes.
- *Adequacy of air terminals:* With the rapid expansion of air transport, especially in respect of the increased size and capacity of planes, many air terminals are finding themselves *inadequately equipped*. Fuel supplies and ground staff are often inadequate and often ground maintenance and meteorological services are not sophisticated enough. Moreover, *poor passenger-handling facilities* cause long delays for travellers. Large planes have no alternative but to by-pass such small terminals. In some less developed countries or very densely populated districts, there may even be difficulties of finding a suitable landing space as only light planes are able to land on small airstrips.
- *Cost of air transport:* Costs of aircraft, fuel, regular and thorough servicing and provision of air terminal facilities, as well as the cost of obtaining flying and landing rights, are all expensive. Airlines must also provide a large staff of pilots, stewardesses and ground-based clerks and booking personnel whose salaries are high. Thus air transport is a *relatively expensive* form of conveyance and large-scale air travel is still a luxury in most parts of the world.

3.1.3. Rope ways

Rope ways were first constructed to transport the logs from areas where it was inaccessible by roads. Later, its use expanded into transporting agriculture goods and people from the remote villages to the road head. The Tashila ropeway between Khothakha and Chuzomsa in Wangdi Phodrang is the only rope way that is in use today for transportation of agricultural goods and logs. With the construction of more farm roads and forestry roads, the use of ropeways is fast disappearing.



Fig. 3.3. Tashila Ropeway

Student Activity

1. “Transport routes are the basic economic arteries of the country.” Explain.
2. What are the advantages and disadvantages of road transportation?
3. Bhutan has signed the agreement on the Asian highway network in April 26 in the 60th session of the United Nations Economic and Social Commission for Asia and the Pacific, in Shanghai, China held from April 22-28, 2004. This ambitious project is expected to bring about “substantive positive impacts”, according to the Foreign Ministry press release.
 - Explain the reasons why Bhutan needs to sign such agreement.
 - Explain in detail the so-called “substantive positive impacts” as claimed by the Foreign Ministry?

- What are some of the major problems we need to solve before becoming a part of Asian highway network?
5. Do you think of any possibility of having inland waterways in Bhutan at least in the plains adjoining India? If so, discuss how it can be developed and what problems we might face in the process?
 6. State the importance of airways in Bhutan.
 7. The Royal Government of Bhutan plans to ply helicopter service to connect all Dzongkhags to overcome the difficulty posed by road transportation. Is it feasible to have helicopter service? Justify your answer.
 8. What problems hinder the development of air transport in Bhutan?
 9. Why are ropeways not popular in Bhutan?

3.2 Communication

Introduction

The second part of Unit Three on communication will discuss some of the general communication services such as postal services, telecommunication, mass communication and the importance of infrastructure as keys to development.

3.2.1 Postal services

In the past, Dzongs (District headquarters or administrative centres) acted as Post Offices for the transmission of mails with the help of runners. It was the responsibility of the civil administrator/authority of each district to make arrangement for transmission of mails at least twice/thrice a month and the importance was given mainly for official mails. In the beginning, there was no system of postage. However, later a system of payment of postage was introduced by using hand stuck stamps and postal marking. In 1954, the first adhesive revenue stamp was issued and later, by a government proclamation, which took effect from January 1, 1955, the same revenue stamps were also used as postage stamps. The first post office was opened at Phuentsholing on October 10, 1962.

- *Mail system:* Currently, the postal network consists of 110 outlets including 2 General Post Offices, 33 Post Offices, 9 Agency Post Offices and 66 Community Mail Offices. In addition, since 1997 Bhutan Post has operated a Post bus network throughout the country to handle the distribution of the mail and carry passenger. Bhutan post currently provides the following products and services:

- i) Letter mail service (ordinary & registered)
- ii) Parcel post service (ordinary, registered and insured)
- iii) Post box services
- iv) Financial Services:
 - Fax Money Order within Bhutan
 - International Money Order
 - Express Money Order with India
 - Western Union Money Transfer
- v) Courier Services
 - Domestic/International EMS
 - Local Urgent Mail (LUM)
 - Post overnight courier(POC)

- vi) Philately
 - Stamps: Definitive and Commemorative
 - Stamp Albums
 - First Day Covers (FDC)
 - Souvenir Sheets
- vii) Electronic Services
 - Fax mail
 - Public Call Office (PCO)
- viii) Transport Service
 - Passengers service
 - Cargo service
- ix) Customs Clearance Service

- *Mail Delivery:* The number of deliveries made differs from place to place depending upon the mail receipts, geographical location and accessibility. In bigger towns, there is usually one delivery a day but separate and special delivery is made for EMS. At Thimphu, special delivery is also made for local urgent mail (LUM).

- *Express Mail Service (EMS):* EMS was introduced in Bhutan in 1993. Initially, only international EMS was available but from 1998 a domestic service was also introduced. At present, international EMS is available to 50 destinations (20 as direct dispatches and 30 as a'decouvert via Bangkok). The largest traffic is with India, Japan, Thailand and the USA. A free pick-up facility from customer premises is available at no extra charge and a credit facility is provided under a "Book now and Pay later" scheme. A bar-coded receipt is issued at the time of booking. The acceptance times for EMS articles coordinate with the working hours of post office.

- *Routing of EMS items:* EMS articles are forwarded with other mails and dispatched according to the Druk Air schedule. Similarly, the incoming EMS is brought to Bhutan from Delhi, Kolkata and Bangkok. For EMS articles mailed at Phuentsholing GPO and Samdrup Jongkhar P.O for India, these are directly dispatched to Delhi SPCC, Mumbai SPCC, Chennai and Kolkata in transit via Siliguri. From Samdrup Jongkhar exchange office, dispatches are made up for Kolkata SPCC and Delhi SPCC via Guwahati SPCC.

For the transmission of domestic EMS articles, Bhutan Post buses and private buses are used.

For the delivery of EMS items, special treatment is given immediately after the arrival at the office of delivery.

- *Local Urgent Mail:* Local Urgent Mail (LUM) is a service for the delivery of important documents and packages within Thimphu. This service is well organized and has attracted considerable clients, especially from the government sector. The service operates either on demand or contract. For delivery of LUM, there are special messengers who collect and deliver the mail twice in a day.

Finally Bhutan Post operates a magazine and newspaper ordering and supply service based on a range of publications from India. This service is provided by each post office with Phuentsholing GPO as the controlling office for this business.

3.2.2. Telecommunication

The consequence of the Second World War was felt in most parts of South East Asia. The post-independent India had to confront a host of conflicts among its neighbours. After the 1962 war with China, India realized the importance of safeguarding its geographical territory from all types of incursion from all the sides. At the same time, India also realized the importance to safeguard the interest of its tiny neighbours in the field of socio-economic development and territorial integrity. To begin with, communication was considered as a vital source of strength not only within the Indian Territory but with its neighbours, as well. As a result of this, India turned its eyes to Bhutan, which is an independent buffer state in between two mighty countries, China and India. The government of India then decided to deploy a task force of the Border Roads for the development of telecommunications service in Bhutan. Accordingly, the task force was assembled in Tezpur of Arunachal Pradesh, India, to discuss the adoption and final resolution of the strategy. The then 41 Signal Task Force of the General Reserve Engineering Force was accorded the responsibility to execute this mammoth task of establishing telecommunication system in Bhutan.

Armed with the mandate to carry out the given task, the 41 Signal Task Force moved to Bhutan under the umbrella of project Dantak and stayed till its final disbandment in the early eighties.

The development of modern telecommunications infrastructure in Bhutan started quite late, compared with many countries. The initial focus of the government was in the development of road networks, strengthening of government bureaucracy,

establishment and strengthening of social sectors of health, education and agriculture etc.

However, by the end of the 6th Five Year Plan (1987-'92), the government realized the importance of telecommunication infrastructure as a basic requirement for socio-economic development. Thus, during the 7th and 8th Five Year Plan periods, the focus was on the development of telecommunication sector. Within a short span of 10 years, we have managed to build a reliable national telecommunications network with international connectivity nationwide. Bhutan has now 100% digital Network interconnecting all major towns and district headquarters accounting for a teledensity of around 2% as compared with about 0.3 % about a decade ago. People have now realized the importance of information super highway.

The telecommunication services in the Kingdom began in 1965. The first physical link was commissioned by connecting the five towns in Bhutan namely Phuentsholing, Thimphu, Paro, Dewathang and Trashigang, with full assistance from the Project Dantak of the Government of India.

- *An Affordable Service:* Bhutan Telecom is the sole telecommunication service provider in the entire country and it enjoys the utmost monopoly with no serious competitions faced at the moment, but still, owing to other external forces, its tariff structures are as competitive as those in any other developing countries and are designed to offer with affordable prices, especially the long distance and international telephone calls. The services provided by Bhutan Telecom are basic telephony, facsimile, pay phone, telex and HF communications in rural areas, leased lines, and Internet services.

The telecommunication service in the country has advanced by leaps and bounds in the past 35 years or so. The open wire transmission systems in the country have been replaced by the state-of-the-art digital system. The country now enjoys modern telecommunications service in all twenty Dzongkhag headquarters and important commercial and population centres.

The number of connections in both urban and rural areas has risen by a tremendous margin. As of July 2002, the total number of connections in the country was slightly more than 20,000 lines, compared with a total of 525 lines some three and half decades ago. At present, there are 90 digital voice channels between Thimphu and Phuentsholing carried through half a dozen standard towers, compared against

more than 3,000 telephone posts carrying 8 analog channels during the early days. Bhutan Telecom has been successfully functioning as a corporate entity since it became a corporation under the Company's Act of Bhutan in July 2000. Earning about Nu.312 million annually, it is ranked as the third highest revenue generator in the country.

Various technologies have been tried out to cater to the needs of diverse areas where the provision of telecommunications facility is not feasible by means of the normal line connections. To mention some of the newly introduced technologies, the VOIP, (Voice Over Internet Protocol), DRMASS, DAMA and the VHF are used to provide telecommunications facility in some of the remote areas of the country, where the rate of return on investment is not at all viable. Even in the case of normal terrestrial lines, the capacity expansion and improvement of the existing network is a regular feature of Bhutan Telecom.

- *B Mobile:* Bhutan Telecom started its mobile phone service in November 2003 initially covering Thimphu, Phuentsholing and Paro region. In 2004, it expanded its service to Gelephu, Sumdrup Jongkhar, Punakha and Wangdi. By 2005, it plans to cover Sarpang, Samtse, Pasakha and Haa. As of May 2005 there are about 25652 mobile users in the country.
- *Internet:* Internet services were introduced in the country on June 2, 1999 when Drunket provided services such as Internet packages, Web Hosting, Domain Registrations, and Mail Hosting Lease line etc. The other internet service providers who joined later are Samden Tech Pvt. Ltd. and Druk Com.

3.2.3. Mass Communication

- *Kuensel:* It started in 1965 as a government gazette national newspaper and in 1986 took the tabloid format as a weekly with 12 pages. The Kuensel Corporation was born in October, 1992, when media organizations in the country were “de-linked” from the civil service to encourage their professional growth. It is an autonomous corporation, registered under the Company's Act of Bhutan.

The primary activity of the Kuensel Corporation is the publication of Bhutan's national newspaper, the Kuensel. The Corporation's printing unit takes on limited commercial printing to subsidize the organization. Previously funded by the government, the Corporation has been steadily decreasing this subsidy and in 1996, the Kuensel Corporation received a 22 percent subsidy from the government of Bhutan.

Late in 1996, the Kuensel Corporation began a project to upgrade its printing facilities. It established a quality colour printing system which became fully functional by 1998. This project, which was assisted by DANIDA, through the Bhutanese government, was a comprehensive configuration of the modern printing press, from the latest colour separation technology to quality post-production equipment.

In 1999, the Corporation stopped receiving government subsidy and in 2001 launched the *kuenselonline* web edition.

On February 19, 2005 the newspaper went bi-weekly and by the end of 2005, Kuensel press in Kanglung will be opened. This will ensure that people in the eastern region get the paper on the same day it is published.

- *Radio and Television in Bhutan:* Radio Broadcasting started in Bhutan by a group of young volunteers, known as the National Youth Association of Bhutan (NYAB) in November 1973. The station was operational only on Sundays with 30 minutes of news and music. The NYAB club office was transformed to an announcing studio on weekends. The 400-watt transmitter was rented from a local telegraph office. The station was called Radio NYAB.

In 1979, the Royal Government recognizing the importance of the radio for development of communication embraced the station under the wings of the Ministry of Communication.

In 1986 with commissioning of a 10kw short-wave transmitter and a small broadcast studio, Radio NYAB was renamed as Bhutan Broadcasting Service (BBS). Daily broadcasting was introduced with three hours of programming that reflected the national character. But, it was only in March 1991 that BBS acquired a permanent seat and a professional look with the commissioning of a 50kw short-wave transmitter station and a studio complex-cum-office block.

June 2, 1999 was another historic day for the country and the Bhutan Broadcasting Service, as the national television service was launched to commemorate the Silver Jubilee reign of His Majesty the King of Bhutan. Presently, the live television service is available for the residents of Thimphu, Paro and Phuentsholing but there are plans to extend it to the whole country. The broadcast is from 6pm to 10pm. News, various programmes and documentaries in both the languages are

telecast during the four hours of TV broadcast every evening. The live telecast of the TV broadcast can also be listened to on the radio.

In June 2000, the BBS introduced an FM radio service for Western Bhutan with the inauguration of the main FM station at Dochula and a relay station at Takti in the South. The FM service was extended to central Bhutan in January 2001 and plans are underway to cover the whole country by the end of the 9th five-year plan.

As of April 2004, BBS FM radio service is available in 15 Dzongkhags. The installation of FM transmitter in the rest of the 5 Dzongkhags will be completed by the end of the current five-year plan.

Coinciding with the 97th National Day of the country, on December 17, 2004, the Bhutan Broadcasting Service increased its Television airtime to 4 hours.

Apart from the daily news bulletins, the BBS devotes 75% of its programming on development issues such as rural development, youth, women and child care, Information Technology, new farming methods, health and hygiene, environment preservation and distance education.

On the Radio, the broadcast is in four languages (Dzongkha, Sharchop, Lhotsam and English).

The BBS plays an important role as a communication link between the urban areas and the rural communities.

- *Cinema:* Cinema is another means of mass communication. It entertains many people all over the world. There are many firms producing Bhutanese films that are screened in several movie halls across the country.

3.2.4. Importance of infrastructure as key to the Development of Industrial Economy

Infrastructural facilities like transportation and communication play key roles in the origin and growth of industrial economy. Transport routes are the basic economic arteries and they provide a vital link between production and consumption. Transport plays a vital role in production and distribution. Production is facilitated as raw materials are brought to the factory site by quick transport. It is the life-blood of commerce. A well-knit and coordinated system of transport

plays an important role in the sustained economic growth of a country. An integrated and coordinated transport network reduces social distances, political fragmentation and economic isolation. It also helps in generating centripetal forces and minimizing the centrifugal forces in society, polity and economy. The location of a manufacturing plant, its production and distribution, the growth of cities, towns, ports, domestic and foreign trade all are influenced by transport. Speed has increased as a result of the introduction of improved means of transport, facilitating large-scale production, marketing and turnover of capital.

Transport and industry are closely related to each other. Cheap and efficient transport is essential for the localization and growth of industries. Transportation facilities are required for carrying raw materials and labour force to the manufacturing site and for carrying manufactured goods to the market. Thus, transport and industries grow side by side in any area. Some of the industries use heavy raw materials with low specific cost.

Student Activity

1. Distinguish between transportation and communication.
2. What would be the role of Bhutan Post with mobile phone and Internet gaining more popularity?
3. What are some of the problems faced by Bhutan telecom?
4. Discuss the role of BBS radio as a medium of mass communication.
5. With mobile phone becoming more popular, what would be its effect on fixed lines?
6. “The decision to take 15 channels out of the cable system has drawn strong response from our television viewers.”
 - a) Why do you think many TV channels were taken out of the cable system?
 - b) Why do you think that the television viewers are opposing the ban?
7. What role should the BBS Television play in the face of growing cable TV culture?

UNIT FOUR

NATURE CONSERVATION

Introduction

Conservation of nature is an inherent part of our traditional way of life. The Bhutanese from a farming and village background understand the limits of natural resources and know that if forests are cut down relentlessly, there will be nothing left for future generations. Such understanding is passed down through proverbs such as “*A cow will yield milk and butter for many years but beef only once.*”

Unfortunately, such wisdom is fading among the younger generation, who are increasingly disconnected from the land. Modern lifestyles encourage consumerism and materialism and market economies are based on the premise of unlimited needs and wants of people. Yet, we live in a finite world, which is increasingly under pressure as populations explode.

Conservation, then, is the race to save endangered species from extinction and use natural resources in a sustainable manner.

4.1. Concept of sustainable Development

Sustainable Development broadly means enhancing development of a country without undermining the resource base of the economy. This means following a development plan which will enable to meet the utmost needs of the people like food, education and health care etc., without having to deplete and harm our natural resources. And, as for Bhutan, the approach to sustainable development was articulated in the Paro Declaration of 1990. The Paro Declaration states that it is important to find a development path that will allow the country to meet the pressing needs of the people, particularly in terms of food, health care and education, without undermining the resource base of the economy. This means any new industries, new agricultural markets, and new forestry products need to be carefully developed, with due respect to their broader environmental ramifications. Sustainable development, we believe, in this regard is a concept that is in harmony with the cultural and religious traditions of Bhutan. Our nation luckily has a strong conservation ethic, and indeed a respect for the natural world is a central tenet of Buddhism. It is therefore essential that the traditional culture be kept strong so that its values can guide our sustainable development path. Within this context the RGOB, has recognized that it is not necessary to restrict

economic growth to ensure preservation of the resource base, but that the utilization of resources in a carefully managed manner will provide sufficient incentives to ensure that natural resources are not depleted. And, to achieve the sustainability of resource utilization, it is necessary to monitor the impact of development on the environment and to provide the necessary controls, regulations and incentives to the private sector.

4.2. Environmental Impact Assessment

We are all aware that Bhutan is in a very rare and possibly unique position amongst developing countries, in its preservation of a wide base of natural resources. Bhutan is also one of the countries with the greatest biological diversity, not only in terms of a large number of species, but also in that several species are unique to Bhutan's environment. However, the knowledge of the status of these species is limited as there have been only a few studies on Bhutanese flora and fauna. But the preservation of natural resources has been possible for Bhutan because of Bhutan's recent entry into the economic development process, which has often been the cause of environmental degradation in many developing countries. Until the 1960's the preservation of the environment had been possible because of the maintenance of a traditional subsistence economy and despite the economic growth rates estimated to be 7.5% in the last decade, the natural resource base has remained largely intact. This has been the result of the Royal Government of Bhutan's cautious approach to development and its awareness of possible negative impacts on the environment. In addition, the fact that hydroelectric power has been the major source of economic growth means that development has had little negative impact on the environment, to date.

4.3. Factors that have resulted in the preservation of the natural Environment

The Buddhist faith, which plays an important role in all aspects of Bhutanese life, also stresses respect for all forms of life and thus the preservation of natural resources. Traditional subsistence farmers have developed environmentally sustainable practices over the centuries, which have only recently come under pressure from changes resulting from economic growth and population increase.

Secondly, Bhutan is in a fortunate position, as it is possible for the RGOB to plan for the sustainable development of the economy, with great caution and learning from the experiences of other countries. Both developed and developing countries have become increasingly concerned about the degradation of the environment and have sought ways of achieving growth without placing further pressure on

their natural resources and the environment. In an effort to develop long term strategies on the environment, the World Commission on Environment and Development was constituted in 1987. One of the major contributions of the Commission has been the popularization of the concept of sustainable development which focuses mainly on ensuring that the needs of the present is made without compromising the need of the future generations. The concept has limits- not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activity. However, technology and social organization can both be managed and improved to make ways for a new era of economic growth.

4.4. Environmental Concerns

While Bhutan has been successful in maintaining its stock of natural resources, the Royal Government is concerned that development may lead to certain trends which are likely to have negative impacts on the environment.

- The rate of population growth will be accelerated by better health programmes, resulting in lower child mortality and longer life expectancy, which means that the impact on environment will be greater since the population will increase.
- It has been estimated that virtually all land suitable for arable production is being utilized. But, as population increases, there will be greater pressure to open new, more marginal areas for production. This may lead to degradation of less productive land, particularly as this land is likely to be on steeper slopes and more susceptible to erosion. The need to increase food production may also result in over-utilization of existing areas and this might also result in the introduction of environmentally damaging and health hazardous practices such as excessive use of chemical fertilizers.
- As population and income increase, the demand for livestock products will rise. Although livestock have not increased significantly in the past decade, further expansion of the national herd, may lead to the deterioration of grazing resources and the reduction in the regenerative capacity of the pastures.
- Though most of the country's original forest cover is still intact, increasing population will place additional demands on the resource for grazing, fodder

and firewood, for non-wood forest products and building materials. At the moment, the per capita consumption of fuel-wood is among the highest in the world (2.4 cu.m/pa). Until the late 1970s, the commercial logging of wood by sawmills had been indiscriminate and was leading to overexploitation in some areas. To address this problem, the RGOB nationalized logging activities and substantially reduced the annual cut. However, the scale of the problem is insignificant as shown by recent studies of the temperate and subtropical zones, which revealed that the annual loss of forest cover is between 0.30% and 0.33% over a 10 year period (1978-88).

- The construction of the road network is also responsible in causing severe erosion in some areas. In such a geologically unstable environment, further road construction is likely to cause additional erosion problems. The provision of additional road infrastructure will also open new areas for development, where environmental problems may occur, if not properly planned.
- The planned development of industrial and mining sectors may result in environmental damage and pollution. The scale of the problem is small at present, largely because these sectors are undeveloped, but this will change in the coming future.

While these concerns has already been raised, the RGOB recognizes that there has been little research into these issues or even baseline data from which to determine the nature and extent of environmental problems in Bhutan. It is therefore important to recognize that these trends may not occur as feared, or that different forms of environmental degradation may be taking place, and therefore avoid inappropriate responses to presumed environmental concerns, which may in themselves be damaging to the environment or hamper economic growth. All this could be the result of, in the absence of detailed data, assuming that the environmental degradation occurring in neighbouring countries will be repeated in Bhutan, without examining the situation more closely. There is also insufficient understanding of the impact of the development process on the environment as a whole.

4.5. Environmental Policies and Programmes

At the moment because of the lack of baseline information and detailed research data, it is not possible to draw up detailed programmes to address environmental problems. It will thus be necessary to make these types of studies a priority. But in the meantime, detailed programmes are based on the above information, and the RGOB is in the process of developing the following broad measures:

- Formation of a National Environment Commission with the responsibility for the formulation of a National Environment strategy, coordination of all environmental activities and monitoring of the environmental impact of development.
- Establishment of an Environmental Trust Fund: an endowment fund from which the benefits will be used for environment-related activities. Several donors have pledged funds and the Fund will become operational once the total funds pledged reach US \$10 million.
- Increasing community and non-government involvement in the planning and implementation of environmental activities. The process of decentralization will enable greater participation of the population in developing appropriate responses to environmental problems.
- Improving existing and introducing new legislation and policies to ensure sustainable utilization. For example, the forestry legislation has been continually updated since the first Bhutan Forest Act was introduced in 1969. The proposed 1991 Forest Act will build on the reorientation of forest policy towards conservation and will include new provisions to encourage community forestry. The Act will be implemented on the completion of the cadastral survey of the country. A draft National Pasture Policy has been prepared and is under consideration by the RGOB.
- A draft of the Mining Regulations was finalized during the 7FYP. It includes regulations to prevent negative environmental impacts.
- Preparation of Master Plans for many sectors of the economy: e.g. Forestry, Power, Roads. These plans will ensure the development of the sectors in a carefully planned manner, which will minimize environmental impact and ensure the utilization of natural resources on a sustainable basis.

- Use of economic incentives to encourage sustainable utilization. For example, the introduction of a progressive cattle tax to reduce incentives to hold cattle.

4.6. Policies in the Natural Resource Sector

Developing an integrated land-use planning capability to provide the necessary information for the planning of sustainable development in the agricultural sector was found important. The activities of the Departments of Agriculture, Forestry and Animal Husbandry will be integrated in recognition of the interdependence of these sub-sectors at the farm level. This will be achieved through the Renewable Natural Resource development approach, which will be the main strategy for land-based development. The benefits and constraints of traditional practices will also be examined and developed for further productivity increases, in close cooperation with farmers. Thus, it will be possible to make use of the accumulated wisdom in agricultural production, rather than depending on the introduction of new farming systems.

Building on existing practices is a more effective approach than the adoption of new control mechanisms in resource management. There are well established institutions for the management of common property in Bhutan, including forestry, irrigation water, and grazing resources. The introduction of new resource management practices and controls have often been the cause of environmental degradation in themselves.

4.7. Environment and Sustainable Development

A good approach includes encouraging farmers to improve livestock productivity through breed improvement and thus reducing the number of livestock required to produce the same benefits. This will relieve grazing pressure, in addition to the efforts to provide other sources of feed through fodder production and improved grazing systems.

A conservation-oriented forest policy where the highest priority is conservation of soil, water regime and climate is another approach towards sustainable development. The aim of this policy will be to maintain 60% of forest cover. The sustainable utilization of forest resources will also be permitted once the necessary inventories and management plans have been drawn up. Bhutan was among the first countries to formulate a National Policy on Community Forestry and is in the process of developing suitable models to encourage communities to take part in the protection and management of forest resources. The Forestry Department has

also been responsible for the afforestation of degraded areas and had replanted over 18,000 hectares by the end of the 6FYP. This programme continued into the 7FYP and focused more on community participation and public awareness

Preserving Bhutan's rich endowment of biodiversity is being brought about through an extensive network of 12 protected areas; 20% of the country is under formal protection. However, the management of these areas is constrained by the lack of staff. The viability of managing these areas will be examined to determine the benefits of re-delineating some areas to establish a network of protected areas, covering 25% of Bhutan's land area and representing a more comprehensive spectrum of species and habitats.

Management Plans for protected areas will be developed, and will incorporate utilization of the natural resources by local residents where appropriate.

4.8. New Technology

The economic development is ensured based on the growth of those sectors and productive activities with the least negative impact on the environment. Much of the recent economic development has been based on hydroelectric power generation, which is less likely to have a negative impact on the environment than the development of heavy industry. The priority accorded to this sector continued during the 7FYP, while ensuring that further developments do not have a negative impact on the environment. Environmental Impact Assessments will therefore be mandatory, prior to the implementation of any new hydroelectric projects, as well as all projects in other sectors of the economy.

The industrial development in Bhutan is at an early stage and has limited or no negative impact on the environment. Thus, Bhutan can take advantage of new technologies being developed that are less environmentally damaging than those developed and adopted by many other developing countries in previous years.

4.9. Social Services

Good social services involve preparing a comprehensive family planning policy, improved urban and town planning, which will ensure provision of necessary infrastructure to improve public health and the urban environment.

Another strategy will comprise developing a new formal education system which will enhance the understanding of the importance of sustainable development for

Bhutan. The New Approach to Primary Education (NAPE) was developed for Bhutanese children of primary age and is oriented towards using practical observations of the environment as a teaching tool in all subjects. This approach will therefore greatly increase environmental awareness at an early age.

4.10. Bhutan's Natural Heritage

Bhutan is one of the ecological wonders of the world. The country is straddled between two bio-geographical realms: the Palearctic realm of the temperate Euro-Asian and the Indo-Malayan realm of the Indian sub-continent. The result is a country rich in bio-diversity, with its natural forest cover largely intact. The biomes in Bhutan stretch from sub-tropical in the south (100m above sea level) through temperate in the central interior, to an alpine zone in the north (7550m above sea level). Animals such as the tiger, the elephant, the one-horned rhinoceros, the Asiatic water buffalo, the pygmy hog and the rare golden langur exist in the lush tropical forest of the South. The snow leopard, the blue sheep and the takin are found in the cool forests and alpine meadows of the North. There are over 200 species of animals (mammals), and more than 770 species of birds identified in Bhutan.

Within Bhutan's borders, one can find over 60 percent of the endemic species of the Eastern Himalayan region. In addition, Bhutan's rich flora include over 50 species of Rhododendrons, and over 300 species of medicinal plants, mostly alpine, which are used in traditional herbal medicine. As a result, Bhutan has been declared as one of ten global "hot-spots" for the conservation of biological diversity. Many ecologists believe that Bhutan represents the last chance for conservation in the Eastern Himalayas, a region considered to be of critical importance to the global effort to conserve biological diversity.

4.11. Conservation Ethic

The preservation of the country's rich biological diversity can be attributed to two factors: the enlightened leadership and the strong conservation ethic of the Bhutanese people. Conservation is a central tenet of Buddhism. Buddhism believes in preserving nature and giving back to the earth what one has taken, and also in the sanctity of life. The importance of protecting nature in all its manifestations has permeated Bhutanese consciousness and has become integral to the Bhutanese way of life. Therefore, preservation of the environment, as well as of sacred and

cultural heritage sites are an important and an integral part of the Bhutanese value system. His Majesty the King Jigme Singye Wangchuck has stated:

“Throughout the centuries, the Bhutanese have treasured their natural environment and have looked upon it as the source of all life. This traditional reverence for nature has delivered us into the twentieth century with our environment still richly intact. We wish to continue living in harmony with nature and to pass on this rich heritage to our future generations.”

Ever since embarking on its first socio-economic development planning, RGoB's policy has been to ensure that the process of development in all its aspects should be consistent with maintaining the environmental and cultural integrity of the country. This guiding principle is the essential basis for Bhutan's sustainable development strategy, which was elaborated further in the 1990 Paro Resolution on Environment and Sustainable Development.

4.12. Cultural Heritage

What is culture? Often the word *culture* means the unique or distinctive aspects of peoples' customs and beliefs. Culture is the beliefs, values, behaviour and material objects shared by a particular people. Sociologists distinguish between non-material culture and material culture. Bhutanese material culture are Dzongs, Bhutanese architectural style, games like archery, clothes, ornaments, and agricultural implements like ploughs etc. The Bhutanese non-material culture is the values and beliefs (our beliefs in local deities), language, songs and dances etc. Culture in a nutshell is a way of life. And, Bhutan is indeed very rich in cultural as well as natural heritage.

It is not just enough to be rich in these heritages but the main task of the Bhutanese is to preserve both the cultural heritage and natural heritage in the face of the ever fast-changing times, where if we are not careful, we could lose both. These very important resources have been passed down from generations to generations and as a result, the Bhutanese have been able to preserve its culture and identity. Thanks to our far sighted leaders especially our present King , Druk Gyalpo Jigme Singye Wangchuck.

Student Activity

1. Choose any National Park to carry out a small research. The work can be done through field visit, interview of relevant people, by reading reference materials or a mix of all. The work can focus on:
 - (a) Animal species and plant species in the park.
 - (b) The threats to the park.
 - (c) Number of villages within the park area.
 - (d) Strategies to mitigate the threats posed to the park. Compile your work in about 1500 words and present it to the class.
2. Divide the class into three groups.
 - Group A: Business loggers.
 - Group B: Local people supporting the construction of road.
 - Group C: Local people against the construction of road.

Setting: The village is located in a remote area surrounded by thick sacred forest which is home of the local deities, many species of animals, birds and medicinal plants. It also has a good supply of clean water. The village is free of pollution. It is economically sound but has no road and modern facilities. The business loggers come up with a proposal to build a road to the village on their own expense.

Activity: Group A will make a proposal for the construction of the road emphasizing on the benefits for the locals. Group B will support the road construction with reasons for their choice. Group C will go against the road construction and tell or write why they do not want the road. The different groups will present their work to the class in group order. Finally, ask some students to tell their choice after listening to the three groups. The discussion can be in the form of debate or panel discussion.

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