

Sustainable Land Management: Policy Implication and Sectoral Achievement



By
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A Thesis Submitted to the Institute of Environmental Science, University of
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Doctor of Philosophy

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Declaration

I do hereby declare that the entire works submitted as a thesis entitled **"Sustainable Land Management: Policy Implication and Sectoral Achievement"** to the Institute of Environmental Science, University of Rajshahi for the Degree of Doctor of Philosophy is the result of my own investigation carried out under the supervision of Dr. Raquib Ahmed, Professor, Department of Geography and Environmental Studies, University of Rajshahi and Dr. Md. Redwanur Rahman, Assistant Professor, Institute of Environmental Science, University of Rajshahi, Bangladesh. The thesis or part thereof has not been previously submitted to any other University or Institution for any other degree or diploma.

I declare that no part of this thesis has never been published anywhere in any form.

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Certificate

This is to certify that **“Sustainable Land Management: Policy Implication and Sectoral Achievement”** submitted by Mr. Md. Shamsul Alam for the award of the degree of Doctor of Philosophy in the Institute of Environmental Science (IES), University of Rajshahi, is based on the results of his own research work. I supervised his research directly as a co-supervisor with his principal supervisor Professor Dr. Raquib Ahmed, Department of Geography and Environmental Studies, University of Rajshahi. I believe that Mr. Alam has made some distinct contribution in the field of Environmental Science.

The thesis or part thereof has not been previously presented for any diploma or degree except due references wherever needed. I gladly recommend the thesis to be submitted for the awarded of the degree of Doctor of Philosophy by the university of Rajshahi.


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Abstract:

Present investigation deals with the "Sustainable Land Management: Policy Implication and Sectoral Achievement". It was conducted from the period of three years (July'2003 to June'2006) in the Barind tract (Nachole *Upazila*) and Chalan *Beel* area (Singra *Upazila*). The Chalan *Beel* area lies between 24°35' to 24°70' North latitude and 89°10' to 89°35' East longitudes. The total area of Chalan *Beel* area is 368 sq km. Barind tract lies between 24°20' to 25°35' North latitudes and 88°20' to 89°30' East longitudes. Total area of Barind tract is about 7,770 sq km. The investigation was designed with land management system of Bangladesh and degradation due to inadequate existing policies and improper implementation of existing laws in Bangladesh.

The present study has observed that there are many laws and government policies to manage the land of Bangladesh such as **The Non Agricultural Tenancy Act'1949, The Land Revenue Act'1949, The State Acquisition and Tenancy Act'1951, The Tax Rules'1962, The Vested Property Act'1966, The Agricultural Pesticides Ordinance'1971, The Bangladesh Irrigation and Water Rate Ordinance'1983**. Most of these laws were prepared during British and Pakistan periods. These ancient laws were prepared and enacted for their own interest and in ancient time. But now the scenario is changed. The formal Bengal province is now fully independent country. The land use pattern has been changed and population has been increased. Man land ratio has been decreased. The excessive landuse and improper landuse change are causing land degradation. The socio-economic problems are rising due to improper land management. The population is much more than the affording capacity of the area. The people need foods, shelter and others from the limited land. The farmers are trying to produce much food from the limited land resource. They are using chemical fertilizer, insecticides, HYV seeds and other harmful things in agricultural land without considering its consequences and future. But there are not laws and policies to stop or to reduce of these harmful activities. Even the existing laws and policies are encouraging them to use the harmful activities such as **The Canals Act'1864, The Irrigation Act'1876, The Destructive Insects and Pests Act'1914, The Agricultural and Sanitary Improvement Act'1920, The Tanks Improvement Act'1939, The Agricultural Pesticides Ordinance'1971, The Bangladesh Irrigation and Water Rate**

Ordinance'1983. Though recent policies are emphasizing to reduce those chemical fertilizers and pesticides in agricultural land. But these policies and laws are not implemented properly. There are 24 agricultural laws and 7 policies passed by the government of Bangladesh to develop the agriculture. Impact of these laws and policies on agriculture environment and other environmental sectors examined and found that due to these laws agriculture production increased significantly but there are some adverse effects such as wetland degradation and deforestation due to conversion of these lands into agriculture. There are no enough provisions in these existing laws and policies to mitigate these problems. It is also found that the existing laws and policies are inadequate to cope with the environmental problems such as decreasing fertility.

Wetland is a part and parcel of the environment and fisheries production. Population increasing and human intervention resulted natural fish scarcity in recent. The government of Bangladesh introduced 12 laws and 7 policies in different period to increase fish production for meeting up the increasing demand and to develop and conserve the fresh water in Bangladesh.

There are many lands of which the owner is government. These government owned lands are called *Khas* land. These *Khas* lands can play a vital role to alleviate poverty from Bangladesh. But improper distribution and improper management of *Khas* land create many socio-economic problems. The government of Bangladesh prepared many laws and policies in different times to recovery from the illegal occupiers but success is very poor. It is observed in this research that the authority can not recovery the *Khas* land from the illegal occupiers. In case of limited land, it is expected that the situation is going to worsen in future unless otherwise it is checked.

The proper laws, acts, regulations, government policies are not being implemented properly which is a reality.

So we must prepare a proper and sustainable land management policy that causes into effect for our better future.

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Abbreviations:

ADB	Asian Development Bank
AEZ	Area of Environmental Zone
BADC	Bangladesh Agricultural Development Corporation
BARC	Bangladesh Agricultural Research Council
BBS	Bangladesh Bureau of Statistics
BMDA	Barind Multipurpose Development Authority
BWDB	Bangladesh Water Development Board
C. S	Cadastral Survey
°C	Degree Celsius
EU	European Union
et al.	<i>et alia</i> (= and others)
etc	et cetera (= and so forth)
FAO	Food and Agricultural Organisation
HYV	High Yield Variety
Km	kilo meter
Mm	millimeter
NGO	Non-governmental Organisation
no	Number
R. S.	Revisional Survey
S. A.	State Acquisition
Tk	Taka
TW	Tube-wells
UN	United Nations
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
WB	World Bank

Bangla Terms

<i>Amin</i>	: Surveyor
<i>Beel</i>	: Low-lying depression on the floodplain that generally retains water throughout the year
<i>Boar</i>	: Water body similar to an oxbow lake
<i>Barga</i>	: Rented land
<i>Bargader</i>	: The peasant who takes land for cultivation from the landowner as a rented land.
<i>Chakla</i>	: Small Administrative area larger than <i>Sarker</i> during <i>Sultani</i> period
<i>Char</i>	: Beach in the river
<i>Haor</i>	: Extended depression between the levees of a river; saucer shaped with a deep central part, which is perennial
<i>Jaminder</i>	: Feudal landlord/revenue collector
<i>Jalmahal</i>	: Water bodies leased only by government - a water estate
<i>Kanungo</i>	: Chief of Surveyors
<i>Khas land</i>	: All kinds of government lands
<i>Mouza</i>	: Smallest land revenue unit of an area

Pagona : Small Administrative area less than *Sarker* during *Sultani* Period

Sarder Matber Mondal: Local leader

Sarker : Administrative area during *Sultani* Period

Tohsil Office : Land Office

Tohsilder : Chief staff of land office

Union Parishad: Lowest level of administrative organization

Upazila : Administrative Area lower than District

CHAPTER ONE

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INTRODUCTION

The land management system of Bangladesh leaves an age-old practice. The region was ruled by different nations in different times with their different cultural backgrounds. For this reason mixed and controversial types of issues are existing in the land management system of Bangladesh (Majumdar, 1988). Initially the Hindu kings ruled this country (Rahman, 1997). Afterwards, the Buddhist kings established Kingdom and ruled the country for a long period of time. They ruled Bangladesh more than 400 years. Then, the Hindu kings took control of the power once again from the Buddhists. In 1204 the Turkish warriors conquered Bangla and established a new Sultani kingdom (Sastri and Srinivaschari, 1989; Bhatia, 1988). They rearranged the new land management system according to their own ideas (Rahman, 1997) and administrative convenience.

The British took the political power of *Bangla* (Rahman and Masud, 2003) and established a new land management system, which is basically an inheritance of British system to adjust with the imperial occupancy. In 1947, India was divided into two major parts called India and Pakistan (Rahman, 1997). Pakistan consists of two provinces, East Pakistan and West Pakistan. During Pakistan period, the prevailed British land management laws and procedures were followed more or less, (Haq, 2000) by which Pakistan government administered their land management system. Afterwards, they enacted some new laws along with the British laws. At present most of the land laws, which are being used in Bangladesh, are inherited from the British and Pakistani land laws (Alberuni, 2002).

The former British and Pakistani laws were not unique maintaining the sustainable land management. It takes much time to settle land-related disputes. The former British and Pakistani laws, along with Bangladeshi present laws, are not really effective. With these particular old and antique laws, the land management systems are suffering from different complexities and the land justice is delaying. So the idea of a sustainable land management system in the country is still a matter of future.

We are to face too many problems originated from natural disasters along with land cover related problems. Thousand hectors of land are going under river water due to heavy inundation and riverbank erosion. Every year river water overflows and sweeps away many houses, crops, valuable materials and some times it causes widespread death of human and animals.

Although floodwater deposits heavy silt, which turns the soil fertile, but its negative impacts are more vivid than positive effects. The farmers usually over cultivate the land to get quicker benefit from flood production. Consequently, heavy load is imposed on the land and it turns the land fertility loss. Moreover, the injudicious

application of chemical fertilizer is bringing land degradation quickly. Some important causes are presented below to show the land loses and its fertility (BARC, 1999).

Table: 1.1.

Land degradation types and its situation in Bangladesh

Sl. No	Types of land Degradation	Areas (in m ha) affected by different degrees of degradation				Total area (m ha)
		Light	Moderate	Strong	Extreme	
1	Water erosion	0.100	0.300	1.300	-	1.700
2	Bank erosion	-	1.700	-	-	-
3	Soil fertility decline	3.800	4.200	-	-	8.000
4	Water logging	0.690	0.008	-	-	0.700
5	Salinisation	0.290	.0430	0.120	-	0.840
6	Pan formation	-	2.820	-	-	2.820
7	Acidification	-	0.060	-	-	0.060
8	Active floodplain	-	-	-	-	1.530
9	Deforestation	-	-	-	-	0.300
10	Barind	-	-	-	-	0.773

Source: Land degradation situation in Bangladesh, Soil Division, BARC, 1999.

The above table shows that 8 million hectares of land have been lost its fertility. The main cause is due to land degradation. Causes for land degradation can be man made and natural. The man made cause is liable to degrade the land in Bangladesh. Men perform their works on land to fulfil their needs. Much food is essential to meet up the demand of the need of population. So the people usually put over pressure on the land to produce more food by using injudicious and harmful chemicals and insecticides, which reduce the soil fertility (Khan *et. al.* 2000).

Various harmful changes are being taken place over land due to various landuse patterns. The people have turned single harvested land into two, two harvested land into three without giving any rest or gap or sustainable land management. Dimension of cultivation over land is increasing day by day. The farmers do not stop cultivation in mid period between two crops. This time is necessary to grow up natural elements of soil. For being economically poor, people are cultivating the land intensively without considering soil fertility and productivity (Barrow, 1994). For this, essential

elements of topsoil are decreasing day by day. That's why topsoil has been lost its fertility (Khan, et. al., 2000). On the other hand, random use of cultivable land by increasing urban infrastructure leads to degradation of cultivable land continuously. Population needs many roads, houses, markets, offices, industries, mosques, schools, colleges, universities, factories and parks. So the people are using cultivable land to fulfil their needs. The different chemical waste from different mills and factories are being mixed with soil and subsequently degrade the fertility and pollutes the environment (Islam, 1992).

The detrimental changes are being taken place in environment due to harmful change of topsoil. The fertile soils lose its fertility for decreasing its essential elements. According to the famous scientist Raven and Berge (2001) "Soil organisms include plants, algae, fungi, earthworms, flatworms, roundworms, animals such as moles and ground hays". These soil organisms like earthworms, toads and beneficial insects are decreasing in Nachole area of Barind tract for excess use of chemical fertilizers. At present the farmers are using 60 kg urea fertilizer per acre in Nachole area but they used only 15 kg before 20 years. Although the crop production is same, the soil is decreasing its fertility. The peasants consider the quantity of crop production but not the condition of soil. In the past it was possible to produce enough paddies without using chemical fertilizer. Now the scenario has been completely changed. Today it is nearly impossible to produce paddy without using chemical fertilizer.

In former time, the farmers of Nachole *Upazila* would cultivate cauliflower, *Shonn pat* (*Capsularis olitorius*) and *Doincha* type of green plants to enrich soil fertility. With these green plants' leaves and roots. would rebuild its fertility. At present, the land does not get any rest to rebuild its natural elements, which helps to restore its fertility. According to Raven and Berge (2001) "Crop rotation is the planting if a series of different crops are planted in the same field over a period of years. Crop rotation prevents depletion of certain nutrient minerals that occurs when the same crop is grown year after year". At this deadly condition, no effective step has been taken yet to protect these harmful changes. As being a smaller country with over population, the people have very little land per capita in Bangladesh.

The *khas* land in different districts, *Upazilas* and *Unions* is occupied by illegal people. They posses not only these *khas* land but also a vast quantity of *char* land or wetland (marshy land). Some of those illegal owners have false documents, some are making

false documents and some are enjoying this government land by force. Since the independence to till now, the government has been trying to rescue the *khas* lands but success is very little. Still many *khas* lands remain under the possession of illegal owner (Haq, 2000). Illegal owners abundantly use this *khas* lands without any plan. For this, the land degradation occurred much. The land degradation is increasing day by day for the lack in land management and improper implementation of *Khas* land management. The owners of land, changing of land ownership, corrections and quantity preservation methods are very old. Consequently, land related problems are being arisen and turned into cases, which breaks the country's law and order situation. The corrupted employees of the government related to land are allotting the *Khas* land to the rich people illegally. The different issues such as corrupt employees, careless administrators and lack in the government management lead to increase the land degradation (Haque, 1992). Ignorance, unplanned landuse, unplanned infrastructures are other causes for land degradation of study area in Nachole and Singra *Upazila*. On the other hand, the low marshy land in Singra *Upazila* is being used for agriculture purpose abundantly. The sustainable land management system is not being followed in both Nachole and Singra *Upazila*.

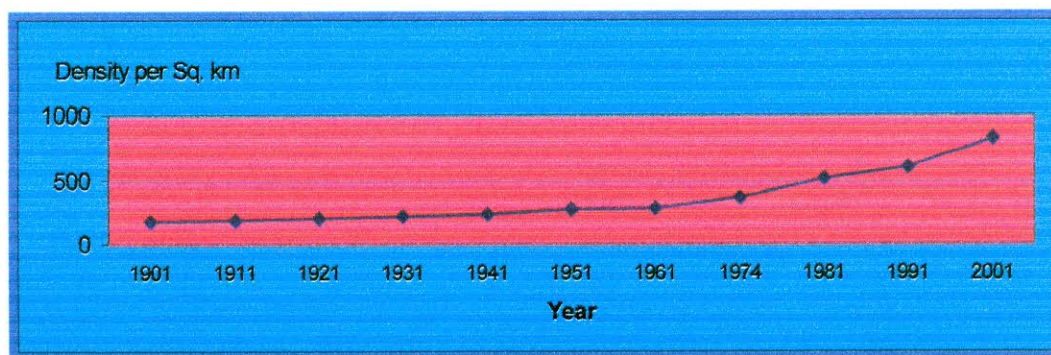
Irrigation is essential to fulfill the water requirement in the agricultural land. This vast need of water in agriculture is mostly dependent on underground water in Nachole and Singra *Upazila*. The farmers are using the underground water lifting by tube-well, semi tube-well, and deep tube-well to irrigate. The underground water is decreasing for abundant use in agriculture. Infrastructures like roads, government buildings, government offices, houses, markets, non government offices, industries, factories, mosques, schools, colleges and parks have been set up proper planning and sustainable land management which is causing land degradation.

1.1. Statement of the problems:

Bangladesh is an over populated country. The total area of this country is 1, 47,570 square km and the total population was above 12 crore in 2001 (Census, 2001) and the total area is not cultivable. The total area includes hills, rivers, forests, canals, and wasteland. So per capita share of fertile land is very little. The people depend on this little land to meet up population's needs. Every year the population is increasing. The ratio of population increasing in Bangladesh is as follows (Graph No 1.1. and Appendices Table No.1.1.):

Graph No: 1.1.

Population density of Bangladesh in different years:



Main Data Source: Population Census of Pakistan 1961

Bangladesh Population Census, 1974, 1981, 1991 and 2001.

The above graph shows that the increasing rate of population is very high. The population is increasing rapidly so per capita share of land decreasing. In 1901, the total population was 27 millions (Census, 1961) but it turned into 35.5 millions after 40 years (Census, 1961). Nevertheless, it was 54.5 millions in 1974 and it turned into 123.1 millions at last in 2001 (Census, 1974; 2001). The population density is increasing due to increased population with the increasing population.

The population densities were 284, 285, 369, 518, 609 and 834 persons per sq. km respectively in 1951, 1961, 1974, 1981, 1991 and 2001 (Census, 1951; 1961; 1974; 1981; 1991; 2001). Only 183 people lived in per square km in 1901 but 834 people lived in per square km in 2001 (Census, 1961; 2001). The difference is clear that 604.35% people increase within 100 years.

Vacant agricultural land is being used to meet up the excess demands of rapidly increasing population. Building of infrastructures such as houses, academic institutions, offices, industries, roads and highways are exacting pressure on vacant agricultural lands

There is no perfect law for using agricultural land. This land related problems could appear in vast manner in future all over the country (Khuda, 2001). Therefore, it will not be wrong to say “there is no alternation of sustainable land management”.

If we want to discuss about the sustainable land management in Barind or Chalan Beel area then first we should have to bear some clear idea about the research field. Barind area includes the district of Rajshahi, Dinajpur, Rangpur, Bogra and some parts of Pabna district. Barind is the landmass in between the two rivers Korto to the east and

Mahananda to the west (Khan *et. al.* 2000). The land feature of the area is little different and high than other plain areas of Bangladesh. As river flows from upper to lower region of Barind and deposits heavy silt, so its topsoil is very fertile. The population of Barind area has so much pressure over agricultural land. To produce more crops people are to irrigate in dry season. Only groundwater is the main source for irrigation in agricultural land of Nachole *Upazila*. Therefore, the level of underground water goes downward (Khan, *et. al.* 2000). According to environment rules if any one wants to set up a tube well, he/she has to take permission from the authority of that particular *Upazila* (Farooque and Hasan, 1996). But it is not followed in Nachole or Singra area. There are not enough rivers in Nachole *Upazila* (Map No. 1). Only the Mahananda river flows on the West Side of Nachole, which does not have any streams to flow over Nachole *Upazila* (Land and Soil Resource Development Indicator of Nachole *Upazila*, 1997). The field of research (Nachole or Singer's land) is not favorable for agriculture. There is no water source to irrigate cultivable land except underground water in Nachole *Upazila*. The groundwater of Nachole *Upazila* has been reduced for its excess use in agricultural land (BMDA, Nachole *Upazila*).

The Chalan *beel* consists of a part of Natore, Pabna and Sirajgonj district. The Chalan *beel* region is little lower than other areas of Bangladesh (Banglapedia, 2005). Many rivers flow over the Chalan *beel* like Atrai, Baral, Tulsi, Ganga, Nagor, Shib, Korotoa and Ghaghot (Khan *et. al.*, 2000). During rainy season water of all rivers come into the Chalan *beel* area and fills it to its brim. To plug up lower part of the Chalan *beel* for agricultural plays an interruption on sustainable land management. The Chalan *beel* area is not favorable for agriculture but people have made it cultivable by making it plain and flat. Thus, the Chalan *beel* is losing its original shape, size and depth (Khan, *et. al.* 2000). During the rainy season it fails to hold profuse floodwater and consequently the over flood becomes detrimental and residential areas.

Floodwater carries sand or silt. When floodwater appears in cultivable land. The sand deposition plays a negative impact on agricultural land and its production. The heavy silt deposition in Chalan *beel* area is remarkable. The latitude of Tropic of cancer dashes over Bangladesh. So geographically, it is called tropical climate area (Haq, *et. al.*, 1990). In summer season, wet monsoon wind comes from the Bay of Bengal and cause heavy rainfall. So many geographers called it monsoon climate zone (Land and soil resource development indicator of Singra *Upazila*, 1997). Moreover, being

located behind Himalayan Mountain its land composed with silt of Gangian valley. Ninety percent of total lands are formed with deposited silt of Padma, Meghna, Jamuna and Bramaputra. For high density and vast food requirement, people use chemical fertilizer to produce more, which decreases fertility of land. This pattern of land use causes land degradation. The land related problem's discussions are as follows:

Land degradation:

“Land degradation in arid, semi-arid and sub-humid area is resulting from various factors, including climatic variations and human activities” (Khuda, 2001). The land degradation is a process that loses its essential elements on which the life spans of trees and plants are related to get proper nutrition (Zuberi, 1998). Again Barrow stated that some joint activities of both man and nature can play a vital role to degrade the land.

According to Barrow (1994)

Land degradation = Natural land degradation + Man made land degradation.

Many scientists describe land degradation with different views. Some of them say that land degradation is such a process in which land loses its essential elements of plants' nutrition and productivity. The plants and trees cannot grow in degraded land. By land degradation, we mean destruction of living organic or non-organic elements of soil like little plants and animals (Barrow, 1994).

In Chalan *beel*, the lower area is blocked up with silt and soil and made the low land into plain to produce crops. In the rainy season, water cannot stay in Chalan *beel* area and it turns into agricultural land. The agricultural land goes under floodwater and sand deposits in agricultural land decrease soil fertility. Therefore, the land of Singra *Upazila* is degraded for such type of activities. On other research field of Nachole, the land loses its fertility for using chemical fertilizers and insecticides. Moreover, arsenic and iron are depositing with uplifting underground water and degrading the land. The government has not taken any step as yet to protect the land degradation.

The laws and regulations for protection of all marshy lands of Bangladesh are the same. The important rules and regulation are “**The Land Management Manual'1991**”, “**The Environmental Conservation Act'1995**”, “**The Environmental Rules'2001**” are existing but these procedures are not being implemented properly. Due to lack of implementation of those laws the marshy lands of the Chalan *beel* area can not be protected from such impacts.

Want of proper laws to protect land degradation:

Most of the existing laws, procedures, ordinances, rules were made by the British East India Company and Pakistan. They had greedy eyes towards land to get maximum benefit from land. Their laws, rules, procedures, ordinances were only for their interests. In 20th century information technology, communication system has been developed by leaps and bounds in course of time but land laws exist similar. Different acts like **The Canals Act'1864, The Irrigation Act'1876, The Registration Act'1908, The Destructive Insects and Pests Act'1914, The Agricultural and Sanitary Improvement Act'1920, The Tanks Improvement Act'1939, The Non Agricultural Tenancy Act'1949, The Land Revenue Act'1949, The East Bengal Evacuees Act'1949, The State Acquisition and Tenancy Act'1951, The Tax Rules'1962, The Vested Property Act'1966, The Ghatwali Land Laws'1969, The Agricultural Pesticides Ordinance'1971, The Bangladesh Irrigation and Water Rate Ordinance'1983** are existing in the country (Farooque and Hasan, 1996; Alberuni, 2002; Rahman and Masud, 2003). Most of these acts and laws are unable to protect the land degradation. Such acts were made according to the formal social and economic conditions. These old and selfish laws have failed to ensure the proper land management and to protect land degradation.

Want of proper implementation of laws and want of awareness:

The Department of Environment, Government of the Peoples' Republic of Bangladesh looks after the implementation of laws to conserve the environment (Farooque and Hasan, 1996). However, some inaccuracy and lapses have been found in laws and rules. So it is found that some corrupt people cut out forests and road side trees and make out forest empty (Khuda, 2001). In many parts of Bangladesh, the government took responsibility to protect the forests with fair announcement but success is little. The people are building infrastructure but not according to sustainable land management. It is not possible to implement valid environmental acts for corrupt and careless related executives (The Daily Independent, 1999).

Some important laws such as **The Agricultural Pesticides Ordinance'1971, The Bangladesh Rice Research Institute Act'1973, The Jute Research Institute Act'1974, The Bangladesh Agriculture Research Institute Ordinance'1976, The Seeds Ordinance'1977** (Farooque and Hasan, 1996). are prepared after independence but these acts are not being implemented properly. The British East

India Company harassed peasant with land related laws so that the peasants afraid of the British East India Company and never thought to rise against the British (Haq, 2000). That is why the old peasants are not conscious about land. It is one of the causes to implement the laws, other problems to implement the laws for want of technology, economic problem, lack of appropriate knowledge of land, carelessness and corruption of law enforcing institution's staff

1.2. Hypothesis:

Hypothesis is very essential to advance a research work. Because the research work advances on the basis of hypothesis. After side inquiry hypothesis proves as a fact then it is taken as a theory or if not the researcher takes new one. There are two important areas in Bangladesh, these are Barind tract and another is Chalan *beel* area. Two areas are very important to conserve environment. The environment is very important for human life. Primarily we select the following problems of above two areas. These are

- The land degradation is continuously increasing
- Want of proper land related laws and implementation problems.
- Want of mass awareness about land and land related laws.

The field of research, Nachole and Singra's land have lost its fertility for using chemical fertilizer that's why now it is difficult to produce any crop without using chemical fertilizer. Only 20 years ago, it was possible to produce any crop in similar land without using any chemical fertilizer. At the initial period of using chemical fertilizer, the people used very little fertilizer and got maximum benefit. Now the thing has been changed to great extent. Today it has been impossible to produce as many crops as before by using redouble quantity of chemical fertilizer than before. At present, the land needs about double amount of fertilizer than before. The land degradation is not stopped but it is increasing. Land related problems are arising due to lack of facility for applying appropriate land laws. There were some problems in land laws. Some laws were amended and some were banned and most of them are existing. After the emergence of Bangladesh some new laws regarding land related purposes such as - **The Agricultural Pesticides Ordinance'1971, The Bangladesh Irrigation and Water Rate Ordinance'1983, The Ground Water Management Ordinance'1985, The Bangladesh Water Resource Planning Act'1992** were drawn up (Farooque and Hasan, 1996; Alberuni, 2002).

The Bengal Alluvion and Dilluvion Regulation'1825, The Bengal Dilluvion (Amendment) Act'1868, The Bengal Dilluvion Land Act'1920 were amended (Alberuni, 2002). Lastly **The State Acquisition and Tenancy Act' 1951** was amended which was related to alluvion and dilluvion of land. If any *char* land (island) arose in the river, the ownership of the *char* land went to the *Jaminder*. But now it will be the government's property at first. Then if any one claims for the land, which had gone in the river within 30 years, the government will distribute to the owners but not more than 60 bigha. In addition, if there is no proper claim the government will be the owner of the land. The government may arrange every thing for distribution among the landless peasants (Haq, 2000; Alberuni, 2002; Rahman and Masud, 2003). However, in the study area of Singra *Upazila* (Map No. 2) it is seen that the local influential people occupied this type of land. In Katuabari area of Singra *Upazila* all the dilluvion, land was illegally occupied. The Government's land, which is called *Khas* land, was not properly distributed among landless peasants though there were laws to distribute among them.

1.3. Theoretical background:

Many scientific investigations on environment are being carried out through the world. These investigations are carried out mainly with air, water, soil and others. Now at present land related research is being important for Bangladesh perspective because land is very limited comparing with population. Population is increasing rapidly on the other hand per capita share of land is decreasing. That's why people are trying to mitigate the demand of increasing people. As a result land is degrading day by day. Without proper management it is impossible to preserve land. But on this topic or related topic's research is not performed. So far, the researcher has come to know about this topic, there is no research work or on this field or the topic related. But there is compilation on land in the form of textbooks. A few of them are published as an article or relevant discussions are here:

Mohammad, (2005) focused on environmental laws of Bangladesh that after independence, Bangladesh has gradually unplanned infrastructure development and unwise resource utilization, this government conserving the environment and environmental resource. But the existing laws and policies are not adequate to mitigate the problems and a few numbers of laws and policies are well but these laws and policies are not properly implemented.

Haque (2000): Most of the people of Bangladesh farmers and they were being oppressed by British and Pakistan. They prepared and enacted to rule the peasants. But their old laws and policies are still running on in the courts of Bangladesh. Most of these rules and regulations are not well enough to manage the land related problems.

Alim (1974) "An Introduction to Bangladesh agriculture, attempted to explain the agricultural land and land improvements, agricultural crop statistics, crop yields, cropping pattern, crop rotation, green revolution and its impacts in agricultural production. So it was also an attempt to project a broad picture of agricultural situation with particular emphasis on the development.

Rahman (1979) focused on mainly the scope of promoting future growth of agricultural situation. In this study he also tried to identity the factors; to agricultural growth and degradation.

Hossain (1984) focused on the growth of Bangladesh agriculture and factors contribution. He pointed out that agricultural production has been increased significantly due to use of chemical fertilizers, pesticides and HYV technologies but these things have impact on land.

Khan and Rumi (1989) revealed that the impact on physical environment such as landform, soil and climate on the changing pattern of agricultural landuse of the study area for the period 1962-88. They also discussed the changing social and economic condition of the study area.

Islam and Halim (1976) found positive relationship between land ownership and adoption.

Hossain (1976) revealed that the level of knowledge of rich farmers were the most significant factors influencing adoption of modern rice varieties and its production.

Hossain (1973) focused on irrigation water increased the use of resources and yield. Irrigation facilities changed the cropping patterns.

Refakatullah (2002) focused on rural land management that the condition has to be changed by adopting dynamic approach on building up rural infrastructure by formulating economic policy to remove poverty and agricultural employment and by putting more emphasis on landuse planning for the optimum use of land resources.

Basher (2006) quoted that major soil nutrients were at higher levels under plantation sites as compared to their non-plantation sites.

Rana (2005) has studied on “the development of urban agriculture: a case study of Rajshahi metropolitan area. The study found that the soils are used for extensive vegetable cultivation are degraded remarkably. The farmers also relies it’s for the gradual decrease of productivity. They have to use more agrochemical gradually over the year to maintain productivity.

Hasan (2000) has studied on assessment of diversity of algal plants in Chalan *beel* area in relation to physio-chemical conditions. His study has proven that the depth and area of Chalan *beel* area is reducing gradually, some important plants and fisheries of the Chalan *beel* are also reducing rapidly.

Maniruzzaman (2000) has stated that nation will face a great problem very soon for their destruction activities and mismanagement of land. Harmful chemical fertilizers and pesticides use in agricultural land declines the soil fertility. The demands of people needs are increasing for rapid growth of population. These needs are to fulfill from the land but this land is degrading. So land management systems should be developed.

Siddique (2004) stated that most of the cases of the court are related to land. The main causes of terrorist activities of Bangladesh are related to land. And most of the development works such as agriculture, industry, social and overall economic developments depends on land. So a proper land management system is very much important for the country.

Mia (2004) described about land management of Bangladesh. He told that every development is originated from land. Human development, social development economic development and state development depend on land management.

According to Land Management Manual (1990) the government’s former policies are not implemented properly. A great number of *Khas* lands are remaining for distribution to the landless. On the other hand landless are increasing day by day. Skilled farmers are decreasing and pressure on land is increasing. For this proper land management system is very important.

Paul and Sarker (2001) told that natural resources are being destroyed for meeting up the demand of increasing population. The biodiversity are being destroyed as a result. Settlement building up is one major cause of them. That’s why a sustainable land management can play a vital role to mitigate this type problem.

Islam (2004) states that after independence of Bangladesh total fifth five year plans have been prepared. Many development initiatives have been taken in hand such as

industry, agriculture, forestation, transportation and communication development project but only 16.01% project works are completed. So the government's policy implication and social achievement are important.

Annual Agricultural Report of Nachole *Upazila*: Agriculture is the main activities of this *Upazila*. Most of the crops excluding *Aman* paddy are cultivating on only ground water resource.

Annual Agricultural Report of Singra *Upazila*: According to this *Upazila* Agricultural report the main activities of this *Upazila* is also agriculture. The total area of Singra *Upazila* is 52,778 hectare and cultivated area is 40,565 hectare. The biotic elements of soil are decreasing. Flash flood is a major problem of Singra *Upazila*. The canals, rivers and wetland are being filled up.

Islam (1999) stated that the cropping pattern should be changed due to flood.

Khan (2003) described in his research paper that sustainable development is dependent on proper policies.

Islam (2001) stated that the utilization of groundwater resources for greater benefits is dependent on adequate hydrological data, from which the full potential of development is determined. So to assess the sustainability of the groundwater yield it is necessary to examine carefully the nature of the aquifer system.

Khan, (2002) Stated that if development implementation is to be substantially improved, planners and managers in developing countries must begin using more effective methods for analyzing potential obstacles, identifying preconditions for change, specifying management needs and coping with the environmental factor that influence the management of development initiatives. Management must, hence, become more concerned with designing and testing analytical methods and operating procedures needed for successful implementation and operation.

1.3.1. Definition of key terms:

For any scientific research definition of key term is inevitable for the purpose, definition of key term on sustainable land management and related issues are reviewed both on national and international. These are as follows:

Land:

United Nation's Organization, FAO and UNEP quoted "The term land, as employed in land evaluation, landuse planning, , has a wider meaning than just soil. It refers to all natural resources, which contribute to agricultural production, including livestock

production and forestry. Land thus covers climate and water resources, landform, soils and vegetation, including both grassland resources and forests” (Khuda, 2001).

Land means either cultivable or uncultivable and swampy or muddy soil that has an ability to produce some profit, which is called land. It may include houses, buildings or any land related things (Alberuni, 2002)

According to Professor Keeton, “To attempt to establish a single satisfactory definition of law is to seek confine jurisprudence within a straitjacket from which it is continually striving to escape.”

Law:

Professor Paton says, “Law may be described in terms of a legal order silently or formally accepted by a community considers essential to its welfare and which is willing to enforce by the creation of a specific mechanism for securing compliance”.

Professor John Austin says, “Law is the aggregate of rules set by men as politically superior or sovereign, to men as politically subject” (Rahman, 1993).

Holmes Black Stones definition is “A rule of civil conduct, prescribed by the supreme power in the state commanding what is right or prohibiting what is wrong” (Chandrachud, 1997).

Act:

passed by the Parliament is called Act. Act used with reference to an offence or a civil wrong, shall include a serious acts, and words which refer to acts done, extend to illegal omissions.

A term is generally relating to something done outside court. This word also signifies the statute relating to the definition of differences, or enforcement of law, after obtaining the assent of the highest authority.

The great lawyer and specialist Mark says, “An act, as I understand it, is an event regarded as under human control. There are on the other hand, few events by which man is in any way affected the results of which might not have been changed has his conduct been different. Few events therefore, strictly speaking, be said to be either altogether dependent on human control and I know of no reason why they should depend in some measure upon the conduct of the party who has control over them” (Ayer, 1934).

The word 'Act' appearing in the order was not such which would include the act of pleading, and was intended to cover only such acts as are capable of being done in the act of acting for a litigation.

Act means and includes the power to examine and cross-examine witnesses and address the court (Aiyar, 1997).

Ordinance:

The word 'Ordinance' has a recognized meaning in legal terminology namely the expression of the legislative will of the Executive Head of the Government when the national Assembly is not in session (Khan, 1968).

In modern times the term 'Ordinance' is used to signify a rule or body of rules enacted by an authority less than sovereign. Ordinance promulgated by the president or the Government of any state when the legislature is not in session; a class of delegated legislation (Aiyar, 1997).

Ordinance means Law of rules enacted for an emergency (Aiyer, 1993; Ayer, 1934).

Bills:

Originally meant a sealed written paper but now it means as account showing a sum as due for goods purchased. And in law terms it is a proposed law, requiring support of both houses and the governor's action for enactment. A written presentation to a legislative body proposing certain legislation for enactment into law. Bills may originate in either Parliament, except as noted below, and must be passed by both Parliament and approved by the President before they become law or, if disapproved by the President, must be passed over his veto by a two-thirds vote of each Parliament. If a bill is passed within the certain period preceding the adjournment, the President may withhold approval and the bill will die (pocket veto). Bills for raising revenue, according to the Constitution, must originate in the Parliament.

A formal statement or declaration of a thing in writing; a formal written statement of complaint to a court of Justice; a written accusation of one or more persons of a crime; a common engagement for money, given by one man to another, a note or the absolute payment of money; an order drawn by one person on another to pay a third a certain sum of money, absolutely another to pay a third a certain sum of money, absolutely and at all events; a form or draft of law, presented to a legislature, but not

yet enacted, or before it is enacted; a proposed law; an account of Charges and particulars of indebtedness by the creditors of his debtor (Aiyar, 1997).

Decree:

Decree means in English the formal expression of an adjudication which, so far as regards the court expressing it, conclusively determines the rights of the parties with regard to all or any of the matters in controversy in the suit and may be either preliminary or final.

A decree is preliminary when further proceedings have to be taken before the suit can be completely disposed of. It is final when such adjudication completely dispossess of the suit. It may be partly preliminary and partly final”

(Takwani, 1997).

The word ‘decree’ as used in section 77 of the Registration Act, means a final decree and, if an appeal is preferred, the document may be presented for registration within 30 days from the date of appellate court’s decree.

Section 96 of the Code of Civil Procedures shuts out appeals against decree which give effect to the consent of the parties but not where the government of the Charge is that it has traveled beyond consent (Khan, 1968).

The definition of ‘Decree’ means that where the proceeding of the court finally disposes of the suits so long as it remains on the record (Ayer, 1934).

Order:

The word ‘Order’ used in section 77 of M. P Co-operative Societies Act, 1960 is comprehensive enough to include every decision, award or order, made under the meaning, Administration of Evacuee Act, 1950 is widest connotation and includes an act of confirmation of sale. It is not correct to say that it is not an order because there is no opposite party contesting against such a confirmation, because the custodian in whom the law normally vests all properties of evacuees is in effect either an order or judgment and the custodian has the power of review his own decision under section 40 of the administration of Evacuee Property Act (Aiyer, 1993; Aiyar, 1997).

Order means the formal expression of any decisions of a civil court, which is not a decree. Thus, the adjudication of a court is not decree of an order (Takwani, 1997).

1.4. Study area:

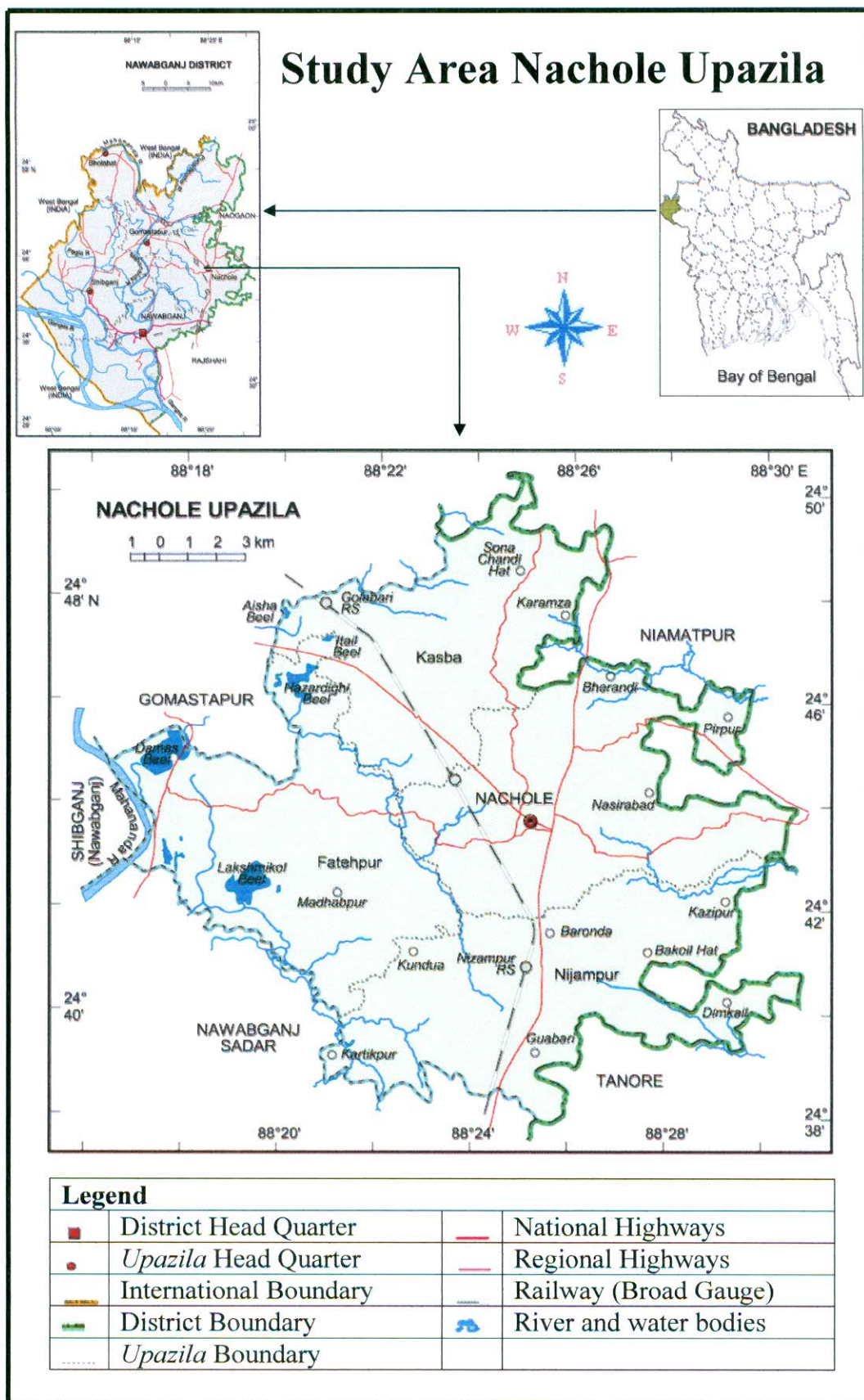
In any geographical study, it is very important to know the study field. This section deals with a brief outline of the study area i. e. area, location, climate and population of the study area.

Barind tract has been selected considering as a high land and Chalan beel has been selected as low land.

Barind Tract largest Pleistocene physiographic unit of the Bangla basin covering an area of about 7,770 sq km. Geographically this unit lies roughly between latitudes 24°20'N and 25°35'N and longitudes 88°20'E and 89°30'E. This physiographic unit is bounded by the Karatoya to the east, the Mahananda to the west, and the northern bank of the Ganges to the South. The Barind Tract covers most parts of the greater Dinajpur, Rangpur, Pabna, Bogra, Joypurhat, Rajshahi, Chapai Nawabganj, and Naogaon districts of Rajshahi division.

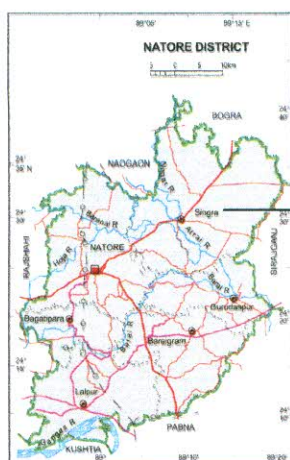
Chalan beel was formed when the old Brahmaputra diverted its water into the new channel of the Jamuna. Chalan beel was probably a backswamp before it was greatly expanded with the inclusion of abandoned courses of the Kartoya and the Atrai and became a vast lake. The formation of the Chalan beel is historically linked with the demise of the Atrai and the Baral. The Atrai or the Gur was the principal feeder channel of Chalan beel, which used to drain the districts of Dinajpur and northern Rajshahi. The Baral worked as an outlet of the beel and eventually found its way into the Jamuna. It was about 1,088 sq. km in area at the time it was formed.

Nachole Upazila (Map No. 1) is one of the most important Upazilas of Barind tract. It is a Upazila of Chapai Nawabganj district. Nachole Upazila is bounded by Gomastapur Upazila on the northwest, Shibganj and Nawabganj Sadar Upazilas on the southwest, Tanore Upazila on the southeast, Niamatpur Upazila on the northeast. Main river Mahananda; Lakshmikol, Aisha, Itail, Hazardighi and Damas beels are noted. In 1949, Tebhaga movement spread over Nachole under the leadership of Ila Mitra co-operated by the leaders of the Communist Party. The peasants of Nachole, specially the Santals were the main force of this movement. This movement is also known as 'Nachole Movement', or 'Peasant Movement of Nachole'. Population is 97119; male 51%, female 49%; Muslim 84.94%, Hindu 11.65% and others 3.41%; noted ethnic nationals are the Santals. The main occupation is agriculture 42.34%,

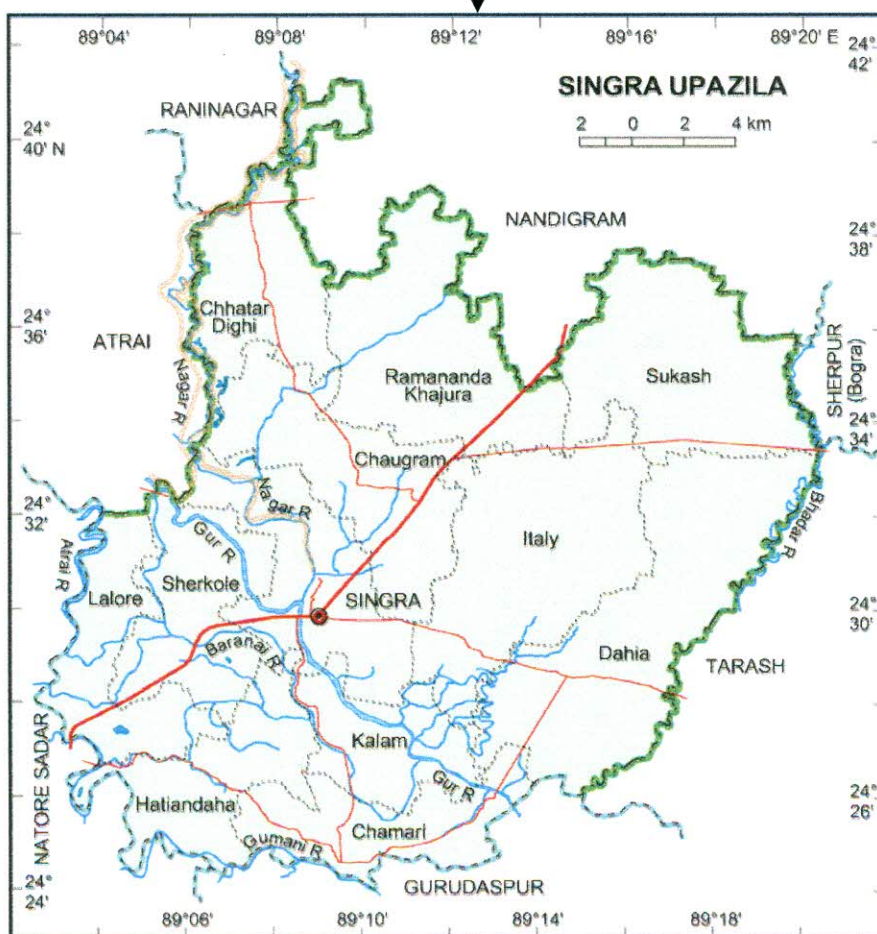


Source: Banglapedia, 2006

Map No. 1



Study Area Singra Upazila



Legend

	District Head Quarter		National Highways
	Upazila Head Quarter		Regional Highways
	International Boundary		Railway (Broad Gauge)
	District Boundary		River and water bodies
	Upazila Boundary		

Source: Banglapedia, 2006

Map No. 2

agricultural laborer 34.11%, wage laborer 3.44%, commerce 9.07%, service 2.8%, others 8.24%. The total cultivable land is 26325 hectares; fallow land 201 hectares; single crop 55%, double crop 42%, triple crop land 2.24% and fallow land 0.76%. Among the peasants 30% are landless, 39% marginal, 25% intermediate and 6% rich; cultivable land per head 0.16 hectare.

Singra Upazila (Map No. 2) is one most important area of Chalan beel. This Upazila is also a Upazila of Natore district. This Upazila is bounded by Nandigram Upazila on the north, Gurudaspur Upazila on the south, Tarash and Sherpur (Bogra) Upazilas on the east, Natore Sadar, Atrai and Raninagar Upazilas on the west. Noted rivers are Gur, Atrai, Baranai, Gumani, Nandakuja and Nagar. Singra thana was established in 1869 and was turned into an Upazila in 1983. It consists of 12 union parishads, 446 mouzas and 439 villages. The total population of this Upazila is 289952; male 51.29%, female 48.71%; Muslim 87.59%, Hindu 11.46% and others 0.95%; ethnic national is Santal. The main occupation is agriculture 52.12%, agricultural laborer 26.75%, wage laborer 1.79%, commerce 6.92%, service 2.32%, fishing 2.51% and others 7.59%. The total cultivable land is 40580 hectares; fallow land 1054 hectares, single crop 65.9%, double crop 29.7% and treble crop 4.4%. Among the peasants, 25% are landless, 22.5% small, 37.5% intermediate and 15% rich.

1.5. Objective of the research:

The main objectives of this research are to find out the lack of the rules or lack of the land management systems and necessity of implementation of laws. The present research objectives are as follows:

- (i) To find out the causes of land degradation due to the lack of government policy;
- (ii) To mark the problems in land management; and
- (iii) To prepare a recommendation for the solution of the problems.

The negative changes are observed in Nachole and Singra *Upazila*. It is becoming difficult to protect the land degradation as well as to conserve the groundwater in Nachole and Singra *Upazila*. The Chalan *beel* (marshy land) is being changed into agricultural land in Singra *Upazila*. These types of negative changes cause land degradation. The Chalan *beel* and the Barind tract area are two major important lands for this research. The Chalan *beel* area is marshy land and Barind tract is a little high

land. Nachole *Upazila* consists of the major part of Barind tract and Singra *Upazila* is one of the most important areas of Chalan *beel*.

Unsustainable land management in Nachole and Singra *Upazila*'s causes land degradation. Marshy land is very important for environment. The people are filling the marshy land to cultivate in Singra *Upazila*. As a result the rivers, canals, *beels*, are losing their natural depths and the weather is being dry and worm day by day in Singra *Upazila*.

The application of excess chemical fertilizers has decreased soil fertility in Nachole *Upazila*. Certainly the natural elements of soil help to grow plants which are being demolished for excessive use of chemical fertilizers and insecticides. There is no appropriate and enough rules to conserve the land in Chalan *beel* area. Groundwater is being lifted without any consideration of future plan. These bring harmful changes in land and environment. Laws and acts are not implemented properly. For example if any one wants to set up tube-well he/she has to take permission from the proper authority but there is none who has taken permission from the proper authority. Excessive lifting of groundwater causes various problems like arsenic problems, iron deposition in soils, which decline soil fertility. There is no mention in the laws, acts, regulations, ordinance to protect these activities like **"The Irrigation Act'1876"**, **"The Tanks Improvement Act'1939"**, **"The Embankment and Drainage Act'1952"**, **"The Bangladesh Irrigation Water Rate Ordinance'1983"**, **"The Ground Water Management Ordinance'1985"** **"The Water Resource Planning Act'1992"**

1.6. Work methodology:

1.6.1. Sampling selection:

The present research includes two different areas selected as study area. One is Barind tract and another is Chalan *beel* area. These two areas are located in the northern region of Bangladesh. The Barind tract and Chalan *beel* area are in Rajshahi division. Nachole *Upazila* has been selected from Barind *tract*. Nachole *Upazila* is one of the important *Upazilas* of Nawabgonj district (Map No. 1). Another study area is Singra *Upazila*, which is called the queen of Chalan *beel*. Singra *Upazila* is one of the important *Upazila* of Natore district (Map No. 2).

The present research includes the sustainable land management of Nachole and Singra Upazila. Some villages have been selected purposively to collect information from peasants, local elite and local administration, NGOs of Nachole and Singra Upazila. The data were collected on land use pattern, socioeconomic condition, environmental condition, soil condition, land management system, land related acts, laws, regulations, ordinances, rules, notices,

1.6.2. Quantitative methods:

Relevant data on various socioeconomic aspects were collected carefully. Available data were classified and presented by charts, tables, graphs and maps for effective and better representation.

1.6.3. Sources of data:

Reasonable data are collected from two important sources.

These are: (i) Primary sources and (ii) Secondary sources.

1.6.3.1. Sources of primary data:

- ☞ Household of concerned research area.
- ☞ Local leaders like *Sarder/Matber/Mondal*, Ward commissar, NGO workers
- ☞ Related persons like honourable Deputy Commissioner (DC), honourable additional DC (Revenue), Additional DC (Land), and Assistant Commissioner (AC) and town planner

1.6.3.2. Sources of secondary data:

- ☞ Related documents published from Bangladesh Bureau of Statistics (BBS)
- ☞ Different books, journals, reports, records, publications from different Government Organization and non-Government Organization
- ☞ Dhaka Law Report (DLR)
- ☞ Land Management Manual' 1991, published by ministry of land
- ☞ Land Administration Manual (2003), published by ministry of land
- ☞ Land and environment related major circulars published by ministry of land

In the present research, two types of survey have much importance. These are

- (i) Land use survey and
- (ii) Socioeconomic and environmental survey

1.6.4. Landuse survey:

Firstly all related maps and settlements like C. S., S. A. and R. S. have been collected and selected from the concerned research area to show the pattern of landuse and its change and to show the causes of land degradation.

1.6.4.1. Socioeconomic and environmental survey:

In this survey firstly, a unique set of questionnaire have been developed and justified by the supervisor. After printing the questionnaires, the information was collected from the study area. To conduct this research, the following steps have been followed.

1.6.4.2. Publication survey:

The land management is not less important than the landuse. Sustainable land management is very important for landuse management. To conduct this research a good number of books, documents, papers, journals, laws, acts, ordinances, rules were studied carefully that are enlisted in references chapter.

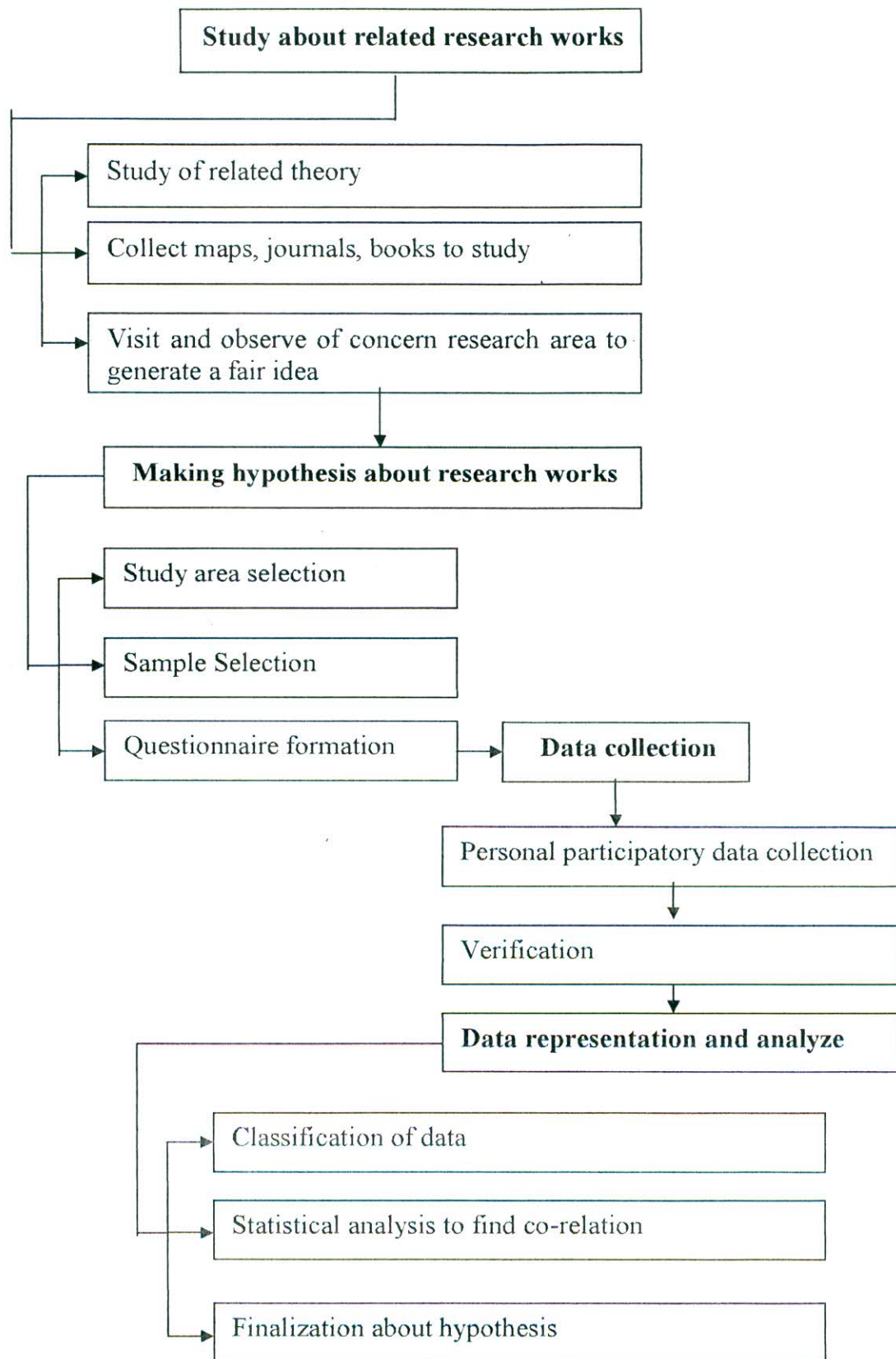


Diagram - 1. Methodology of the work schedule

1.7. Required data:

To conduct the research both primary and secondary data have been considered. The information most particularly the pattern of land use and its changes, land related procedures, laws and different thesis from different institutes have been collected and studied. These are as follows:

- Institute of Environmental Science, University of Rajshahi, Rajshahi
- Central Library, University of Rajshahi, Rajshahi
- Geography and Environmental Studies, University of Rajshahi, Rajshahi
- Bangladesh Survey Institute, Rajshahi
- Rajshahi Central Public Library, Rajshahi
- Rajshahi Advocate Association (BAR) Library, Rajshahi
- Barind Museum Library, Rajshahi
- Barind Multi Purpose Authority (BMDA), Rajshahi
- Rajshahi City Corporation, Rajshahi
- Rajshahi Development Authority (RDA), Rajshahi
- Assistant Commissioner (Land) Office, Nachole *Upazila*, Nawabgonj
- Assistant Commissioner (Land) Office, Boalia *Upazila*, Rajshahi
- Assistant Commissioner (Land) Office, Singra *Upazila*, Natore
- Local Government and Engineering Department (LGED) Office, Nachole *Upazila*, Nawabgonj
- Local Government and Engineering Department (LGED) Office, Singra *Upazila*, Natore
- *Upazila* Statistics Office, Nachole *Upazila*, Nawabgonj
- *Upazila* Statistics Office, Singra *Upazila*, Natore
- Regional Statistics Office, Rajshahi
- Soil Resource Development Institute, Rajshahi
- Bangladesh Water Development Board (BWDB), Rajshahi
- Bangladesh Meteorological Department, Rajshahi

Environment related various documents have been taken from the Institute of Environmental Science, Central Library of Rajshahi University, Geography and

Environmental Studies, Rajshahi. The land and environment laws, ordinance, procedures, circulars have been studied from the Institute of Environmental Science, Central Library, Geography and Environmental Studies, Department of Law and Justice, University of Rajshahi and Advocate Association Library, Rajshahi.

To study the historical background of land management system of research areas, the information were collected from Central Public Library, Rajshahi, Bangladesh Survey Institute, Rajshahi, Department of Law and Justice, University of Rajshahi, Rajshahi Advocate Association Library, Rajshahi, Nachole and Singra *Upazila Nirbahi* Officers' Offices and Barind Multipurpose Development Authority.

The land related data have been taken from office of the Soil Resource Development Institute, Rajshahi, Bangladesh Water Development Board (BWDB), Rajshahi, Bangladesh Agricultural Research Council, Dhaka, Institute of Environmental Science (IES), University of Rajshahi, Central Library, University of Rajshahi, Central Public Library, Rajshahi, Bangladesh Survey Institute, Rajshahi, Nachole and Singra *Upazila Parishad* Offices, Nachole and Singra *Upazila* Statistics Offices and Barind Multipurpose Development Authority (BMDA).

The history, physiography, weather, climate, soil, environment, population, agriculture of Bangladesh, Barind region and Chalan *beel*, were collected from Institute of Environmental Science (IES), Central Library, Geography and Environmental Studies, Central Public Library, Rajshahi, Soil Resource Development Institute, Rajshahi, Bangladesh Water Development Board (BWDB), Rajshahi, Bangladesh Agricultural Research Council, Dhaka, Institute of Environmental Science (IES), Rajshahi University, Rajshahi, Central Library, University of Rajshahi, Central Public Library, Rajshahi, Bangladesh Survey Institute, Rajshahi, Nachole and Singra *Upazila Parishad* Office, Nachole and Singra *Upazila* Statistics Offices and Barind Multipurpose Development Authority (BMDA)

1.8. Outline of the Thesis:

The Thesis Report is divided into eight chapters to explain the “Sustainable Land Management: Policy Implication and Sectoral Achievement”. In the following section is provided the chapter-based brief discussions on the basis of this research work.

Chapter one:

The first Chapter contains introductory subject matter of the study, which covers the Statement of the Problem, Hypothesis, Theoretical Background, Definitions of some key terms, Objectives, work methodology, required data, study area and outline of the Thesis.

Chapter two:

The Second chapter deals with land management system in Bangladesh. It includes the Cadastral Land Management, Landuse management, Reclaimed Land Management, Forestland Management and Wetland Management.

Chapter three:

The third chapter discusses due the government policies for the land management. It discusses only the relevant laws, regulations, ordinances and the present policies of the country in briefly.

Chapter four:

The fourth chapter deals about the “socio-economic profile and Khas land status of the Upazila”. This chapter also deals about the illegal khas land occupation and recovery of khas land in the both Upazila.

Chapter five:

The fifth chapter analyses the landuse pattern and management of the study area. The changing pattern of different landuse was shown on this chapter.

Chapter six:

Singra Upazila is a wetland of Chalan beel area. This entire research work has been completed in major two part of is Barind tract and another is Chalan beel area. This chapter deals with the environment of the wetland.

Chapter seven:

The Seventh chapter describes some important land laws and policies failures and success. This chapter is mainly conclusion of the chapter three.

Chapter eight:

The eighth chapter is finally a conclusive chapter. It summarizes the findings of the study particularly the sustainable land management of the study area.

CHAPTER TWO

2. Land Management Systems in Bangladesh

- 2.1. Cadastral Land Management**
- 2.2. Land Use Management**
- 2.3. Reclaimed Land Management**
- 2.4. Forest Land Management**
- 2.5. Wetland Management**

2.1.

Cadastral Land Management

Population is increasing rapidly but land area is fixed. The population is being great pressure on land and at the same time, per capita share of land is decreasing.

With the increasing population, land area is fragmenting so it is decreasing land ratio.

Total population, cultivated area and cultivated land ratio of Bangladesh are as below (Table No. 2.1.):

Table No: 2.1.

Total Population, cultivated area and man-cultivated land ratio of Bangladesh

Sl No	Year	Total Population	Cultivated Area (in Acre)	Man and Cultivated Land Ratio (in Acre)
1	1981	089,912,000	1716106	0.0191
2	1991	111,455,185	1920489	0.0171
3	2001	123,151,469	1997000	0.0162

Source: Bangladesh Population Census, 1981, 1991 and 2001.

The fertile land, over 230 rivers, physiographic features, and independence, peaceful social condition help in increasing population. Improper planning, mismanagement and lacking in application of these planning and procedures are also influencing in increasing population. As a result man and cultivated land ratio is decreasing.

The roads, offices, houses, religious and educational institutions, parks, mosques, churches, temples are also increasing with the growth of population. For this reason, the pressure is mounting on cultivable land. The per capita share of cultivable land in 1981, 1991 and 2001 were respectively 0.019 acre (Census, 1981), 0.071 acre (Census, 1991) and 0.0162 acre (Census, 2001) which clearly indicates that the man and cultivated land ratio is decreasing in every year. In the past, a man was owner of that big land but now many men are the owners of a land. For this particular reason, the land is fragmenting into many pieces and it is creating many complexities about land. Different land related problems are arisen like ownership of land, settling boundaries, land survey sometimes it turned into blood shading quarrels (Haq, 2000). In this circumstances land survey and cadastral survey management are essential.

2.1.1. Survey related laws in cadastral land management system:

The land survey system of Bangladesh was conducted under cadastral system. There are some laws and acts related to cadastral survey. Some of them are as follows:

- The Survey Act'1875
- The Bengal Tenancy Act'1885
- The Survey and Settlement Manual'1935
- The Sylhet Bengal Tenancy Act'1936
- The Tenancy Rules'1945
- The State Acquisition and Tenancy Act'1950
- The Technical Rules and Instruction of Settlement Department'1957
- The Land Management Manual'1991
- The Land Administration Manual'2003

(Ahmed and Baroi, 1994; Alberuni, 2002; Rahman and Masud, 2003)

2.1.2. Cadastral survey:

The Cadastral survey is a process in which land is surveyed with traverse survey. In the cadastral survey, data could be collected appropriately. Not having proper documents of former land management and hypothesis in the ancient measurement there were some faults. Up to date data could be kept appropriately through cadastral survey system. In the scientific views, cadastral survey was standard and suitable. Long ago land classification was easy because all land were almost the same. Before the invention of cadastral survey system, the land measurement was a troublesome matter. To measure all types of land according to the cadastral survey is a very advance process (Alberuni, 2002). The land owner's death, change of land ownership or many other problems could be solved by cadastral survey (Haq, 2000).

2.1.2.1. Merits of cadastral survey:

Advantages of cadastral survey are given below:

1. Better Information based on planning and administrations
2. Better specification of rights and more security
3. Better possibilities to finance development
4. Easier implementation of policy measure
5. Better steering and control

Other benefits:

1. Land assessment and taxation
 2. Administrative benefits
 3. Improving maps production
 4. Less litigation and less work for the courts
 5. Easier transaction in land
 6. Establishing proper land management system
 7. Calculating benefits
 8. Investigation and presentation of basic facts
 9. Analysis of existing problems and benefits of a new or improve system.
 10. Pilot studies
 11. Cost estimates
 12. Choice of methods
 13. Properties and selection of areas
 14. Definition of legal measures
- (Hossain and Ahsan, 2000)

2.1.2.2. Demerits of cadastral survey:

The cadastral survey is well and proper survey method by which fair measurement and accurate dimension of land could be had. But this survey system is not highly appropriate for everywhere and there are some lacks in this system as in mountainous or forestry or riverine land areas it is very difficult to measure with cadastral survey systems.

This process is very lengthy and old by which important data can not be measured. The cadastral survey is very difficult to measure in hilly regions. So effective measure or accurate planning can not be carried sometimes in those area (Haq, 2000).

To avoid existing problems like land locations, land description, owner's description The British government established "The Land Survey Act'1875". For land measurement and settlement, the cadastral method was implied (Alberuni, 2002).

2.1.3. Cadastral land management system in Bangladesh:

The cadastral survey and land management system was developed for two major reasons. These are -

1. Preservation of land document

2. To collect land revenue

Moreover, to prove land ownership, land document preservation etc are essential. In ancient time, there was no necessity to change the ownership of land. Because the quantity of land was not limited. But later on the land has become very limited as per need of population. Therefore, the value of land has been increased.

At first the Egyptian and Babilians Surveyed the land (Larsson, 1991).

The Land measurement and cadastral survey are essential for revenue collection, change of land ownership, preservation of documents about land location, preparing of maps, agricultural development, shape of land. The cadastral survey and land management systems are being used in many part of the world. The countries where cadastral land management was developed like Australia, India, Pakistan, China, Japan, Malaysia. The land management systems were developed in Bangladesh from ancient time (Ahmed and Baroi, 1994).

To know about the cadastral land management system of Bangladesh it is essential to know about the history of ancient land management of Bangladesh.

Cadastral land management has been developed in the following periods:

- ✓ Muslim period
- ✓ British period
- ✓ Pakistan period
- ✓ Bangladesh period

The above periodic discussions on cadastral land management system in Bangladesh are as follows:

2.1.3.1. Muslim period:

After the Hindu rule, the Muslim Empire ruled over Bangladesh (Haque, 1992). The Muslim kings encouraged the people to live on agriculture. The cadastral survey of land was started in the Muslim period. For using the land and to collect fairly land revenue, they started cadastral survey of land. The Muslim rulers were interested to play an important role to develop land management system (Haq, 2000).

For adopting cadastral survey in the Indian sub-continent Sher Shah is always remembered. According to the famous historian Sayed Amir Ali 'There was no creative ruler in India as Sher Shah was (Haque, 1992).

In 1357, Sultan Sikander conducted the survey of land. His measurement process was very famous in that time. His basic unit of measurement is familiar till now and known as *Sikandary Goze* (Haq, 2000).

Alauddin Hussain Shah (1490-1519) formed a new land revenue unit in the name of *Diwanikhana*. This *Diwanikhana* was famous as *Pargona* (Majumder, 1990). The famous Pathan Sulthan Sher Shah used survey based land revenue systems. During his rule, he measured all government land area. Todarmal, the famous minister of revenue of Emperor Akbar introduced a fair land revenue system in 1582. That was a famous example of land revenue system. In the basis of *Pargona* system in Sultani period, he divided Bangla in 19 *Sarker* and 682 *Pargona*. After measuring the land revenue of Bangla, Bihar, Orissa, Todarmal introduced land survey system for next 10 years. This process was examined, revised and reformed by Nawab Murshid Kuli Khan. Instead of province he divided the region into 13 *Chakla* and increased *Pargona* in 1660. Murshid Kuli Khan converted many lands as government land, he abolished many old *Jaminders* (landlords) and appointed new officers (Hossain and Ahsan, 2000).

Emperor Akbar made four tiers of public administration for proper land management and played an important role in cadastral land management system (Siddiqi, 1970).

The emperor himself looked after all land management system (Sing, 1998). *Kanungo* was responsible for *Pargona*'s management. *Kanungo* conducted the land survey and explained it in front of mass people (Sarker, 1984).

In 1582, Emperor Akbar ordered Raja Todarmal to survey the land of both Bangla and Orissa. Raja Todarmal started land survey in 1582. He conducted the survey from 1582 to 1587. He did not do participatory land survey because unused land was much more than cultivable land (Siddiqi, 1970). He completed his survey with sample survey. Todarmal fixed one-third crops as revenue. If any peasant was able to make uncultivable land into cultivable, then he would pay one-fifth crops as revenue (Ahmed and Baroi, 1994). Some uncultivable land turned into cultivable and pressure over cultivable land was decreased. So land degradation was protected. In the period of Akbar, Raja Todarmal prepared the land records in 1582 (Haq, 2000).

To collect revenue the authority appointed reliable Bengali *Amil*. *Amil* was the administrator of an area. He distributed land among poor people after survey. The pressure over cultivable land was decreased and possibility of land degradation was

reduced. Shah Suja re-examined and re-corrected Todarmal's land survey (Mia, 1999; Rahman and Masud, 2003).

Murshid Kuli Khan surveyed the land to increase revenue and reformed land management system of Todarmal. He reformed Bangla's land revenue system by the survey of 1722. Murshid Kuli Khan separated Medinipur from Urissa and attached it with Bangla. He appointed many *Amils* for every *Pargona* and *Chakla*. They measured soil fertility, productivity and its worth (Haque, 1999). He didn't survey all land like mosques, temples, churches, educational institutions, orphanage or the land which was very difficult to measure like forests, rivers, *beels*, *haors*, *baors* (Haq, 2000). Sher shah established a new land management system with his own views (Sharma, 1951).

Sher Shah conducted land survey from 1540 to 1545. Sher Shah is remembered for his contribution to cadastral land management system. At first, he helped to establish the peasant's rights on land. He firstly invented *Patta* (a kind of land management system) and *Kabuliat* (assurances paper) which established peasant's rights on land (Mia, 1999).

Patta was a system under which landlord gave ownership of land to the peasants and gave them responsibilities on land (Haq, 2000). At present *Patta* system has been abolished. After receiving *Patta*, peasants were given assurances paper which was identified as *Kabuliat*. At present landless peasants are to sign on *Kabuliat* paper and make registry after taking land from the government. In this sense *Kabuliat* is continuing (Alberuni, 2002).

This *Patta* has played an important role to establish the peasant's rights over land (Mia, 2004; Siddique, 2004). Emperor Sher Shah appointed *Amin* (surveyor) and *Kanungo* (chief of surveyor). *Amin* measured land and *Kanungo* looked after land survey systems. It was revolutionary steps in history of land management (Haq, 2000). To indicate the location and boundary of the lands, the survey is very important. After preparing land settlements and records, *Kanungo* examined them and *Kanungo* showed it to the people. If anyone had objection he re-examined and finalized. These historical processes in land management systems are still running on (Mia, 1999).

The survey system of cultivable land was preserved from the period of Mir Jumla, Saestha Khan, and Murshid Kuli Khan. Different cadastral land management systems were developed in their periods (Mia, 1999; Haq, 2000).

2.1.3.2. British period:

It was felt necessary that survey of big landlord's area measurement, survey, marking administrative area, preservation of land related documents and most particularly preparing a proved *Mouza* map after permanent settlement in 1793 (Rahman and Masud, 2003). So **The Bengal Survey Act'1875** was passed (Alberuni, 2002). This act is still running on though it is very old. In that time, the king ordered to survey "**Thak and Evacuee Survey**" so that the *Mouza* could be seen in the map. Many *Jaminders* lost their rights on land (Haq, 2000).

It was very revolutionary step of British East India Company that the Cadastral land survey system was developed.

Cadastral Survey (C. S.) settlement:

Cadastral land survey activities were conducted from 1890 to 1940 according to **The Bengal Tenancy Act'1885**. After a long time the survey of different places of Bangladesh, have been finalized and that was called C. S. Settlement (Alberuni, 2002).

In 1950, the Pakistan government abolished "**The Bengal Tenancy Act**". The land, area, ownership, location were measured in that time. The settlement was made and published on basis of the survey. If any fault found in the survey, it was corrected. Later all those laws were re-corrected in the next survey (Hossain and Ahsan, 2000). Sometimes, a lot of problems have been arisen in cadastral survey system for alluvion and dilluvion of land. **The Survey Act'1935** (Alberuni, 2002) and **The Settlement Manual'1958** were prepared (Land Management Manual'1991) to preserve land records.

2.1.3.3. Pakistan period:

State Acquisition (S.A.) settlement:

The *Jamindery* custom abolished in 1950 by The State Acquisition (S.A.) Act'1949. Before this law, *Jaminder* was owner of land. By this act, the peasants became landowner. The middlemen's rights on land were abolished (Rahman and Masud, 2003). As a result peasant's name, father's name, addresses have been taken place instead of the *Jaminders*. The location and measurement created many problems. In that circumstance a short survey has been taken from 1956 to 1962. This settlement is called S.A. settlement. Its elaboration is '**State Acquisition (S. A) Settlement**' (Ahmed and Baroi, 1994).

This settlement was made on the basis of former C. S. settlement and it was made within very short time. Many faults have been found in it. This settlement was made with handwriting and only three copies were made. One copy was put in district record room, another copy in circle office and rest one was put in *Tohsilder's* office. For this, there was an immense possibility to corrupt the settlement (Alberuni, 2002).

2.1.3.4. Bangladesh period:

From 1985 to 1987, vast changes were taken place in the history of land management and land survey of Bangladesh. *Upazila* settlement office was established in every *Upazila* to survey the land. The circle officer post was abolished and established a first class Bangladesh Civil Service (B.C.S) graduate *Upazila* taxation officer. Later the name of the post was changed and kept a new name as 'Assistant commissioner (land)'. He is a chief officer of *Upazila* land office. With specific procedures the name of every Tohosil office has been changed and put a name as *Union* land office (Alberuni, 2002).

2.1.3.4.1. Revisional Survey (R.S.) settlement:

To make up to date settlement of a *Mouza* there is no alternation of **Revisional Survey (R.S.) settlement** and to select *Khas* land. The **Revisional Survey (R.S.) settlement** plays an important role to signify land per family (Mia, 1999). Many complexities were created to select ownership of land and sometimes it turned into complexities in settlement (Haq, 2000). Former temporary president of Bangladesh formed the land revenue administration inquiry committee. According to the recommendation of this committee, a **Revisional Survey (R.S.) settlement** was organized (Alberuni, 2002).

With this recommendation, a fair survey took place, which is known as '**The Revisional Survey (R.S.) settlement**'. Within the range of the survey, a survey was conducted in the district of Dhaka and it took place in 1965 to 1966. The Survey conducted for other districts respectively Khulna, Jessore, Kustia, Bogra, Pabna, and Barishal (Alberuni, 2002). In 1983 when the survey of Rajshahi district was finished (Mia, 2004), it was published in complete features.

There were some faults in it. In the meantime, many owners of land were changed. For this consequence, the authority decided to conduct this survey all over the year.

But it was not possible to organize a neat and clean survey for want of sufficient manpower, lack of instruments, frequently transfer of workers, political situation (Ahmed and Baroi, 1994; Land administration manual, 1st part, 2003)

2.1.3.4.2. Zonal activities:

The lands are fragmented in every time for many reasons. Many lands are being degraded and many new *char* land rise up for river activities. Much information was changed because of land ownership. The Government took a project by which worker surveyed 2 or 3 districts and went to next districts. In this way, survey takes much time. Many differences were found in the information. Therefore, the government announced an ordinance on 24 December' 1984, which is called zonal survey scheme. In the range of these activities, every district was taken as a zone and its chief officer with 28 assistants conducted the survey in that particular zone. The application of the scheme is not possible till now (Ahmed and Baroi, 1994).

The survey and record collection activities were being conducted in Comilla, Faridpur, Bogra, Jessore (1985-86), Rangpur, Noakhali, Tangail and Khulna (1986-87), Barishal, Sylhet (1987-1988) (Alberuni, 2002).

2.1.3.4.3. Diara settlement:

Bangladesh is a riverine country. Hundreds of rivers and canals are flowing through Bangladesh. In every year vast areas are going under river water due to river erosion in one hand. On the other hand as a result of heavy siltation vast areas are rising up to form new land locally know as *char* land. This is why the *Mouza* maps are frequently becoming useless (Ahmed and Baroi, 1994). So to settle this problem permanent *Diara* settlement division was established. In local language river is called *Diara*. So its name was *Diara* settlement and this division calls it *Diara* settlement division (Alberuni, 2002). The *Diara* survey office is founded in Dhaka in 1963 (Mia, 2004).

If any *char* land rises in any area then the collector will inform it to the central office. Then if it is required, the central office will send some manpower to measure and survey the land (Ahmed and Baroi, 1994).

If any island rises in the river then it will be called *Paisthy* in the language of Bengali, which is called Alluvion in English. Incase any land goes under the river then it is

called *Sikosthi* in Bengali language, which is called Dilluvion in English (Haq, 2000; Alberuni, 2002; Mia, 2004).

This subject related many laws were prepared and amended like **The Alluvion Laws'1825**, **The Bengal Dilluvion land Management Act'1858**, **The Bengal Dilluvion (Amendment) Act'1868**, **The Bengal Dilluvion Land Act'1920**, **The Dilluvion Regulation'1947** (Alberuni, 2002; Rahman and Masud, 2003). Above mentioned acts and laws were prepared and amended on different occasions. In changing procedures, if any *char* land rises it will be under control of the government. If this land rises throughout in the year then firstly it will be under control of the government and then if any one claims and if he/she is able to prove his/her real ownership, the government may distribute to him/her but not more than 20 acre. This type of land will have to be risen before 30 years and if the land rises after 30 years then the government will be the owner of the land (Haq, 2000; Alberuni, 2002; Rahman and Masud, 2003).

2.1.3.4.4. Settlement in hill tract districts:

The southern hilly regions of Bangladesh like Rangamati, Kagrachari, and Banderban were conducted survey at first according to **The Hill Tract Regulation and Government Manual'1900** (Ahmed and Baroi, 1994; Mia, 2004).

In 1984, The Chitajong Hill Tract Ordinance was formed for the preservation of rights of hill tracts' people and in 1986 cadastral survey started in 404 square miles but within a short time it was stopped. Nevertheless, the Survey was stopped for misunderstanding between Bangladesh government and tribal people. Bangladesh government is interested to apply cadastral survey in the hilly regions. So all hoped that the government will survey very soon (Alberuni, 2002; Mia, 2004).

2.2.

Land Use Management

Bangladesh is a fertile land located in $88^{\circ}01'$ to $92^{\circ}41'$ longitudes and $20^{\circ}34'$ to $26^{\circ}38'$ latitude. Ninety-percent land of this Gangatic delta was formed with fertile silt. Except some parts of southern hilly regions, all lands are plain and very well for agriculture (Hawlder, 1997). According to ancient history, this country's land was agricultural based (McCrindle, 1960; Mia, 2004).

The most ancient civilization was Egyptian civilization. It is predicted that the first civilization was agriculture based and most of the economic activities were based upon agriculture (McCrindle, 1960).

The historic periods in land management are as follows:

- ✓ Hindu period
- ✓ Muslim period
- ✓ British period
- ✓ Pakistan period
- ✓ Post independence

The above period discussions are as follows:

2.2.1. Hindu period:

In Hindu period was running on before the establishment of Muslim Kingdom. In Hindu Kings' ruler period the owner was the King. The king had the right to impose tax. The had the right to expel a peasant from his holding, but such power was also limited by religious sanctions and king's own laws. In later times, the land was classified by the state according to its use and fertility. The history of land management of Bangladesh is very ancient (Sastri and Srinivachari, 1970). The people are dependent on lands because agriculture was the main source of income (Mahajan, 1977). As land was much comparing than population. There were not so land related problems (Haq, 2000).

The name of this country was not Bangladesh in ancient period. Different names were established in different times (Chattopadhyay, 1987). In ancient times Bangladesh was divided into some parts like *Pundra Bardhan*, *Samatata*, *Harikel* and *Banga* (Hawlder, 1997). Different nations came to this continent to live, travel and for business purpose. The Iranians, Iraqis, Afghans, Jordanians, Andamanians, French, and Portuguese came in this subcontinent for its fertile land, rivers, communicational means, mineral resources,

and forest (Ojha, 1968). The land management systems of Hindu rulers were running on before the establishment of Muslim periods. In ancient period the people burnt the forest to get the agricultural land but Ashoka a famous ancient king prohibited this system (Chowdhury, 1983). In ancient time land was unlimited and environment was not bad. More discussions are in chapter 2.1.

2.2.2. Muslim period:

Information about the land system during the Sultani (first time of Muslim period) period is as inadequate as was the case with that about land system in ancient times. The Muslim rule was started in the period of Ikhtiar Uddin Mohammad Bakhtiar (Habibullah, 1961). When Bengal was conquered by *Bakhtiar Khilji* at the beginning of the 13th century, the rulers merely changed the rate of land revenue from one-sixth to one-fifth or one fourth of the produce, payable either in cash or in kind (Banglapedia, 2005). The Muslim rule had been existing from 1204 to 1765 (Alberuni, 2002). It is, however, assumed that the sultans did not change the previous system very drastically, though they had introduced many new tenurial terms for the existing institutions. The sultans seemed to have collected land revenue mostly directly from the peasants as before Siddiqi, 1970). There was an intermediate class called *majmuadars* who formed a rent receiving interest group as revenue farmers. How extensive and organised the *majmuadari* institution was is not very clear. That the sultans received land tax through revenue farmers is evidenced by the fact that the Portuguese were employed as revenue farmers of some coastal parts of eastern Bengal. Evidence indicates that *majmuadars* were not perpetual tenure holders. They were engaged for a term and required to pay a fixed amount to the royal treasury out of what they collected from the peasantry (Chattopadhyay, 1987). Like the *nivi-dharma* tenure of ancient rulers, the Sultani rulers also made rent-free land grants to religious and charitable organisations and individuals, though the nomenclatures for such grants were mostly different (Banglapedia, 2005).

The land tenurial system was substantially changed by the Mughal rulers. Though land belonged to the state under the Mughal constitution, such ownership was compromised to an extent because of some limited private ownership (Sharma, 1951). The government engaged revenue collectors called *Jaminder* and *Talukdars* who traditionally enjoyed

revenue collecting right hereditarily (Alberuni, 2002). But the government had always the right to dispossess such revenue collectors. The *raiya*ts enjoyed customary rights in land, which they enjoyed hereditarily on the basis of the terms laid down in *patta* and *kabuliyat*. First Sher Shah ensured peasants' ownership over land by *Kabuliat* and *Patta* system. As regards tenurial rights in land, there were two groups of *raiya*ts: *khudkasta* and *paikasta* *raiya*ts. *Khudkasta* *raiya*ts were the permanent residents of a village and had customary rights in land. They had the right to possess the land permanently and use it as they liked so long they adhered to terms of the *kabuliyat* or agreement. They had the right to pay *jama* or state revenue according to the standard rate of the *pargana* what was then known as *pargana nirikh*. *Paikasta* group of *raiya*ts were non-resident cultivators who moved from village to village in search of cultivating land for a season at competitive rent rates. One remarkable feature of the Mughal land tenure system was *jagir* or assigned lands. Imperial officers were often not paid salaries in cash but were given compensation in the form of *jagir*. To *raiya*ts, *jagirdars* were like *Jaminders*. *Raiya*ts paid them rent as they did to *Jaminders*. But *jagir* rights never affected the prescriptive *raiya*ti rights, which were backed by customs and usage. In addition to *jagirs*, the Mughal system provided for *lakhiraj* or rent-free revenue grants, usually known as *madad-i-ma'sh* (aid for subsistence) (Siddiqi, 1970). *Madad-i-ma'ash* grants were made to learned men, religious devotees, and persons of noble lineage who would not take to any employment. No service was expected of the grantees in return (Banglapedia, 2005). The *madad-i-ma'ash* grants were not transferable. In Muslim period there is no example for the land degradation or mismanagement. Because then per capita share of land was not little than present and the people was so few and land was much.

2.2.3. British period:

The East India Company came to Indian subcontinent from England in 12 August of 1765. The people of this country began to suffer much for the British East India Company's injudicious oppression on peasants. The happiness of Muslim period of the people was escaped. They increased tax without considering actual condition of the peasant and people of Bengal. They appointed middlemen to collect tax (Haq, 2000). They could increase tax many times if they desired. Therefore, the epidemic was caused

in this country in 1770 (Debnath, 1985). It was a surprising matter that in the year of epidemic the company collected 1,40,06,030 Taka tax. What was much more than it's last year (Haq, 2000).

As a result the peasants rose against the British East India Company. The *Fakir Biddraha* (movement), *Sannasy Biddraha* and many other movements were demonstrated against the British (Haq, 2000). Warren Hastingin came in 1772 as a governor general of the company and established 5 years settlement (Alberuni, 2002). After Warren Hastings, lord Cornwallis came and abolished "The Land Revenue Committee" and formed "**The Land Revenue Board'1786**" (Mia, 1999).

He appointed sir John Shore as the Chairman of the board. He abolished 5 years settlement and established 10 years settlement after receiving the advice of the district collectors (Haq, 2000).

In 1793 lord Cornwallis enacted "The Permanent Settlement Regulation Ordinance". In the history of Bangladesh, the permanent settlement was significant. Five years settlement existed in Bangladesh from 1772 to 1777 (Haq, 2000; Alberuni, 2002).

Then land ownership was settled for ten years. The ten years settlement was conducted with the middlemen (like *Jaminder*, *Chowdhury*, *Talukder*) who collected tax from the peasant.

The Company established "**The Bengal Alluvion and Dilluvion Regulation'1825**". According to this regulation if any island formed in the river or sea will be *Poisthy* in Bengali and alluvion in English. If any land disappeared in the river it is called *Sikasthy* in Bengali and dilluvion in English (Haq, 2000; Alberuni, 2002; Rahman and Masud, 2003). If any part of the land submerges in the river, the East India Company decreased tax. If any part of land appeared in the river then the island's ownership will be the concern *Jaminder* (Haq, 2000).

If any *Jaminder* would fail to pay tax before sunset of selected day then the *Jaminder* would lose his *Jamindery* which act was named as "**The Sunset Act'1841**" (Haq, 2000). This act brought a great problem on the life of both *Jaminder* and mass people of Bengal. If any *Jaminder* failed to pay tax before selected day's sunrise, *Jaminder* was confiscated (Mia, 1999).

After failure of "*Sepoy (soldiers) Hunting*" (*Sipahi bidraha*) in 1857 the British queen Elizabeth took the power of Indian sub continent and sent a governor general as a central ruler of India. A fixed tax was levied by practical measurement of land survey. Thus the peasant who were the landowner for long ten years, was selected as the owner of the land (Haq, 2000).

2.2.4. Pakistan period:

A major step in the direction of land reforms dates back to the formation of a Commission called Bengal Land Reforms Commission in 1940, which had Sir Francis Floud as the chairman. On the basis of the recommendations, laws were framed. But before the draft legislation was passed, the Partition of Bengal took place in 1947 (Banglapedia, 2005). Pakistan a new country was formed in 1947 East Pakistan (present Bangladesh) and West Pakistan (present Pakistan). In 1950, the East Bengal Legislative Assembly passed the East Bengal State Acquisition and Tenancy Act, which received the consent of the Governor General in 1951. The State Acquisition and Tenancy Act was prepared in Bengal Provincial council in 1947. Later in 1950 The State Acquisition and Tenancy Act was enacted with 152 sections, which were described in this act and Jamindery system was abolished (Rahman and Masud, 2003; Haq, 2000; Alberuni, 2002). The main subject of this act is as follows:

The land revenue authority's power, appeal, consideration, reconsideration, tax procedures making

- ⌚ Land related document preservation and correction
- ⌚ Rent and rent collection related procedures
- ⌚ Accumulation, division and settlement of landlord
- ⌚ Increasing and decreasing procedures of tax
- ⌚ Land selling and buying procedures

(Haq, 2000; Alberuni, 2002)

2.2.5. Post independence:

The Floud Commission did not recommend any ceiling of khas land, which could be retained by any individual landholder in his direct possession. But the East Bengal State

Acquisition and Tenancy Act contained a specific provision to the effect that no individual land holder (be he the *Jaminder* or a tenure-holder or a raiyat) could retain in his direct possession any land exceeding 100 standard Bigha s or 13.5 ha.

The Father of the Nation and former president of Bangladesh Bangabandhu Sheikh Mujibar Rahman promised to make tax free till 25 Bigha . But in 10th April of 1971 the government of Bangladesh declared to run all existing laws of Pakistan period with little change.

After taking the power of Bangladesh, the president freed tax upto 25 Bigha by correction of The State Acquisition and Tenancy Act with the ordinance No.-96 of 1972 (Alberuni, 2002). In 1972 land sealing was increased to 100 Bigha by the ordinance No-98 of 1972 (Haq, 2000).

The State Acquisition and Tenancy Act was amended many times after independence (Alberuni, 2002). The significant changes are as follows:

- ⊗ Abolition of the Rent Board.
- ⊗ Keep a system to recollect the Khas land
- ⊗ Control and process of Khas landuse
- ⊗ Development of taxation
- ⊗ Land sealing
- ⊗ Tax free upto 25-Bigha

(Haq, 2000; Alberuni, 2002)

2.2.6. National land policy of Bangladesh:

Land is very much important for agriculture. Actually land is not only for agriculture but also it is very much important for industry, socio-economic condition, education, treatment, settlement, transport and communication. Land is very important than other because the population of Bangladesh is much more than land. Economic developments, public welfare, peace, order, administrative systems are formed on the bases of land. Therefore, it needs a fair management system.

Every time Bangladeshi people are to face different types of problems related to land. So Bangladesh government emphasizes on land management. However for sustainable land management, the remaining landuse conflicts the different ministries will be given

attention. Because the problems are being arisen due to legal conflict between the ministry of land, ministry of agriculture and ministry of forest. They are carried out different in land management. The ministry of Environment and Forest, The Department of Environment and Department of Forest. Besides, the national Environment Council and the executive committee of the national environment council are two organs to handle different international and problems and review the progress of the different strategies undertaken by different ministries of divisions, department of environment provides technical advice and assistance to help for controlling environment pollution, evaluate environmental guidelines and enforce environment conservation act'1995 and its subsidiary rules (Lokproshasan Samoecky, 1998). But these departments have been suffering due to non-coordination. The policy guidelines for optimum use of land, prevention of the use of agricultural land for brick making On industrial areas, protection of land, degradation and reclamation unutilized or degraded land for suitable use and improvement of the land resources for future generation, will be considered for sustainable agriculture development in Bangladesh. Besides the conflicts between the ministry of land and the ministry of forest and environment should be resolved for the sustainable landuse, the haphazard should be removed then the smooth situation will formed which is blessing for agriculture development and environment of Bangladesh. In addition, there is no provision for conservation of land resource such as mineral resources and aquatic resources.

2.3.
Reclaimed Land
Management

In ancient period the land's owner was only the king. The peasants would get some crops for cultivation (Rahman and Masud, 2003). Now the landowner is peasant. Some land's owner is the government. These types of lands are *hat*, *bazar*, rivers, canals, and *beels*. These types of government lands are called *khas* land. Bangladesh is a country of rivers. From the very beginning the owner of these rivers is the government (Haq, 2000). Sometimes it creates different type of land like lakes, canals, and *beels*, *char* land sometimes the river erosion causes differences of land. The land goes into the river water for its movements and currents. The new land is arisen in the river. This new island in the river is called *char*. This newly formed area's landownership makes quarrels among the people. These types of disputes make fighting, quarrels etc even blood shedding (Land Management Manual, 1991; Haq, 2000). So the government prepared rules, regulations, laws, acts, ordinances etc to manage these types of reclaimed lands. Some of them are as follows:

- The Bengal Alluvion and Dilluvion Regulation'1825 (Acts No 11 of 1825)
- The Bengal Alluvion and Dilluvion Act'1847 (Act No 9 of 1847)
- The Bengal Alluvion and Dilluvion Land Management Act'1858 (Act 31 of 1858)
- The Bengal Alluvion and Dilluvion (Amendment) Act'1868 (Act no 4 of 1868)
- The Bengal Alluvion and Dilluvion Act'1920 (Act no 5 of 1920)

All the above acts have been changed and lastly The State Acquisition and Tenancy Act'1950 have been prepared. According to this act rule no 28 is related to these types of reclaimed lands. The government has amended the acts in 1994. It is called **The State Acquisition Tenancy (Amendment) Act'1994** (Alberuni, 2002).

2.3.1. *Char* land management:

There are management policies about *char* land or newly formed island or many kinds of reclaimed land conducted by **The Land Management Manual of 1991** and **The Land Administration Manual of 2003**. The newly formed land in the river is called *char* land. Previously there were many rules related to these types of land. Now if there is formed any new land in the river, the government will be the owner of that land. If any one claims himself as the owner of this displaced land and if he can be able to prove, the government may distribute maximum 20 acres of lands to him (Alberuni, 2002). But at first the government will be the owner and then as soon as possible the government will survey the land. On the other hand if any land goes under the river, the owner of the land can not claim for its compensation. Only the owner of the land may apply for tax excerpction (Rahman and Masud, 2003). But in the study areas it is quite different. In Katuabari mouza of Singra *Upazila*, the *char* land in the Gur river is not properly managed though there is rule to manage the *char* land. If the *char* land's owner is not available, then the government may distribute this land among the landless poor people or poor peasants. In different time the government has prepared rules and acts and noticed many times for fair distribution of reclaimed land such as notice no 8-5/86/111 of 28th February 1987 was about this matter.

The illegal occupation of the *khas char* land is found in the study area of Singra *Upazila*. In Katuabari mouza of Singra *Upazila*, the dishonest people have illegally occupied the *khas* land. In different times, the government ordered to dislodge the illegal occupant from the *khas* land but in the study area it is not followed. The government became disappointed, surprised and astonished by observing its success. According to mentioned notice and management policy, the collector should have take necessary steps to rescue and preserve the *khas* land. According to the **Land Management Manual'1991**, the collector or the revenue officer will order to survey the reclaimed land for fair and proper distribution among the landless and poor peasants. In this purpose the authority will invite application from the landless and poor peasants. The collector will publish the notice for the distribution of the *khas* land so that landless peasants can be the landowner. Thus the landless peasant could be landowner and can play a good role for sustainable land management. According

to the **Land Management Manual'1991** the qualifications of the applicants will be as follows:

- a) Who has less than 3 acres of land and agriculture-related tools and a cow for cultivation.
- b) Applicants have to be the inhabitant near the distributable Mouza.

It will be very difficult to distribute the land among the real landless following the above procedures because they are many in numbers. Moreover, who has about three acres of land, plough, tools and cow can not be landless and poor in the perspective of fertile land of the country. So some modifications of the rules and regulations made in the land management manual'1991 shall have to be enforced for fair distribution of *khas* land among the landless people..

The government is the owner of *Kheyaghat* (boat station) and other places of the river. According to the **Land Management Manual'1991** and the **Land Administration Manual'2003**, there are the management policies about these types of land. The local administration will invite for bid and the highest bidder will get the lease. But it is not followed according to the manual.

2.3.2. Coastal land management:

In the coastal area, shrimp cultivation is increasing rapidly. In this purpose, the people of the coastal area collect the saline water and practice the shrimp cultivation. For this the nearby land of the shrimp farm, also becomes saline. Increasing salinity is changing the qualities of land through land degradation. The saline soil is not useful for agriculture. The president of the International Society of Ecological Modeling says, "Saline soils are as these soils which the saturation extract is more than 4 decimal and exchangeable sodium percentage is less than 15. The pH of these soils is normally less than 8.5" (Biswas, 1998).

Under this situation the government has enacted **The Environmental Policy'1992** for the conservation of the coastal area (Farooque and Hasan, 1996).

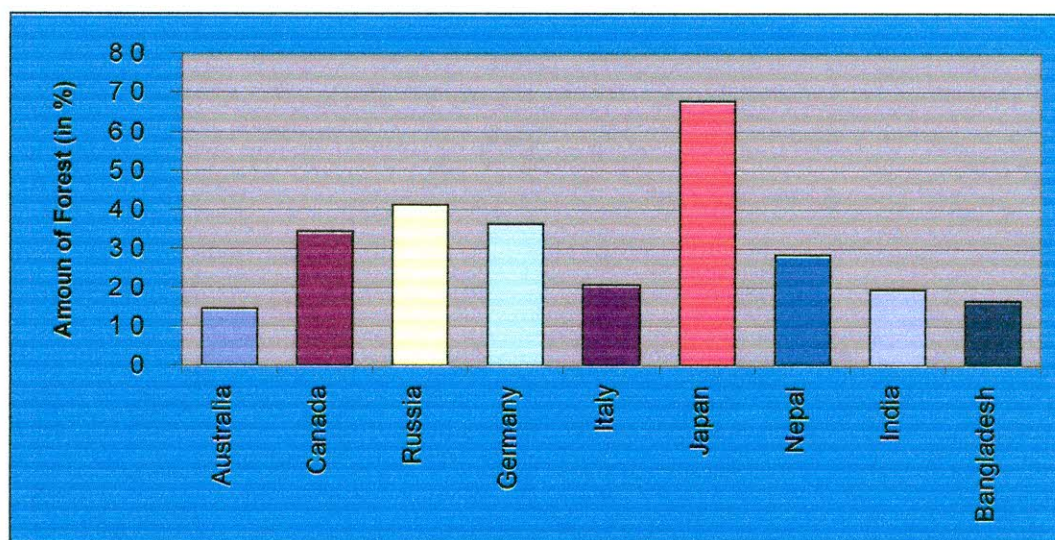
2.4.

Forest Land Management

In the 20th century, the total forestland of Bangladesh was 25% of total area (Chakrabarti, 2003). Unfortunately it is true that at present the total forestland of this country is only 17% of the total land (Khuda, 2001). Fifty percent of the total forests were deforested within last 20 years (Zinatunnessa, 2001). One country should have at last 25% forestland of the total area (Siddiqi, 2001). The graphical representation of forestland areas of some selected countries of the world given below. (Graph No. 2.4.1 and Appendices Table No. 2.4.1.).

Graph No: 2.4.1.

Graphical representation of some countries forestland in the world:



Main Data Source: Khuda, 2001,

In those countries forestland is more comparing with Bangladesh. We can see, the forestland ratio of Japan is maximum in the world. Japan has 67% forestland of the total land where as Australia has 14.34%. Forestland of Canada, Russia, German and Nepal were respectively 34.40%, 41.40%, 36.40%, 20.69% and 28.60% of their total land (Khuda, 2001).

The forestland is not only important to environment but also it provides raw materials to the industries for economic development. For having more forestland, Japan is developed both economically and environmentally.

Bangladesh has very little forestland comparing with other countries and it is decreasing day by day. The total quantity of our forestland is only 2.18 million hectors and excluding government, public forestland has only 0.27 million hector.

The 2.01 million forestland is under the government's controlled (Chakrabarty, 2003). In those lands are fully government controlled as *Khas* land. Decreasing forestland has very bad impacts on environment. Deforestation increases temperature of the earth and decrease the rainfall. Different area's rainfall of Bangladesh is shown in the following table.

Monthly Rainfall of Bangladesh in 1992

Table: 2.4.1.

Name of the Month	Dhaka (Central Region)	Chitagonj (South east Region)	Khulna (South west Region)	Rajshahi (North west Region)	Sylhet (North east Region)	Rangpur
January	1	1	13	1	0	13
February	47	109	203	33	53	10
March	0	0	0	0	172	0
April	25	25	2	16	129	89
May	153	88	192	121	544	245
June	132	562	160	85	666	348
July	386	401	198	250	901	247
August	182	222	111	185	374	367
September	158	362	111	124	459	552
October	83	446	90	29	203	129
November	2	0	0	5	3	4
December	0	25	0	0	0	2
Total	1169	2241	1080	849	3504	2006

Source: Bangladesh Meteorological Department (in Statistical Pocked Book Bangladesh, 1994, BBS, p. 64).

The rainfall of Rajshahi region is much little comparing with other regions of Bangladesh. The above table shows the total rainfall of different areas of Bangladesh that Dhaka region's rainfall within 12 months from January to December was 1,169 mm, Chittagonj region had 2,241 mm, Khulna region had 1080 mm, Rajshahi region had only 849 mm, Rangpur region had 2006 mm and Sylhet region had more than any other areas of Bangladesh and that was 3504 mm (B. B. S, 1994)

The Sylhet region had much forestland than other parts of Bangladesh. So it is clear that those areas have much forest in where much rainfall takes place. The forestland absorbs carbon-di-oxide of factories and human. The mankind had no existence if trees would not absorb such carbon-di-oxide (Ciesla, 1998). Human activities are decreasing forestland day by day. The human activities have played a vital role in decreasing forestland more than any other natural reasons. The forest resources are decreasing day by day for population increase, destruction of trees, unplanned infrastructures, want of modern technologies and zoom cultivation in hill tract area.

The forestland is very essential for environment. It plays very important role on fresh environment. The forestland is essential for sustainable environment, protection from green house effect, control of carbon-di-oxide, bio-diversity conservation, protection of land degradation etc. It is also essential to control flood, to provide raw materials in industries, herbal medicines, woods for furniture. Besides these the forestlands plays vital role to solve unemployment problem and helps to increase national income by creating income opportunities.

Types of the forestland:

According to climate, geographical location and rivers, forestland is four types (Siddiqi, 2001). These are:

- A) Mangrove Forest
- B) Hill Tract Forest

C) Plain Land Forest and

D) Village Forest.

The location and information of all types of forestland of Bangladesh are as follows

Table No. : 2.4.2.

Forest location, area, growing stocks of Bangladesh:

Forest	Location	Area (Million Hector) of Country's Total	Growing Stock Million M ³ (Tree cover Density m ³ /ha)	Remarks
1. Mangroves				
a) Sundarbans	South west	0.57 (4.00)	13.19 (23.10)	Includes 0.17 Million Hector area
b) Costal	Coastline	0.11 (0.76)	05.05 (45.90)	
2. Hill tract Forest	Eastern part of H. T. districts			
a) Managed forest		0.61 (4.65)	28.32 (42.30)	Denuded due to shifting cultivation
b) Unclosed State forest (Scrub forest)		0.72 (5.00)	Negligible (needed)	
3. Pain Land Forest (tropical Moist deciduous)	Central and North west Region	0.12 (0.83)	1.13 (0.94)	
4. Village Forest	Spread over the country on land	0.27 (1.87)	54.68 (202.50).	

Source- Siddiqi, 2001, p.27

Mangrove forest:

Table No. : 2.4.3.

Forest coverage (Thousand Acre) of Bangladesh by district and years from 1992 to 2001:

Sl No	Name of District	1992	1993	1994	1995	1996	1997	1998	1999	2000
1	Bandarban	463	463	407	743	637	799	799	799	799
2	Chittagong	654	654	535	538	675	544	544	660	650
3	Commilla	02	02	02	02	02	01	01	02	02
4	Khagrachari	359	359	437	441	357	573	573	554	554
5	Noakhali	103	103	243	243	243	244	244	456	458
6	Rangamati	1100	1100	1219	1328	1380	1383	1383	1400	1400
7	Sylhet	190	190	189	189	185	189	189	189	189
8	Dhaka	65	65	65	68	64	68	68	65	65
9	Faridpur	-	-	-	-	-	-	-	-	-
10	Jamalpur	17	17	30	30	30	30	30	30	30
11	Kishorganj	03	03	02	02	02	02	02	02	02
12	Mymensingh	51	51	39	39	39	39	39	39	39
13	Tangail	120	120	123	123	124	123	123	123	123
14	Barisal	62	62	32	32	53	37	37	367	375
15	Jessore	-	-	-	-	-	-	-	-	-
16	Khulna	1426	1426	1426	1426	1426	1426	1426	1484	1484
17	Kustia	-	-	-	-	-	-	-	-	-
18	Patuakhali	21	21	71	72	72	73	73	279	279
19	Bogra	01	01	01	01	-	-	-	01	01
20	Dinajpur	25	25	26	25	26	26	26	26	26
21	Pabna	-	-	-	-	-	-	-	-	-
22	Rajshahi	06	06	07	08	07	08	08	07	08
23	Rangpur	06	06	07	07	07	07	07	07	07
		4674	4674	4861	5317	5329	5572	5572	6490	6491

Source: National Agriculture Census, 1997 and 2001.

2.4.1.1. Mangrove forest:

The world largest mangrove forest is the Sundarbans of Bangladesh. Sundarbans's 68% total forests remains in Bangladesh and rest of the forest lies in west Bengal in India (Siddiqi, 2001).

Sundarbans includes three districts like Satkhira, Khulna and Bagerhat of southern Bangladesh. Its geographical location is from 21°30' to 22°30' latitude from 89°00 to 89°55' longitude. The total area of Sundarbans is 5, 77,052 hectors. The dense forest area is about 3,95,500 hectors and rest of all 1,80,000 hectors includes rivers, canals Marshy land of Sundarbans is 169905 hectare and light forest area is about 26807 hectare (Begum, 1998). The Sundarbans is a world heritage site (Khuda, 2001).

2.4.1.2. Hill tract forest:

Hill tract forest is located in hills and hilly areas, hill forests are composed of tropical evergreen and semi-evergreen vegetations. This is one of the main forest types of Bangladesh. These forests are to be found in Rangamati, Bandarban and Khagrachari Hill Tracts, Chittagong, Cox's Bazar, Sylhet, Maulvi Bazar and Habiganj districts, covering an area of approximately 1.40 million ha, of which 0.67 million ha is under the control of the Forest Department and the remaining 0.73 million ha are unclosed state forest under the control of the Hill District Councils. A large diversity of tree, bamboo, and shrub species of ecological significance is found in these forests. The existing growing stock in the hill forest is estimated at about 28.57 million cubic metres. In addition to timber and fuelwood, bamboo are also extracted from these forests to meet local needs as well as industrial demand (Banglapedia, 2006).

2.4.1.3. Plain land forest:

Three million acres of plain forestland remain in the district of Rajshahi, Sherpur, Gazipur, Dinazpur, Rangpur, Mymensing, Tangail (Khuda, 2001). The plain land forest of Bangladesh are being destroyed in large scale in the time of infrastructures such as houses, roads, bridges construction for increasing population (Siddiqi, 2001; Khuda, 2001).

2.4.1.4. Village forest:

The village forest of Bangladesh is about 1.79 million acres. Different types of trees are found in Bangladesh like bamboo and fruits trees like mango trees, jackfruit trees, litchi trees. The village forest includes all kinds of trees besides houses, roads and near other residential areas. This type forest is about 1.88% of total forests of Bangladesh. This forest has a great importance although it is little in comparison to other types. These trees are being cut down to fulfill needs (Khuda, 2001).

For more economic requirements trees are being cut down before attaining maturity. Different government organizations (GOs) and non-government organizations (NGOs), private household and organizations plant trees beside roads, graveyards, fields, railway lines, government parks, government offices. The corrupt people cut these trees. Although it's protection laws are available but these are not applied in practically (Ahmed et. al., 2002).

2.4.2. Forestland management policies of Bangladesh:

The forest bureau has been established to conserve the forestland. It is trying to increase forest through plantation in coastal areas and other government's land. This activity is running on with the finance of Asian Bank under the name of a project "Forestry Master Plan" (Siddiqi, 2001). Another project is running on in the name of "The Coastal Green Belt Project" with the finance of Asian Bank. This project tries to save the coastal people from natural calamities like tornado, hurricane and keeping natural balance in coastal area through plantation (Khuda, 2001).

The Government is trying to increase the forestland in hill tract areas particularly in that area where mills, factories or industries have been developed. The tree plantation project has been taken place to plant beside roads, schools, collages, mosques, universities (Khuda, 2001).

The government has forbidden the following activities within 10 km around the Sundarbans reserved forest through a gazette:

- ❖ To cut and collect natural trees and plant
- ❖ To hunt any forest animal
- ❖ To collect or trap any forest animal
- ❖ To destroy nest, cave, living place of any plant and animal

- ❖ To do any activity by which the feature of land and water could change
- ❖ To establish any industry which can pollute the forestland's soil, water, air and sound and
- ❖ To perform any activity by which the animal and fish could face harms

In **The Environment Rules'1992**, chapter three includes the following forestland preservation principles:

- To increase, develop and conserve natural balance and socio-economic necessity
- To include tree plantation activities in every development schedules
- To protect the decreasing forestland
- To invent alternative forest resources and encouraging their uses
- To conserve wild life and bio-diversity, to enlarge research related consequence and to enlarge and share experience

(Farooque and Hasan, 1996; Land Management Manual, 1991; Land Administration Manual, 2003)

2.4.2.1. Social forestland management and laws:

The social forest action started in eighteen century but there was no procedure. The forest laws of 1927 were re-corrected in parliament in April 2000. This law is recognizing as "The Forest Amendment Act'2000". After reformation of forest Act'1927 chapter 28-A, chapter-B and chapter 33 were combined with chapter G. Social forestry means to help the mass people to develop forestry. According to this reformed Act government assets would select these land occupy by government and these land which was given to the government willingly by contract to conserve and manage according to the sub-chapter no 2 (Ahmed et. al., 2002).

Along with these amendment of laws, the government is trying to develop forestland through different projects. These are:

- The Agro-forestry Project
- The Tangua Project
- The Bethge Model
- The Banderban Rehabilitation Project
- The Community Forestry Project
- The Forest Resources Management Project

(Farooque and Hasan, 1996)

The social forestry is now turned into very important means to fill the lack of our forestland as our forest is decreasing day by day (Khuda, 2001).

Sea level will rise for green house effect if the forestland decreases. Coastal area will be badly affected if sea level would rise. The forests of hill tract, plain land forest, Sundarbans forests of Bangladesh are under threaten to merge. The forest animal, bio-diversity, plants are destroying in every moment. The Social Forestry Rules'2000 was published, although its institutional touch has been gotten in 2000. According to this act forest can be established in vacant government land and new arisen island. If any people or institution participates in the social forestry then they ought to look after the forestland. This duration would be 7 to 10 years. Later when these trees would grow up 60 percent profit will get government and rest 40 percent benefit will get the concern institution or people (Farooque and Hasan, 1996). The unfortunate truth is that this project now comes under a question. A research team of Dhaka University and The Society for Environment and Human Development (SHED) have proved by their research that the social forestry has much more failure than its success in many areas. Because these who participate in the social forestry, they cut down tree before grown. They feel that they will not get benefits from this project. As an example, Madhupur area's forestland is decreased rather than increase by the social forestry project (Ahmed et. al., 2002; Khuda, 2001).

The social forest could not get success for some errors of the laws. Many valuable trees, herbs, serbs and plants are being lost day by day. The forestland suffers form different types of crises for miss land management (Revesz et. al., 2000; Khuda, 2001).

After independence **The National Forest Rules** were formed in 1979 for the first time to protect forest resources. But these rules were not adequate to protect the forest from vast destruction of the forestland. It was felt necessary to take appropriate steps and accordingly **The National Forest Rules** (1979) were amended in 1994 to make rules more effective for protecting forest and ultimately the environment.

A master plan was taken under these procedures to develop 20% forestland of the total land. As the reserved forestland is very little in Bangladesh so a plan was taken to make forest in new *char* lands and other government areas. The forestation activities were booted in village area beside roads, graveyards, vacant lands, pond's sides, house yards and in towns, cities, ports, populated areas, parks, hills (Farooque and Hasan, 1996).

2.4.2.2. Mangrove forest management policies:

In 1658 Shah Suja formed a new government and he included Sundarbans under his state. In 1582 emperor Akber's minister Todermal included Sundarbans under taxation area and prepared a list on the taxation on Sundarbans. After Muslim period, Sundarbans considered as an important source of taxation area in British period. Clod Russell kept emphasis on Sundarbans in 1770: Later in 1784 in the time of district judge and magistrate Tim Hinkle attached to the *Jaminder* area and included under national taxation source. By regulation No. 23, Sundarbans was showed as a new administrative area. Lieutenant Hedges first surveyed Sundarbans in 1830 whose head quarter was situated at Alipur. Port Canning gave lease for annually 8000 Taka tax. The Governor took the responsibility of Sundarbans in 1869. The deputy conservator of forest Mr. Slit realized the economic benefit from Sundarbans in 1872. Later in 1874, the governor of joint Bengal Sir Richard Temple participated in practical observation and showed its importance (Begum, 1998).

In ancient time there is no safety of Sundarbans but its size was double than present. There was no management procedure for Sundarbans forests. There was no harm taken place before Muslim period. Now its condition is very severe.

In ancient period, the local kings collected resources from the forest area according to their need. British ruler took many taxes than before. The people collect resources from the forest. Consequently, many species were eradicated from the forest (Siddiqi, 2001).

Survey of Sundarbans was conducted by British East India Company's procedures for the first time under cadastral survey in 1862 (Alberuni, 2002).

A committee was formed with some forest officers in 1872-1874. Sundarbans was conserved first with this committee. Later this committee submitted a planning in 1893-1894 for Sundarbans. It was revised in 1903-1904 and next that was reformed again as Farrington's working scheme in 1906-1907. After vast experiments and analysis, Trafford submitted a plan in 1912 to 1932. He showed that some important species are demolished like *E. agallocha*, *X. mekongensis*, *C. Decanda* and *N. fruticans*. He submitted his planning so that every wood tree and all essential species could be conserved form imminent ruin (Siddiqi, 2001).

Chowdhury's modification planning after a reformation of Cattlis planning was to save the mangrove forest. This act was locked after finishing of British rule from Indian sub-continent. In this circumstance, the forest officers managed the forestland.

When Sundarbans conservation planning was stopped, Sundarbans have faced vast damages (Khuda, 2001).

2.4.2.3. Sustainable forestland management:

The sustainable forestland management has enough importance. It is possible to conserve the forestland and natural resources from destruction. Moreover its economic profit will be enough under this sustainable land management. In every year, so many trees are not grown as destroyed. Trees should be cut with the ratio of its new plantation. One species helps to conserve other species. The fact is very disappointing that many essential plant and animals of Sundarbans are being destroyed day by day. If this condition can not be stopped just today otherwise Sundarbans will have to face vast damages (Siddiqi, 2001).

The people cut hills for another areas and infrastructures. Then the soil of earth surface will be degraded. The topsoil of the hilly regions will be destroyed by heavy rainfall, Cyclone, wind. Moreover animal species have to face great trouble for it. The tribal people cultivate zoom cultivation for want of cultivable land. For the establishing of Kaptai lake many settlements were abolished and many species were destroyed. The government formulated "The Environment Conservation Act'1992, which includes some rules to conserve the hilly regions (Siddiqi, 2001). Moreover, land conservation procedures were in "The Land Management Manual'1991". After compiling these laws there is no application of it. So the forestland is decreasing rapidly.

2.5.
Wet Land
Management

The wetland is a land where most of the time or sometimes of the year water exists. Wetland is such ecological system where water exists all times earth surface like ponds, canals, *beels*, shallow coastal area etc. According to **Ramsar Convention, 1971** "Areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters" (Banglapedia, Vol.10, 2003).

"The earth's surface which is situated or submerged at least part of the year called wetland" (Saigo, *et. al.*, 2005).

There are many rivers, canals, *beels*, ponds, hills, lowland, highland, plain land etc. in Bangladesh. In this natural diversity of Bangladesh, there are many *beels* in it like *Chalan beel*, *Faridpur beel*, *Beel Dakatia*, *Hakaluki haor* etc.

2.5.1. Importance of wetland:

Though the world has only 2% wetland of its total area but it is very important and the wetland is now under threat. Because of the lack of proper management this wetland is decreasing and polluting in many ways. Polluted water comes into wetland and wetland's water is being polluted (Trivedi and Gurdeep, 2005). We should take the wetland under sustainable land management to protect the rivers, canals, *beels*, *haors*, *baors*, ponds, marshy lands etc. otherwise environment and biodiversity will be affected abundantly.

The wetland has a closed relationship to interact with ecosystem. Moreover the wetland has a vast role for economic and social development (Pande, 1999). Carbon dioxide cycling, Sulphur cycling, Nitrogen-Phosphorus cycling mostly depends on the wetland. To lead better life and to preserve important animals and plants, the wetland is essential. It is important to fill the underground water level, to control flood, to friction of Nitrogen etc. (Tatu *et. al.*, 1999).

Different resources like fish's etc. are collected from the wetland to fulfil the national demand of protein. It helps to decrease unemployment problem. But unfortunately truth is that this wetland is decreasing (Banglapedia, 3rd part, 2003).

2.5.2. Types of wetland:

Wetland can be classified in many ways such as basis of ownership the wetland we can be divided into two kinds:

- Government's wetland and
- Private ownership wetland

2.5.2.1. Government's wetland:

The *Khas* wetland has been defined in section 2(A) of the government Fisheries (Protection) Ordinance. Here it has been mentioned that the government is the owner of the *khas* wetlands. Private ownership's also exists in *beels*, *haors*, *baors* etc. along with the *khas* lands in many areas (Farooque and Hasan, 1996).

2.5.2.2. Private wetland:

Except the government's wetland, all wetlands whose ownerships lies under private authority are called private wetland (Farooque and Hosan, 1996).

Land management manual' 1991 divided the wetland into two kinds. These are

- ⌚ Inland wetland and
- ⌚ Open wetland

2.5.2.2.1. Inland wetland (Closed water):

Inland wetland is that types of wetland, which is bounded on all sides by land. It has a good possibility to collect fish at a particular time in a year like *haor*, *beel*, *zhil*, lake, ponds etc.

2.5.2.2.2. Open wetland:

Open wetland is that type of wetland, which is not bounded on all sides by land rather running water in their and fishing is not occasional. Open wetland includes generally rivers and canals (Land Management Manual, 1991).

Table No. 2.5.1.

Types of wetlands and their areas (in sq km)

Open water	
Name of Wetlands	Amount
Rivers	7,497
Estuaries and mangrove swamps	6,102
<i>Beels</i> and <i>haors</i>	1,142
Inundable floodplains	54,866
Kaptai Lake	688
Closed Water	
Ponds	1,469
<i>Baors</i> (Oxbow Lakes)	55
Brackish-water farms	1,080
	72,899

Source: Khan, 1994

Some wetland of Bangladesh according to geological Characters.

1. Saline wetlands	a) Marine Wetland	Permanent shallow waters at low tide, e.g. bay coral reefs, e.g. St Martin's reef
	b) Estuarine Wetland	Inter tidal mud, sand or salt flats with limited vegetation, e.g. newly accreted land intertidal marshes inter tidal forest wetlands including mangroves, e.g. Sundarbans.
	c) Lagoonal	Brackish to saline lagoons with narrow connection with sea.
2. Freshwater wetlands	a) Riverine wetlands	Permanent rivers and streams including some <i>Char</i> land, temporary seasonal rivers and streams.
	b) Lancastrian wetlands	There are thousands of lakes of varying areas in Bangladesh, the greatest concentrations being in the main delta region covering the districts of Rajshahi, Pabna, Khulna, Jessore, Faridpur, Comilla and Noakhali
	c) Palustrine wetlands	Permanent freshwater marshes and swamps with emergent vegetation, permanent peat-forming freshwater swamps, freshwater swamp forest, e.g. <i>hijal</i> forests of lowland
3. Man-made wetlands		Aquaculture ponds (brackish and freshwater) irrigated land and irrigation channels salt pans hydro-dam, eg Kaptai Lake

Banglapedia, Vol-3, 2003, p-481

2.5.3. Some wetland areas of Bangladesh:

Chalan beel:

The Chalan *beel* is located from 24°12' to 24°35' latitudes and from 89°10' to 89°12' longitudes. The Chalan *beel* includes Singra, Gurudaspur and Baraigram *Upazila* of Natore district, Chatmohar *Upazila* of Pabna district, some parts of Taras and Raigonj of Sirajgonj district. There are some small rivers in Chalan *beel* area. Once many rivers flowed through the Chalan *beel* but now except few all are dead. Now Atrai, Korotoa, Nagor, Boral, Nandakunja are flowing on. During the rainy season, water rises to the brim all over the Chalan *beel* with water of these rivers. The area of Chalan *beel* is decreasing for siltation and agricultural activities (Banglapedia, 2005). Few rivers flow through the Chalan *beel* and fall into Jamuna river. As this *beel*'s water is flowing all times, so it is named as Chalan (Continuous) *beel* (Khan et. al, 2000).

Beel or wetland has a great role to conserve the environment. The wetland is essential for the circulation of Carbon-di-oxide, Nitrogen, Sulphur, Phosphorus etc. (Odum, 1983). The wetland is not only essential for environment but it is also a great source of protein.

To fill the low land for agricultural purpose Chalan *beel* faces great harm, which is also harmful for environment. The people try to make it agricultural land. The Chalan *beel* is decreasing. The total area of Chalan *beel* was 1088 square km in 1909 and now it is turned into 368 square km in 2005 (Banglapedia, 2005). Now Chalan *beel* cannot hold water. It flows over agricultural lands, which turns into flood. Singra *Upazila* has been suffering from flood in every year. The sand deposition over cultivable land degrades the land fertility. The lower *beel* area is being filled with sands and silts. The observation and survey have proven that the Chalan *beel* area is being degraded for human activities. The riverbed is being filled for making damp beside river (Khan et. al., 2000).

Under groundwater is being used for agriculture. As a result underground water is decreasing (Khuda, 2001).

Sylhet's haor:

This *haor* is located from upper to lower land in Sylhet. As being lowland water deposits during flood makes the area logged and turned into a great *haor*. It is

imagined that during the creation of Madhupur and Vaoal Garh this land turned low and created lots of *beel* and *haor*. According to Morgan and Shuester (1969) these land squatted 9 to 12 meters (Khan et. al., 2000).

There are plenty of *beels* and *haors* in Bangladesh. These are called *Zalabhume* in Bangla and the wetland in English (Banglapedia, 2003). Only the total area of Hakaluki *haor* of Sylhet and Moulovi Bazar is 748 square km (B. B. S, 1991). This important wetland is suffering from many problems due to natural disaster.

This *beel* is in danger for man made and natural causes. The natural causes include changes of weather, rainfall, topsoil erosion etc. Man made causes include agricultural activities, infrastructures in *beel* area, through chemical wastages from mills and factories, which polluted and decreased wetland. Although Hakaluki *haor* was degraded by draught but man made causes were played much more than natural. The *beel* faced immeasurable susceptibility in 1999 for settlement around the *beel* from which the people threw lots of wastage in it. The area of the *beel* is decreasing. The migratory birds in winter season and ducks are decreasing. As an example 40-60 thousand ducks were in the winter season in 1960 which number was decreased to 15 thousand in 1987 (Khuda, 2001).

Therefore, the proper management is needed to conserve the *beel*. The reason is that the important *beels* are going to die for mismanagement (The Daily Independent, Nov-13, 1999).

The *beel* area is not only important for environment but also economically, it is very important. The fishes reproduce when floodwater comes here from nearby area. Thus wetland is the source of 11% of total national fishes production (Khuda, 2001). Therefore, the wetland needs a proper management and its fair implementation.

Tanguar haor:

Tanguar *haor* is one of the important *haors* among the wetland and *beel*. Tangour *haor* expands over 10 *Mouza* of Tahirpur and Dharmapasha *Upazila* in Mymensing. The area of Tanguar *haor* is 100 square km. A large number of birds live here. The *beel* has a great importance to keep ecological balance. About 140 genera of birds are found here. Moreover, various types of fishes, birds and rare types of flora are found in this wetland like Hijal (*Barringtonia acutangula*), Karach (*Pongamia pinnata*), Ban Tulsi (*Ocimum americanum*), Nalkhagra (*Phragmites karka*) etc.

This is an ideal *haor* ecosystem, which is very important in respect to environment and socio economic sustainability. In the year of 1999-2000 the government has collected 70, 73,184 Taka tax from this *haor* (Banglapedia, 2005). Tanguar *haor* was declared as a reserved wetland in 1996 by the government (Farooque and Hasan, 1996). But till then mismanagement and unlawful explorations of the *haor* resource are going on.

Faridpur *beel*:

From the northern part of Sundarbans, a low land with shallow deep wetland situated in Khulna covers the district of Faridpur and Barisal. It is called Faridpur *beel*. Faridpur *beel* is on the right side of Padma, the total area of this *beel* is 3000 square km. This low land is criss-crossed by Padma's branches (Khuda, 2001).

Lowland of Dhaka:

The wetland of the left side of Padma, which has been created by the flows from Dhaleshwari and Shaka Chalan *beel*, is familiar as a lowland of Dhaka (Banglapedia, 2005). The wetland of Dhaka is facing more suffering than other wetland of Bangladesh. Most particularly to fill the low land to build settlement, mills, industries, housing projects are decreasing its depth and put it into danger. Moreover, fishes and living animals of water are facing multiple harms for drainage, sewerage wastage. This low land is all around the Dhaka City which is blocking up by making brick industry which creating a vast loss of the wetland (Khuda, 2001).

Gopalganj-Khulna *beel*:

This *beel* is mainly one kind of low land where the rainwater is deposited. Two big *beels* are included to this *beel*, one is Baghia and another is Chanda *beel*. This wetland becomes muddy. However, in somewhere, water exists and many fishes are collected from this *beel*. This *beel* is also turning into agricultural land. Agricultural practice is degrading this *beel*. Thus this wetland is being changed (Banglapedia, 2003).

***Beel* Dakatia:**

Beel Dakatia is in the north West of Khulna district. This *beel* includes two important *Upazilas*, one is Dumuria and another is Fultala *Upazila* of Khulna district. The total area of this *beel* is about 194.30 sq km and the wetland area is 91 sq km (Banglapedia,

2005). Water of *Beel* Dakatia is being polluted from saline water, which comes from shrimp cultivation. About 50 sq. km of total 91 sq. km water is polluted (Khuda, 2001). The government is trying to save this *beel*. Therefore, the government has been taken in hand Khulna-Jessore Drainage Rehabilitation Project (KJDRP). However, success is very little from (Khuda, 2001).

2.5.4. Wetland management and policies of Bangladesh:

According to "The Permanent Settlement Regulation'1793" wetland is rivers, canals, *beels*, etc. In 1950 these rivers, canals, *beels* are added to the *khas* land (Land Management Manual, 1991).

The government can add to reserve any wetland according to The Territorial Water and Maritime Zones Act' 1974, twenty acres of wetland can be distributed among the fishermen. According to "The Local Government Union Porishad (Amendment) Act'1993" the government can conserve any wetland (Farooque and Hasan, 1996).

According to the above-mentioned act, the government can dig any canal necessary. To preserve the distinct species the government will arrange all necessary steps. The government can conserve any wetland to rear fishes and for this purpose, little settlement can be built in wetland area. This rule should be cleared. Otherwise, the people will build settlement near the wetland area, which will hamper the *beel* environment. There are 10,108 *Khas* wetland in total and the government has declared 10 important wetlands as conserved (Banglapedia, 2003). These are as follows:

Table No. 2.5.2.

Ten Important conserved wetlands:

No	Name of the wetland	Location	Area
1	Dakmandup khundah	Natore	6 mile width and 400 feet length
2	Moukhali	Bagerhat	356.89 acre
3	Jafarshahi	Bogra	Length is 12 mile
4	Padma-Jamuna-Balbanta	Faridpur	Length is 12 mile
5	Narisa	Faridpur	Length is 13 mile
6	Padmabati bhati	Faridpur	Length is 24 mile
7	Arial Kha	Faridpur	Length is 30 mile
8	Mahasing nadi	Sunamganj	118 acre
9	Kanglar haor	Sunamganj	201 acre
10	DaudkadiUpazila fishery	Commilla	Length is 30 mile

Source: Land Administration Manual, 2nd Part, 2003, p.62

The government should conserve more wetland area in favour of public interest as well as sustainable land management. The true picture is quite different between rules and preservation condition. There are compensation rules in **The Environment Preservation Rules'1997**. If any one disobeys this rule or one builds infrastructure in the wetland area, The government can abolish (Farooque and Hasan, 1996). But such law implementations are not found in practice.

2.5.5. Wetland related other laws:

- There is more government policies to conserve the wetland. These are:
- The Protection and Conservation of Fish Rules'1985
- The Private Fisheries Protection Act'1889
- The Fish and Fish Products (Inspection and Quality Control) Ordinance'1983
- The Bangladesh Fisheries Development Corporation Act'1973
- The Fisheries Research Institute Ordinance'1984
- The Environment Policy'1992

(Farooque and Hasan, 1996)

The Private Fisheries Protection Act'1889 according to this act any person who fishes in any private waters, not having a right to fish therein and erects, places, maintains or uses any fixed engine in private waters, or puts, or knowingly permits to be put, therein any matter for the permission of the person or destroying fish without the permission of the person of whom the right of fishery therein belongs (Farooque and Hasan, 1996).

There are fisheries related laws in the above mentioned acts and policies.

Fishes production, generation, preservation are described according to "**The Fish and Fish Products (Inspection and Quality Control) Ordinance'1983**".

The environment Department's Officer can visit any place in favor of environment conservation. The officer can file cases against the person. The officer can take decision against that person who will do harm to the wetland or environment.

The Bangladesh Fisheries Development Corporation was established in 1973 according to "**The Fisheries Development Corporation Act'1973**". This Institution investigates for fisheries development, protection of rivers, canals and other marshy land. The government has enacted **The Environmental Policy'1992** for preserving the wetland (Farooque and Hasan, 1996).

In the above discussion of the wetland related laws it is observed that the different government in different times prepared and established many laws and rules. Most of the above laws, acts, procedures and rules are not being followed. In Singra *Upazila*, the small fries are collected without consideration of its re-generation and reproduction. Most of the people do not know the rules and regulations.

So we should make and prepare impliable laws and rules, which will contribute to conserve the wetland. Because wetland has great importance not only for preservation but also it is important for playing effective role in economic development to ensure the employment and source of protein.

CHAPTER THREE

Land Management and Government Policy (Laws, Acts, Regulations and Ordinances on Land Issues in Detail)

The discussion about land management policies and laws were also divided as follows:

- ✓ **British period's laws and policies**
- ✓ **Pakistan period's laws and policies and**
- ✓ **Bangladesh period's laws and policies**

3.1. British period's laws and policies:

3.1.1 The Taxation Act'1862:

This act was enacted to develop the relationship between landowner and peasant. Actually it was a process to take a hard step against the land rebels though it was described to file case against *Jaminder* if the *Jaminder* would harass any peasant. However, the fact was that no poor peasant had such courage to the case against the *Jaminder* (Haq, 2000).

3.1.2. The Canals Act'1864:

This act was related to collection of tolls on canals and others line of navigation and for the construction and improvement of this line of navigation in Bangladesh. The Government may take possession for public purpose (Farooque and Hasan, 1996).

3.1.3. The Alluvion and Dilluvion Act'1875:

It was enacted which was concerned with the rising and merging of land into river. According to this act, if any land is risen in river then the land directly went under the control of the concerned *Jaminder*. For the new risen land, the *Jaminder* was to pay tax to the British East India Company (Haq, 2000). Up dated law is that if any land is arisen in the river or near the bank of the river then at first it will be the government's property. If any one claims to the government for his submerged land and if he/she was able to prove that this land was submerged in the river which was his/her land then the government may settle to the owner of the land but this submerging period will have to be 30 years. After 30 years, the owner of this newly arisen land will be the government. The government may distribute this land among the poor people or landless peasant (Alberuni, 2002).

3.1.4. The Irrigation Act'1876:

The act to provide for irrigation in Bangladesh has hinted about setting up any canals in the land for irrigation purpose. The government can set up any pipeline in any land by this act (Farooque and Hasan, 1996).

3.1.5. The Agricultural and Sanitary Improvement Act'1920:

This to consolidate and amend the law relating to the construction of low drainage and other works for the improvement of the agricultural and sanitary conditions of certain areas in Bangladesh (Farooque and Hasan, 1996).

3.1.6. The Bengal Tenancy Act' 1885:

After the promulgation of "**The Permanent Settlement Act**" the *Jaminder* had many opportunities to harass the tenant. The *Jaminder* compelled the tenant to put signature on the *Kobuliat* paper, which was made according to their own will. The rich *Jaminder* used to harass the oppressed poor tenant (Rahman and Masud, 2003). For "**The Permanent Settlement Act**" the condition worsened day by day. **The Rent Act'1859** and **The Rent Commission'1869** were prepared (Mia, 1999). Much procedures and acts were prepared in British period but some were changed, some were abolished and some were in existence.

3.1.7. The Tanks Improvement Act'1939:

This act provided for the improvement of tanks in Bangladesh for the purpose of irrigation (Farooque and Hasan, 1996).

3.1.8. The Destructive Insects and Pests Act'1914:

This act was enacted to prevent the introduction of any insects, fungus or other pests which is or may be destructive to crop in Bangladesh (Farooque and Hasan, 1996).

The Development Act'1939 to provide for development of land in Bangladesh and to impose a levy in respect of increased profits resulting from works constructed by the Government. A dead or decayed river is said to be revived when on increased volume of water by any means whatsoever, caused to flow freely into or along any part of such dead or decayed river (Farooque and Hasan, 1996). There were some more laws, which are prepared during the regime of British East India Company and British. These are as follows:

- ✓ The Penal Code'1860
- ✓ The Canals Act'1864
- ✓ The Canals Act'1876
- ✓ Irrigation Act'1876
- ✓ The Land Improvement Loans Act'1883
- ✓ The Explosive Act'1884
- ✓ The Agricultural Loan Act'1884
- ✓ The Government Building Act'1899
- ✓ Smoke Nuisance Act'1905
- ✓ The Registration Act'1908
- ✓ The Limitation Act'1908
- ✓ The Destructive Insects and Pests Act'1914
- ✓ Juvenile Smoking Act'1919
- ✓ The Poisons Act'1919
- ✓ The Agricultural and Sanitary Improvement Act'1920
- ✓ The Forest Act'1927
- ✓ The Tanks Improvement Act'1939

(Farooque and Rizwana, 1996; Rahman and Masud, 2003, Alberuni, 2002).

3.2. Pakistan period's laws and policies:

3.2.1. The State Acquisition and Tenancy Act:

The State Acquisition and Tenancy Act was prepared in Bengal Provincial council in 1947. Later in 1950 **The State Acquisition and Tenancy Act** was enacted with 152 sections, which were described in this act and *Jamindery* system was abolished (Rahman and Masud, 2003; Haq, 2000; Alberuni, 2002). The main subject of this act is as follows:

The land revenue authority's power, appeal, consideration, reconsideration, tax procedures making

- ❖ Land related document preservation and correction
- ❖ Rent and rent collection related procedures
- ❖ Accumulation, division and settlement of landlord
- ❖ Increasing and decreasing procedures of tax
- ❖ Land selling and buying procedures

(Haq, 2000; Alberuni, 2002)

Besides "The State Acquisition and Tenancy Act" The Pakistan government prepared many land related acts, laws, procedures, ordinances, notices etc. These are as follows:

- ⌚ The East Bengal Land Revenue (East Bengal Amendment) Act'1949
- ⌚ The Bengal Tenancy (East Bengal Amendment) Act'1949
- ⌚ The East Bengal Evacuees (Administration of Property) Act'1949
- ⌚ The East Bengal Land Revenue Rent and Ceases (Apportionment) Act'1949
- ⌚ The East Bengal Non-Agricultural Tenancy Act'1949
- ⌚ The Bengal Alienation of Agricultural Land (Temporary Provisions) (East Bengal Amendment) Act'1949
- ⌚ The East Bengal Tenancy (East Bengal Second Amendment) Act'1949
- ⌚ The East Bengal State Acquisition and Tenancy Act'1950
- ⌚ The East Bengal Acquisition of Waste Land Act'1950
- ⌚ The Sylhet (Board of Revenue for East Bengal's Jurisdiction) Act'1951
- ⌚ The Bengal Walkof (Extension to Sylhet) Act'1951
- ⌚ The East Bengal Evacuee Property (Restoration of Procession) Act'1951
- ⌚ The East Bengal Evacuee (Administration of Immovable Property) Act'1951
- ⌚ The East Bengal Transfer of Agricultural Land Act'1951
- ⌚ The East Bengal Evacuee Property (Restoration of Possession) Amendment Act'1951
- ⌚ The East Bengal Evacuee (Administration of Immovable Property) (Amendment) Act'1951
- ⌚ The East Bengal Alluvial Land (The East Bengal Amendment) Act'1952
- ⌚ The East Bengal Prevention of Transfer of Property and Removal of Documents and Records Act'1952
- ⌚ The East Bengal State Acquisition and Tenancy (Amendment)'1952
- ⌚ The East Bengal State Government Lands and Buildings (Recovery of Possession) Act'1950
- ⌚ The East Bengal State Acquisition and Tenancy (Amendment) Act'1953
- ⌚ The East Bengal Alluvial Lands (The East Bengal Amendment) Act'1953
- ⌚ The Assam Land Revenue Re-Assessment (East Bengal Amendment) Act'1953
- ⌚ The Land Registration (East Bengal Amendment) Act'1953
- ⌚ The Assam Land Revenue (East Bengal Amendment) Act'1953

- ⌚ The East Bengal Transfer of Immovable Property (Relaxation of Restriction) Act'1953
- ⌚ The East Bengal (Emergency) Requisition of Property (Amendment) Act'1954
- ⌚ The Sylhet Tenancy (East Bengal Amendment) Act'1954
- ⌚ The Bengal Tenancy (East Bengal Amendment) Act'1954
- ⌚ The East Bengal State Acquisition and Tenancy (Amendment) Act'1954
- ⌚ The East Bengal Emergency (Administration of Immovable Property (Amendment) Act'1955
- ⌚ The East Bengal State Acquisition and Tenancy (Amendment) Act'1955
- ⌚ The East Pakistan State Acquisition (Ad-interim Payment) Act'1956
- ⌚ The East Bengal State Acquisition and Tenancy (Amendment) Act'1956
- ⌚ The East Pakistan Urban Immovable Property Tax Act'1957
- ⌚ The East Bengal Alluvion and Dilluvion (The East Pakistan Amendment) Act'1957
- ⌚ The East Bengal (Emergency) Requisition of Property (Second Amendment) Act'1957
- ⌚ The East Pakistan State Acquisition (Bonds) Act'1957
- ⌚ The Chittagong Hill-Tracts (Land Acquisition) Regulation'1958
- ⌚ The East Bengal State Acquisition and Tenancy (Amendment) Ordinance'1958
- ⌚ The East Bengal State Tenancy (East Pakistan Amendment) Ordinance'1958
- ⌚ The Sylhet Tenancy (East Pakistan Amendment) Ordinance'1958
- ⌚ The Bengal State Tenancy (East Pakistan Second Amendment) Ordinance'1958
- ⌚ The Sylhet Tenancy (East Pakistan Second Amendment) Ordinance'1958
- ⌚ The East Bengal State Acquisition and Tenancy (Amendment) Ordinance'1958
- ⌚ The East Bengal State Acquisition and Tenancy (Second Amendment) Ordinance'1958
- ⌚ The East Bengal Tenancy (East Pakistan Third Amendment) Ordinance'1958
- ⌚ The Sylhet Tenancy (East Pakistan Third Amendment) Ordinance'1958
- ⌚ The Court of Words (East Pakistan Amendment) Ordinance'1958
- ⌚ The East Bengal State Acquisition and Tenancy (Third Amendment) Ordinance'1959
- ⌚ The East Pakistan Transfer of Immovable Property (Relaxation of Restriction) Ordinance'1959
- ⌚ The Sairat Mahals (Management) Ordinance'1959

- ⌚ The East Pakistan Tenancy Laws (Amendment) Ordinance'1959
 - ⌚ The East Pakistan Hats and Bazars (Establishment and Acquisition) Ordinance'1959
 - ⌚ The East Bengal (Emergency) Requisition of Property (Amendment) Ordinance'1959
 - ⌚ The Assam Land and Revenue (East Pakistan Amendment) Ordinance'1959
 - ⌚ The East Bengal State Acquisition and Tenancy (Second Amendment) Ordinance'1959
 - ⌚ The East Bengal State Acquisition and Tenancy (Third Amendment) Ordinance'1959
 - ⌚ The East Bengal State Acquisition and Tenancy (Fourth Amendment) Ordinance'1959
 - ⌚ The East Bengal State Acquisition and Tenancy (Fifth Amendment) Ordinance'1959
 - ⌚ The Sylhet Tenancy (East Pakistan Second Amendment) Ordinance'1959
 - ⌚ The Non Agricultural Tenancy Act'1947
- (Rahman and Masud, 2003; Haq, 2000; Alberuni, 2002; Baroi and Shahjahan, 1997)

3.2.2. The Non Agricultural Tenancy Act'1949:

The Non Agricultural Tenancy Act'1949 was applied practically from 20 December of 1949 (Rahman and Masud, 2003). After independent of Bangladesh, this act was enacted for all over the country by the ordinance no 48 (Haq, 2000).

Former East-Pakistan Government passed this act in 1950 which was approved in 1951 by the government of East Pakistan. Firstly the government acquisitioned some *Jamindery* and later in 14 April of 1956 the government acquisitioned all the *Jamindery* (Alberuni, 2002).

3.2.3. The East Bengal Tenancy Rules'1954:

The government prepared this act with 152 sections. This act is divided into two parts. First part has 4 chapters which include the abolition of *Jamindery* and peasants became the owner of land. This act is running in Bangladesh which described the lands owners' responsibilities, the government's responsibilities, the power of land-related officers, working process etc.

Sections 1 to 25 and 45 of the act are related to land management procedures and 26 to 44 related to land survey and settlement (Haq, 2000). After passing this act, the government prepared "The Government Estate Manual'1958 (Rahman and Masud, 2003). The Rent Board was formed under the provincial government to help rent division (Alberuni, 2002).

A new administrative structure was formed in district level with *Tohosilder*. The Circle Inspector of the sub division and the Deputy commissioner looked after and maintained the *Khas* lands (Hossain, 2000).

3.2.4. The Agricultural Pests Ordinance'1962:

The Agricultural Pests Ordinance'1962 (Ordinance No. vi of 1962) to provide for the prevention of spread of agricultural pests in Bangladesh. The Government may by notification in Official Gazette prohibit the employment of such methods of cultivation as held the spread of agricultural pests either generally or with respect of any particular crop or the transport or sale of any infested crop (Farooque and Hasan, 1996).

3.3. Present period's laws and policies:

The former president of Bangladesh Sheikh Mujibar Rahman promised to make tax free until 25 bigha. However, in 10 April of 1971 the government of Bangladesh declared to run all existing laws of Pakistan period with little change.

3.3.1. The State Acquisition and Tenancy Act:

After taking the power of Bangladesh, the president freed tax upto 25 bigha by correction of **The State Acquisition and Tenancy Act** with the ordinance No.-96 of 1972 (Alberuni, 2002). In 1972 land sealing was increased to 100 bigha by the ordinance No-98 of 1972 (Haq, 2000).

The State Acquisition and Tenancy Act was amended many times after independence (Alberuni, 2002). The significant changes are as follows:

- ⌚ Abolition of the Rent Board
- ⌚ Keep a system to recollect the *Khas* land
- ⌚ Control and process of *Khas* land use
- ⌚ Development of taxation
- ⌚ Land sealing

⌚ Tax Free upto 25-bigha
(Haq, 2000; Alberuni, 2002)

3.3.2. The Land Development Tax Ordinance'1976:

By this act "**the authority**" is meant "**The Deputy Commissioner**" or a person who will take the power from the commissioner. This ordinance will mean it as **The Land Development Tax Ordinance '1976**. The Tax will mean the land development tax. By this ordinance, the powers of tax officer were described. The Tax officer can visit any mill and industry to determine tax.

If necessary he can visit any house, land, building or infrastructure to determine or re-determine tax (Haq, 2000).

In the British period the inhabitant of hill tracts were operated by the local land custom and in Pakistan period 10 acre of lands were settled to hill tracts' people instead of 25 acre according to the "**The Chittagonj Hill Tracts Act'1984**" (Haq, 2000).

3.3.3. The Emergency Property Acquisition Act'1989:

According to this act the government can take possession of any part of land to make shelter camp to save people from flood or other natural calamities like drought, cyclone, heavy rainfall etc. (Haq, 2000).

3.3.4. The Land Revenue Act'1989:

The Land administration board was formed in 1980 by **The Land Administration Act**. This board was many responsibilities to settle the land related problems but many complexities were created. Therefore, the government formed The Land Reformation Board according to **The Land Reformation Board Act'1989**. It was passed in 1989. By this act, the land administrative structure was reformed. According to the act, a new land officer's post was created to take care of the office. It also kept a system to build a committee with gazetted officer in district and sub-division level (Haq, 2000). Some remarkable land related acts after independence were prepared in different times and these are as follows:

- ⌚ The Bangladesh (Property and Vested Property) Ordinance'1972.
- ⌚ The Bangladesh Vested Property (Control, Management and Distribution) Order'1972

- ⌚ The Bangladesh Vested Property (Land, Settlement and others Property) Rules'1972
- ⌚ The Bangladesh Vested Property (Settlement of Urban area) Rules'1972
- ⌚ The Bangladesh Vested Property (Business Institutions) Rules'1972
- ⌚ The Bangladesh Vested Property (Industrial Institutions) Rules'1972
- ⌚ The Land Development Tax Ordinance'1976
- ⌚ The Land Development Tax Rules'1976
- ⌚ Acquisition of Immovable Property Rules'1982
- ⌚ The Acquisition and Requisition of Immovable Property Ordinance'1982
- ⌚ The Land Reformation Ordinance'1984
- ⌚ The Land Reformation Rules'1984
- ⌚ The Vested Settlement (Fulfillment Rules) Ordinance'1985
- ⌚ The Emergency Property Acquisition Act'1989

According to **The Ordinance of 1972**, land limitation was fixed upto 100 bigha and later it was again fixed upto 60 bigha (Haq, 2000; Hossain and Ahsan, 2000; Alberuni, 2002; Rahman and Masud, 2003).

3.3.5. The land management policies:

The Planning Commission of the Government of the People's Republic of Bangladesh prepares a plan for reconstruction and development taking into account of the inescapable political, social and economic realities of Bangladesh. The Bangladesh Government has prepared all together fifth plans from 1973 to till now. A short discussion relating to land development from the Five Year Plans are as follows:

The predominance of agriculture in economic life becomes evident. Agricultural output depends on land. The crops production dominates agriculture in Bangladesh. Rice was covered about 78% of the cropped area in 1973. Now this ratio is much more than past. So the government emphasized to increase its contribution to the GDP (Gross Domestic Product) of the country. In this First Five Year Plan the former government tried to improve fishery, forestry and livestock sectors because these sectors were being made very little contribution to the growth. The former government tried to improve in agriculture sector through appropriate development in agriculture, high technology and investment, effective implementation of development program, adequate physical and institutional infrastructure. Foodgrains

production was planned to increase but the success was not much more than expectations.

The fertilizer application increased in this planning for being self-sufficient. A table relating to this matter was presented in the following table (table no. 3.1).

Table No. 3.1.

Estimated year-wise requirement of fertilizers during the plan period:

Sl No.	Year	Total fertilizers (in Thousand Tons)
1	1973-1974	520
2	1974-1975	589
3	1975-1976	734
4	1976-1977	906
5	1977-1978	1135

Source: First Five Year Plan (1973-1978).

In the First Five Year Plan, the government made plan to control the flood. The former government planned to make embankment to protect low-lying areas from floods. The Plan was prepared to collect various data like comprehensive hydrological, groundwater, hydrographic etc. Provision has been made for the use of a large quantity of agricultural outputs in plan. The government tried to give agricultural credit to develop the low-income farmers. The former government also gave money for agricultural Research and Education. Total 29.60 crore Taka for various research and 33 crore Taka for education was planned in the first five year plan. Moreover, 1.5 crore Taka was fixed for research of soil fertility and soil testing institution. Altogether fifth Five Year Plan were prepared and these are as follows:

1. The First Five Year Plan for 1973-1978
2. The Second Five Year Plan for 1980-1985
3. The Third Five Year Plan for 1985-1990
4. The Fourth Five Year Plan for 1990-1995
5. The Fifth Five Year Plan for 1997-2002

The last fifth Five Year Plan was published in 1998. Since the First Five Year Plan, all the development plans emphasized the overall development of the rural economy with food and agriculture as its centerpiece. The average annual growth rate of the agriculture sector was 1.86% from 1972/73 through 1979/80 and 2.17% from 1980/81

through 1990/91. During the Second Plan, the area under irrigation reached 6.12 million areas only against the target of 7.21 million areas. During the Third Plan, the annual growth rate of the agriculture sector was 2.5% only as against a target of 4%. The growth of the agriculture sector as a whole during the Fourth Five Year Plan fell short of the rate envisaged. Annual average growth rate attained was 0.98% against the target of 3.6%. The failure to achieve production target was due to shortfalls in both areas and yield.

Bangladesh made steady progress in crop agriculture in the post-independence period. The cropping intensity increased from 148% to 179% and foodgrain production almost double during the period from 1969/70 to 1992/93. In fact, the entire growth in crop production is due to the growth in foodgrain production, most particularly rice. According to the government's Fifth Five Year Plan was to sustain of high yield and environmental protection was remained the principal concern in recent years. The government realized the worsen situation about land. In the Fifth Five Year Plan the government tried to improve this situation. The plan specify objectives are as follows:

- a) Increase productivity and real income of farming families in rural areas on a sustainable basis;
- b) Attain self-sufficiency in food grain production along with increased production of other nutritional crops;
- c) Encourage export of agricultural commodities particularly vegetables and fruits keeping in view domestic production and need;
- d) Promote adoption of modern agricultural practice in dry, wetland and coastal areas;
- e) Ensure sustained agricultural growth more efficient and balanced utilization of land, water and other resource; and
- f) Encourage comparatively large farm to graduate into commercial farming.

The government prepared Fifth Five Year Plan. Some important crop production plan was as follows:

Table No.3.2.

Some important crop production plan in the Fifth Plan:

Crops	Production (in million metric tones)	
	196/97 (Benchmark)	2001/2002
Rice	18.88	23.40
Wheat	01.45	01.60
Total foodgrain	20.43	25.12

Source: The Fifth Five Year Plan.

The government planned to increase crop production by applying various methods and using HYV seeds in agricultural land. It refer to use Bangladesh Agricultural Research Institute (BARI)'s invented HYV seeds in flood prone areas. The government was prepared plan for wetland farming. Besides, the preservation of biodiversity of the wetland was given high priority. The government made plan to increase cropping intensity. Cropping intensity from 1992/1993 to 2001/2002 was shown in the table no. 3.3.

Table No. 3.3.

Cropping intensity (area in Million Hectors)

No	Year	Net Land Area	Total Cropped Area	Intensity Cropping
1	1992/1993	7.64	13.70	179
2	1996/1997	7.60	14.08	185
3	2001/2002 (Projected)	7.50	14.41	192

Source: The Fifth Five Year Plan.

The Government made policies to control the flood and excess use of underground water. The former government made plan to improve peasant's condition giving agricultural credit. An amount of Taka 30,000 million was projected to be developed as credit to agriculture in the terminal year of the plan. In the Fifth Year Plan, the former government planned to launch agricultural insurance. The farmers of this country is not rich and most of them are poor and they live under poverty line so the government planned to improve their economical condition by these types program like agricultural marketing, agricultural research, education and training etc. The former government took necessary initiatives to develop the land and to protect the land degradation. Therefore, this plan divided land use. Resolving land use was given special attention for sustainable agricultural development. Strategies for sustainable development of the agricultural sector during the Fifth Plan period were devised to ensure environmental conservation. The government emphasized to improve agriculture so the government kept financial budget for agriculture. This type data are as follows:

Table No. 3.4.

Agricultural budget in the Fifth five year plan:

Program	Total Taka (in Million)
Agricultural Extension	1,650
Agricultural Research	2,500
Seed Development	6,000
Fertilizer and soil development	550
Agricultural Marketing	500
Women in Agricultural Development	50
Environmental Protection	500

Source: The Fifth Five Year Plan

Agriculture plays a vital role in the growth and stability of the country's economy. At present it accounts for about one-third of the GDP and employs about two-third of the labour force. All these directly related to land. So land management policy of the government is very important. There is no different policy for land. Some are directly related to land like agriculture, soil and land resources etc. In every Five Year Plan the government has emphasised to increase the use of chemical fertilizers and insecticides. But there is not any mention about how to conserve the soil and how to rescue *Khas* lands from the illegal occupants though the government has noticed for rescuing *Khas* lands. There is not proper plan for sustainable land management.

3.3.6. Agricultural management policies:

The development of Bangladesh is dependent on agriculture. So it is very much important to develop agriculture. In different times, different governments have taken many initiatives to improve for agriculture. For this purpose government prepared and enacted many rules and policies for the development of agriculture such as the First Five Year Plan, the Second Five Year Plan, the Third Five Year Plan, the Fourth Five Year Plan and the Fifth Five Year Plan. However the government enacted many laws and policies such as the Agricultural Policies'1992, the Agricultural Extension Policy'1997, the Crop Policy'1998, the Irrigation Policy'1998 and the National Water Policy'1999. Some lacks are found in the policies of the government. Such discussions were mentioned below:

The government's several departments are acting for the improvement of agriculture. But there is no sufficient rule or provision is to conserve the land's preservation because without no land agriculture is meaningless. If land is degraded it also will make impacts for agriculture. The government's different institutions and departments have not so coordination among them. For this when any important initiatives are prepared then haphazard is observed when people are cultivating in the river bed then the water development board will not take any initiative saying this that it is not their duties. They tell that another departments will care of it. How these initiatives will be taken for effective?

3.3.6.1. Agriculture Extension Policy'1992:

The government has set up the objectives of Environment Policy'1992 and has formulated different sectoral policies such as fisheries, industry and forestry. A policy reflects the development philosophy of the country. It should be formulated and be incorporated based on the welfare needs of the best sectoral policies ever formulated in the country. The most important strengths of the formulated policy are of its overall policy structures, macro-threshold, micro-level specification, right identification of sectoral problems formulation of a legal frame work and institutional agreements for policy implication and above all inclusion of an action plan to address the sectoral problems fixing the responsibilities of different ministries, divisions, departments and other relevant departments. The existence of a good policy is not everything, but of course, it is perquisite with this end in view and to present the declining nature of the environment, the government has taken some initiatives to cope with this situation (Alamgir, 2002).

According to the above policy it is observed that technology should be used in agriculture for attaining self-sufficiency in food and those steps should be environment friendly. But it is interesting to note that on what ways policies are to be adopted for coping with the environment friendly resources use which is not mentioned in the policy. The use of chemicals such as insecticides, pesticides, chemical fertilizers should be regulated which is said in the policy. But there is no direction in the policy for the regulation of pesticides use in agriculture that bears adverse impact on the agriculture environment through pesticide residues in the field. In this regard, the rules are seriously ignored.

Some institution developed various High Yield Varieties of crops for more agriculture production for the purpose of meeting the requirements of the country. But there are no guidelines to conserve the indigenous varieties of crops because introducing of HYV causes extinction of indigenous low yield varieties of crops, which is very important for ecosystem. The application of different chemical fertilizers would be encouraged. Bio manners are useful for the sustainable agriculture.

3.3.6.2. Agriculture in the Environment Action Plan'1992:

It is much priorities on a field based national survey, conserving of the nutrients in the soil, regulation of the agro-chemicals, introducing natural and integrated pest management method, discouraging synthetic fibbers use, agriculture ecosystems conservation, the application of the agro-chemicals for should agriculture environment in Bangladesh. The degradable chemicals may be allowed under control condition. Through it is clearly known to us that degradable chemicals is harmful for the environment yet it is not prohibited or banned, for that reason use of those chemical fertilizers will be regulated properly. The users particularly the peasants community is not properly complying with those directions, as they are not aware of this matter. But in reality, it is different in context of Bangladesh because of no compliance of the agriculture action plans, related policies and laws, which are often happened. Moreover, huge irregularities such as non-coordination, negligence of the implementation of the research findings, corruption are prevailing in the implementation of the laws and policies among concerned departments. Finally it may be pointed out that the formulated and approved action plan is well but it is regret that it is hardly seen any significant program and activities of the action plan. The government should immediately look into the matter and should take proper action in this regard for the purposes of agriculture development in Bangladesh only for the greater interest of the nations.

3.3.6.3. Agriculture Extension Policy:

Agriculture extension is one of the main components of the national agriculture policy. There is a need for strengthening agricultural extension service for ensuring proper use of agricultural land and improving land productivity. But it can be mentioned that he ingredients of the productivity of agriculture in Bangladesh, several

factors such as information technology, methodology, integrated extension support, proper coordination, optimizing the use of resources, supporting extension programs should be given much priorities for agriculture development in Bangladesh. But it should be aware about the implementation of the agriculture extension policies. It is crying need to implement the policies including agriculture extension policy. Nothing should be kept in the paper rather it should be carefully implemented. In fact, the development of agriculture has taken some important initiatives for promoting agriculture development in Bangladesh. The guideline for the development of agriculture is almost limitations. Because in the field, the officers of the DOA were not interested to look into the activities prescribed for them. The monitoring of the local officers will be frequently observed for the purpose of the developing agriculture in Bangladesh. There are no facilities of the field officers mentioned anywhere of the design of the DOA activities, which may reconsider, for their work. In this regard, there are certain coordinating agencies but there are no guidelines for them in this regard, which could have to insert in the policy.

3.3.6.4. National Agricultural Policy'1999:

The main objective of the policy is to maintain self-sufficiency in food. This policy has implications to national water policy framed in 1997 for the coping with the water scarcity. The policy permits agro-chemicals uses for food sufficiency. The objectives of this policy are the maintenance on ecological balance, conservation of biodiversity and ensuring public health, which further enhance the agriculture policy in Bangladesh because of the absence of this kind of provision in the agriculture policy framed in 1992.

3.3.6.5. The Planning:

After independence of Bangladesh, all the governments have taken many initiatives for the development of agriculture. The governments have prepared the fifth Five Year Plans such as the First Five Year Plan, Second Five Year Plan, Third Five Year Plan, Fourth Five Year Plan and Fifth Five Year Plan.

The basic objectives of this plan are to transform the institutional and technological base of agriculture with a view to attaining self-sufficiency in food grains considering employment opportunities in agriculture and creating a modern agriculture. The plan emphasis to increase agriculture production, to provide productive employment to the growing rural labor force to reduce rural poverty and promote equally income distribution.

This plan emphasis to develop the rural, agricultural such as irrigation, chemical fertilizer, pesticides and cultivation of HYVs of rice and wheat.

The Third Five Year Plan emphasized to promote the employment problem and improve the rural development of the country by developing agriculture. The plan also emphasis on optimum use of land, expansion of HYV seeds and the agricultural education, credit, research and extension service.

The government tried to improve the agricultural knowledge through researches and studies. The Fourth Five Year Plan also emphasized for zone wise agricultural development.

According to the Fifth Five Year plan, the government tried to conserve land and environment because this most important elements are being degraded. The plan emphasized to decrease the use of chemical fertilizers. This plan pointed out about the agricultural protection but there was no provisions how it will be possible. The planning was perhaps unrealistic and the management of agriculture policy was not well defined and specific. Neither such policy was adequately integrated to and consistent with other development policies and programs. It appears that political will, policy guidance, planning objective and implementation strategies of development programs are not going hand in hand. A big gap can be observed between thinking and doing by technical experts or scientists which do not have enough courage to communicate faults and reality with the planners and administrations. It is observed that the government have prepared many plans for agricultural development but most of them are not properly used. And it is also found that the implementation of the policy is not well.

3.3.7. Water management policies:

3.3.7.1. The Embankment and Drainage Act'1992:

This act to consolidate the laws relating to embankment and drainage and to make better provision for the control of embankments and water course for the better drainage of lands and for their protection from floods, erosion or other damage by water.

This act is provided to protect from flood and other damage by water. But here is no provision for them who will violate the rules and the government policy. This act can not protect the embank of the river of the study area Singra Upazila. The study observed that many illegal owners of the khas land and corrupted people are damaging the embankment of rivers. There is no provision for them who are cultivating in the riverbed area. This type activity is decreasing the depth of river. When floodwater comes in river then it can not hold so much water because increasing its depth. That is why flash flood is occurred every year in Singra Upazila.

3.3.7.2. The Ground Water Management Ordinance'1985:

This ordinance was prepared and enacted to manage the ground water resource. This ordinance was enacted for agriculture purpose but no provision to reserve and to restore the groundwater resource is observed in the planning. In Chalan beel area or in Barind tract both study areas groundwater's situation is not well. Especially in Barind tract area, the groundwater is decreasing rapidly. According to the act the government can set up any deep tube well or tube well in any place of the country. But if any one wants to set up tube well or deep tube well, he/she has to get the license from the local authority of the Upazila. In practical observation, it is not followed. Not a single tube well is seen who has such license.

3.3.7.3. The Territorial Water and Maritime Zones Act'1974:

The Territorial Water and Maritime Zones Act'1974 to provide for the declaration of the territorial water and maritime zones.

3.3.7.4. The Bangladesh Water and Power Development Boards Order'1972:

Bangladesh water and Power Development Board has been established by The Bangladesh Water and Power Development Boards Order in 1972. According to The

Bangladesh Water and Power Development Boards Order the board can play a vital role to conserve the water resources and the wetlands of the country.

3.3.7.5. The Water Resources Planning Act'1992:

This act was prepared and enacted to develop the water resources of Bangladesh. According to this act it was supposed to improve and confirm the sustainable water resources use but there is no provision in this act to preserve and to confirm the water resources management policy.

3.3.7.6. National Water Policy'1999:

The water policy was adopted in September 1987 and was updated this draft in October 1999. The national water policy focuses on balanced use of water as well as flood and drought management. The policy provides guidelines for identification of future programs for optimum development and efficient management of water resources for agriculture, a basic human need and a precious national asset. Agriculture is still main user of water and its share in water demand will further increase concurrently with efforts to attain food security through increased food grain production. Objectives of the water policy should be implementation without making any delay, as it is vital for irrigation. During the implementation of the water policy, it should be noted that the natural resources such as fish and fish habitats, biodiversities of the fisheries and also aquatic ecosystems should be preserved for the sake of sustainable agriculture and environment as well in Bangladesh which is not included in the water policy formulation.

CHAPTER FOUR

Case Study: Socio-economic profile and Khas Land Status in the Study area

According to the rules of Bangladesh, the maximum limitation of land was 100 *bigha* and later it was again fixed upto 60 *bigha* (Alberuni, 2002). One who has above 60 *bigha* land, the excess land will be the *Khas* land. These lands and other government land like *char*, *beels*, canals, lakes, rivers, ponds, and roads are called *Khas* land and *Khas* land's owner will be the government (Land Management Manual, 1991). There were many *Khas* lands in Nachole and Singra *Upazila*. Some of them have been distributed and the corrupt people have illegally occupied some of them, the rest are existing till now for settlement. A table (table no. 4.1) is arranged to indicate the condition of the *khas* land of Nachole and Singra *Upazila*.

Table No. 4.1.

***Khas* land in the study area (in acre)**

SI No	Type of the <i>Khas</i> Land	Nachole <i>Upazila</i>	Singra <i>Upazila</i>
1	Total <i>Khas</i> Land	2213.99	2726.02
2	Suitable for Distribution	358	1975.08
3	Distributed	1770.96	873.94
4	Waiting for Distribution	85.03	1101.14

Source: Assistant Commissioner's Office (Land), Singra and Nachole *Upazila*.

Now the *Khas* land settlement has been stopped because most of the land has been distributed in Nachole and Singra. Many *Khas* land went under illegal ownership. For having much more river, Singra *Upazila* has more *Khas* land than Nachole. Particularly the *Khas char* land went under illegal owner. The environment and ecology in Singra and Nachole *Upazila* are being polluted. The *khas* land should have to be distributed properly otherwise the illegal owners will use the land in an unplanned way, which will degrade the land and pollute the environment and the poor people and poor landless peasants will be deprived of their rights on land. If the government distributes the *Khas* land properly, the landless poor people can lead their lives on those lands. Thus the poverty will be alleviated from the country.

The sustainable land management is necessary in Singra because most of the people of the research area are poor and they do not have enough land to lead a better life. But before the settlement of the *khas* land, it should bear in mind that the amount of *Khas* land in the study area is very little. So there should be proper settlement of *Khas*

land among the poor landless peasants. *Khas* lands may be necessary to build government infrastructures and some *Khas* lands are necessary for the sound environment. As for example, the *beel* and *Haor* (wetland) is very important to preserve the environment and ecology.

Therefore, the *Khas* land management should have to be according to future plan and this management has to be proper for sound environment. But sorry to say that the *Khas* land is not properly distributed and controlled.

4.1. Classification of *Khas* land:

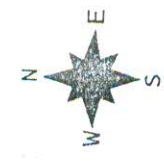
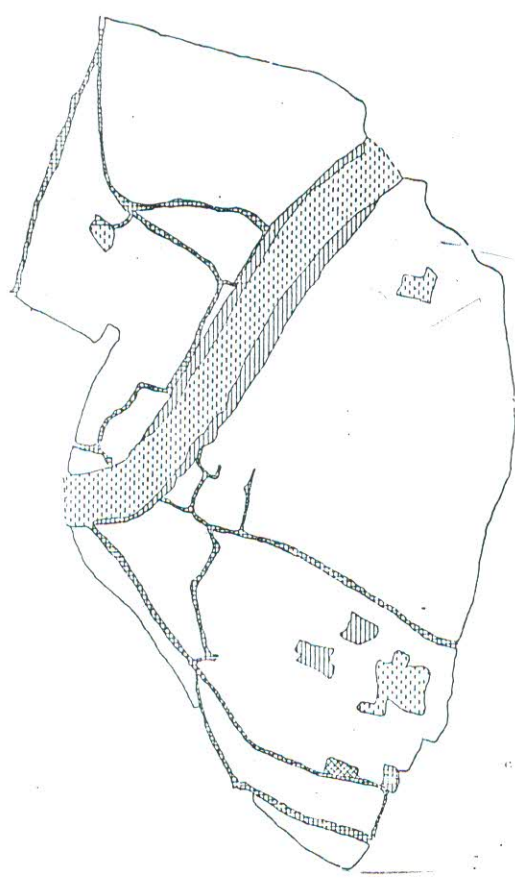
Khas land's owner is government. The government is using the *khas* land for many purposes such as roads, highways, *hats* (small markets), *bazars* (markets), administration buildings, water and sanitation system, graveyard, ponds, canals, rivers and others. These types of *khas* lands are found in the study area Nachole and Singra Upazila. These *khas* lands can be divided as follows:

1. Settlement
2. Agriculture
3. Water bodies
4. Commercial
5. Roads and high ways

Nachole and Singra Upazila are the study areas of this research and the above mentioned various *khas* lands are shown in maps (map no. 3). A good number of the *khas* lands in Singra Upazila are waterbodies such as wetland, rivers, canals and ponds. Some *khas* lands are using for agriculture. Some *khas* lands are using for roads, government building, pond, public toilet, *hat*, *bazar* and settlement. On the other hand Nachole Upazila is a high plain land. Most of the *khas* lands are using for agriculture in Nachole Upazila. But some of the *khas* lands are using for settlement, roads, *hat*, *bazar*, pond, government building, graveyard, educational and regions institution.

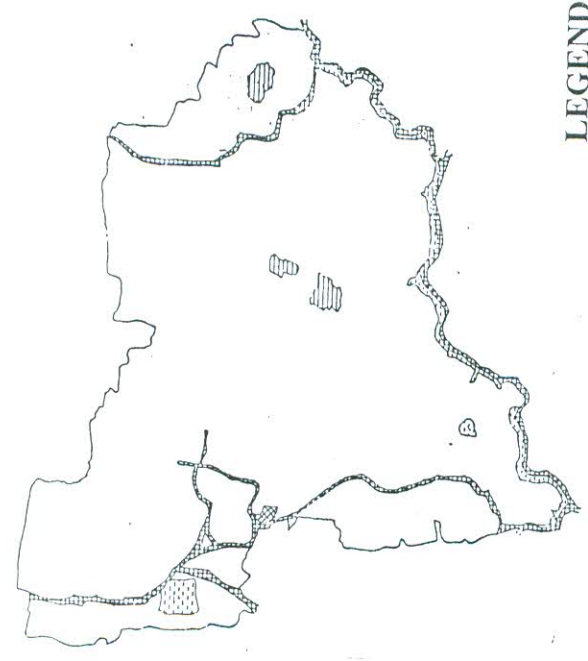
There are communication facilities through *khas* land. There are 71 km pucca, 7 km semi pucca and mud road 355 km; railways 20.5 and 2 nautical mile waterways in Nachole Upazila. Traditional transport Horse carriage, palanquin. These means of transport are either extinct or nearly extinct.

KHAS LAND IN THE STUDY AREA
(KATUABARI MOUZA, SINGRA)



0 66 FEET

KHAS LAND IN THE STUDY AREA
(BHATSA MOUZA, NACHOLE)



LEGEND

	Water bodies
	Agriculture
	Roads and high ways
	Settlement
	Commercial

Source: Field Survey'2006

Map No. 3

Hats, bazars and fairs Hats and bazars are 12, most noted of which are Nachole, Rajbari, Sonaichandi, Mollikpur, Nezampur, Hat Bakoil, Verendi, Golabari. Khas lands also using for public interest. There are 1 Upazila health complex and 4 health and family welfare centers (TNO office, Nachole and Banglapedia, 2005).

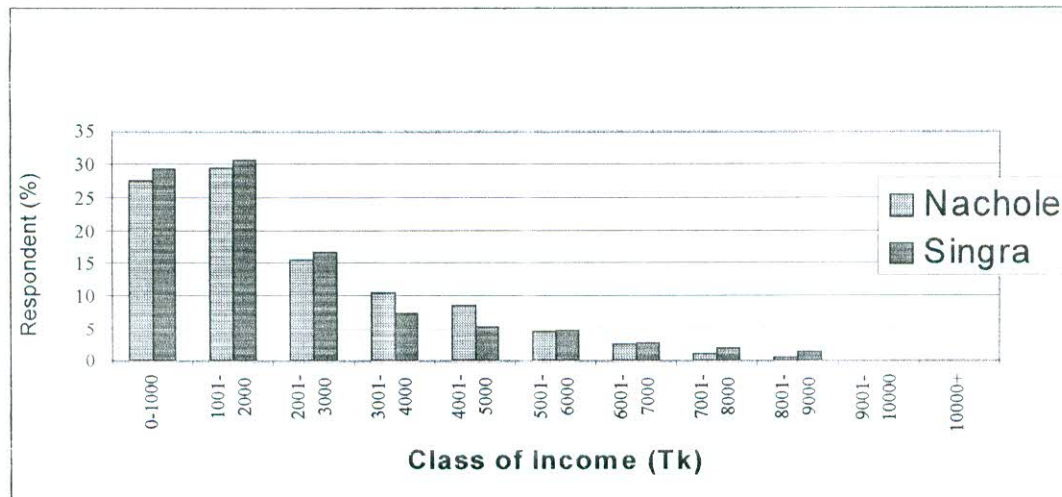
On the other hand, Singra Upazila's khas lands are using for roads, health centers and public for welfare. The Communication facilities through khas land is pucca road 27 km, semi pucca road 9 km and mud road 523; waterways 39 nautical mile, Hats and bazars are 39, fair 16, most noted of which are Singra, Kaliganj, Bildahar, Jamtali (TNO office, Singra, Banglapedia, 2005).

4.2. Causes of illegal occupation of *Khas* land:

In Nachole and Singra *Upazila* there was plenty of *Khas* land. The illegal occupation is existing and illegal occupation of *Khas* land by making false documents is in operation. The government is being deprived of tax for illegal occupation of the land. The poor people, landless peasants, landless labor are being deprived of their rights on the land. The *Chalan beel* area is turned into agricultural land. Silt and soil have filled the riverbed. Many people are causing these harmful changes in the *Chalan beel* area. The people of concerned areas are not rich. Most of them are very poor; they do not have much land. The population is much more in respect of land. The price of land is very high. So some people are trying to obtain the *khas* land. Many causes are there for illegal occupation of the *khas* land. Such as poor economic condition, want of education, want of honesty, want of mass awareness, over population problem, lacking in laws and procedures, want of proper implementation of laws.

4.2.1. Poor economic condition:

Eighty six percent people of the country live under poverty level (Hasina, 1995). The people's per capita income of the study area is very low. Seventy two percent people per capita income of Singra and Nachole *Upazila* is below 3000 Taka. Only 1% people's income per month is more than 7000 Taka. Only 2% people's income of Singra *Upazila* is 7000 to 8000 Taka per month. The pattern of income of the study area is presented in Graph No. 4.1. and Appendices Table No. 4.1.

Graph No.: 4.1.**Pattern of income in the study area**

Main Data Source: Field survey' 2005.

The people of the study area try to occupy the *khas* land for being economically poor. They try to develop their economic status through occupying the *khas* land.

Two hundred households of Nachole *Upazila* have been selected to collect data. Fifty seven percent people's income per month is more than 2000 Taka. Only 10.5% people's income per month is between 2001 to 3000 Taka. Only 1.5% people's income per month of Nachole *Upazila* is 7001 to 9000 Taka. Therefore, the per capita income of Nachole *Upazila* is very poor. The peasants are to face many problems like drought and natural calamities. Most of the people's main economic source of Nachole and Singra *Upazila* is agriculture. Their economic condition is not very well. They want to occupy the government's *Khas* land for financial benefit. Those who have occupied the *khas* land they are degrading the wetland like *Chalan beel*, rivers and cultivable land. The people are occupying the *char* lands for lack of the government's management and want of proper rules and policies.

4.2.2. Population:

The population is much more in respect of available land in Singra and Nachole *Upazila*. Population related data and table of Nachole and Singra *Upazila* are as follows:

Table No. 4.2.

Total population of Nachole and Singra Upazila:

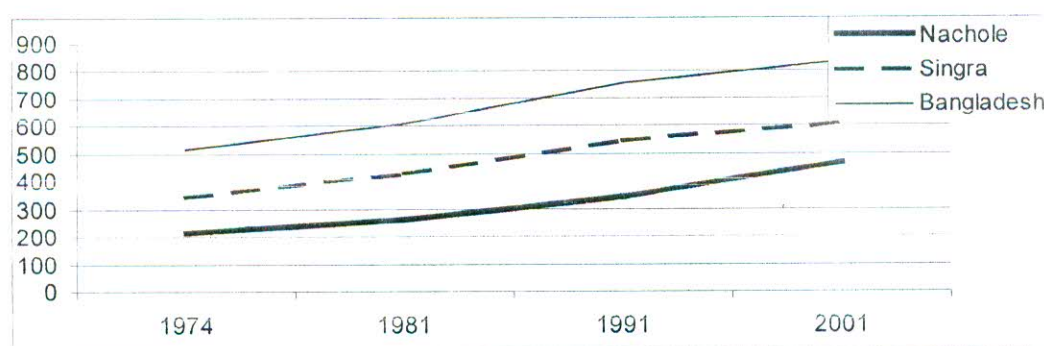
Census Year	Nachole	Singra
1974	60780	181180
1981	74860	224850
1991	97119	289952
2001	132308	320818

Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

Above table (Table No. 4.2.) shows that the population of Nachole and Singra Upazila are much more than land. The total area of Nachole Upazila is only 283.68 square km but its population was 1,32,308 in 2001 (Census, 2001), it was just only 60,780 in 1974 after 7 years the population turned into 74,860 in 1981 (Census, 1974; 1981), the population was 97,119 in 1991 (Census, 1991).

The area of Singra Upazila is 528.46 square km but its population was 3,20,818 in 2001 (Census, 2001). It was just only 1,81,180 in 1974 after 7 years the population turned into 2,24,850 in 1981 (Census, 1974; 1981), the population was 2,89,952 in 1991 (Census, 1991). So the population density is decreasing rapidly. The population decreasing data of the field of research is as follows.

Graph No: 4.2.

Population density per sq. km in Nachole and Singra Upazila

Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

Above graph (Graph No. 4.2.) shows the population density has been increased to about double in both Upazilas by last 30 years. In 1974 there lived only 214 people per square km in Nachole Upazila (Census, 1974) but in 2001 the population density became 466 per square km likewise (Census, 2001). The population density per

square km in 1974 and 2001 in Singra *Upazila* were 343 and 607 respectively (Census, 1974, 2001). The per capita share of land is decreasing rapidly and the people tend to occupy *khas* land for increasing their own share.

4.2.3. Area:

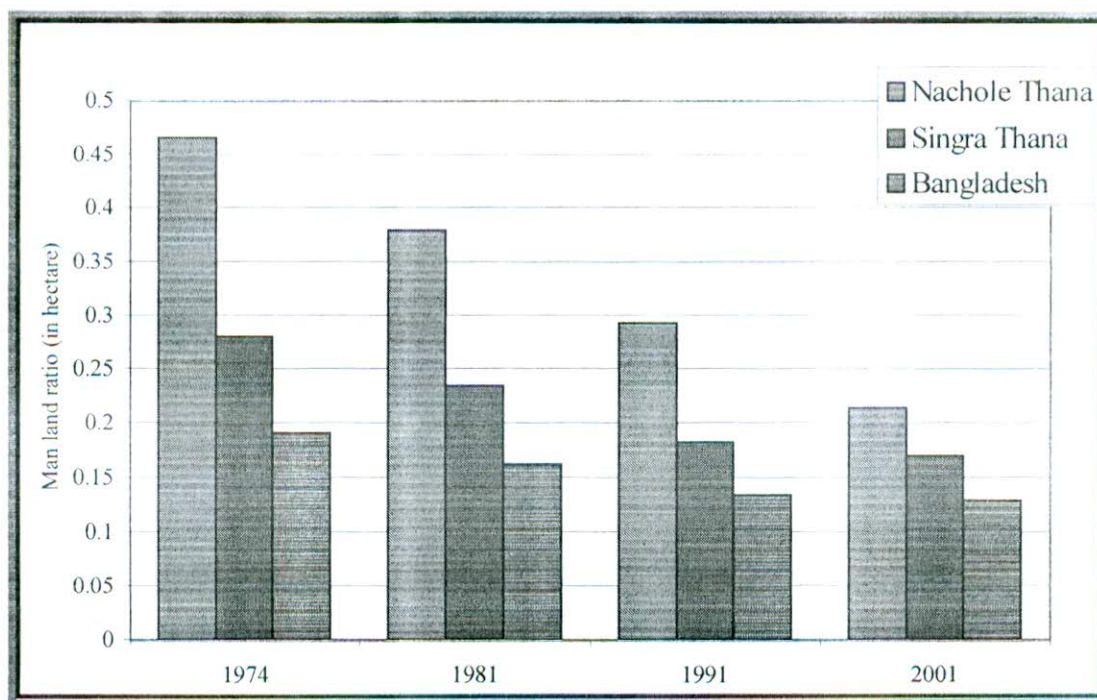
Per capita share of land of Bangladesh is very least than any other country of the world (Ahmed et. al. 2002). This small land has vast population. The illegal owners are occupying the *khas* land.

The per capita share of land of Nachole and Singra *Upazila* of Bangladesh from 1974 to 2001 are as follows (Graph No. 4.3. and Appendices Table No. 4.3):

Graph No. 4.3.

Per capita share of land of the study area and Bangladesh

Per capita share of land = area/population



Main Data Source: Population Census, 1974, 1981, 1991 and 2001.

The total area of Nachole *Upazila* is 283.68 square km (Census, 1974). Per capita share of land was only 0.466 hector in 1974 (Census, 1974), it was 0.378 hector in 1981 (Census, 1981), it was 0.292 in 1991 (Census, 1991) and only 0.214 hector in 2001 (Census, 2001). The per capita share of land is decreasing for over population. The total area of Singra *Upazila* is only 283.68 square km (Census, 2001). The per

capita share of land of Singra *Upazila* was only 0.279 hector in 1974 (Census, 1974), 0.235 hector in 1981 (Census, 1981), 0.182 hector in 1991 (Census, 1991) and only 0.170 hector in 2001 (Census, 2001).

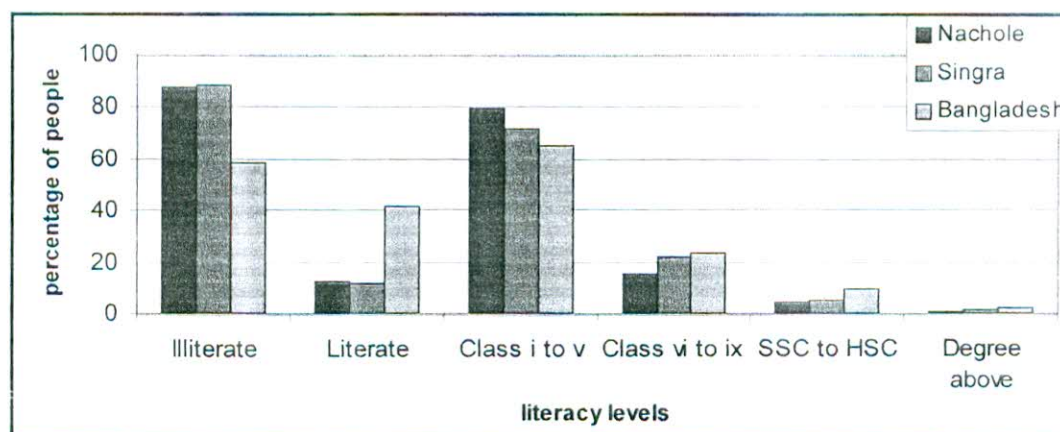
Some people of Nachole and Singra *Upazila* are trying to be owner of the *khas* land to increase the total amount of their own land. Both *Upazilas* are agriculture base area. The laws are not so available to protect illegal occupation of the *khas* land but which laws are existing that is not properly implemented.

4.2.4. Literacy and education:

The education or literacy ratio is not well in Bangladesh. According to UNO report about 42 million people are ignorant in Bangladesh in 1995 (Hasina, 1995). Education develops the sense of justice. If a man does any evil work, education stops to do such inhuman work. The light of education protects to do that illegal works. Education ratio is very low in Nachole or Singra *Upazila*. Higher education ratio is very low. Therefore, they are trying to occupy the *khas* land. The educational status of the study area is available in the following.

Graph No. 4.4.

Percentage distribution of population by literacy levels



Source: Field Survey'2005 and Census, 2001.

In the above chart is showing that the ratio of class (i to v), (vi to ix), (SSC to HSC) and degree educational statistics are among literate ratio.

The elder education ratio is lower than younger in Nachole and Singra. Formerly most of the people of Singra *Upazila* depended on fishing. The area of the *beel* was large and they caught enough fish. In that time population was not so large. The people

easily led their lives depending on agriculture and fishing in Chalan *beel* area. For that the older people didn't feel to be literate. They preferred to work. The older villager's educational ratio is very small in both areas. For the lack of education and morality, they occupy the *khas* land continuously. Most of the *Khas* lands of Nachole and Singra *Upazila* have gone under illegal occupation for want of proper rules and regulations. There are rules to stop illegal occupation as in **Land Management Manual'1991** and **Land Administration Manual'2003** and procedures. According to the above-mentioned rules the local administration will recover those *Khas* land from illegal occupants. The government ordered the local authorities to re-collect from them but it is a matter of regret that the success came very little. On the other hand, such type of illegal occupation encourages others to occupy the *Khas* land. If the laws and rules are applied strictly. Seeing example of application of the laws, others will be afraid of occupying the *khas* land. As per laws, they should be punished for illegal occupation.

4.2.5. Poor implementation of appropriate laws:

All the rules and procedures should be implemented in Nachole or Singra *Upazila*. The laws and rules are not proper implemented in the study areas for some reasons as follows:

- I. Want of The government's awareness
- II. Lack of consciousness of mass people
- III. Want of Education
- IV. Carelessness of the government
- V. Lack of appropriate training of concerned staffs
- VI. Corruption of related officers and workers
- VII. Population Problems
- VIII. Ruling party's interference
- IX. Want of Knowledge about land
- X. Want of awareness of land and order enforcement institutions
- XI. Economic problem

XII. Lack of the government interest

The Bengali nation is land dependant nation. Agriculture is main profession to depend on. This land dependant nation has been suffering since the rule of British East India Company. The British East India Company had greedy eyes on the fertile agricultural land of this country. After rescuing the land of this country, they oppressed the peasants. They established their rights on agricultural land and collected excessive land revenue from peasants. The land revenues and important resources were trafficking to Britain. The East India Company and they're appointed middlemen like *Jaminder* took away resources earned hard work and inexpressible labor of the peasants. If any peasant raised objections against the British then he would be harassed and punished by British ruler. So the people were afraid of land laws. They were not much interested on land. The lack of consciousness is found in the people from the British period. But other corrupt people made false documents and took the ownership of the *Khas* land.

4.2.6. Employment problems:

Increasing population, want of resources, poor economic conditions play a major role for the unemployment problem. Unemployed people want to do something on the *khas* land. So they try to occupy the *khas* land. Both in Singra and Nachole *Upazila*, unemployment is a great problem. The land is becoming smaller and useless for vast defragmentation. Divided small land could not provide food for the family. So by selling these small land people became unemployed. Moreover increasing population creates more unemployed people and unemployed people try to occupy *Khas* land. So unemployment plays one of the main roles for illegal occupation of land.

Some lands related government officers and staffs are corrupt. With the help of these corrupt people, the illegal occupant made false documents and occupied the *khas* land.

4.3. Effect of illegal occupation of *Khas* land:

Thousands of problems hamper the development works in the study area. The occupation of the *Khas* land is one of the major problems among them. A class of people occupied *khas* land. By creating false documents and some are trying to occupy more *Khas* lands in similar way. Some of the major problems arising due to improper and illegal distribution of *khas* lands are as follows:

4.3.1. Economic problems:

Most of the people of Singra and Nachole *Upazila* are suffering from poverty and natural calamities. Both areas economic condition is controlled by agriculture. Agriculture is suffering from flood and drought every year.

Flood occurs every year in Singra *Upazila* for making dump on rivers and silt deposition on riverbed (Khan et. al., 2000). Increasing population is becoming a curse instead of bless to economy. It is possible to develop poor people's economic condition by rescuing *Khas* land from illegal occupants.

Economic development is possible by abolishing illegal owners from the *khas* land and it will help to increase that area's development.

4.3.2. Imbalance development:

The *Khas* land can not play a vital role in these areas development for lack of proper management and distribution. If poor people get *Khas* land then they can grow enough crops and they can eliminate poverty. If the helpless women get *Khas* land in *Upazila* proper then their house rent will be saved and they also will be able to establish small cottage industry which may eliminate her poverty. As a result all the areas will enjoy balanced economy.

Both areas' economic development would not be possible if not distributed equally.

4.3.3. Centralization of land:

Agriculture is an ancient profession. This profession was started when population of the world was very few. Then the total population was only 4 million. But with the beginning of the 20th century, the total population was one Billion (Hossain, 2000). Total population of Bangladesh was 2,89,27,786 in 1901 (Census, 1961).

But just after independence total population was 763,98,000 in 1974 (Census, 1974).

Thus population increased highly and it became 12315149 in 2001, (Census, 2001).

In the starting period of agriculture when population was very small, the people cleared forestland to make it agriculture land. But now the people are much more than the past. Per capita share of land is very little. Under this circumstance the people are inclined to *Khas* land.

The rich or powerful people, whose lands were beside the *khas* land, he/she enclosed the *Khas* land with his/her own land. So the land was centralized and this process is still going on.

Those who have already more land enclosed near the *Khas* land and land is becoming centralized. The proper utilization of land is interrupted.

4.3.4. Imbalance distribution of property:

In Nachole and Singra area, the poor people are being poorer for not proper distribution and utilization of the *khas* land. On the other hand the rich are becoming richer for imbalance distribution of *khas* land.

So for the proper utilization of land resources, all illegally occupied *Khas* land should be recovered and distributed among landless peasants or workers.

4.3.5. The distance between the government and peasants:

The relation between the government and peasants was not well for improper utilization of *Khas* land. If the government would distribute *Khas* land among the poor peasants then the relation would buildup. Moreover there is a bitter relation between the government and peasants. If the government distributed the *Khas* land among the poor people and landless peasants than they would come under the government control. Even they would also be happy.

4.3.6. Social injustice:

Agricultural and non-agricultural *Khas* lands were not distributed properly in Nachole and Singra area. Many people occupied the *khas* land illegally. The former government decided to distribute *Khas* lands among the poor and landless peasants (Land Management Manual, 1991). By participatory observation and interview it is known that when the *Khas* land was distributed many local leaders and their followers conspired and took the *Khas* land and turned its ownership into their own name.

The Government ordered to distribute the *Khas* land to landless peasant and the poor people but corrupt people had taken this land for themselves. Thus the social justice was hampered. It is very expected that the government will help the poor. But the

poor people didn't get the *Khas* land from the government. As a result such social injustice inspired the landless poor people to commit crime.

4.3.7. Want of experienced manpower in agriculture:

The peasants can not apply their proper skills and experience for not having their own land. As most of the illegal owners have no skills and experiences in agriculture, so the success is not desirable. On the other hand for want of land, most of the skilled and experienced peasants are moving to another profession from agriculture. So agriculture is now suffering for want of vast skilled peasants.

The skilled and experienced peasants know which weather and climate and soil are favorable for which crops. But inexperienced peasants fail to do that.

Agriculture needs agriculture related experienced peasants and skilled workers. Only skilled and experienced workers and peasants can make proper contribution on agriculture and land. But inexperienced illegal occupants can create too many problems in agriculture and their activities can degrade the land.

The experienced peasants know which fertilizer will be helpful for soil and which will not degrade the soil and which will not decrease its fertility. They have enough knowledge about insects and they know which insecticides can be applying in agricultural land in which time. At the time of *Khas* land distribution it would be given priority to experienced poor peasants and true landless.

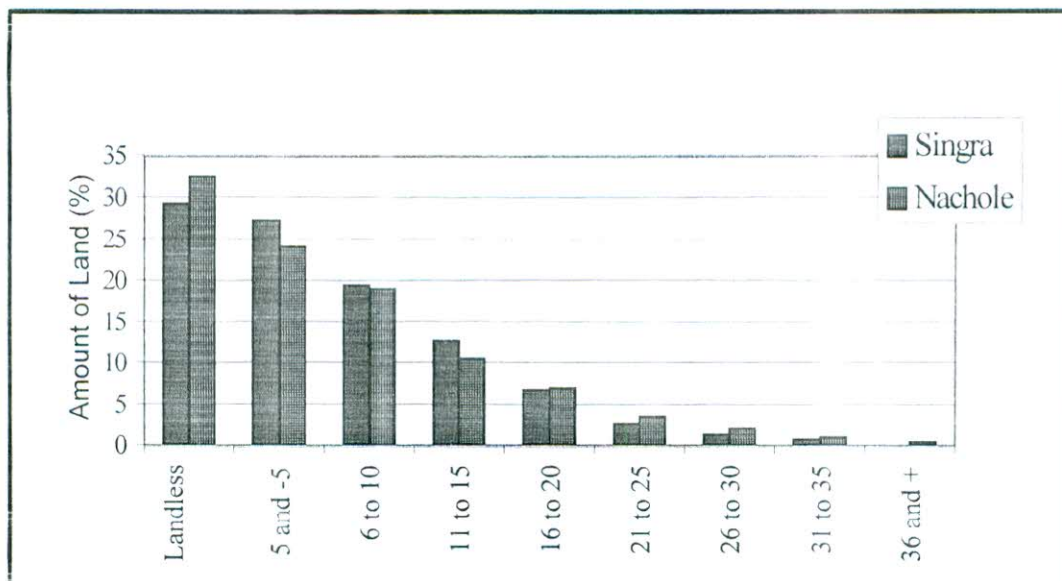
So at the time of *Khas* land settlement these above described matter should be considered or it would be impossible to develop agriculture and sustainable land development in Nachole and Singra, the research area.

4.3.8. Increase of landless people:

The increasing population has a vast pressure on agricultural land. The landless people are increasing with the growth of population. When it will be impossible for a poor family to lead their lives with the tiny piece of land then they sell it. In this way the landless people are increasing. When the *Khas* land is settled to the rich or elite people then the poor people and landless people will increase more. The landless people are increasing due to ill distribution of *Khas* land in Nachole or Singra *Upazila*. The land ownership of the study area is shown by the graph bellow.

Graph No. 4.5.

Land ownership in the study area (in Bigha)



Main Data Source: Field Survey'2005

The landless people will increase more if illegal owners are not abolished from *Khas* land. The landless people's data are as above graph (Graph No. 4.3).

The landless people are increasing rapidly. This problem is remarkably high in Nachole and Singra *Upazila*. The landless people are increasing for increasing of population, poverty and poor economy. This problem is creating other problems.

For being poor economy and for want of job, the people move from village to town in search of works and money, which increases urban population. The law and order situations are decreasing in the *Upazila* head quarters for the insufficient land planning and improper distribution of *Khas* land.

The land use pattern of Nachole and Singra are increasing rapidly for increasing population. The law and order situations will be broken when many groups of people will try to occupy the same land.

If the people protect illegal occupying and ensure proper management then Law and order situation will be developed in Nachole and Singra area.

For increasing population problem in the field of research area Nachole and Singra, many people are still passing their days under open sky in rainfall, sunshine and natural calamities. They have no permanent land; many people are passing their day in the government office and beside roads.

The settlement problem will be solved if the poor people get a share of the *Khas* land and the poverty will be alleviated.

4.4. Recovery of illegally occupied *Khas* land and laws.

In different times, different governments enacted many land laws. The people are using different agricultural land, *Khas* land, vested land, ponds, *beels*, and canals. The government ordered for distribution of *Khas* agricultural or non-agricultural land among landless people (Haq, 2000) but it was not followed properly. The government had decided to distribute the *Khas* land among landless and poor people on 6th January in 1986 (Rahman and Masud, 2003).

In different times, the *Khas* land was distributed and stopped by the government. Many illegal owners like elite, dishonest, political leaders, local leaders and village leader illegally occupied *Khas* land in Singra and Nachole *Upazila*.

As a result marginal peasants, landless people, poor farmers, workers, day laborers are being poorer. The government stopped settlement for illegal occupation of *Khas* land. Sometimes the government invades against illegal owners of both agricultural and non-agricultural land (Haq, 2000). In 1975 the government declared to rescue both agricultural and non-agricultural *Khas* land from illegal owners (Rahman and Masud, 2003). On 8th February 1986 the government enacted an ordinance to distribute *Khas* land among the landless and poor peasants. On 26th February of 1987 the government decided to settle the *khas* land among landless who have lost their land in the river (Haq, 2000).

On the October of 1987 the government decided for one-year settlement, to extricate the *Khas* land from illegal occupants and to distribute among the landless people of *char* area.

On the 1st July 1987 the government formed the **Land Reform Committee** for national, district and *Upazila* level. The Land Reform Committee (national) made procedures to rescue the *khas* land from illegal occupants (land management manual, 1991).

On 16 July of 1987 by the ordinance No. 3, on 9th August by the ordinance No. 4, and 3rd September by the ordinance No. 5, the government ordered to the Deputy Commissioners to implement these procedures. In the same year on 30th September, the government ordered to the Deputy Commissioners to distribute the *Khas* land to make *Guchha gram* (Cluster village) (Haq, 2000). But no *Guchha gram* found in any

village in Bichenta, Bherindi, Chaterdighi, Darbespur, Dulahar, Jhikra, Maktapur, Nasirabad Pirpur, Srrirampur and Surjya gram of Nachole *Upazila*.

On the other hand there is one Guccha gram in Ninguin village of Singra *Upazila*, named as Ninguin Adarsha Gram (**Ninguin Model Village**). No other Guchha gram is found in Wukri, Balua, Maguri, Haspukuria, Damdam, Daksin Damdam, Palpur, and Patkul of Singra *Upazila*. By the ordinance No. 9 of 1987, the president ordered to the Deputy Commissioner (DC) to collect and rescue all the *khas* land. On 17th December 1987, the government ordered to the Deputy Commissioners (DC) to rescue all *Khas* land from illegal occupants and to ensure security of landless people of the *char* area (Haq, 2000).

Therefore, though much notice, procedures, laws, acts, ordinances and rules are in existence but success is very poor. It is not only sufficient to establish acts but also to implement the procedures. These procedures have to be sustainable (Haq, 2000; Mia, 2000; Land Administration Manual, 2003).

CHAPTER FIVE

Case Study: Land Use Pattern and Management

Bangladesh is a highly populated country. The proper management and planned use of land are very essential for increasing population of Bangladesh. The land will not be increased with population. Land use consequence is very important in the present context of Bangladesh. The *urban* population growth and population pressures are increasing on land. Therefore, the land use pattern and control are very impotent in the research area Nachole and Singra. The increased population is mostly depending on land. The population related data are as follows (Table No. 5.1):

Table No. 5.1.

Population increase in Nachole Upazila from 1974 to 2001 (%)

Increase = {(Present - Before) x 100}/Before

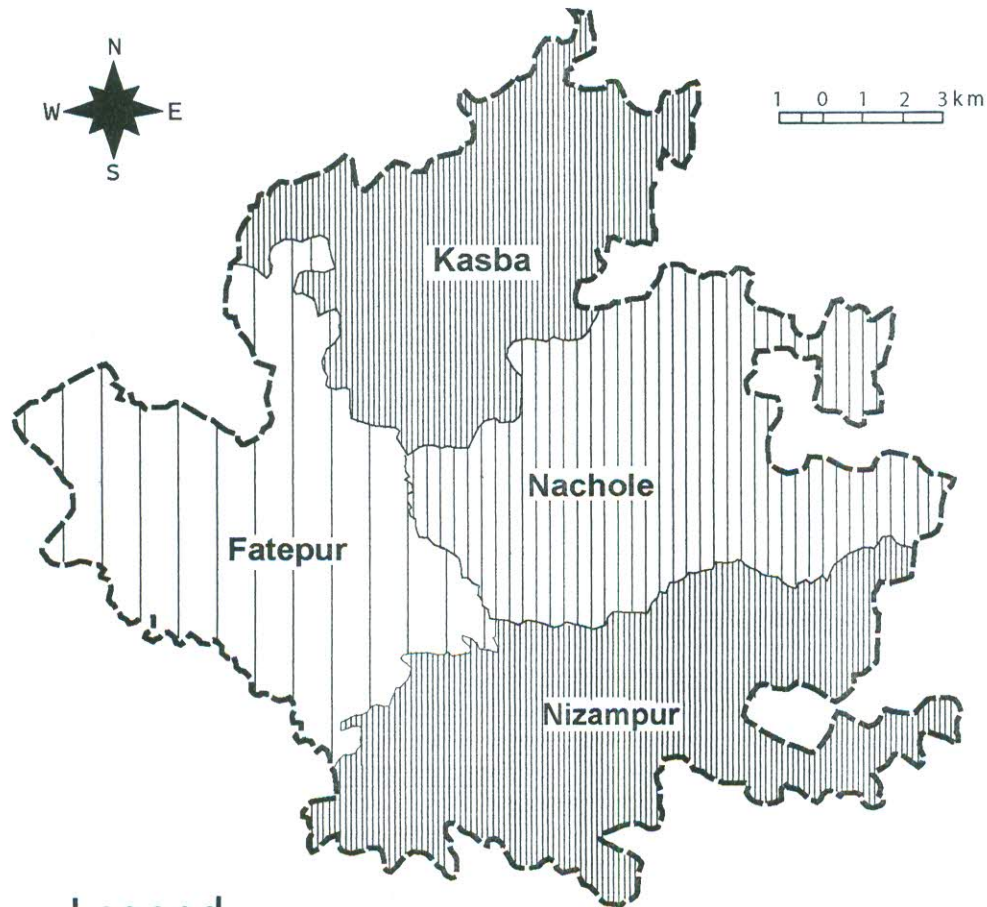
No	Name of Place	1974-81	1981-91	91-2001	1974-91	74-2001
1	Nachole Upazila	23.17	29.73	36.23	59.79	117.68
	Name of the Union					
1	Fatepur	10.23	35.81	37.91	49.70	106.45
2	Kasba	28.80	26.95	41.25	63.52	126.70
3	Nachole	25.35	32.75	32.68	66.39	120.78
4	Nizampur	27.89	21.42	38.38	55.28	114.87

Main Data Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

The land use and changing pattern have been taken place for increase of population. The continuous population increase plays a vital role for it. The population has been increased very much from 1974 to 2001 for long 27 years. The population has been increased rapidly in four *Unions* of Nachole Upazila. Most of the increasing ratio has taken place in Nachole Union. The population-increasing ratio is shown on separate page with map from 1974 to 2001 (Map No. 3 to 7).

Population Increase 1974 - 1981

Nachole Upazila



Legend

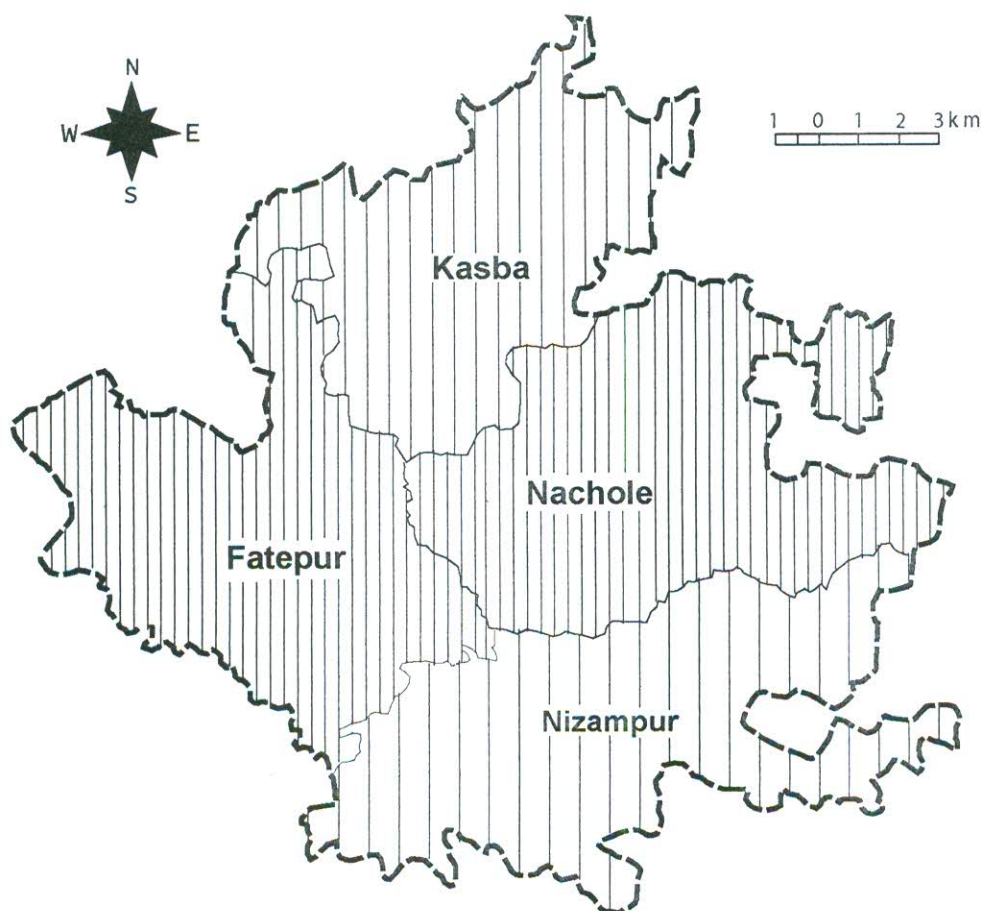
1	06 - 10 (%)	
2	11- 15 (%)	
3	16- 20 (%)	
4	21 - 25 (%)	
5	26+(%)	
6	Upazila Boundary	
7	Union Boundary	

Source: Table No. 5.1

Map No. 04

Population Increase 1981-1991

Nachole Upazila



Legend

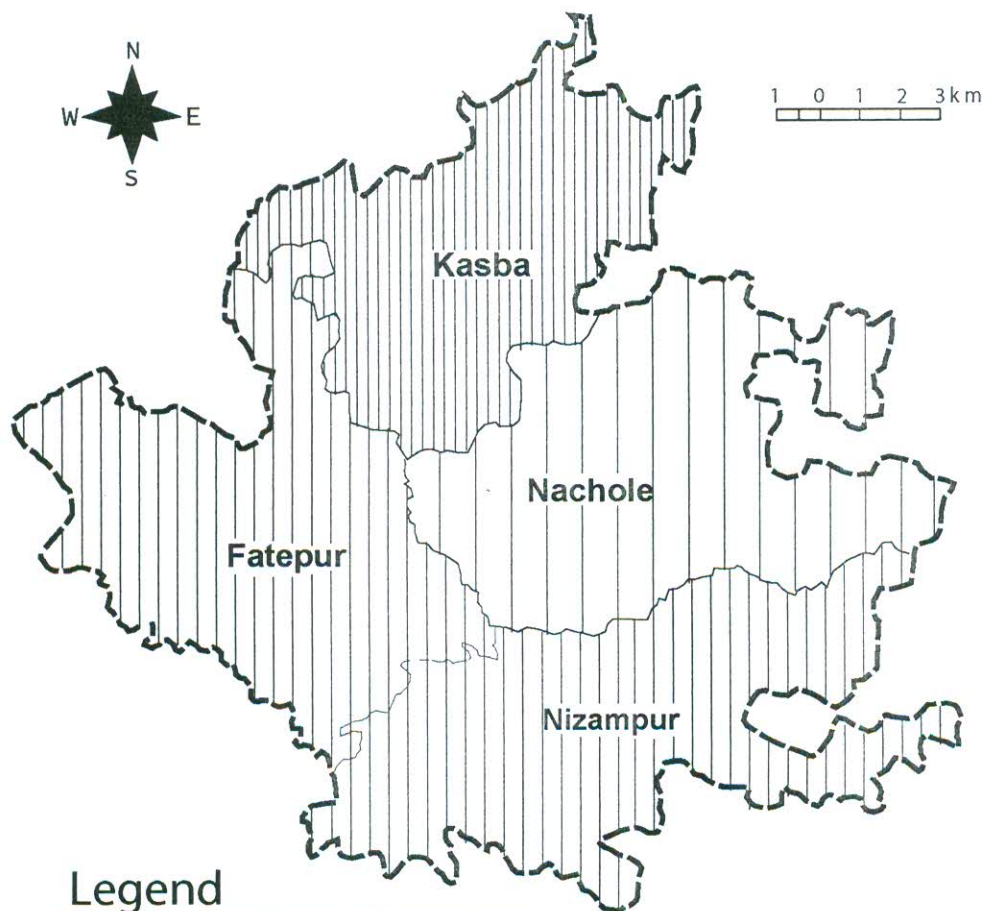
1	21 - 25 (%)	
2	26 - 30 (%)	
3	31 - 35 (%)	
4	Upazila Boundary	
5	Union Boundary	

Source: Table No. 5.1

Map No. 5

Population Increase 1991-2001

Nachole Upazila



Legend

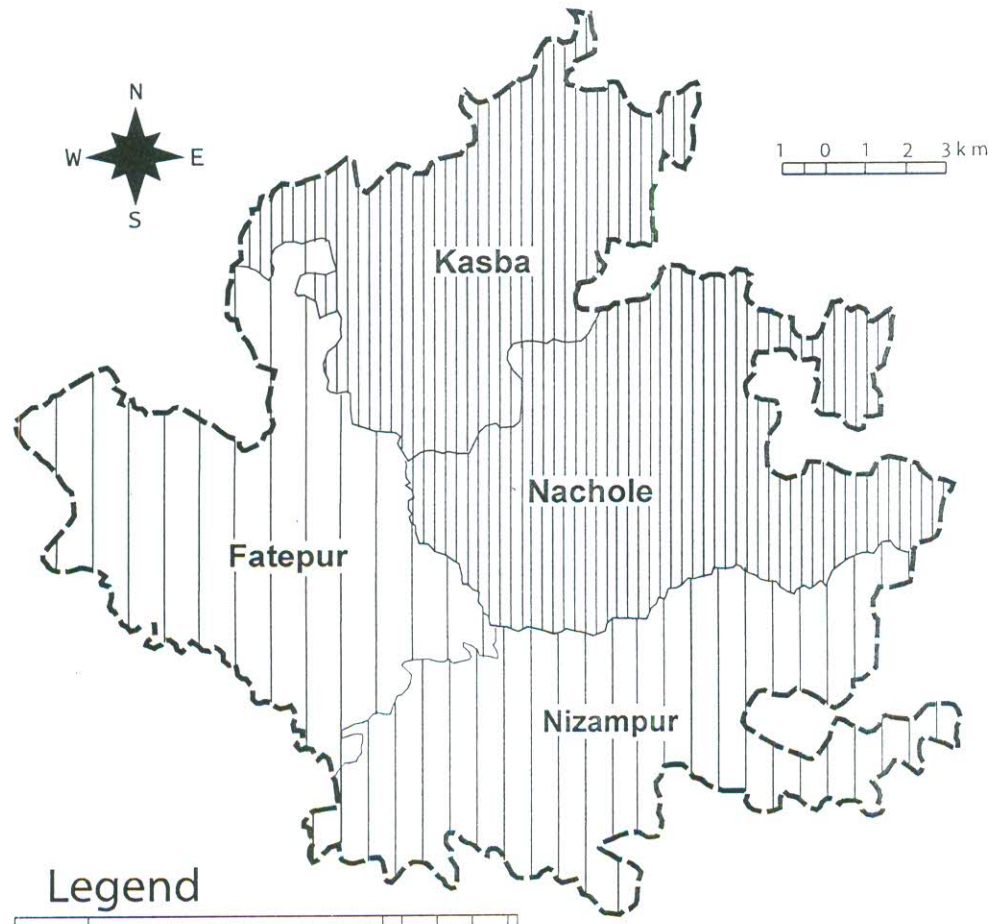
1	31 - 33 (%)	
2	34 - 36 (%)	
3	37 - 39 (%)	
4	40 + (%)	
5	Upazila Boundary	
6	Union Boundary	

Source: Table No. 5.1

Map No. 6

Population Increase 1974 - 1991

Nachole Upazila



Legend

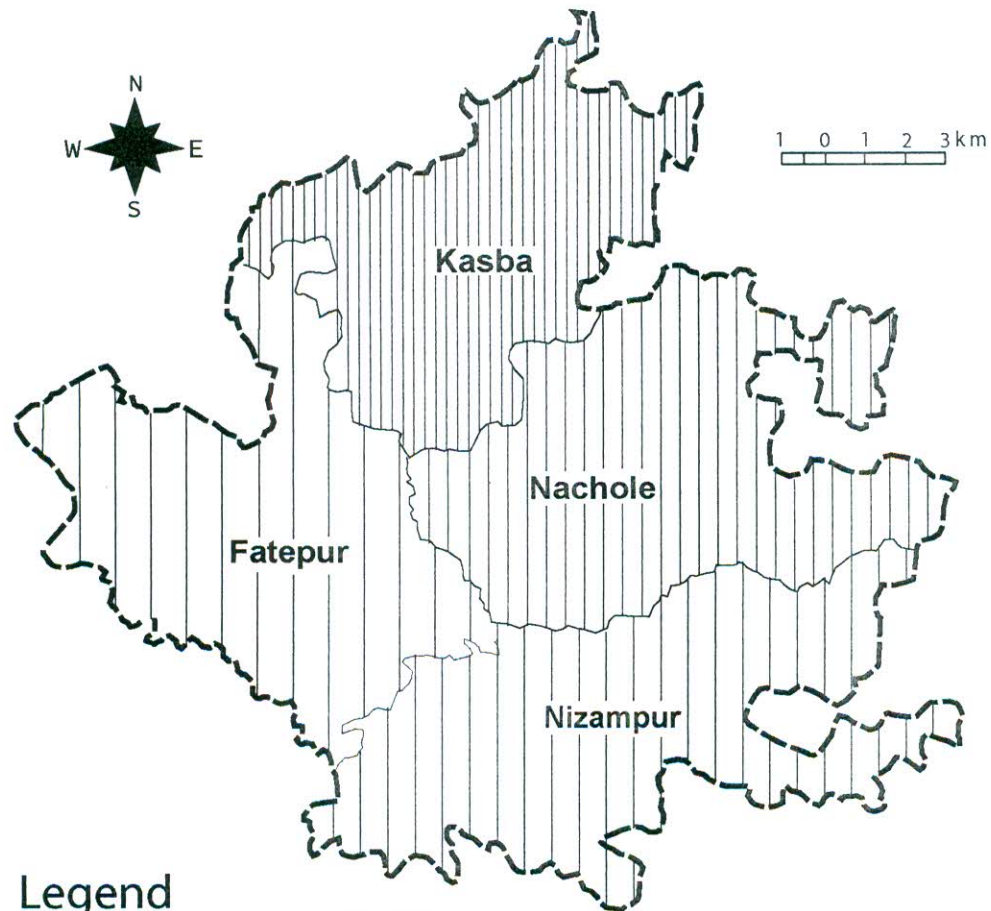
1	46 - 50 (%)	
2	51 - 55 (%)	
3	56 - 60 (%)	
4	61+ (%)	
5	Upazila Boundary	
6	Union Boundary	

Source: Table No. 5.1

Map No. 7

Population Increase 1974 - 2001

Nachole Upazila



Legend

1	106 - 110 (%)	
2	111 - 115 (%)	
3	116 - 120 (%)	
4	121+ (%)	
5	Upazila Boundary	
6	Union Boundary	

Source: Table No. 5.1

Masp No. 8

The population has been increased in the 12 *Unions* of Singra *Upazila*. The housing and settlement are developing for increased population. The educational ratio is increasing with increased educational institutions, primary schools, high schools, colleges, religious institutions and all of them lead to increase the land use patterns. The mills, factories, shops, banks, insurance etc are being developed too. So man land ratio is decreasing in full swing both in Nachole *Upazila*. Man land ratio of Nachole *Upazila* are shown in the following table (Table No. 5.2.):

Table No. 5.2.

Man Land Ratio in Nachole *Upazila* from 1974 to 2001

Man Land Ratio = (Area/Population)

Sl No	Name of place	Area in hectare	Man land ratio			
			1974	1981	1991	2001
1	Nachole <i>Upazila</i>	28368	0.467	0.379	0.292	0.214
Name of the <i>Union</i>						
1	Fatepur	7356	0.531	0.482	0.355	0.257
2	Kasba	6145	0.454	0.352	0.278	0.200
3	Nachole	7386	0.342	0.273	0.206	0.155
4	Nizampur	7482	0.633	0.495	0.408	0.295

Main Data Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

The above table shows that the man land ratio has been half in 2001 than 1974. Man land ratio is decreasing for over population. Man land ratio is decreasing in every *Union* of Nachole *Upazila*. Nachole *Union* is at the center of Nachole *Upazila*. Man land ratio has been decreased in Nachole proper for over population. The man land ratio decreasing of Nachole *Upazila* is shown in the following table (Table No. 5.3.):

Table No. 5.3.

Man Land Ratio Decrease in Nachole Upazila from 1974 to 2001 (%)

Decrease = {(Present - Before) x 100}/Before

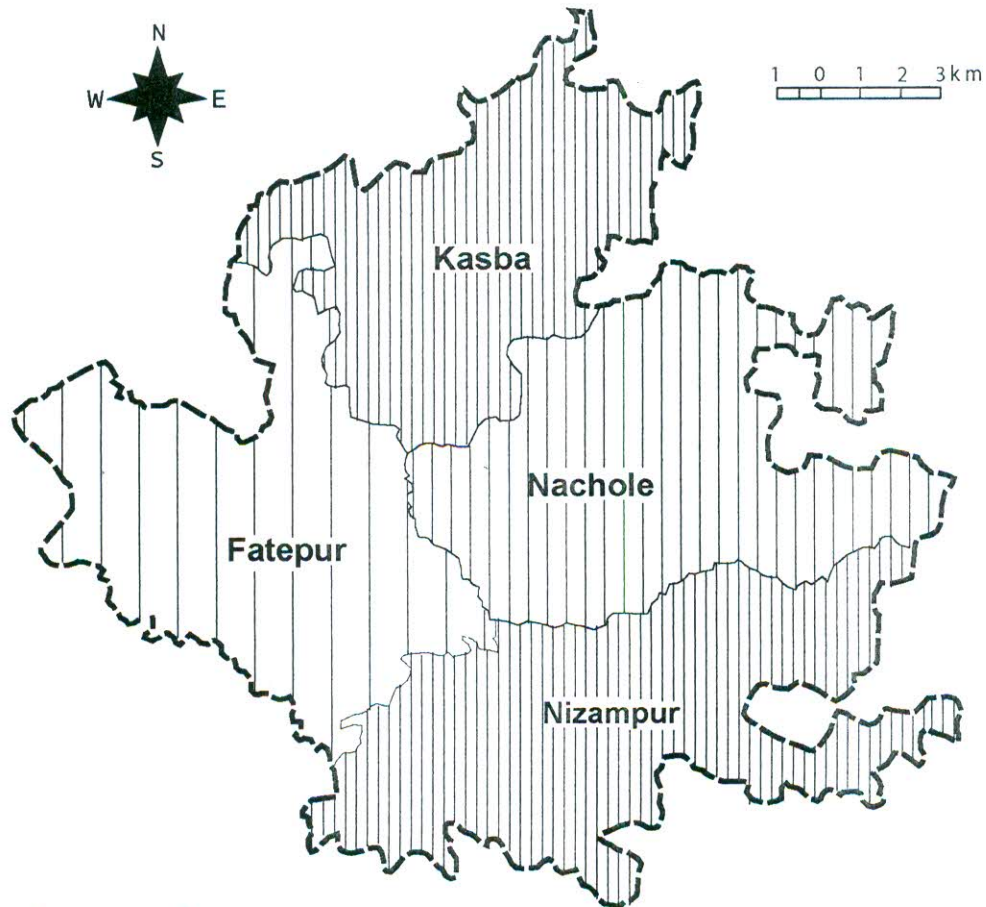
No	Name of Place	1974-81	1981-91	1991-01	1974-91	1974-01
1	Nachole Upazila	-18.84	-22.96	-26.71	-37.47	-54.18
	Name of the Union					
1	Fatepur	-9.23	-26.35	-27.61	-33.15	-51.60
2	Kasba	-22.47	-21.02	-21.97	-38.77	-55.95
3	Nachole	-20.18	-24.54	-24.76	-39.77	-54.68
4	Nizampur	-21.80	-17.58	-27.70	-35.55	-53.40

Main Data Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

The above Table No 5.3 shows that the man land ratio has been decreased every year and the man land ratio decreasing much more from 1974 to 2001 for the long 27 years. The population-increasing ratio is very high according to area, which play most important role to decrease land ratio. The land use pattern is dense in the Upazila head quarters. The population increases economic activities, shops, offices, courts, banks, insurance, agricultural trades etc.

Moreover, the population increases civilian's advantages like supply of water, education, electricity, treatment, communication, the daily necessary things etc. Nachole Union's population is higher than other Unions of Nachole Upazila. The man land ratio is decreasing in Nachole Union. The changing pattern (decrease) of man land ratio from 1974 to 2001 is shown on the next page with map (Map No. 8 to 12).

Man Land Ratio Decrease 1974 - 1981 Nachole Upazila



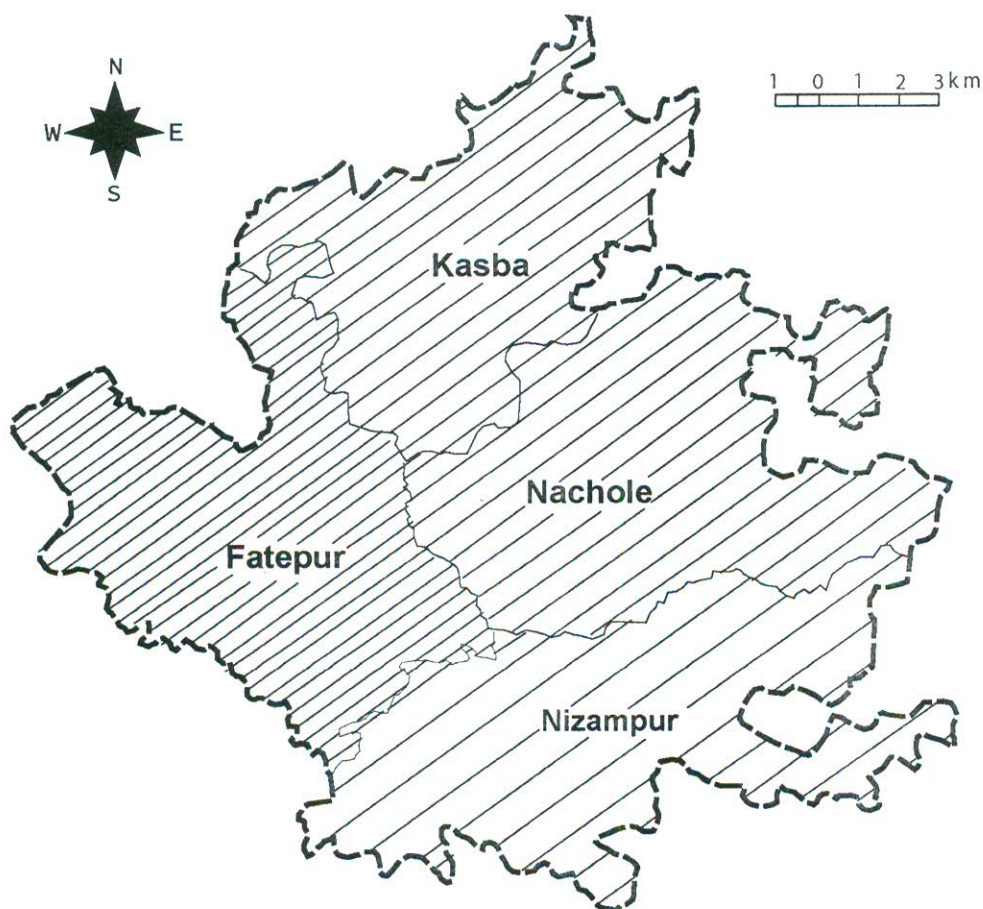
Legend

1	06 - 10 (%)	
2	11- 15 (%)	
3	16- 20 (%)	
4	21 - 25 (%)	
5	Upazila Boundary	
6	Union Boundary	

Source: Table No. 5.3

Map No. 9

Man Land Ratio Decrease 1981-1991 Nachole Upazila



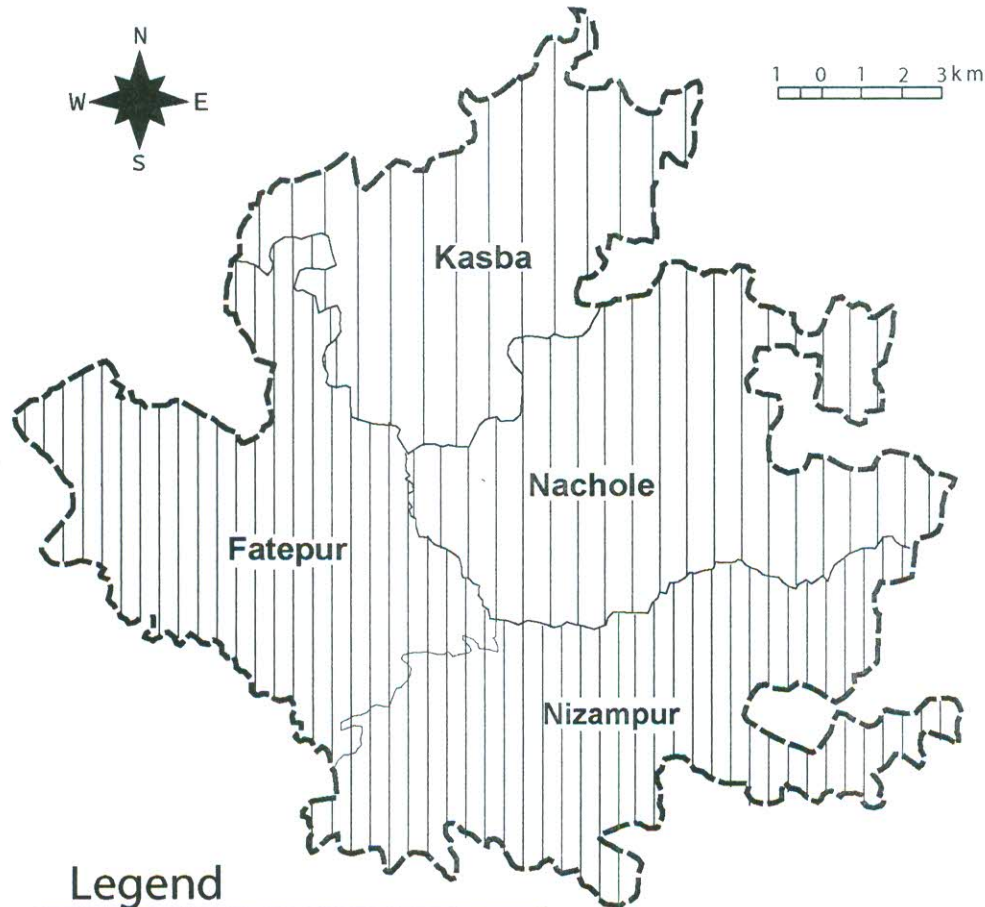
Legend

1	16 - 20 (%)	
2	21- 25 (%)	
3	26 - 30 (%)	
4	Upazila Boundary	
5	Union Boundary	

Source: Table No. 5.3

Map No.19

Man Land Ratio Decrease 1991-2001 Nachole Upazila



Legend

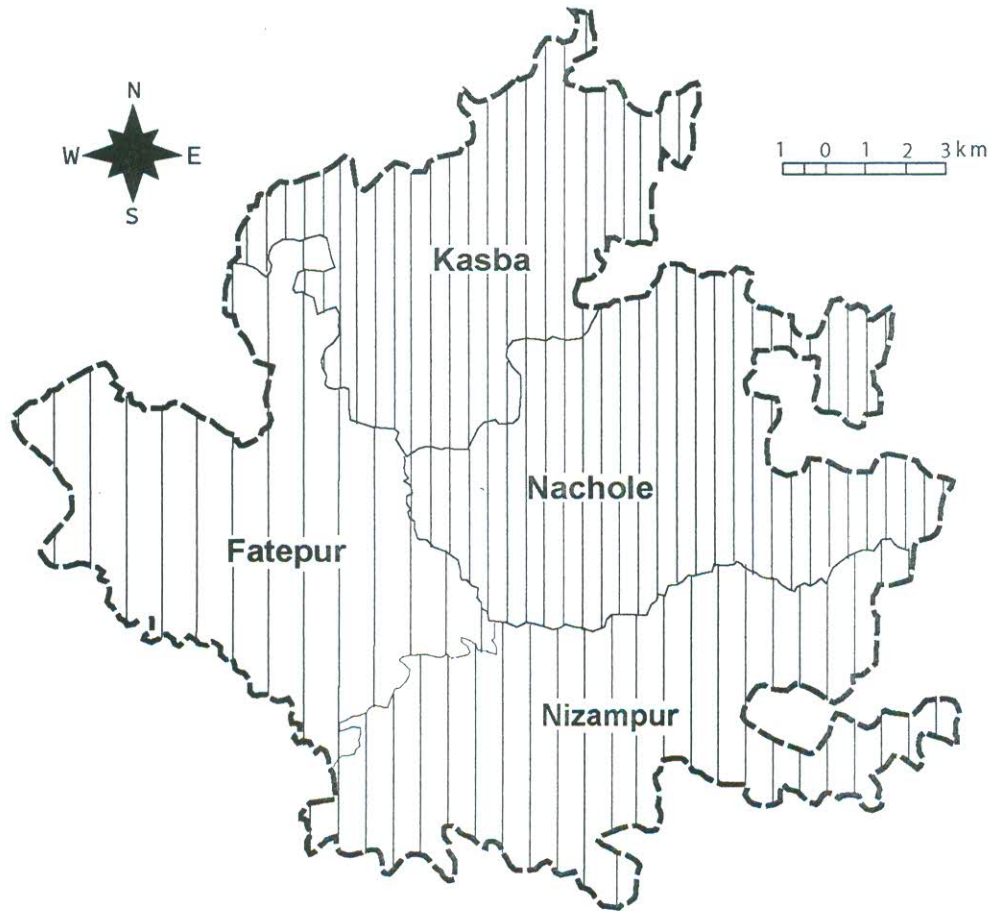
1	21 - 22 (%)				
2	23 - 24 (%)				
3	25 - 26 (%)				
4	27 - 28 (%)				
5	Upazila Boundary				
6	Union Boundary				

Source: Table No. 5.3

Map No.11

Man Land Ratio Decrease 1974-1991

Nachole Upazila



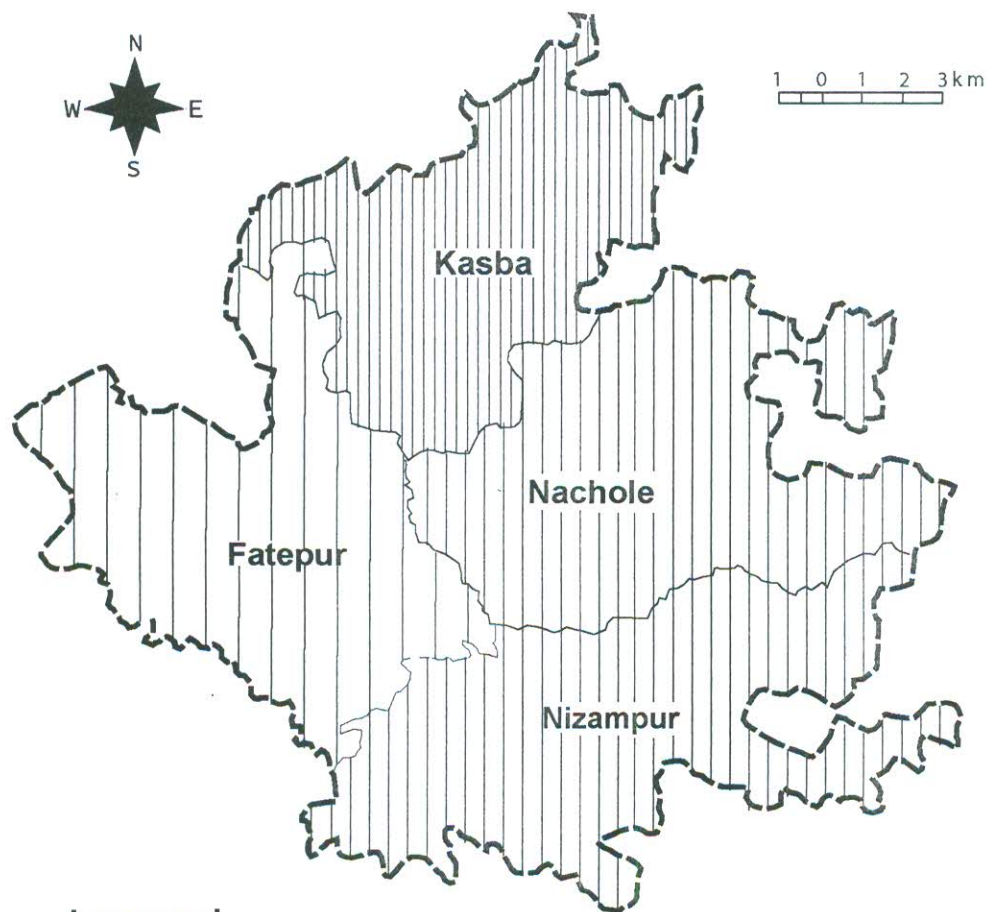
Legend

1	32 - 33 (%)	
2	34 - 35 (%)	
3	36+ (%)	
4	Upazila Boundary	
5	Union Boundary	

Source: Table No. 5.3

Map No. 12

Man Land Ratio Decrease 1974-2001 Nachole Upazila



Legend

1	51 - 52 (%)	
2	53 - 54 (%)	
3	55 - 56 (%)	
4	Upazila Boundary	
5	Union Boundary	

The total area of Singra *Upazila* is 528.46 square km. The total population is 3,07,866 and man land ratio is only 0.170 hectare. The total area of Singra *Union* is 40.22 square km. The total population of Singra *Union* is 35,551 (Census, 2001). The population of Singra *Upazila* is as (Table No. 5.4) follows:
Table No. 5.4.

Area and total population in Singra *Upazila*

Sl No	Name of Place	Area in Acre	Total Population			
			1974	1981	1991	2001
1	Singra <i>Upazila</i>	130589	181180	224850	289952	320818
Name of the <i>Union</i>						
1	Chamari	7400	15661	19078	25149	26606
2	Chaterdighi	9675	13093	15221	20830	24751
3	Chougram	11505	12348	14704	18421	19132
4	Dahia	17795	15513	19183	25348	26765
5	Hatiandah	8237	15282	19067	22951	26436
6	Italy	16096	14963	17948	22925	28332
7	Kalam	5969	16753	19964	26517	27149
8	Lalore	7518	14890	17962	23094	24199
9	Ramananda Khajura	14042	14369	17542	23486	26224
10	Sherkole/Tajpur	8737	15669	21115	26066	27385
11	Singra	9935	16749	22513	28235	33551
12	Sukesh	13549	15890	20553	26930	30288

Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

The above table shows that the population is increasing in every *Union* in every year. Singra *Upazila* consists of 12 *Unions* and the population of all *Unions* has been increased. The main reason of population increasing in Singra *Upazila* is unplanned family planning, early marriage, lacking in implementation of the government-planning etc. But the population of the central area of Singra *Upazila* has been increased for infrastructure development and civilian's advantages.

The civilian opportunities, business, trade, communication of Singra *Upazila* is better than Nachole. The population of Singra *Upazila* is much more than

Nachole. The growth of population increases infrastructures, communications, industries, mills, factories, trades, shops, banks, insurance etc. So the man land ratio is decreasing day by day in Singra *Upazila* for increasing population. This related data of Singra *Upazila* is as (table No. 5.5) follows:

Table No. 5.5.

Population Increase in Singra *Upazila* from 1974 to 2001 (%)

Increase = {(Present - Before) x 100}/Before

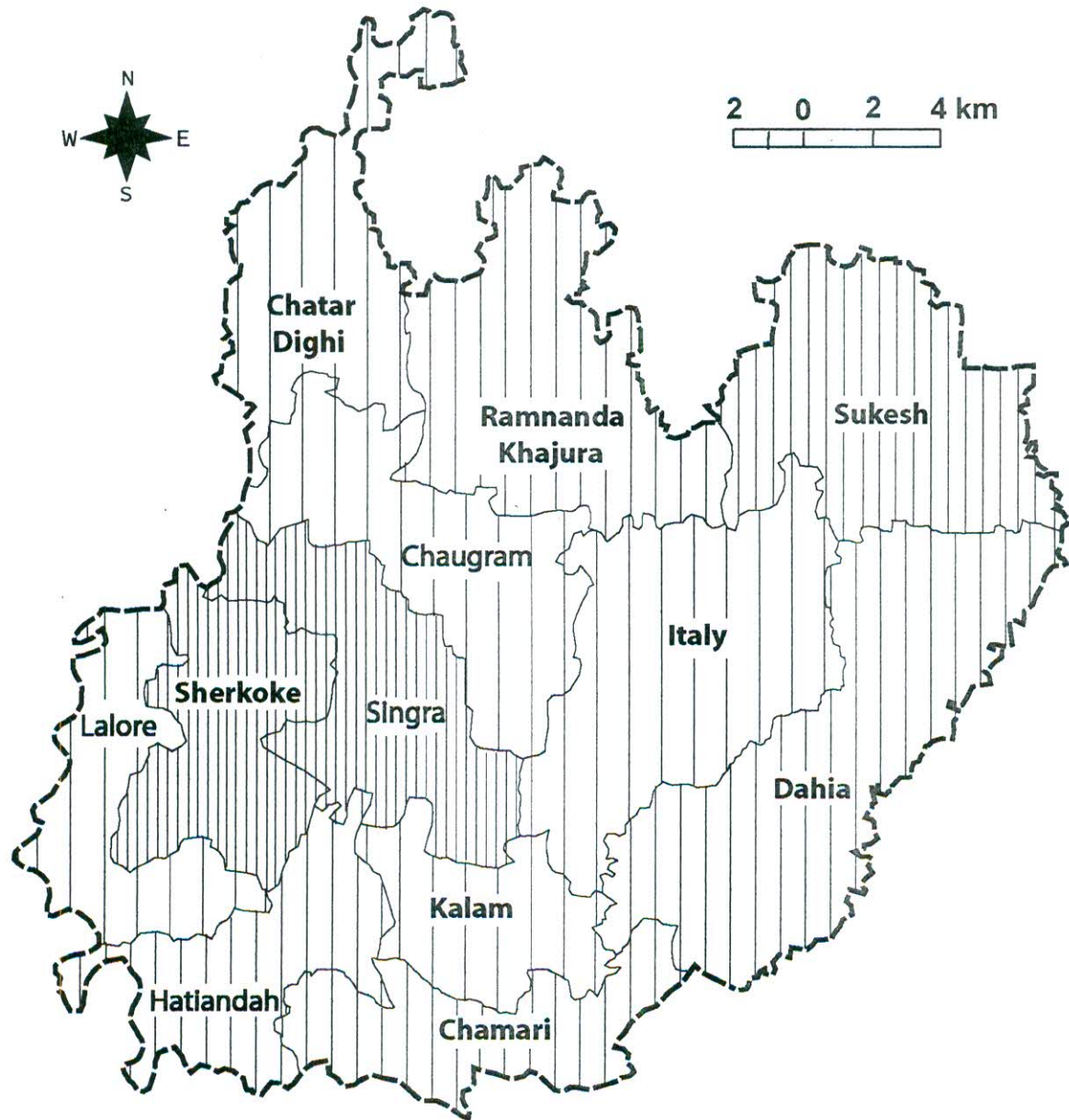
No	Name of Place	1974-81	1981-91	1991-01	1974-91	1974-01
1	Singra <i>Upazila</i>	24.10	28.95	10.65	60.04	77.07
Name of the Union						
1	Chamari	21.82	31.82	5.79	60.58	69.89
2	Chaterdighi	16.25	36.85	18.82	59.09	89.04
3	Chougram	19.08	25.28	3.86	49.18	54.94
4	Dahia	23.66	32.14	5.59	63.40	72.53
5	Hatiandah	24.77	20.37	15.18	50.18	72.99
6	Italy	19.95	27.73	23.59	53.21	89.35
7	Kalam	19.17	32.82	2.38	58.28	62.05
8	Lalore	20.63	28.57	4.78	55.10	62.52
9	Ramananda Khajura	22.08	33.88	11.66	63.45	82.50
10	Sherkole	34.76	23.45	5.06	66.35	74.77
11	Singra	34.41	25.42	18.83	68.58	100.32
12	Sukesh	29.35	31.03	12.47	69.48	90.61

Main Data Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

The above table no 5.5 is showing that the population is increasing and it is much more in between 1974 to 2001. Singra *Union's* population increasing ratio is much high than other *Unions* because it is the *Upazila* head quarter of the *Upazila*. The trend of population increasing of Singra *Upazila* from 1974 to 2001 was shown with map on next page (Map No. 13 to 17). The man land ratio is decreasing in Singra *Upazila* for increase of population.

Population Increase 1974 - 1981

Singra Upazila



Legend

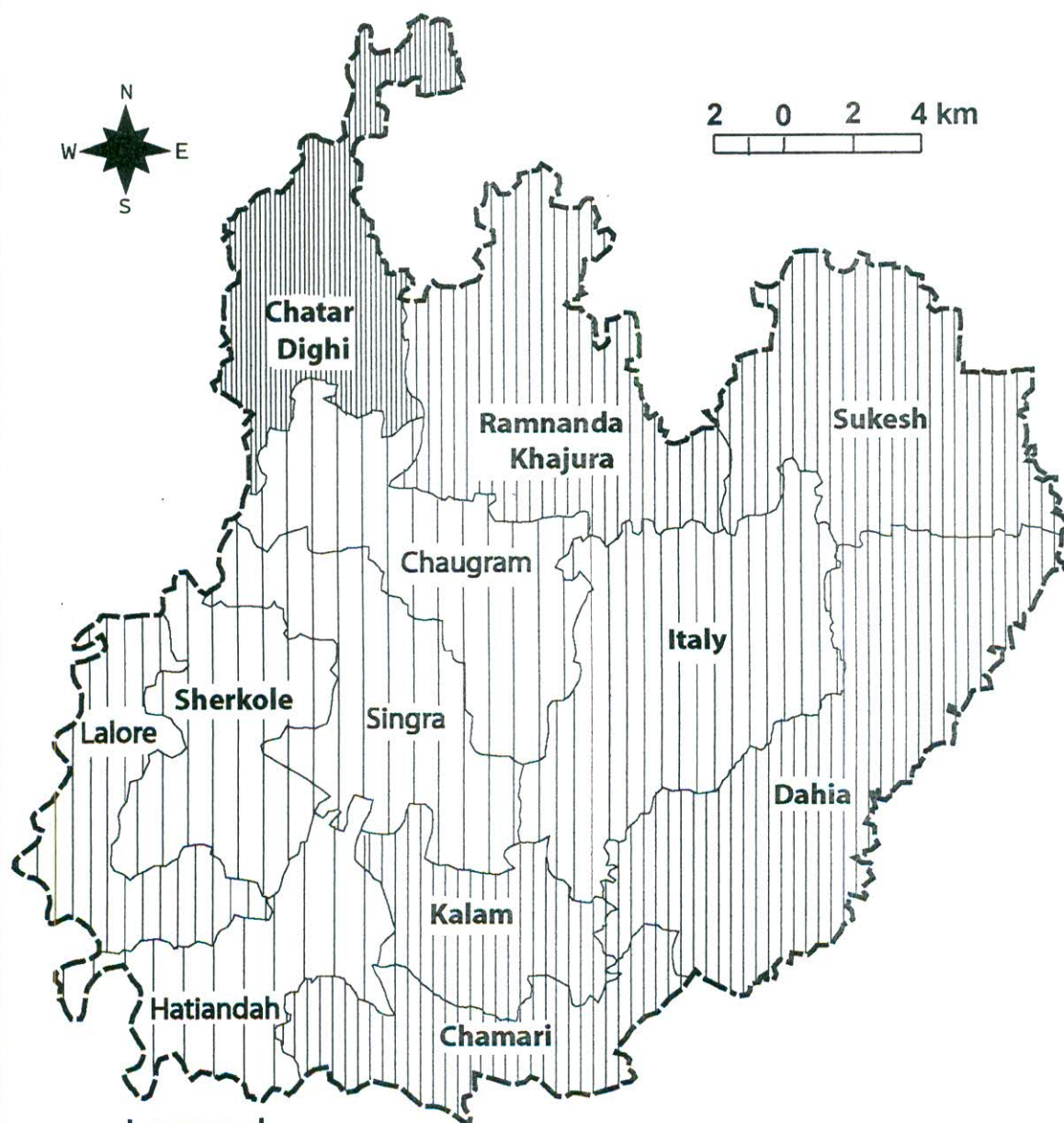
1	16 - 20 (%)		5	Upazila Boundary	---
2	21 - 25 (%)		6	Union Boundary	—
3	26 - 30 (%)				
4	31 - 35 (%)				

Source: Table No. 5.5

Map No. 13

Population Increase 1981-1991

Singra Upazila



Legend

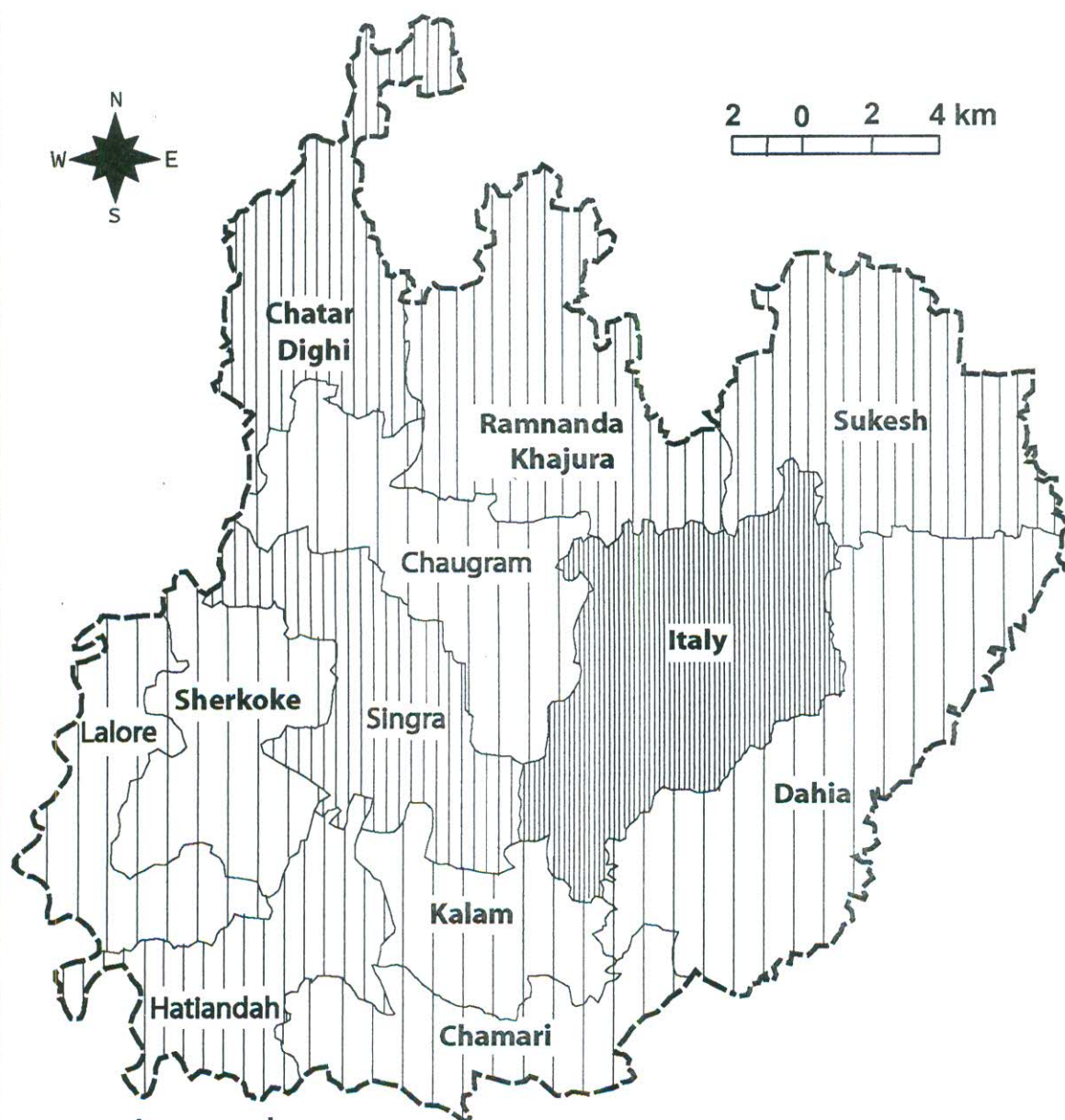
1	16 - 20 (%)		5	36+ (%)	
2	21 - 25 (%)		6	Upazila Boundary	---
3	26 - 30 (%)		7	Union Boundary	—
4	31 - 35 (%)				

Source: Table No. 5.5

Map No. 15

Population Increase 1991-2001

Singra Upazila



Legend

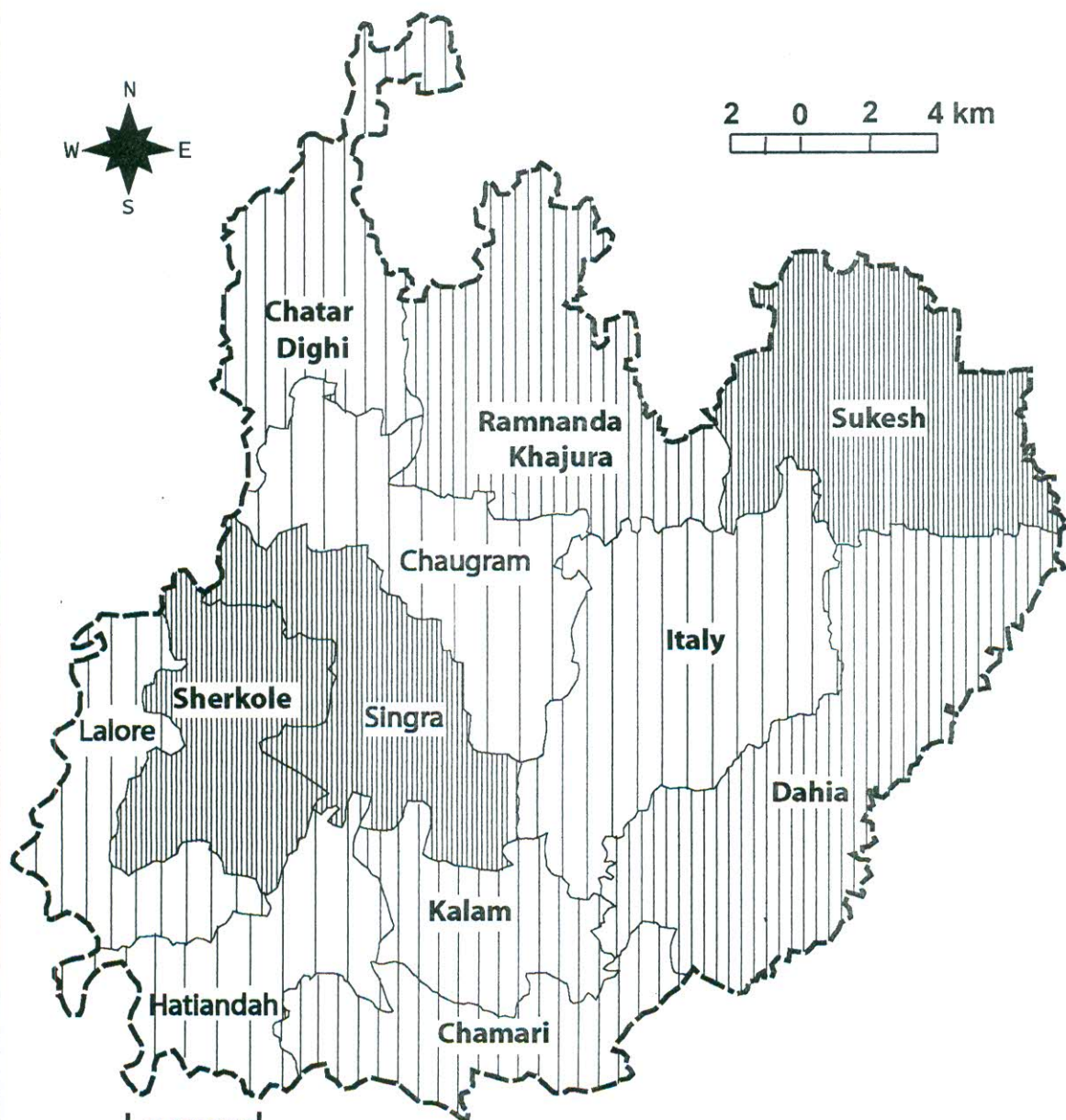
1	01 - 05 (%)		5	21+ (%)	
2	06 - 10 (%)		6	Upazila Boundary	---
3	11 - 15 (%)		7	Union Boundary	---
4	16 - 20 (%)				

Source: Table No. 5.5

Map No. 16

Population Increase 1974-1991

Singra Upazila



Legend

1	46 - 50 (%)		5	66+ (%)	
2	51 - 55 (%)		6	Upazila Boundary	---
3	56 - 60 (%)		7	Union Boundary	—
4	61 - 65 (%)				

Population Increase 1974 - 2001

Singra Upazila



1	51 - 55 (%)		5	76+ (%)	
2	56 - 60 (%)		6	Upazila Boundary	---
3	61 - 70 (%)		7	Union Boundary	—
4	71 - 75 (%)				

Source: Table No. 5.5

Map No. 18

As a result of population increasing, the man land ratio is decreasing in Singra *Upazila*. The data of decrement of man land ratio of 12 *Unions* of Singra *Upazila* is shown below (Table No. 5.6.)

Table No. 5.6.

Man Land Ratio in Singra *Upazila* from 1974 to 2001 (in %)

Man Land Ratio = Area/Population

Sl No	Name of Place	Area in Hectare	Man Land Ratio			
			1974	1981	1991	2001
1	Singra <i>Upazila</i>	52846	0.292	0.235	0.182	0.165
Name of the Union						
1	Chamari	2995	0.19	0.16	0.12	0.11
2	Chaterdighi	3915	0.30	0.26	0.19	0.16
3	Chougram	4656	0.38	0.32	0.25	0.24
4	Dahia	7202	0.46	0.38	0.28	0.27
5	Hatiandah	3333	0.22	0.18	0.15	0.13
6	Italy	6514	0.44	0.36	0.28	0.23
7	Kalam	2416	0.14	0.12	0.09	0.09
8	Lalore	3043	0.20	0.17	0.13	0.13
9	Ramananda Khajura	5683	0.40	0.32	0.24	0.22
10	Sherkole/Tajpur	3536	0.23	0.17	0.14	0.13
11	Singra	4021	0.24	0.18	0.14	0.12
12	Sukesh	5483	0.35	0.27	0.20	0.18

Main Data Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

The above table shows that the man land ratio has been half in 2001 where it was double in 1974. The man land ratio has been decreased in all *Unions* of Singra *Upazila*. Moreover trades, commerce, industries, mills, factories, educational opportunities, banks and financial activities have been developed in

Singra proper instead of agricultural activities. The land use ratio has been increased in Singra *Upazila* head quarter that is why man land ratio decreased in that area. The man land ratio of Singra *Upazila* is in the following table:

Table No. 5.7.

Man Land Ratio Decrease in Singra *Upazila* from 1974 to 2001 (%)

Decrease = {(Present-Before) x100}/Before

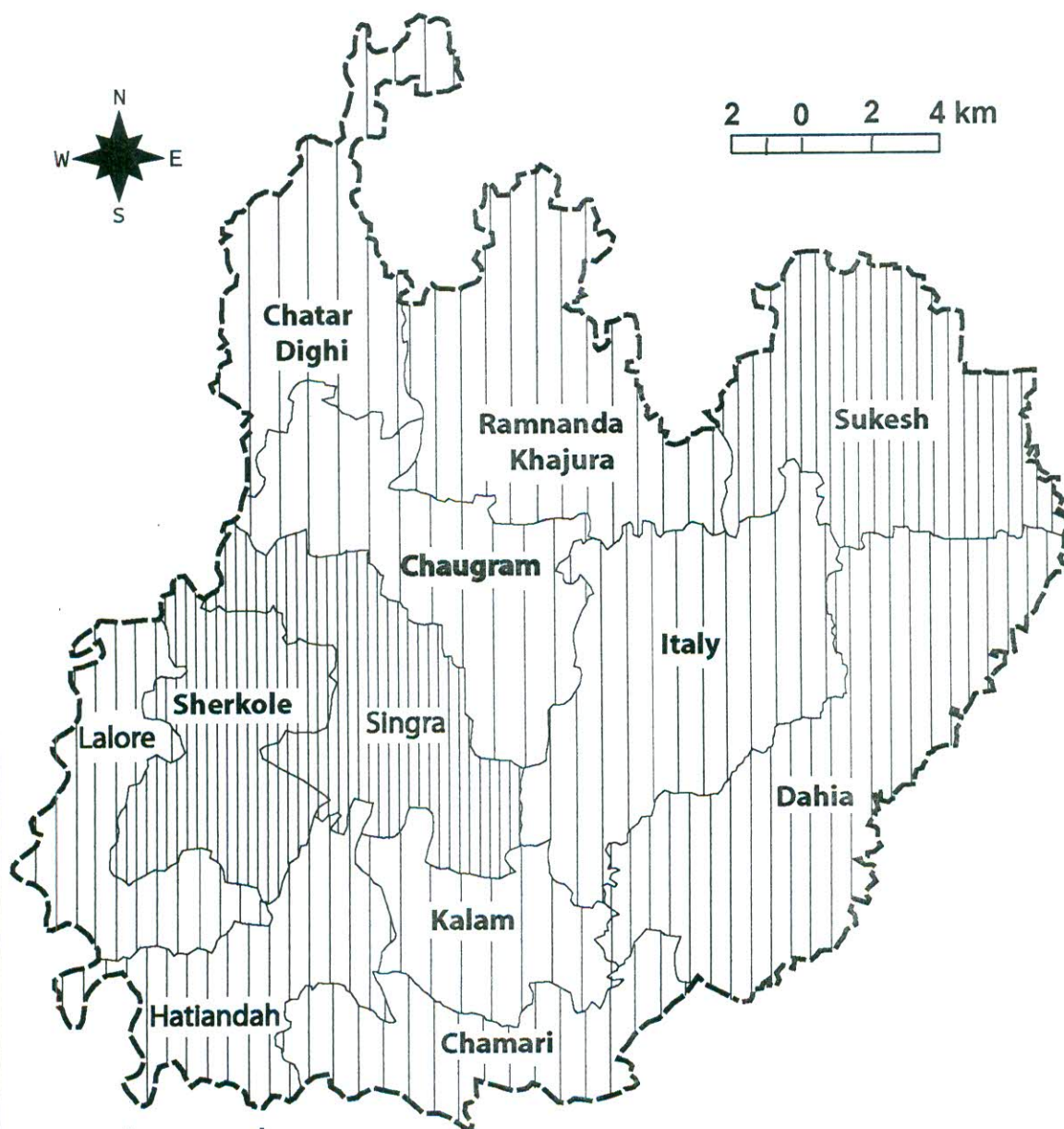
No	Name of Place	1974-81	1981-91	1991-01	1974-91	1974-01
1	Singra <i>Upazila</i>	-19.52	-22.55	-9.34	-37.67	-43.49
Name of the Union						
1	Chamari	-17.80	-24.20	-5.04	-37.70	-40.84
2	Chaterdighi	-14.05	-26.85	-15.96	-37.12	-47.16
3	Chougram	-15.92	-20.19	-3.95	-32.89	-35.54
4	Dahia	-19.18	-24.27	-5.28	-38.79	-42.03
5	Hatiandah	-19.72	-17.14	-13.10	-33.49	-42.20
6	Italy	-16.61	-21.76	-19.01	-34.76	-47.16
7	Kalam	-15.97	-24.79	-2.20	-36.81	-38.19
8	Lalore	-17.16	-21.89	-4.55	-35.29	-38.24
9	Ramananda Khajura	-18.18	-25.31	-10.33	-38.89	-45.20
10	Sherkole	-26.43	-18.56	-5.15	-40.09	-43.17
11	Singra	-25.42	-20.67	-15.49	-40.83	-50.00
12	Sukesh	-22.61	-23.60	-11.27	-40.87	-47.54

Main Data Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

The man land ratio decrease of different *Unions* are on the next page with map from the year of 1974 to 2001(Map No. 18 to 22).

Man Land Ratio Decrease 1974-1981

Singra Upazila



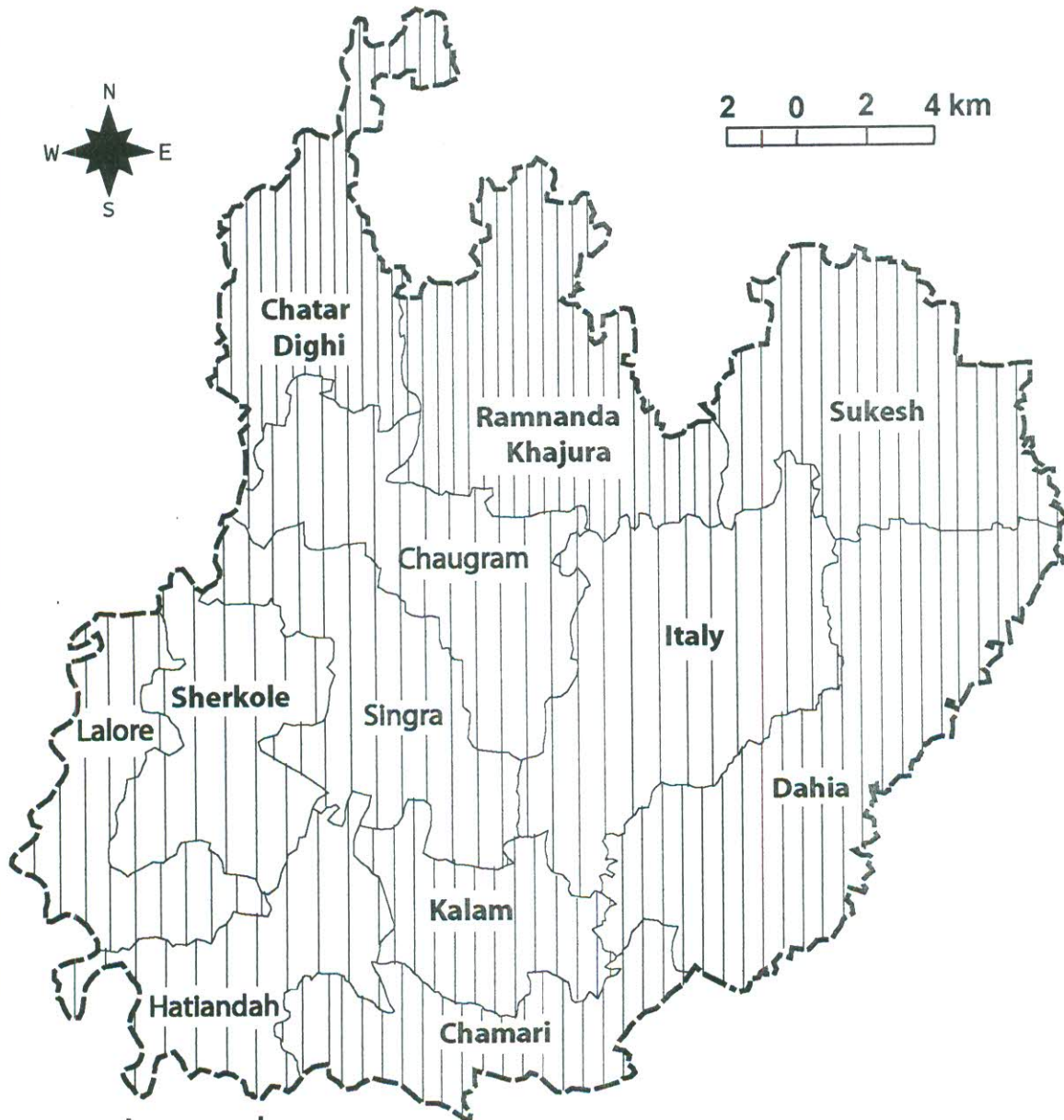
Legend

1	13 - 15 (%)		5	25+ (%)	
2	16 - 18 (%)		6	Upazila Boundary	---
3	19 - 21 (%)		7	Union Boundary	—
4	22 - 24 (%)				

Source: Table No. 5.7

Map No. 19

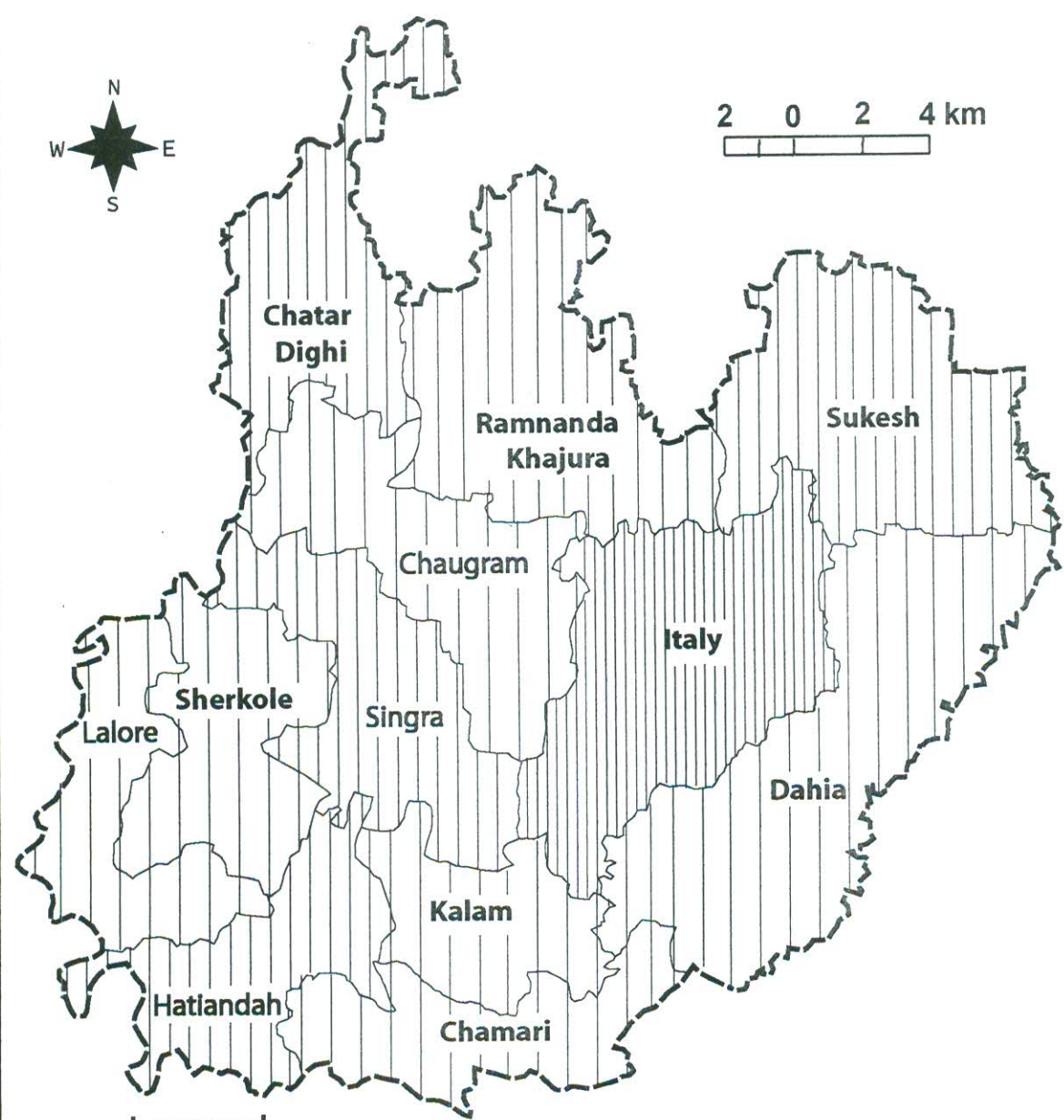
Man Land Ratio Decrease 1981-1991 Singra Upazila



Legend

1	16 - 18 (%)		5	Upazila Boundary	---
2	19 - 21 (%)		6	Union Boundary	—
3	22 - 24 (%)				
4	25+(%)				

Man Land Ratio Decrease 1991-2001 Singra Upazila

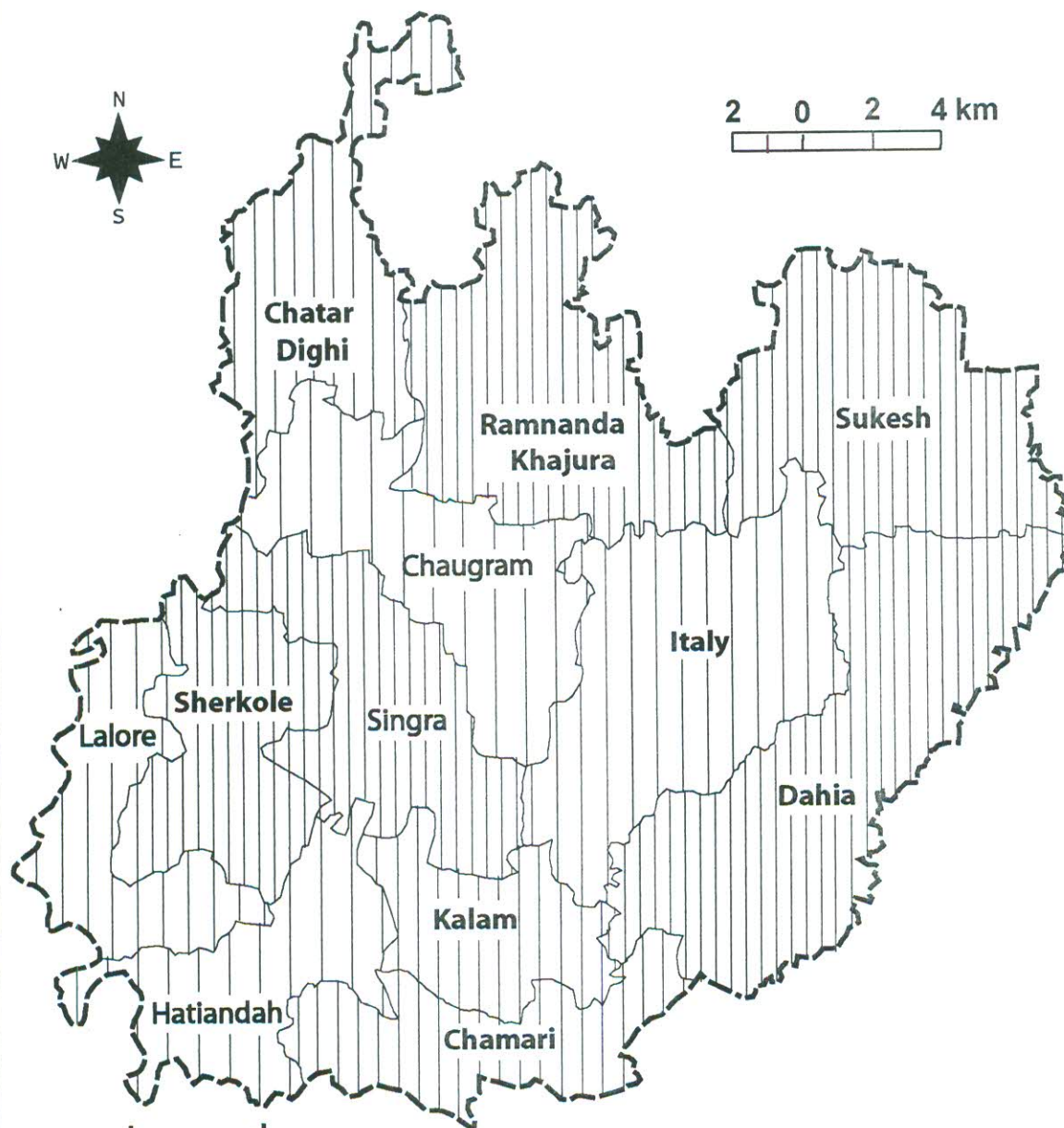


Legend

1	01 - 05 %		5	Upazila Boundary	---
2	06 - 10 %		6	Union Boundary	—
3	11 - 15 %				
4	16 - 20 %				

Man Land Ratio Decrease 1974-1991

Singra Upazila



Legend

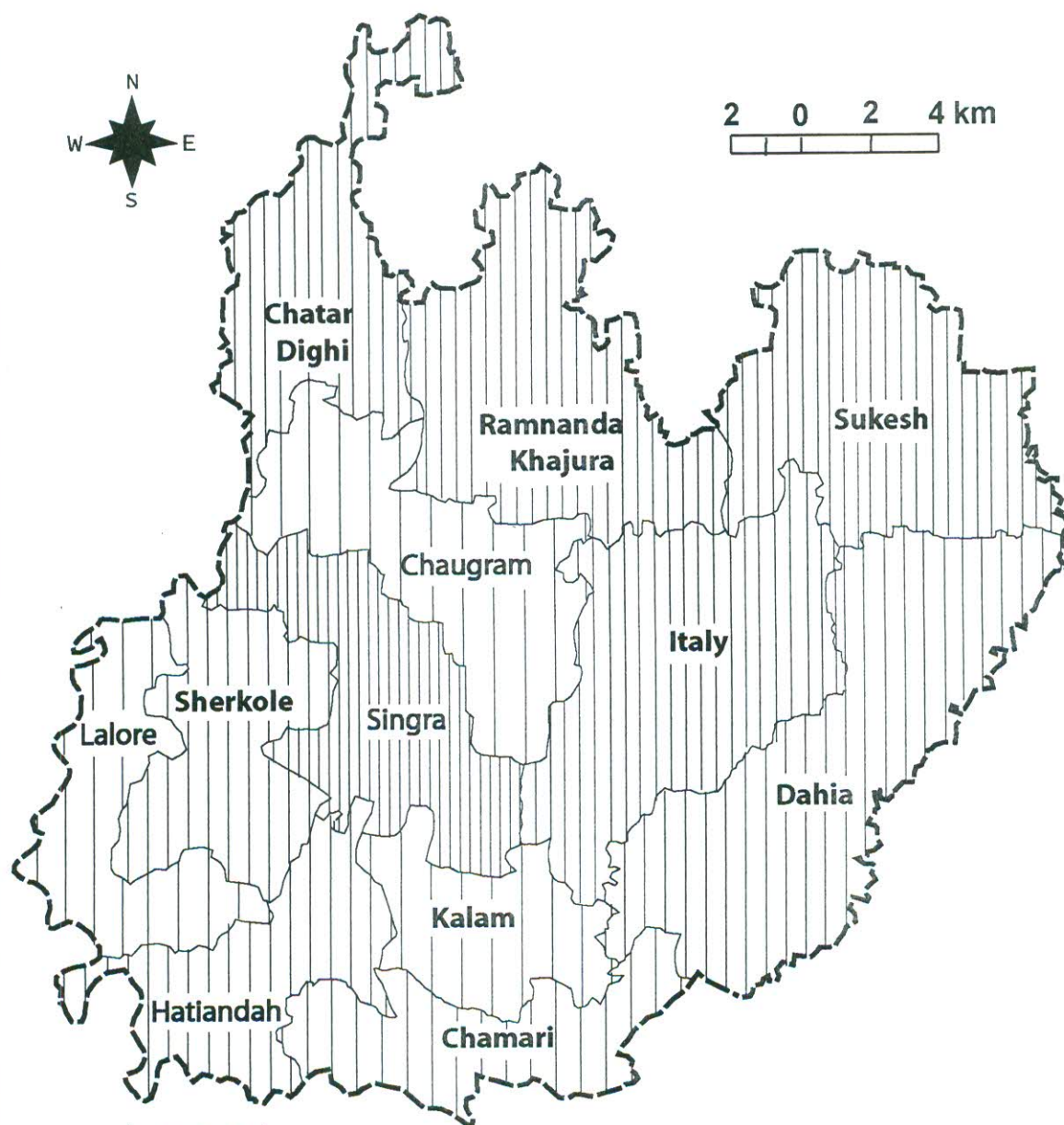
1	32 - 33 (%)		5	Upazila Boundary	---
2	34 - 35 (%)		6	Union Boundary	—
3	36 - 37 (%)				
4	38+(%)				

Source: Table No. 5.7

Map No. 21

Man Land Ratio Decrease 1974-2001

Singra Upazila



Legend

1	35 - 38 (%)		5	48+ (%)	
2	39 - 41 (%)		6	Upazila Boundary	---
3	42 - 44 (%)		7	Union Boundary	—
4	45 - 47 (%)				

Source: Table No. 5.7

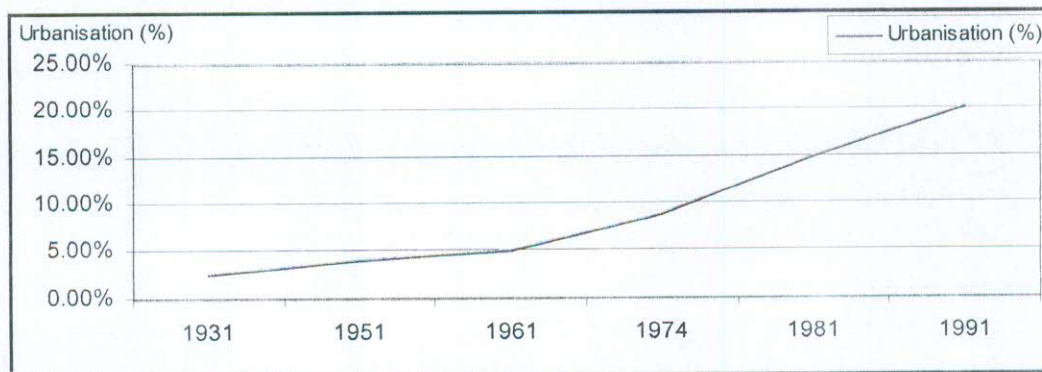
Map No. 23

5.1. The landuse pattern in the study area:

Bangladesh is an agriculture-based country. About 80% of total land is used in agricultural purpose and most of the people live in rural areas (Census, 1991). But urbanization rate is very high. Twenty-percent people of total population live in *Upazila* head quarter areas. The urbanization ratio is very high for the increase of population, job opportunities, and advantages of civil life, offices, schools, trades, industries, education and transportation. The population is creasing by leaps and bounds. The present urbanization ratio of Bangladesh is about 20.14% (Seikh, 1992). But the rate is not equal in all times. As an example the urbanizing ratio was 15% in 1981 and 20% in 1991 (Census, 1981; 1991). The related graph (Graph No.5.1 and Appendices Table No. 5.1) of those was shown below:

Graph No. 5.1.

Urbanization of Bangladesh from 1931 to 1991:



Main Data Source: Population Census, 1951, 1961, 1974, 1981, 1991 and 2001.

The urbanization was started mainly in 1981. From the time of urbanization it is increasing (Sheik, 1992). Most of the people are gathering in Nachole and Singra *Upazila* head quarters to enjoy much more civilian advantages than other *Unions*. In such a way, landuse pattern is increasing rapidly in both Nachole and Singra *Upazila*. The landuse pattern of Singra and Nachole *Upazila* has not come under planning but population is increasing. Most of the roads, houses, institutions, infrastructures, shops, banks, insurance, and industries have been formed without future plan. The Barind tract area is very important among northern regions (Sarker, 1985). The main economic activity of Barind tract area is agriculture. Generally all the activities and trades are based on agriculture. The development of settlement is being started with agriculture. Nachole *Upazila* was formed in 1918. There are four *Unions*, 201 villages and 190 *Mouzas* in Nachole *Upazila* (Banglapedia, 2005). Various service centers have been formed in the *Upazila* head quarters to fulfil people's need. The land is

mainly used to fulfill the basic need like foods, shelters, clothes, education, and settlement. The various activities like food-producing industry, little markets to buy and sell agricultural products create trade and commercial area in the center of the *Upazila*.

5.1.1. General landuse of the study area:

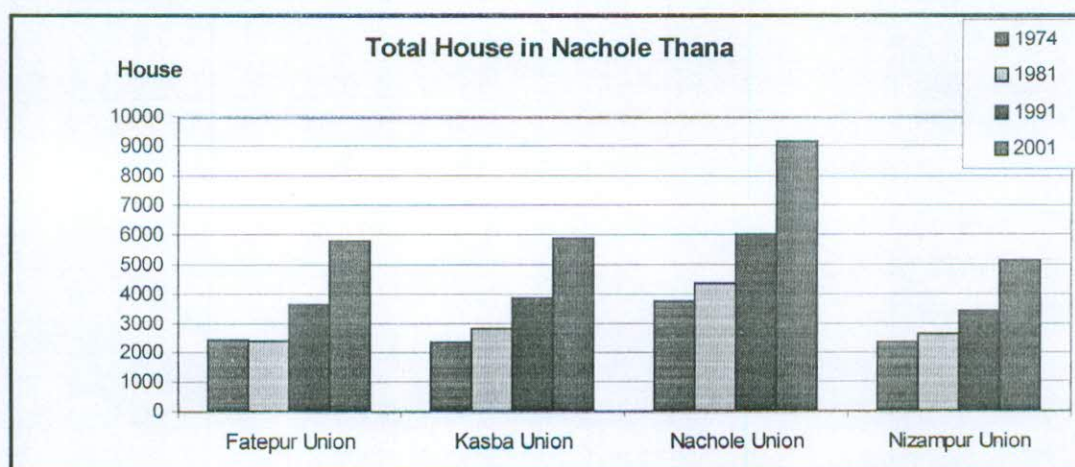
Nachole Upazila's single, double and triples cropped area were respectively 51.08%, 38.73%, 2.59% and waterbodies, fallow-khas land, settlement-roads, and orchards-graveyards were respectively 1.10%, 1.45%, 3.56% and 1.49% of the total land. On the other hand in Singra Upazila, single, double and triple cropped area were respectively 50.32%, 22.74%, 3.42% and waterbodies, fallow-khas land, settlement-roads, and orchards-graveyards were respectively 3.32%, 13.47%, 4.41%, 2.32% of the total land. General landuse patterns of Nachole and Singra Upazila were shown in map no. 24 and 25.

5.2. Housing and settlement:

The urban facilities help build settlement near *Upazila* head quarters and *Union* center. The population is increasing rapidly so the settlement is increasing. Before independence the population was not so much than at present. After independence the population and the settlement are increasing very rapidly. The quantity of settlement in Nachole *Upazila* from 1974 to 2001 was as (Graph No.5.2 and Appendices Table No. 5.2) follows:

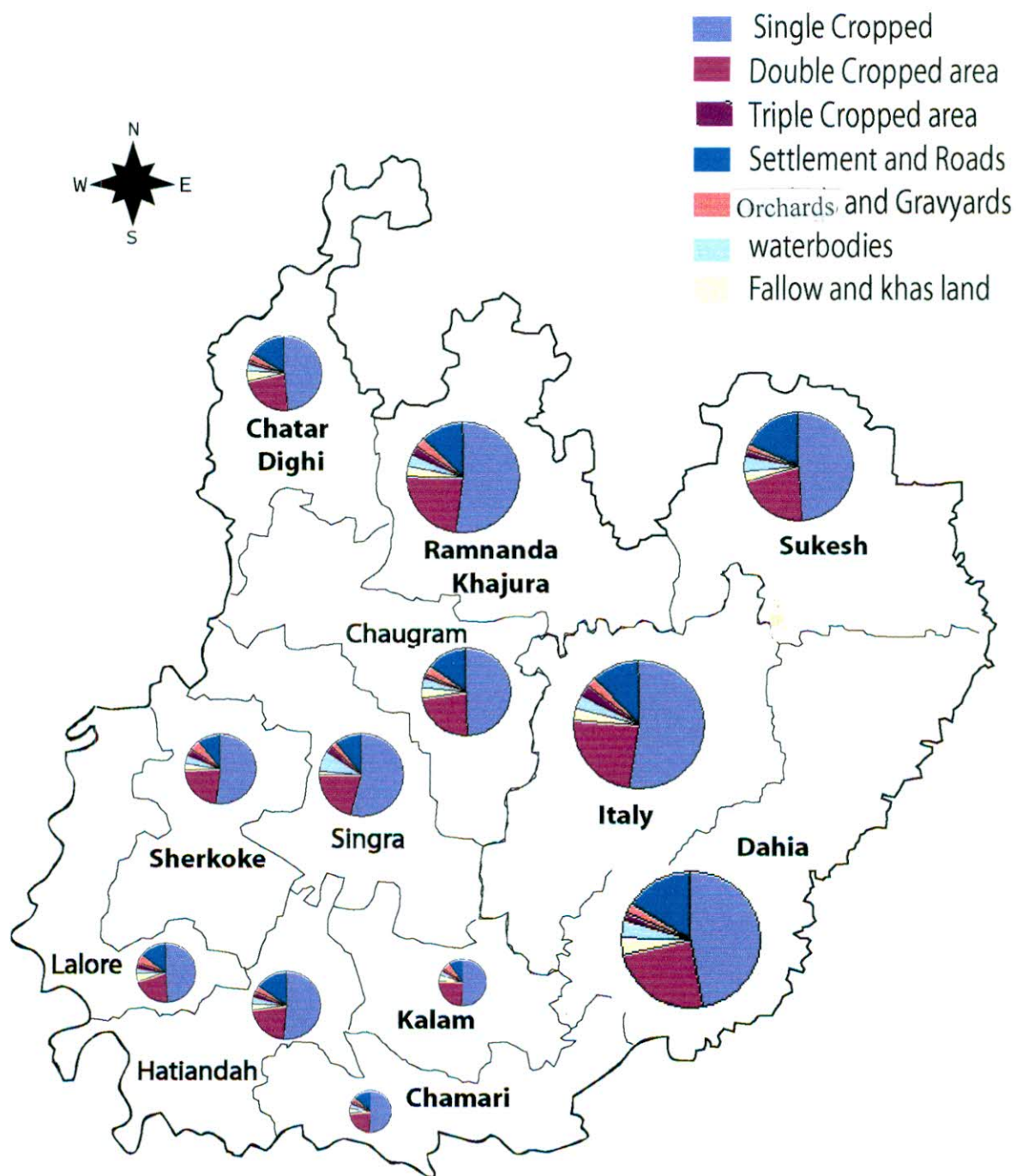
Graph No. 5.2.

Settlement in Nachole *Upazila* from 1974 to 2001



Main Data Source: Bangladesh Population Census, 1951, 1961, 1974, 1981, 1991 and 2001.

Landuse of the Study Area (Singra Upazila)



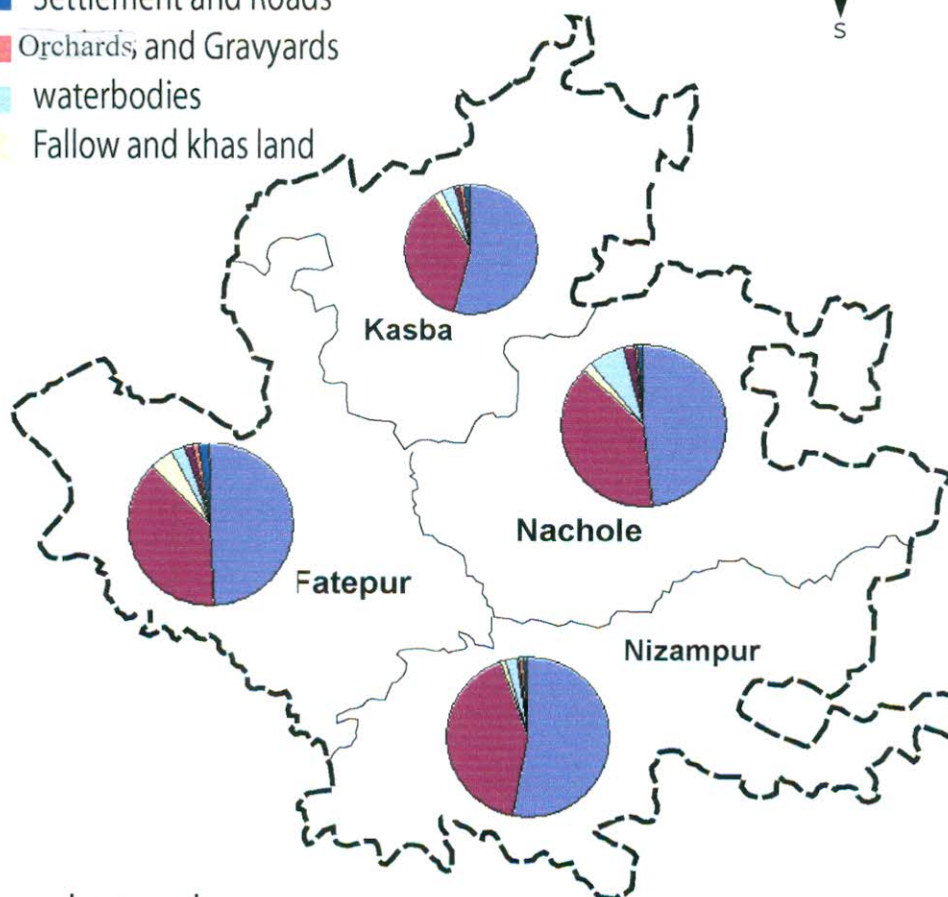
Legend

1	Upazila Boundary	
2	Union Boundary	

1 0 1 2 3 km

Landuse of The Study Area Nachole Upazila

- Single Cropped
- Double Cropped area
- Triple Cropped area
- Settlement and Roads
- Orchards, and Gravyards
- waterbodies
- Fallow and khas land



Legend

1	Upazila Boundary	
2	Union Boundary	

1 0 1 2 3 km

Table No. 5.8.

Settlement increase in Nachole Upazila from 1974 to 2001 (%)

$$\text{Increase} = \{(\text{Present} - \text{Before}) \times 100\} / \text{Before}$$

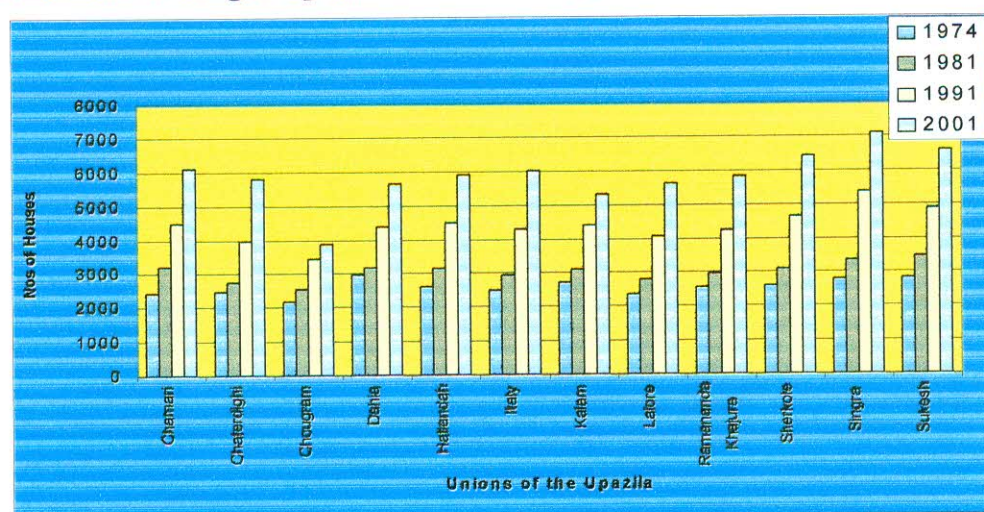
No	Name of Place	1974-81	1981-1991	1991-2001	1974-1991	1974-2001
1	Nachole Upazila	12.24	37.84	53.53	54.70	137.51
	Name of the Union					
1	Fatepur	-0.37	49.83	60.39	49.28	139.43
2	Kasba	19.29	35.44	52.30	61.55	146.05
3	Nachole	16.49	37.91	52.22	60.65	144.54
4	Nizampur	11.36	29.40	49.78	44.11	115.84

Main Data Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

The above table shows that the settlement is being increased in every *Union*. If settlement increases then other things also will increase. These are medical facilities, civilian facilities, electricity, education etc. Therefore, the total houses and settlements of Nachole Upazila are increasing. Housing and settlement increasing ratio was shown through maps on the next page (Map No. 23 to 27).

On the other hand the settlement and housing are increasing in Singra Upazila. The following graph (Graph No.5.3 and Appendices Table No. 5.3) is showing the number of settlement of different *Union*'s as follows:

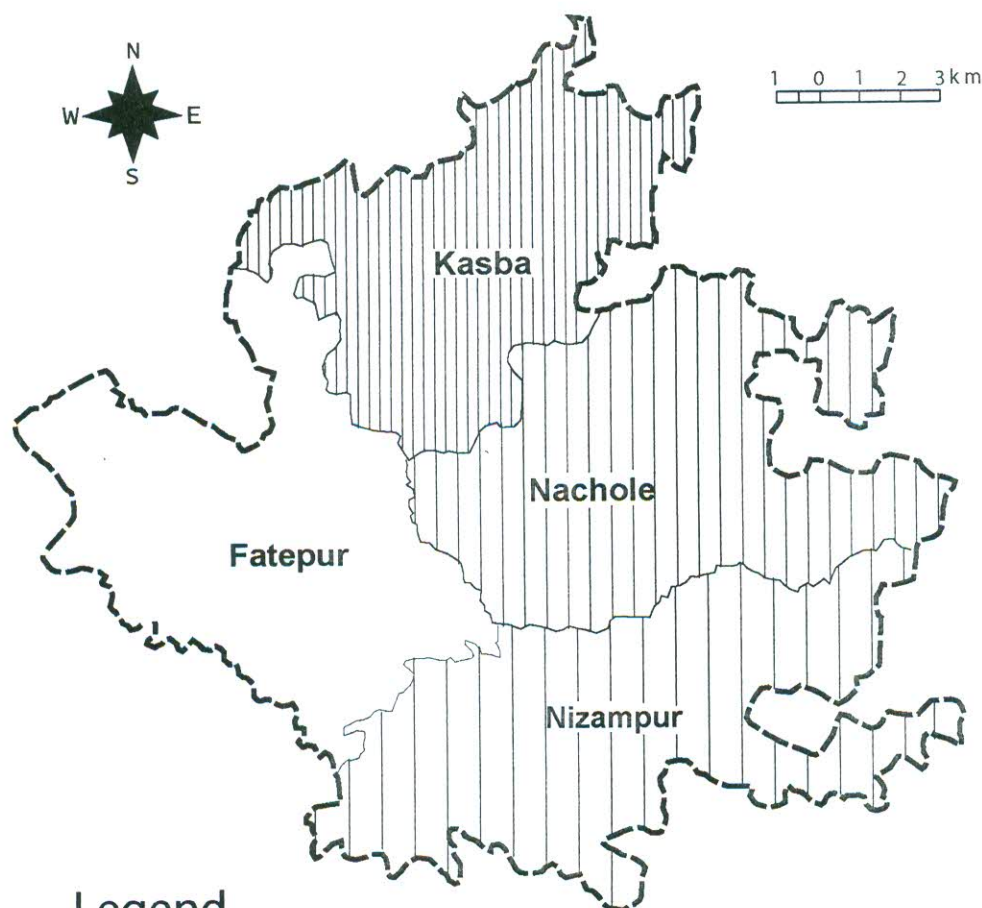
Graph No. 5.3.

Settlement in Singra Upazila from 1974 to 2001

Main Data Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

Settlement Increase 1974 - 1981

Nachole Upazila



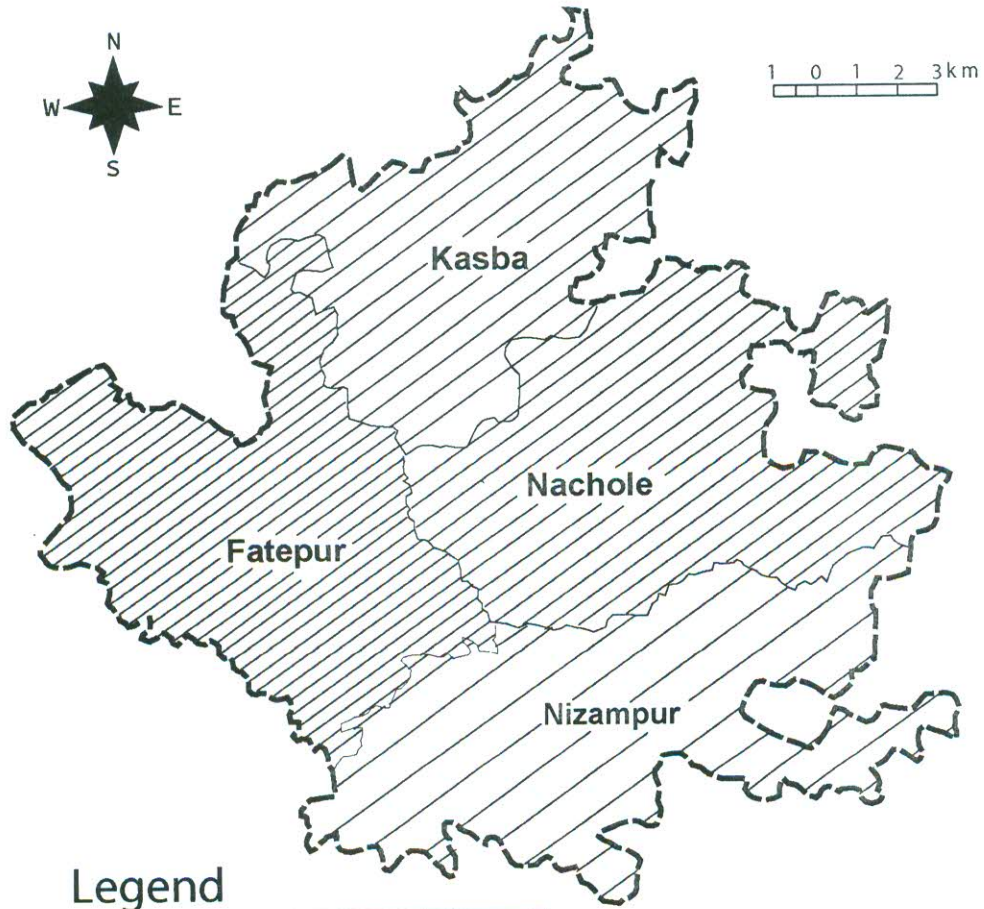
Legend

1	No Increase	
2	11 - 13 (%)	
3	14 - 16 (%)	
4	17- 19 (%)	
5	Upazila Boundary	---
6	Union Boundary	—

Source: Table No. 5.8

Map No. 26

Settlement Increase 1981-1991 Nachole Upazila



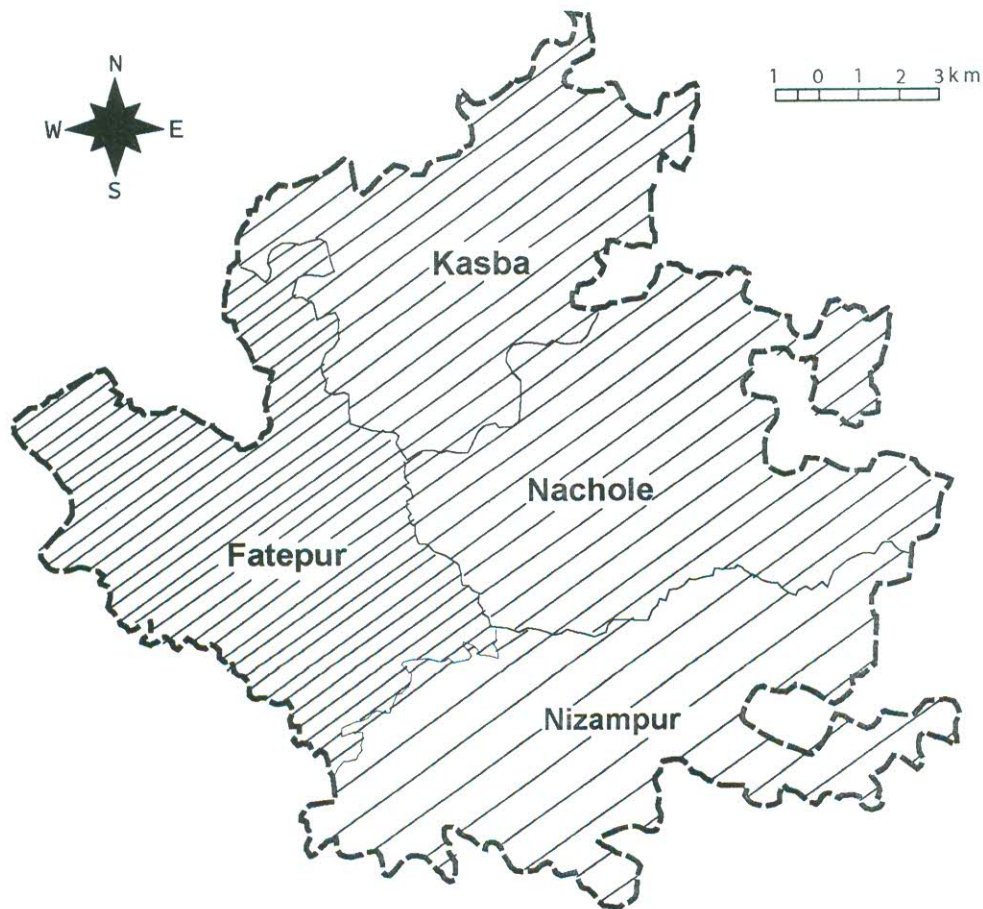
Legend

1	26 - 30 (%)	
2	31- 35 (%)	
3	36 - 40 (%)	
4	41 + (%)	
5	Upazila Boundary	
6	Union Boundary	

Source: Table No. 5.8

Map No. 27

Settlement Increase 1991-2001 Nachole Upazila

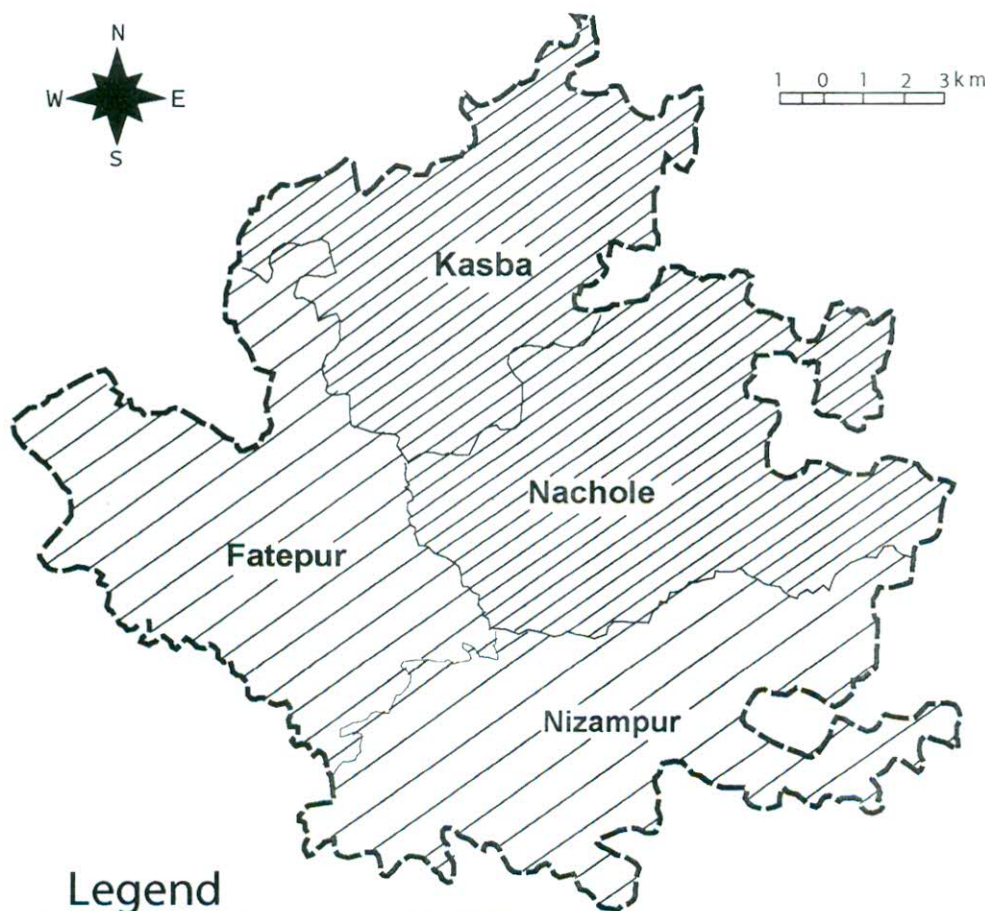


Legend

1	46 - 50 (%)	
2	51- 55 (%)	
3	56 - 60 (%)	
4	Upazila Boundary	
5	Union Boundary	

Settlement Increase 1974 - 1991

Nachole Upazila



Legend

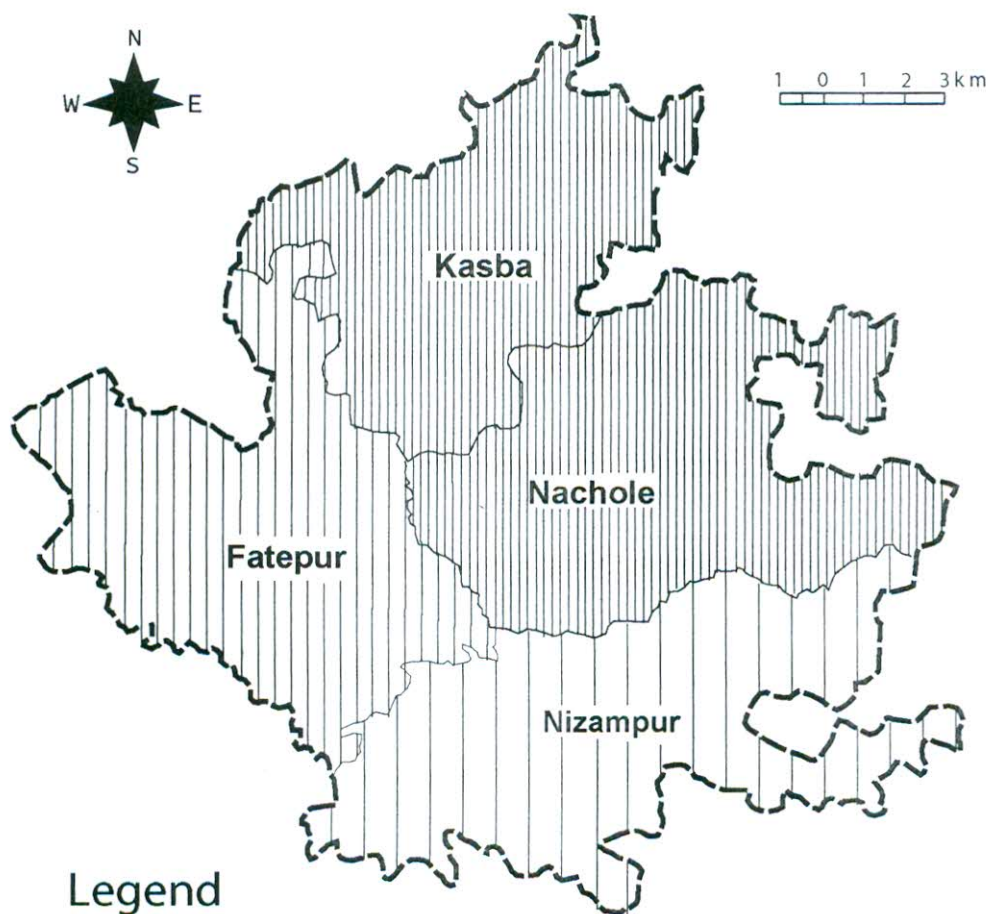
1	41 - 45 (%)	
2	46 - 50 (%)	
3	51 - 55 (%)	
4	56+ (%)	
5	Upazila Boundary	
6	Union Boundary	

Source: Table No. 5.8

Map No. 29

Settlement Increase 1974 - 2001

Nachole Upazila



Legend

1	101 - 120 (%)	
2	121 - 130 (%)	
3	131 - 140 (%)	
4	141 + (%)	
5	Upazila Boundary	
6	Union Boundary	

Source: Table No. 5.8

Map No. ~~27~~ 30

In Singra *Upazila* about 4.2% land was used for housing and settlement in 2005 (Singra *Upazila Parishad*, Natore). This increase occurred for agricultural development. Agriculture increases economical, communicational, business, educational developments. And this development has helped to increase housing and settlement. The growth of housing and settlement has increased land use. The communication systems and other opportunities of Singra *Upazila* like education facilities; trade, etc are better than Nachole. So the settlement is increasing very much in Singra *Upazila*. The data is in the following table (Table No. 5.9.)

Table No. 5.9.

Settlement increase in Singra *Upazila* from 1974 to 2001 (%)

Increase = {(Present-Before) x 100}/Before

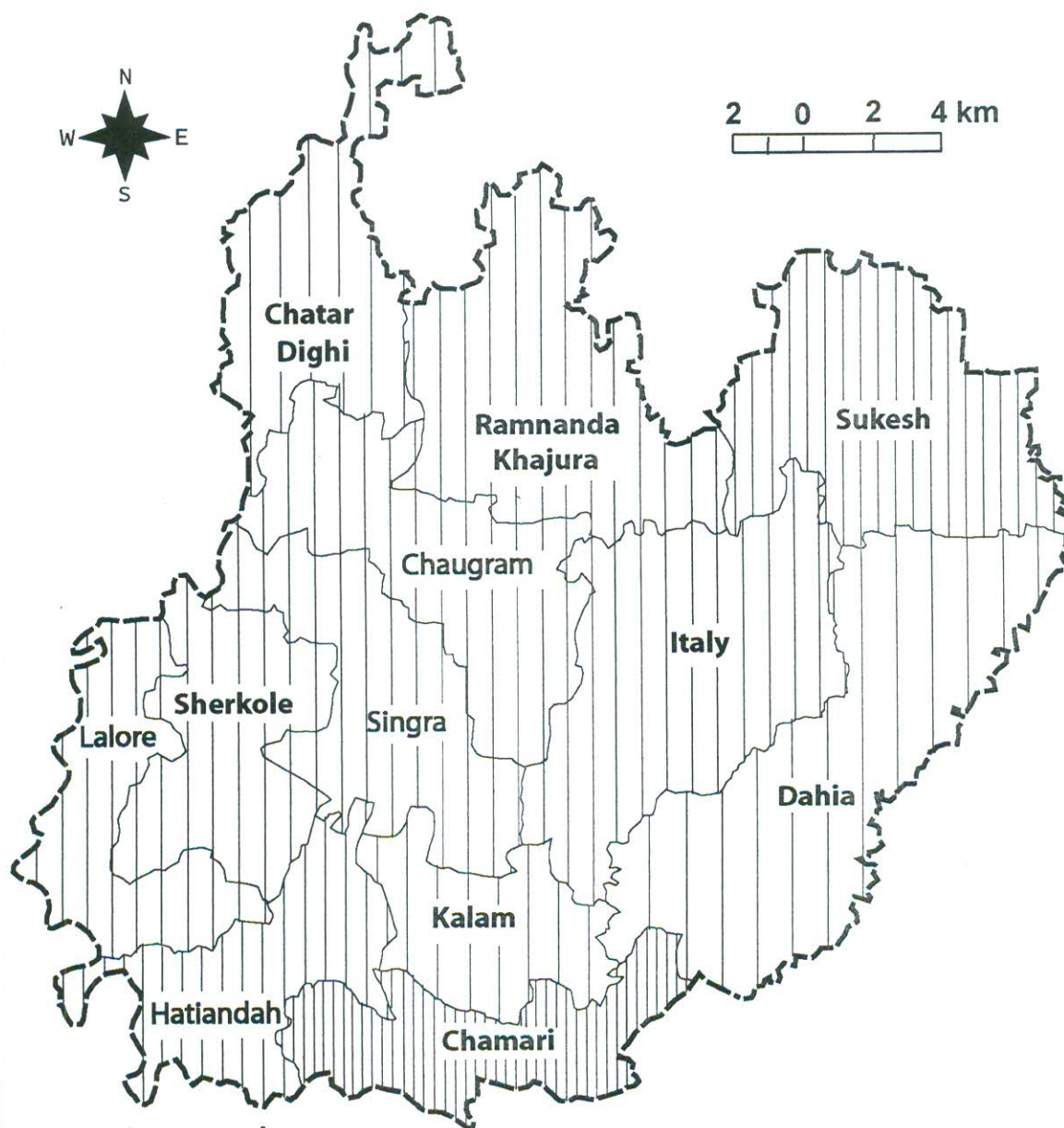
No	Name of Place	1974-81	1981-91	1991-01	1974-91	74-2001
1	Singra <i>Upazila</i>	18.27	44.18	33.34	70.52	127.37
Name of the Union						
1	Chamari	32.44	40.17	35.75	85.64	152.00
2	Chaterdighi	11.50	44.86	46.06	61.52	135.92
3	Chougram	17.04	35.03	13.06	58.04	78.67
4	Dahia	7.23	37.63	29.29	47.58	90.81
5	Hatiandah	21.38	42.65	31.10	73.15	127.00
6	Italy	18.92	45.42	40.52	72.93	143.00
7	Kalam	14.28	42.72	20.45	63.09	96.45
8	Lalore	18.92	45.43	38.65	72.94	139.80
9	Ramananda Khajura	16.28	42.81	37.68	66.07	128.64
10	Sherkole	20.05	49.58	38.46	79.57	148.63
11	Singra	20.46	60.94	31.72	93.88	155.37
12	Sukesh	22.39	40.80	34.77	72.32	132.24

Main Data Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

The above table shows that the changing ratio of housing and settlement of Singra *Union* is much more than other *Unions*. The housing and settlement have been increased in different period but especially the settlement-increasing ratio is much from 1981 to 1991. The roads, government buildings, culverts, bridges, schools, colleges etc. have been developed. So during this time, the houses have been increased. Other *Union's* housing and settlement growth ratio was shown through maps on the next page (Map No. 28 to 32).

Settlement Increase 1974-1981

Singra Upazila

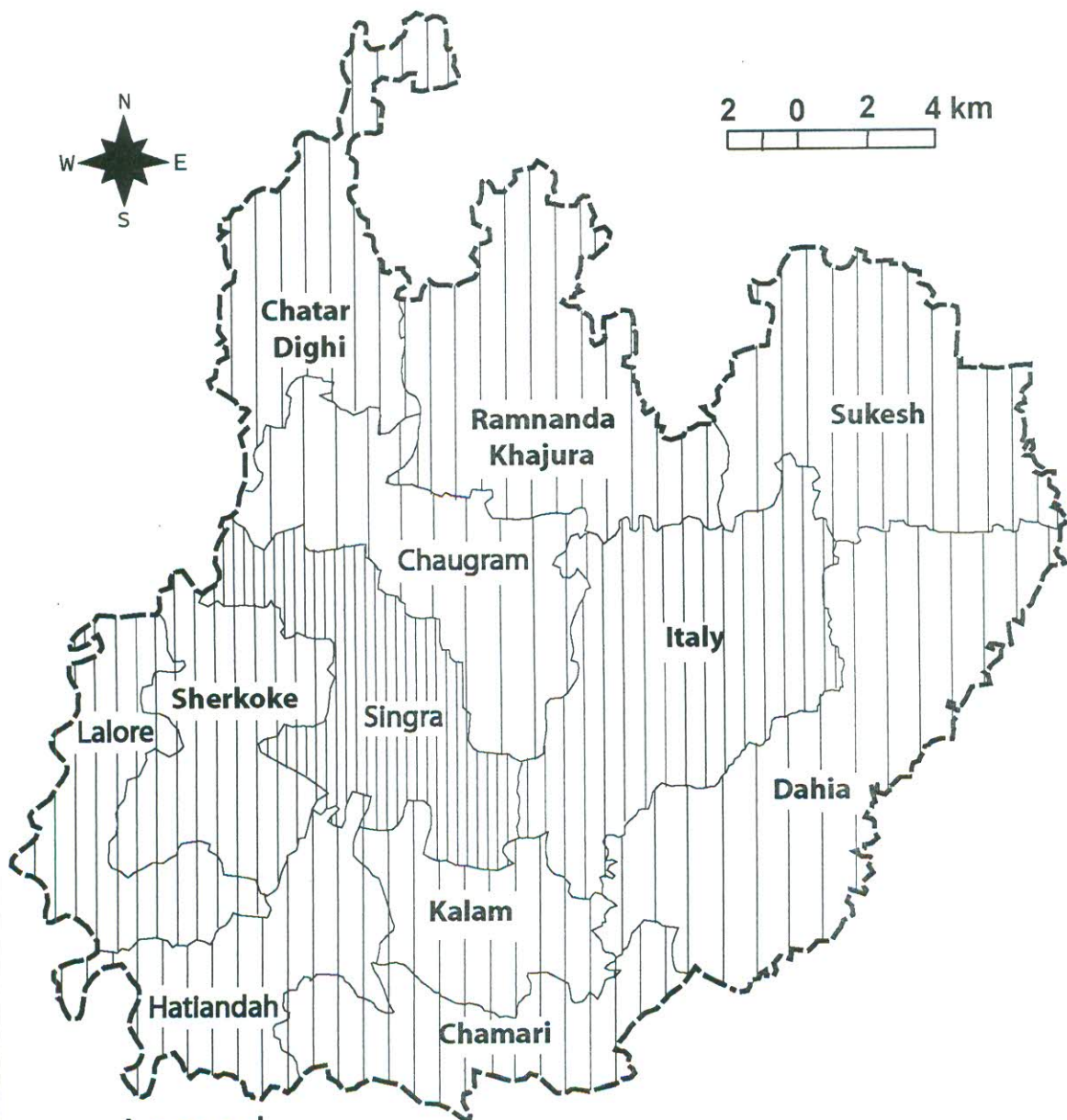


Legend

1	06 - 10 (%)		5	26 - 30 (%)	
2	11 - 15 (%)		6	31+ (%)	
3	16 - 20 (%)		7	Upazila Boundary	
4	21 - 25 (%)			Union Boundary	

Settlement Increase 1981-1991

Singra Upazila



Legend

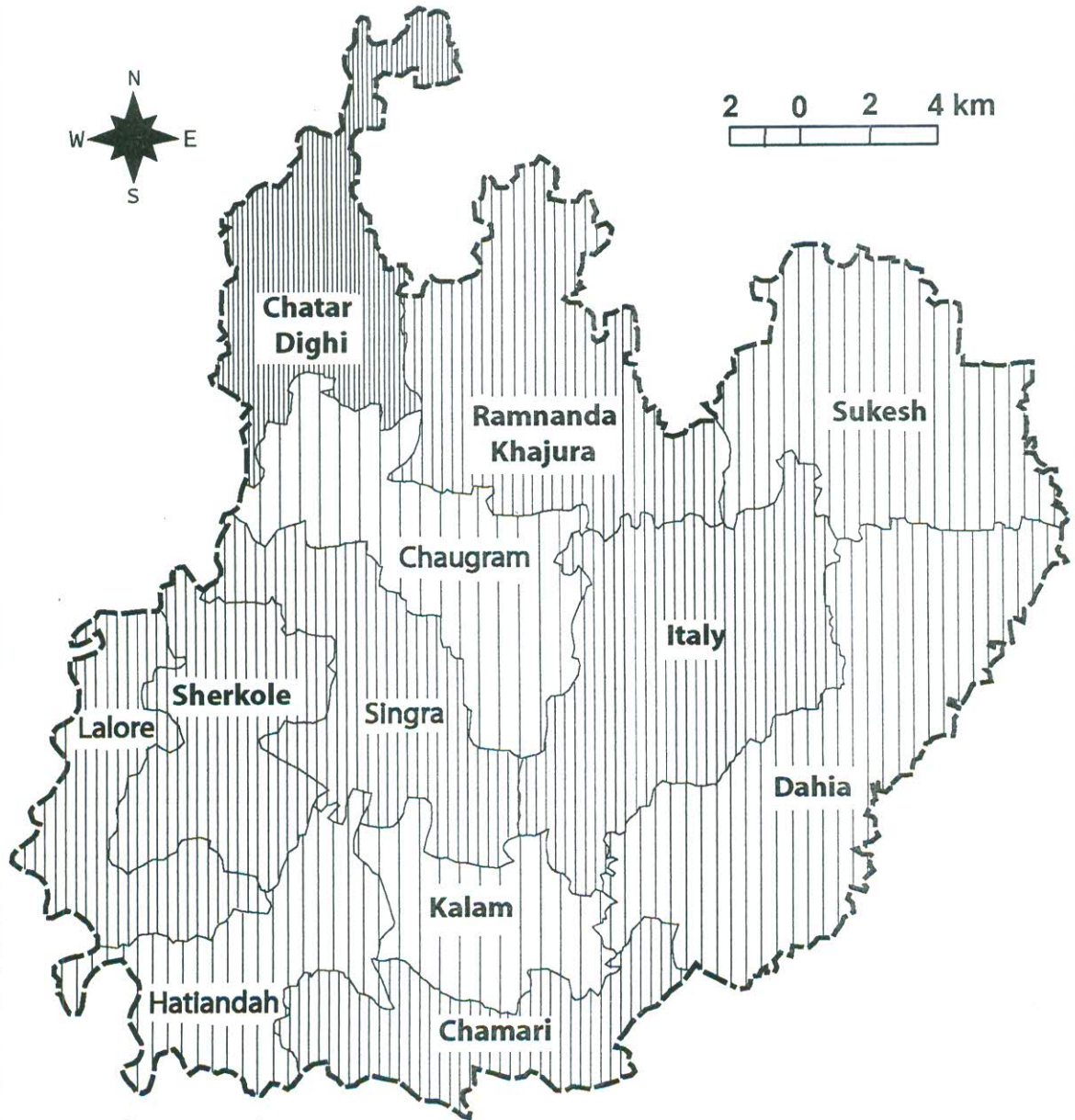
1	35 - 39 (%)					5	55 - 59 (%)				
2	40 - 44 (%)					6	60+ (%)				
3	45 - 49 (%)					7	Upazila Boundary			---	
4	50 - 54 (%)					8	Union Boundary			—	

Source: Table No. 5.8

Map No. 1032

Settlement Increase 1991 - 2001

Singra Upazila

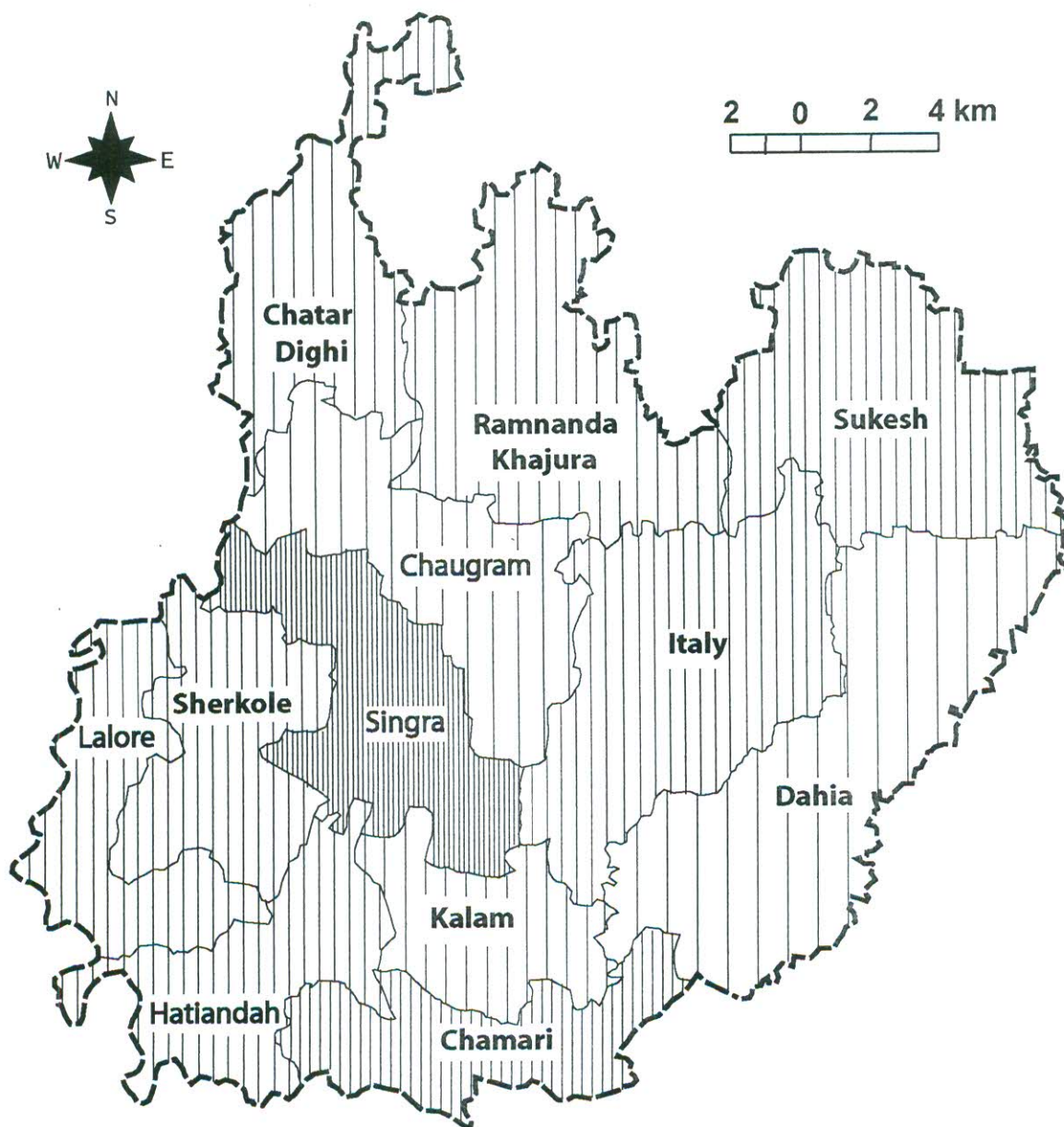


Legend

1	11 - 20 (%)		5	Upazila Boundary	---
2	21 - 30 (%)		6	Union Boundary	—
3	31 - 40 (%)				
4	41 - 50 (%)				

Settlement Increase 1974-1991

Singra Upazila



Legend

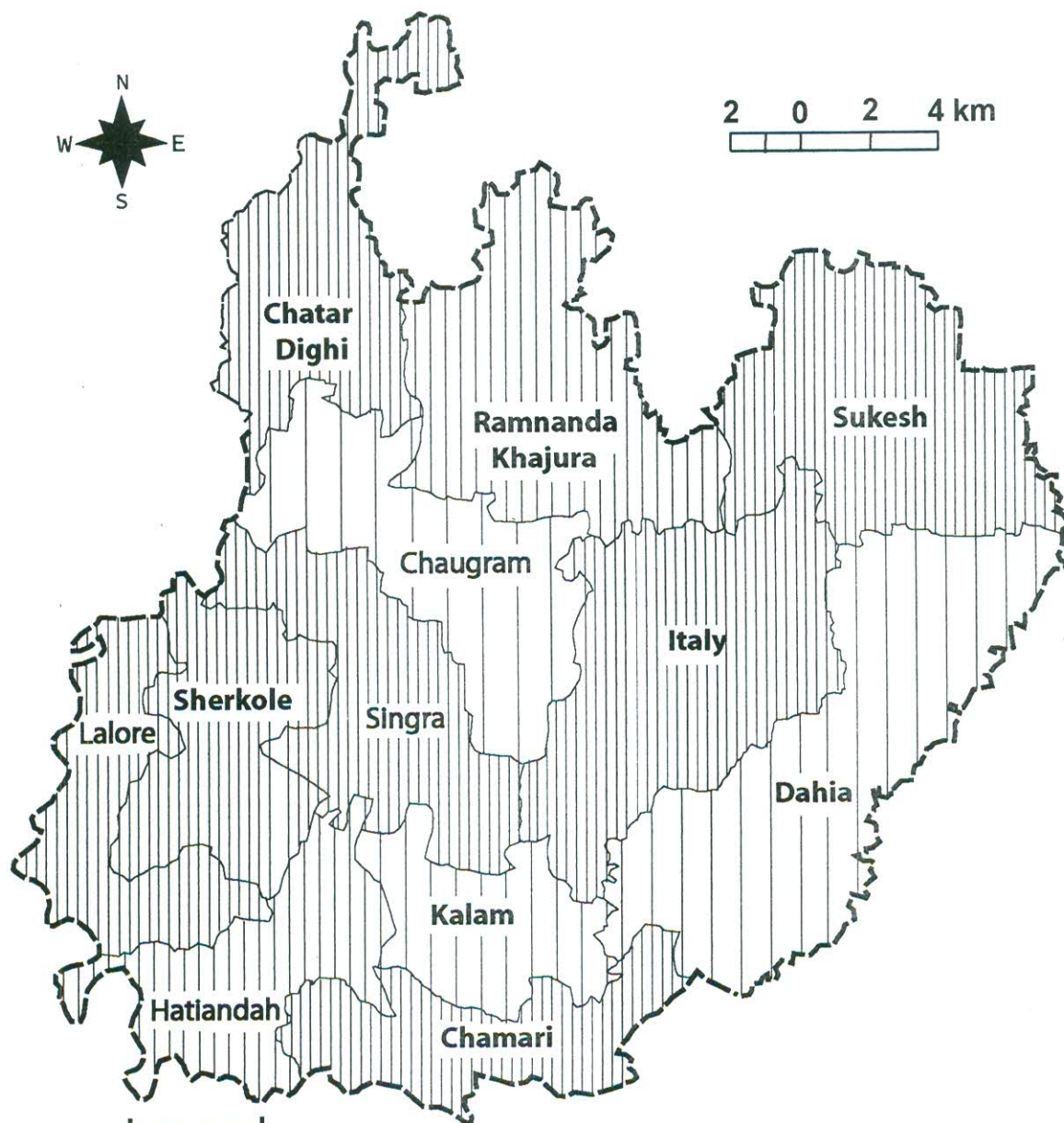
1	41 - 50 (%)		5	81 - 90 (%)	
2	51 - 60 (%)		6	91 (%)	
3	61 - 70 (%)		7	Upazila Boundary	---
4	71 - 80 (%)		8	Union Boundary	—

Source: Table No. 5.8

Map No. 34

Settlement Increase 1974-2001

Singra Upazila



Legend

1	71 - 80 (%)		5	121 - 130 (%)	
2	81 - 90 (%)		6	131 (%)	
3	91 - 100 (%)		7	Upazila Boundary	---
4	101 - 110 (%)		8	Union Boundary	—

Types of housing and settlement in the study area:

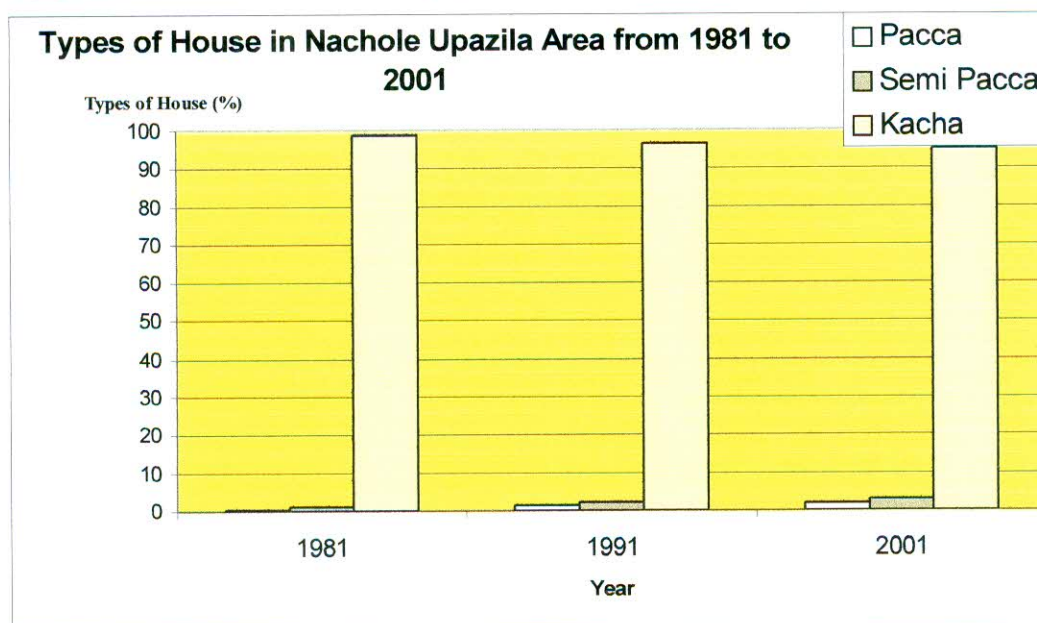
Nachole Upazila:

About 99% houses were *kachha* before 1974 in Nachole Upazila, which were made with mud, straws, clays and bamboo. But now it is different, the people are building their houses with bricks, concrete and wood.

The settlement before 1974 of Nachole and Singra Upazila were clusters. But now most of the settlements have been formed in an unplanned way. The settlement has been formed for vast growing family members. The settlement has been formed without considering well environment, healthy weather and future. There was no planning in Nachole Upazila head quarters for settlement and still no planning found. This unplanned settlement is increasing day by day. The type of houses related data of Nachole Upazila from 1981 to 2001 is presented in the following Graph No5.4 and Appendices Table No. 5.4.

Graph No. 5.4.

Types of House in Nachole Upazila From 1981 to 2001



Main Data Source: Bangladesh Population Census, 1981, 1991 and 2001.

Table No. 5.10.

Changing Pattern of House Types in Nachole Upazila From 1981 to 2001 (in %)

Increase/Decrease = {(Present - Before) x 100}/Before

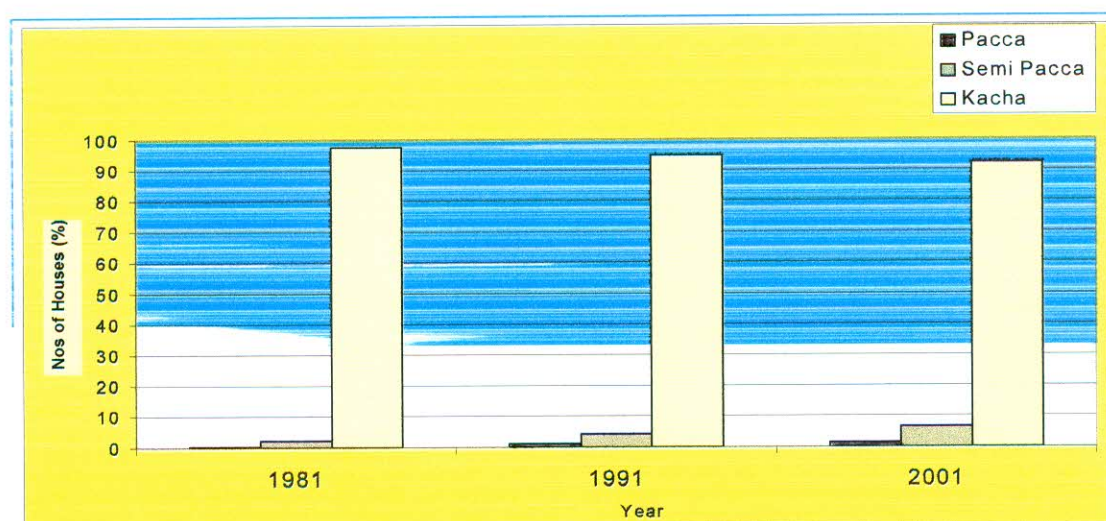
Sl No	Types of House	Nachole Upazila		
		1981-1991	1991-2001	1981-2001
1	<i>Pucca</i>	169.23	95.24	425.64
2	<i>Semi Pucca</i>	120.59	34.22	196.08
3	<i>Kachha</i>	-2.32	-1.42	-3.71

Main Data Source: Bangladesh Population Census, 1981, 1991, 2001 and Regional statistics office, Rajshahi.

In 1981 only 0.39%, 1.02% and 98.59% houses were *pucca*, semi *pucca* and *kachha* respectively in Nachole Upazila (Census, 1981). In 1991 only 1.45%, 2.25% and 96.30% houses were *pucca*, semi *pucca* and *kachha* respectively in Nachole Upazila (Census, 1991). In 2001 only 2.05% and 30.2% houses were *pucca* and semi *pucca* and rest 94.93% houses were *kachha* respectively in Nachole Upazila (Census, 2001). Therefore, *pucca* houses are increasing with settlement and housing in Nachole Upazila and the increasing ratio is shown in the above table no. 5.10.

On the other hand housing and settlement are also increasing in Singra Upazila. There is the graph (Graph No. 5.5 and Appendices Table No. 5.5)) to show the increasing condition of settlement in Singra Upazila

Graph No. 5.5.

Types of Housing in Singra Upazila from 1981 to 2001

Main Data Source: Bangladesh Population Census, 1981, 1991, 2001 and Regional Statistics Office, Rajshahi.

Table No. 5.11.

Changing Pattern of House Types in Singra Upazila From 1981 to 2001 (in %)

Changing pattern (Increase/Decrease) = {(Present - Before) x 100}/Before

Sl No	Types of House	Nachole Upazila		
		1981-1991	1991-2001	1981-2001
1	<i>Pucca</i>	129.03	109.86	380.65
2	<i>Semi Pucca</i>	83.26	46.60	168.67
3	<i>Kachha</i>	-2.81	-2.61	-5.35

Main Data Source: Bangladesh Population Census, 1981, 1991 and 2001

Regional statistics office, Rajshahi.

In 1981 only 0.21%, 2.33% and 97.46% houses were *pucca*, semi *pucca* and *kachha* respectively in Singra Upazila (Census, 1981).

In 1991 only 1.01%, 4.27% and 94.72% houses were *pucca*, semi *pucca* and *kachha* respectively in Singra Upazila (Census, 1991).

In 2001 only 1.49%, 6.26% and 92.25% houses were *pucca*, semi *pucca* and *kachha* respectively in Singra Upazila (Census, 2001). Therefore *pucca* houses are increasing in Singra area and the increasing ratio is shown in the above table No. 5.11.

The *pucca* and semi-*pucca* houses are increasing significantly in Nachole and Singra Upazila. But all *pucca* houses are not much more than *kachha*, most of the houses of different Unions of Nachole Upazila are *kachha*. Unplanned settlement has been formed for lack of proper planning. Different types of problems could be arisen there if the settlement is not built properly. The settlement in agricultural land creates problem in agricultural activities. The waste of the settlement pollutes the agricultural land. It also creates problems in irrigation. So housing and settlement should be built according to sustainable land management. Some houses have been found in agricultural land. "It will be difficult to break the settlement if it is formed improperly" (Shafiq, 2001).

Different types of problems can be arisen like security problem; water and sanitation problem for which environment and agriculture will suffer for improper settlement.

About 99% houses were also *kachha* before 1974 in Singra. Recently *pucca* houses are increasing. But for the lack of planning and fair procedures or unplanned population increase in local areas, settlements are increasing towards agricultural land. Semi *pucca* houses are increasing. The settlement patterns of Singra before 1974 was in ring or circle shape. The people are building houses and settlements in *beel* area. They filled up low land in *beel* area to turn it into agricultural land. In this way the nature of Chalan *beel* are being degraded.

During flood houses suffer innumerable harms by soil erosion. The people live in flood-affected area and suffer from different types of diseases. They suffer from different types of diseases for want of pure drinking water, poor sewerage systems and improper management. The people of Singra *Upazila* suffer from want of proper planning and procedures, unplanned settlements, vast increase of population, ignorance and others.

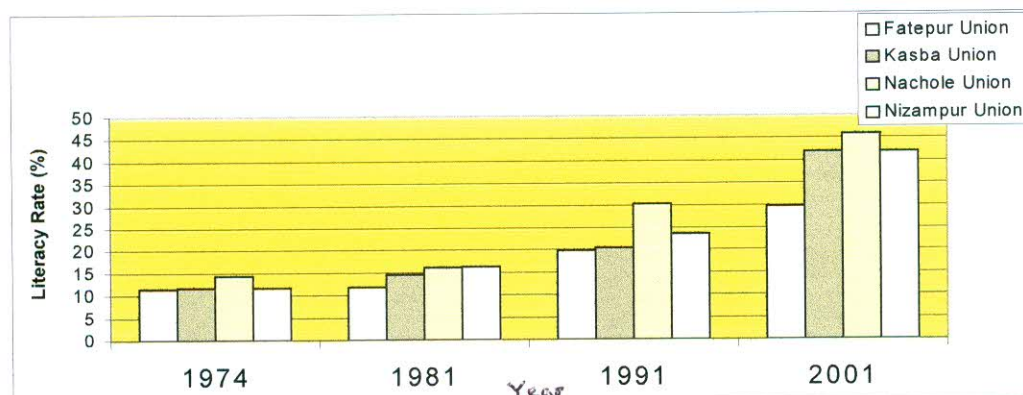
Educational Institutions:

Educational Institutions can change the land use pattern like residence, mills, factories, offices, businesses, trades, etc. The educational institutions are increasing with the increase of population. Many people want to live beside the educational institutions so that they can be able to get education. Some people start business depending on the students. The educational institutions can help increase trades and businesses. Students need health center for their sound health. The educational institutions can also help to increase various land uses. And the literacy rate increases with the increase of educational institutions. The literacy rate is increasing in Nachole *Upazila*. There is the graph (Graph No.

5.6 and Appendices Table No. 5.6.) of literacy conditions of Nachole *Upazila* as follows:

Graph No. 5.6.

Literacy Rate in Nachole Upazlia



Main Data Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

Above five years old people's literacy rate was only 11.47% in 1974 in Nachole *Upazila* (Census, 1974), which was increased to 14.9% in 1981 (Census, 1981). The literacy rate was increased to 30.19% within 7 years. In 2001 the literacy rate was 40.3% (Census, 2001). From 1974 to 2001 within 27 years, the literacy rate increased to 251.61% (Census, 1974; 2001). The literacy-increasing ratio of Nachole *Upazila* is as follows (Table No. 5.12.):

Table No. 5.12.

Literacy Rate Increase in Nachole *Upazila* from 1974 to 2001 (in %)

Increase = {(Present - Before) X 100}/Before

No	Name of Place	1974-81	1981-91	1991-01	1974-91	74-2001
1	Nachole <i>Upazila</i>	30.19	64.73	63.94	114.47	251.61
Name of the Union						
1	Fatepur	5.12	66.39	50.56	74.91	163.34
2	Kasba	24.89	41.38	104.44	76.57	260.98
3	Nachole	12.27	87.04	51.52	109.98	218.16
4	Nizampur	42.24	43.90	60.66	104.68	264.09

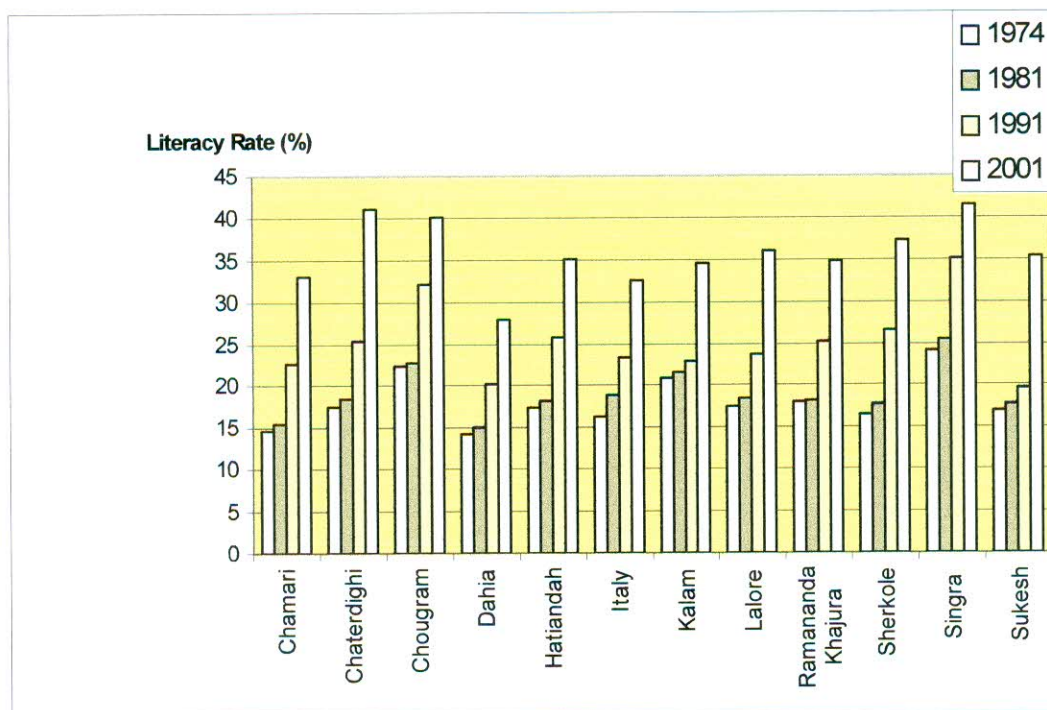
Main Data Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

In all *Unions* of Nachole *Upazila* the literacy rate has been increased. But the literacy rate of Nachole *Upazila* head quarters is higher than other 3 *Unions*. The educational or training institutions have been founded in Nachole *Upazila* head quarters. Most of the people of Nachole *Upazila* head quarters are less related to agriculture than other *Unions*. The major profession of *Upazila* head quarters is agriculture. But economic activities like trades, commerce, businesses, services etc. are much more than other *Unions*.

On the other hand in Singra *Upazila* more than five years old people's literacy rate was only 17.97% in 1974 (Census, 1974). Which was increased to 17.99% in 1981 (Census, 1981) that means literacy rate has changed a little within this 7 years and it was only 0.11%. The literacy related data of Singra *Upazila* are as follows (Graph No. 5.7 and Appendices No. 5.7):

Graph No. 5.7.

Literacy Rate in Singra *Upazila*



Main Data Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

The literacy rate was only 25.6% in 1991 (Census, 1991), which was increased to 45.75% within 10 years from 1991 to 2001 (Census, 2001). The literacy rate was increased to 104.8% within 27 years from 1974 to 2001 (Census, 1974; 2001). The literacy development and changes have taken place in education sector, which is in the following table (Table No.5.13).

Table No. 5.13.

Literacy Rate Increase in Singra Upazila (%) from 1981 to 2001 (in %)

Increase = {(Present - Before) X 100}/Before

No	Name of Place	1974-81	1981-91	1991-01	1974-91	1974-01
1	Singra Upazila	0.11	40.08	45.75	40.23	104.40
Name of the Union						
1	Chamari	5.05	46.75	46.50	54.16	125.85
2	Chaterdighi	5.65	37.30	61.46	45.06	134.21
3	Chougram	2.20	40.79	24.92	43.88	79.74
4	Dahia	6.56	33.77	38.07	42.55	96.82
5	Hatiandah	4.44	42.54	36.01	48.87	102.48
6	Italy	16.52	23.28	39.57	43.65	100.49
7	Kalam	3.20	6.02	50.87	9.41	65.07
8	Lalore	5.59	28.11	52.36	35.27	106.11
9	Ramananda Khajura	1.28	38.46	38.10	40.23	93.66
10	Sherkole	7.94	49.44	40.23	61.31	126.20
11	Singra	5.99	37.65	18.23	45.89	72.49
12	Sukesh	5.20	10.67	79.80	16.43	109.34

Main Data Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

The above table no 5.13 shows that more literacy rate was developed in Chamari, Chatter Dhigi and Sherkol Unions among other Unions of Singra Upazila. The literacy rate is high in that area where economic condition and people are much interested in education having well, better educational facilities etc.

Adult Education:

The literacy rate is not equal among all aged people in Nachole and Singra *Upazila*. Interview has been taken from Nachole and Singra area. Two hundred households from Nachole *Upazila* and one hundred and fifty households from Singra *Upazila* have been selected to collect family head's educational data in 2005. It shows that the literacy rate of the family head is very low. Only 9% of Singra and 8% of family heads of Nachole *Upazila* are educated. But according to Bangladesh Bureau of Statistics (B. B. S) only 36.43% people of Singra and 40.3% people of Nachole *Upazila* were literate in 2001 (Census, 2001).

Adult education is not well in the study area. The educational status of the family heads of study area is presented in table no 5.14.

Table No. 5.14.

Educational Status of the Family Head in the Study Area (in %)

No	Educational Qualification	Nachole <i>Upazila</i>	Singra <i>Upazila</i>
1	Illiterate	91.00	92.00
2	Literate	6.00	4.00
3	Eight Pass	2.00	2.00
4	S. S. C. Pass	0.50	0.67
5	H. S. C. Pass	0.50	0.67
6	B.A/B.Com/B.Sc	-	0.67
7	M.A/M.Com/M.Sc +	-	-
	Total	100.00	100.00

Source: Field Survey, 2005.

The above table shows that the literacy rate is very low in both Nachole and Singra. Particularly before 1974, the people's interest towards education was very little. So they are not much educated. The adult educational ratio is not much than younger ones because in the past educational facilities, mass awareness, economy etc. were not very well. Moreover the social and religious conditions were not favorable for education.

Educational Institutions:

The literacy rate is increasing significantly but it is not increasing equally among all classes and the people of all ages. The literacy rate is not increasing among the poor people of Nachole and Singra *Upazila*. The land use will be increased if education develops and education will develop if people of all classes become educated. The educational institutes are being increased with increase of literacy rate. The total schools, colleges including primary schools were only 28 before 1974 (Rajshahi Regional Statistic Office).

There were only 11 government primary schools, 10 non-government primary schools, 7 non-government high schools, in Nachole but no government high schools, no government-non-government colleges and public library in Nachole *Upazila* before 1974. But now the number has been increased to 127 in Nachole *Upazila* in 2005. These are 38 government primary schools, 45 non-government primary schools, 33 non-government high schools, 7 non-government colleges and 4 public libraries in Nachole *Upazila* (Banglapedia, 2005). The educational institutions are increasing rapidly than before. The data of the institutions are in table No. 5.15.

Table No. 5.15.

Educational Institutions in Nachole *Upazila* from 1974 to 2005

No	Name of Institutions	1974	1981	1991	2001	2005
1	Govt. Primary School Boys and Girls	11	19	26	37	38
2	Non Govt. Primary School Boys and Girls	10	18	27	39	45
3	Govt. High School Boys and Girls	0	0	0	0	0
4	Non Govt. High School Boys and Girls	7	11	19	31	33
5	Govt. College (Boys and Girls)	0	0	0	0	0
6	Non Govt. College (Boys and Girls)	0	1	2	4	7
7	Public Library	0	0	0	1	4

Source: B. B. S., Regional Office, Rajshahi.

Banglapedia, web page, 2005.

Nachole *Upazila* Education Office, Chapai Nawabgonj and
Field Survey'2005.

Table No. 5.16.

Changing Pattern of Educational Institutions in Nachole Upazila from 1974 to 2005 (in %)

Changing pattern (Increase/Decrease) = {(Present - Before) x 100}/Before

Sl	Name of Institutions	1974-81	1981-91	1991-01	2001-05	1974-05
1	Govt. Primary School Boys and girls	72.73	36.84	42.31	2.70	245.45
2	Non Govt. Primary School (Boys and Girls)	80.00	50.00	44.44	15.38	350.00
3	Govt. High School (Boys and Girls)	-	-	-	-	-
4	Non Govt. High School (Boys and Girls)	57.14	72.73	63.16	6.45	371.43
5	Govt. College	-	-	-	-	-
6	Non Govt. College	-	100	100	75.00	-
7	Public Library	-	-	-	300	-

Main Data Source: B. B. S., Regional Office, Rajshahi Region, Rajshahi.

Banglapedia, web page, 2005.

Upazila Educational Office, Nachole Upazila, Chapai Nawabgonj and Field Survey'2005.

The educational institutions have been developed much, which has increased the literacy rate in Nachole Upazila. Many people have established educational institutions to remove poverty and for economic development. The educational institutions and literacy rates have been increased during the period 1974 to 2001 much more than before 1974. The literacy rate has been increased in every Union for government initiatives, local people's interest, increased population, achieving better communication and available educational institutions.

On the other hand in Singra Upazila, the total government and non-government primary schools, high schools and colleges were all together only 54 before 1974. There were only 21 government primary schools, 25 non-government primary schools and 7 non-government high schools in 1974 in Singra. But the

total numbers of institutions at present are 247 in 2005 (Banglapedia, 2005). There are 110 government primary schools, 80 non-government primary schools, one government high school, one government college, 11 non-government colleges and one public library in Singra Upazila (Rajshahi Regional Statistic Office; Banglapedia, 2005; Singra Upazila Educational Office, Field Survey'2005).

Table No. 5.17.

Educational Institutions in Singra Upazila from 1974 to 2005

No	Name of Institutions	1974	1981	1991	2001	2005
1	Govt. Primary School Boys and Girls	21	44	86	110	110
2	Non Govt. Primary School Boys and Girls	25	39	59	73	80
3	Govt. High School Boys and Girls	0	0	1	1	1
4	Non Govt. High School Boys and Girls	7	16	24	38	43
5	Govt. College	0	0	1	1	1
6	Non Govt. College	1	1	5	10	11
7	Public Library	0	0	0	1	1

Source: B. B. S., Regional Office, and Rajshahi Region. Rajshahi.
Upazila Educational Office, Singra, Natore.
Banglapedia, 2006 and
Field Survey'2005.

Table No. 5.18.

Changing Pattern of Educational Institutions in Singra Upazila from 1974 to 2005 (in %)

Changing pattern (Increase/Decrease) = {(Present - Before) x 100}/Before

No	Name of Institutions	1974-81	1981-91	1991-01	2001-05	1974-05
1	Govt. Primary School Boys and Girls	72.73	36.84	42.31	2.7	245.45
2	Non Govt. Primary School (Boys and Girls)	80	50	44.44	15.38	360
3	Govt. High School (Boys and Girls)	100	0	0	0	100
4	Non Govt. High School (Boys and Girls)	57.14	72.73	63.16	6.45	371.43
5	Govt. College	-	-	-	-	-
6	Non Govt. College	-	100	100	75	0
7	Public Library	-	-	-	-	100

Main Data Source: B. B. S., Regional Office, Rajshahi Region. Rajshahi.
Upazila Educational Office, Singra Upazila, Natore.
Banglapedia, 2006 and
Field Survey'2005.

Land use for educational institutions' purpose were very little before 1974 but 235.57% was increased within 30 years from 1974 to 2005 (Rajshahi Regional Statistic Office; Banglapedia, 2005; Singra *Upazila* Educational Office Field Survey'2005).

By analyzing educational institution's area location, population etc. it is found that most of the educational institutes in Nachole and Singra *Upazila* were founded here and there and without proper planning. Most of the primary and high schools have been situated in the head quarters of *Union*. Most of the educational institutions have been founded within one km from the *Union* center. The schools are being founded in densely populated area. The schools are little far from the central area of the *Union*. Before 1974 there were a few schools for spares population. The schools of Singra *Upazila* were founded without proper planning. It can be said that before 1974 the educational institutions were founded in a planned way but after that time the educational institutions were not established under proper planning. Most of the schools and colleges are beside commercial or administrative area beside the roads. The Singra Government College is located by the side of a *hat* (village market). It was nationalized in 1985 (Singra *Upazila* statistic office, Natore).

About 80% of the educational institutes have been located around 1 km from *Upazila* head quarters. All the educational institutes of Nachole and Singra *Upazila* were not according to plan and sustainable management. Again though most of the people acting as the authorities of the institutions are very interested in education but they are not much educated. They are been in the committee for political background or for being the rich or the elite. He/she establishes the educational institutions according to the political wish and the wish of their workers or his/her own views. Both Nachole and Singra *Upazila*'s economy is not well enough. Most of the educational institutions have been established in a particular place according to the will of the people, who provide land, building cost, educational accessories cost etc. A very few institutes were formed according to population, distribution of settlement, communicational facilities. Here it may be mentioned that according to King (1968) "every schools, colleges or educational institutions should be founded

according to population distribution and fair location. Two things should have to be kept under consideration to build a school or college. These are the total population of the area and location.”

Industrial and Commercial Area:

The fundamental needs of human being are foods, clothes, shelters, education and treatment. The first, secondary and tertiary needs are related to land. Food comes from land. The crops are grown in the land. And then it is made for use. The secondary need is cloth, which also comes from land. And another most important need is shelter, which is built on land. Actually all needs of human being are related to land. These types of land related activities could be designated as follows:

- a) The primary activities
- b) The Secondary activities and
- c) The Tertiary Activities

The agricultural activities, forest resource related activities, underground mineral resource related activities etc. are primary activities. About 85% people of both Nachole and Singra *Upazila* are related to primary economic activities. Most of the people of the study area depend on agriculture. And agricultural activities also depend on land. Most of the economic activities like business, offices, banks, insurance, professions etc. are related to agriculture. The data of these are as follows:

Table No. 5.19.

Profession of the Family Head in the Study Area.

SI No	Name of Profession	Nachole (%)	Singra (%)
1	Farmers	77.50	68.67
2	Businessman	6.50	15.33
3	Job	5.50	7.33
4	Labors	6.00	5.33
5	Others	4.50	3.33
6	Total	100	100

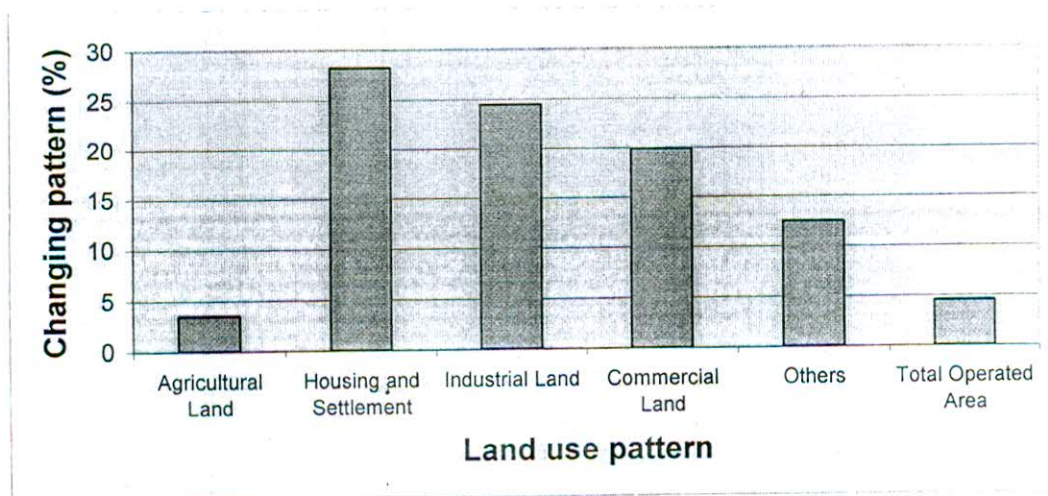
Source: Field Survey'2005.

From the above table, we can say all the economic activities of the research area are related to land. The economic activities are increasing day by day. The land use is also increasing in the research area. The agricultural land is not increasing and economic activities increasing in Nachole and Singra Upazila. The offices, businesses etc. related institutions, small shops, *bazar* (market) and various shops like cloth, stationary, confectionery, medicine etc. are increasing rapidly with increasing population. Furniture, vegetables, fishes meats etc. businesses are also increasing. So the land use is increasing for economic purpose. The changing pattern of land use is as follows (Graph No. 5.8 and Appendices Table No. 5.8)

Graph No. 5.8.

Changing Pattern of Land Use in Nachole Upazila (in %) from 1985-1997
(in %)

Changing pattern (Increase/Decrease) = $\{(Present - Before) \times 100\} / Before$



Main Data Source: Bangladesh Agricultural Census' 1984, 1997 and Upazila Agricultural Office, Nachole Upazila, Chapai Nawabgonj.

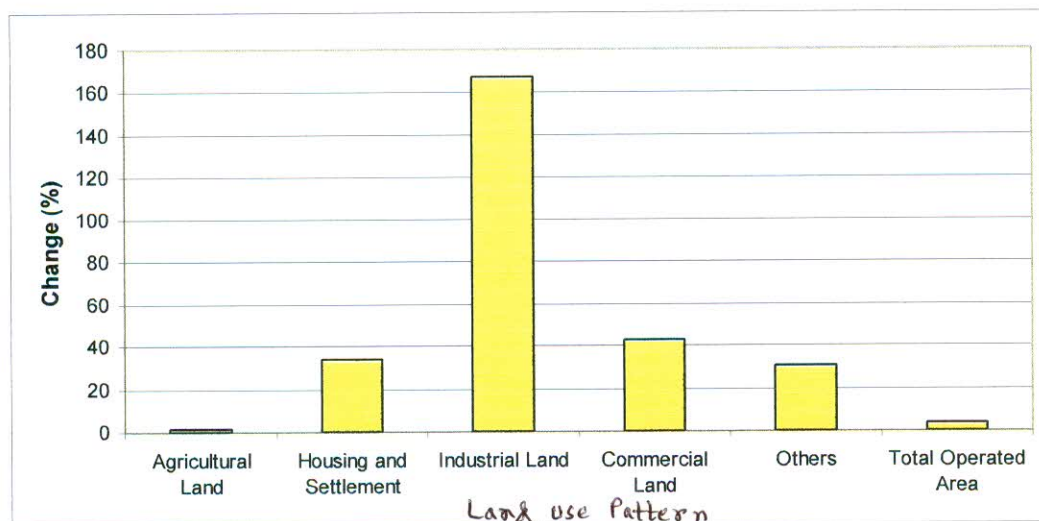
Changing pattern of land uses in Singra *Upazila* is much more diversified and rapid than that of Nachole *Upazila*. The economic activities related to paddy harsh mills and factories, irrigation machineries, agricultural machineries, shops and various business are much more in Singra *Upazila* than those of Nachole. Changing Pattern of Land Use is as follows (Graph No. 5.9 and Appendices Table No. 5.9.)

Graph No. 5.9.

Changing Pattern of Land Use in Singra *Upazila* from 1985 to 1997 (in %)

Changing pattern (Increase/Decrease) = $\{(Present - Before) \times 100\} / \text{Before}$

Main Data Source: Bangladesh Agricultural Census' 1984, 1997 and



Upazila Agricultural Office, Singra Upazila, Natore.

Business activities are better in Singra *Upazila* than Nachole. Because the population is much more than Nachole *Upazila*. *Hat* and *bazaar* (small market) are also better than Nachole *Upazila* for well communication systems, well transport system etc. in Singra *Upazila*. Small markets, industries, factories, cottages etc. purpose land use is much more in Singra *Upazila* than Nachole.

But most of the land use like business institutions, shops, small markets, etc. are not set up properly and not according to sustainable land management. Unplanned land use makes many problems. The settlement in agricultural land

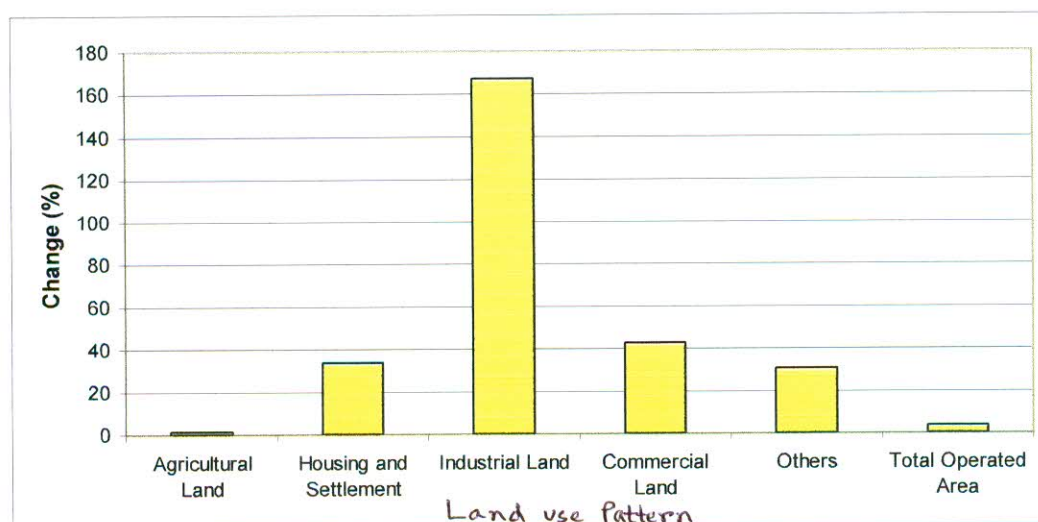
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Graph No. 5.9.

Changing Pattern of Land Use in Singra *Upazila* from 1985 to 1997 (in %)

Changing pattern (Increase/Decrease) = $\{(Present - Before) \times 100\} / \text{Before}$

Main Data Source: Bangladesh Agricultural Census' 1984, 1997 and



Upazila Agricultural Office, Singra Upazila, Natore.

Business activities are better in Singra *Upazila* than Nachole. Because the population is much more than Nachole *Upazila*. *Hat* and *bazaar* (small market) are also better than Nachole *Upazila* for well communication systems, well transport system etc. in Singra *Upazila*. Small markets, industries, factories, cottages etc. purpose land use is much more in Singra *Upazila* than Nachole.

But most of the land use like business institutions, shops, small markets, etc. are not set up properly and not according to sustainable land management. Unplanned land use makes many problems. The settlement in agricultural land

hamper to irrigate and cultivate. Business activities and settlement's waste pollute the air, water and land.

Transport and Communication:

Transport and communication are important to increase the land use. If transport and communication will be enough well, the land use will be increased. It is essential for land development. Economy also depends on communication and transport. So it is also important for land use increasing. The Nachole research area's roads and communications are not well than Singra Upazila. The regional high way is connected to two important districts like Nawabgonj and Rajshahi district. There is railway in Nachole Upazila but not in Singra Upazila. The river way of Singra Upazila is better than Nachole because there are many rivers in Singra Upazila. The data about transport and communication of Nachole Upazila are in the following table.

Table No. 5.20.

Communication Statistics of Nachole Upazila

Name of Communication	1981		1991		2005	
	Amount (km)	% of Total	Amount (km)	% of Total	Amount (km)	% of Total
Rail Way	24	13.26	24	10.00	24	5.78
Pucca Road	12	6.63	18	7.50	27	6.51
Semi Pucca Road	3.5	1.93	4	1.67	7	1.69
Kachha Road	135.5	74.86	190	79.17	355	85.54
River Way	6	3.31	4	1.67	2	0.48
Total	181	100.00	240	100	415	100

Source: Nachole Upazila Statistic Office, Chapai Nawabgonj.

Soil Resource Research Institute, Rajshahi and
Banglapedia, 2005.

Table No. 5.21.

Changing Pattern of Communication Statistics of Nachole Upazila (in %)

Changing pattern (Increase/Decrease) = {(Present - Before) x 100}/Before

Name of Communication	1981-1991	1991-2005	1981-2005
Rail Way	0	0	0
<i>Pucca</i> Road	50	50	50
Semi <i>Pucca</i> Road	14.29	75	75
<i>Kachha</i> Road	40.22	86.84	86.84
River Way	-33.33	-50	-50
Total	32.60	72.92	72.9

Main Data Source: Nachole Upazila Statistic Office, Chapai Nawabgonj.

Soil Resource Research Institute, Rajshahi and

Banglapedia, 2005.

Nachole and Singra Upazila's physiographic condition and communication system are not same. The topography of Nachole Upazila is high but low in Singra Upazila's. Presently there are many rivers in Singra Upazila like Nagor, Tulsi, Baral, Shib etc. and many other rivers have died already. In Nachole Upazila, only the Mahananda river follows in the west of Nachole Upazila. So the river's way of Singra Upazila is much better than Nachole Upazila. The river way of Singra Upazila becomes better in rainy season when floodwater comes in this Upazila. Two area's communication system is increasing with population, economic, agricultural and others development. The communicational statistic of Singra Upazila is as follows (Table No. 5.22).

Table No. 5.22.

Communication Statistics of Singra Upazila

Sl No	Name of Communication	1981		1991		2005	
		Amount (km)	% of Total	Amount (km)	% of Total	Amount (km)	% of Total
1	Rail Way	0	-	0	-	0	-
2	<i>Pucca</i> Road	31.5	39	50.69	25	73.41	8.69
3	Semi <i>Pucca</i> Road	22.5	6.71	42.66	6.10	72.9	8.63
4	<i>Kachha</i> Road	235.5	0.19	560.29	0.08	659.05	78.05
5	River Way	46	3.71	46	6.57	39.02	4.62
	Total	335.5	0.00	699.64	100	844.38	100

Source: *Upazila* Statistics Office, Singra *Upazila*, Natore.

Soil Resource Research Institute, Rajshahi and

Banglapedia, 2005.

Table No. 5.23.

Changing Pattern of Communication Statistics of Singra Upazila (in %)

Changing pattern (Increase/Decrease) = {(Present - Before) x 100}/Before

Name of Communication	1981-1991	1991-2005	1981-2005
Rail Way	-	-	-
<i>Pucca</i> Road	60.92	44.82	133.05
Semi <i>Pucca</i> Road	89.60	70.89	224.00
<i>Kachha</i> Road	137.92	17.63	179.85
River Way	-	-15.17	-15.17
Total	108.54	20.69	151.68

Main Data Source: *Upazila* Statistics Office, Singra *Upazila*, Natore.

Soil Resource Research Institute, Rajshahi and

Banglapedia, 2005.

Transport and communication system is such media, which help to develop land use density. Economical, social, cultural and all types of activities development depend on communication and transport. And the changing ratio of transport and communication of Singra *Upazila* is much higher than that of Nachole. From 1981 to till 2005 all types of communication system has been increased. It is clear that the transport and communication system is increasing in Singra *Upazila*.

But unplanned roads and high ways make many problems. The rivers of Singra *Upazila* have been filled with silt and sand. The rivers have lost its depth. So the river way is decreasing in Singra *Upazila*. The roads and high ways are not built properly in the two *Upazilas*.

After 1980, the land use has been increased in educational, health, cultural, business and transport sector. Different types of infrastructure like settlements, offices, parks, theaters, small industries and factories, post offices, telephone offices etc. are increasing rapidly.

There are one *Upazila* health complex, two cinema halls, 357 mosques and four temples in Nachole *Upazila* (Regional statistics office, Rajshahi; Banglapedia, 2005 and Field Survey, 2005).

On the other hand in Singra *Upazila*, one *Upazila* health complex, four cinema halls, 417 mosques, 75 temples and two churches (Regional statistics office, Rajshahi; Banglapedia, 2005 and Field Survey, 2005).

Some villages of Nachole and Singra *Upazila* have been selected to discuss the land use-changing pattern. The land use changing patterns of some *Mouza* of

both *Upazilas* are as follows (Table No. 5.24. and Appendices table No. 26 to 31):

Table No. 5.24.

Land use changing pattern of some selected *Mouza* of Nachole and Singra *Upazila* from 1976 to 2006 (in %)

Changing pattern (Increase/Decrease) = {(Present - Before) x 100}/Before

Land use pattern	Nachole <i>Upazila</i>			Singra <i>Upazila</i>		
	Bhujail <i>Mouza</i>	Zotamati <i>Mouza</i>	Bhatsa <i>Mouza</i>	Katuabari <i>Mouza</i>	Basta <i>Mouza</i>	Debatra Sarabari
Settlement	115.56	95.24	161.46	154.93	180.73	138.46
Roads	66.67	68.80	60.43	52.88	111.86	65.22
Graveyards and others	145.08	138.46	142.11	61.82	5.3	-
Commercial/Orchard	148.42	110.86	176.79	-50.59	-	-56.06
Triple Cropped Area	36.92	68.97	117.52	102.00	70.20	-
Double Cropped Area	117.99	62.22	15.63	146.11	601.70	674.7
Single Cropped Area	-75.04	-64.78	-66.48	-60.94	-72.86	-77.07
Cultivable Waste	-23.02	-23.53	-18.17	-51.72	-27.25	-58.18
Water-bodies	-41.38	-66.67	-77.25	-37.41	-61.86	-72.00
<i>Khas</i> Land	-87.47	-64.46	-75.94	-23.83	-75.81	-12.82

Source: Field Survey'2006.

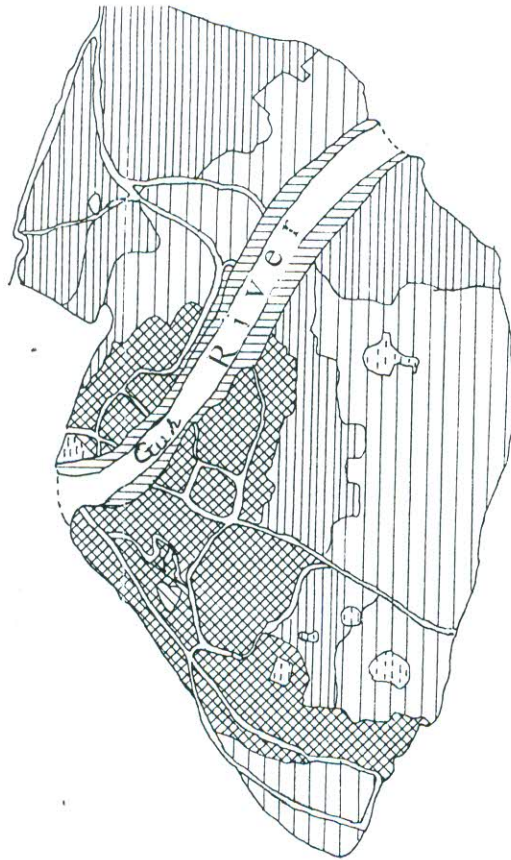
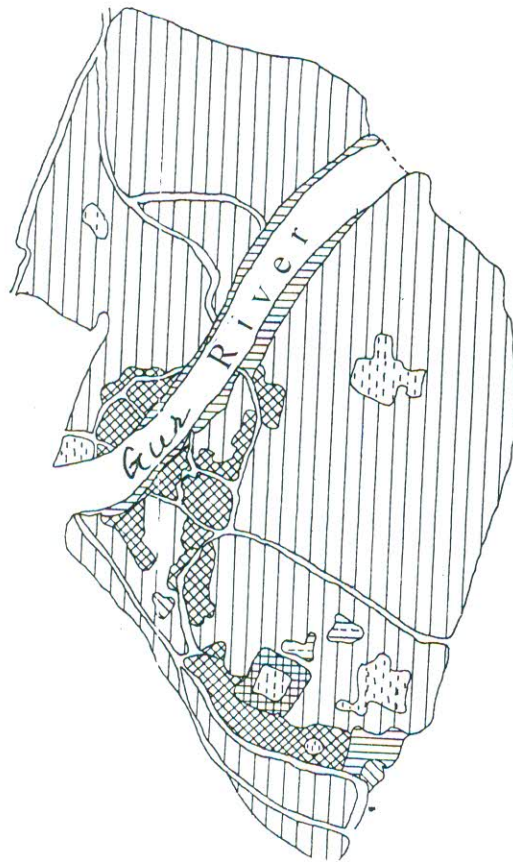
The above table (Appendices Table No. 26 to 31) is showing that the housing and settlement have been increased in Bhujail, Zotamati and Bhatsa *Mouza* of Nachole *Upazila* respectively 115.56%, 95.24% and 161.46% and in Katuabari, Basta and Debatra Sarabari *Mouza* of Singra *Upazila* respectively 154.93%, 180.73% and 138.46% from 1976 to 2006. Roads have been increased in Bhujail, Zotamati, Bhatsa, Katuabari, Basta and Debatra Sarabari *Mouza* of Nachole and Singra *Upazila* respectively 66.67%, 68.80%, 60.43%, 52.88%, 111.86% and 65.22% in between 1976 to 2006. These *Mouzas*'s land use pattern maps (Map No. 33 to 38) were given on different page.

Land Use Pattern 1976

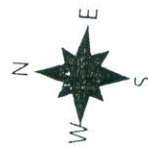
Katuabari, Singra Upazila

Land Use Pattern 2006

Katuabari, Singra Upazila



Legend	
Settlement	Double Cropped Area
Roads	Single Cropped Area
Graveyards and others	Cultivable Waste
Orchards Area	Water Bodies
Triple Cropped Area	Khias Land



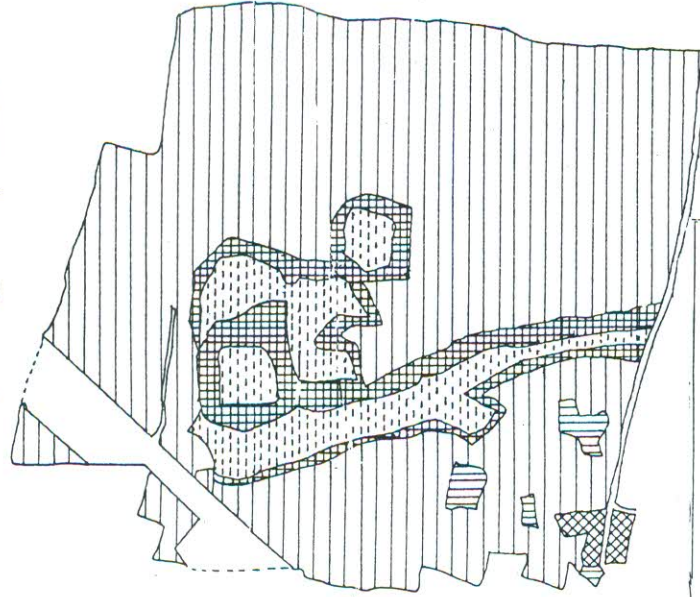
500 FEET

Source: Field Survey 2006

Map No. 36

Land Use Pattern 1976

Basta, Singra Upazila



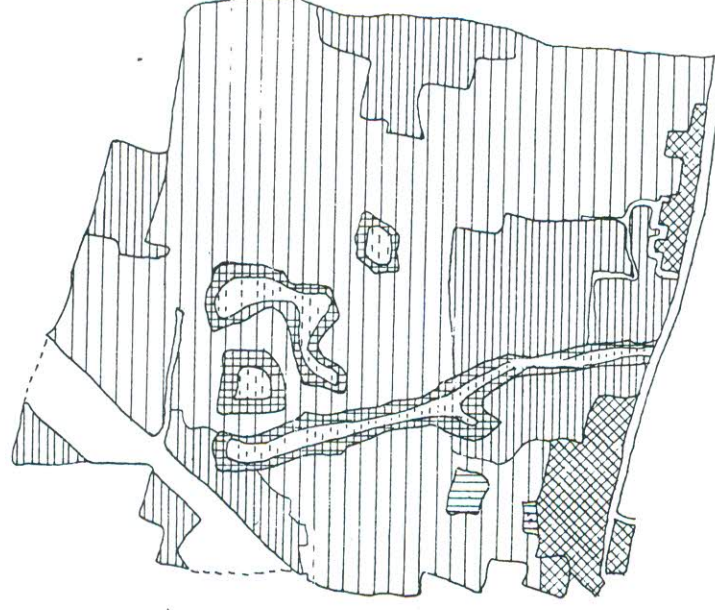
Legend	
Settlement	Double Cropped Area
Roads	Single Cropped Area
Graveyards and others	Cultivable Waste
Commercial Area	Water Bodies
Triple Cropped Area	Khas Land

2 400 FEET



Land Use Pattern 2006

Basta, Singra Upazila



Source: Field Survey' 2006

Map No. 37

Land Use Pattern 1976

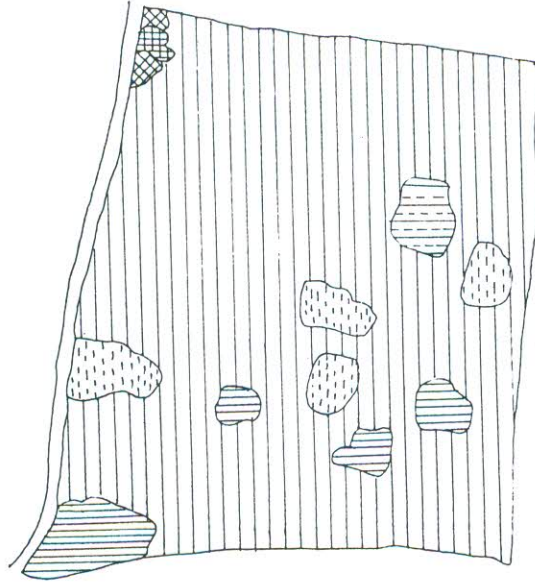
Debatra Sarabari, Singra Upazila



Legend	
	Settlement
	Roads
	Graveyards and others
	Orchards Area
	Triple Cropped Area
	Double Cropped Area
	Single Cropped Area
	Cultivable Waste
	Water Bodies
	Khas Land

Land Use Pattern 2006

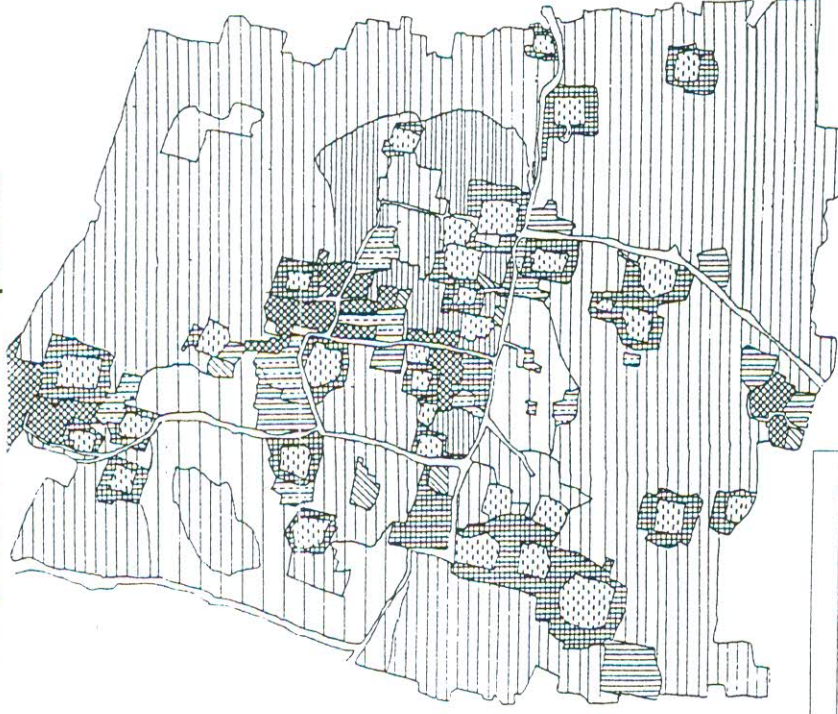
Debatra Sarabari, Singra Upazila



0 330 FEET

Land Use Pattern 1976

Bhujail, Nachole Upazila



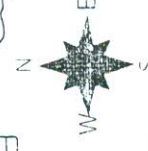
Legend	
	Settlement
	Roads
	Grassy fields and others
	Commercial Area
	Triple Cropped Area
	Double Cropped Area
	Single Cropped Area
	Cultivable Waste
	Water Bodies
	Forest Land

Land Use Pattern 2006

Bhujail, Nachole Upazila



330 feet

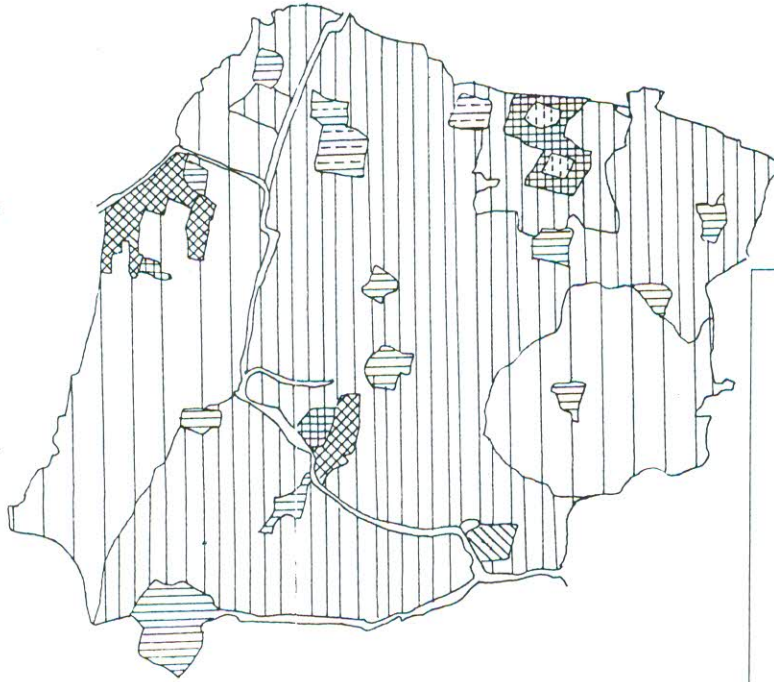


Source: Field Survey 2006

Map No. 39

Land Use Pattern 1976

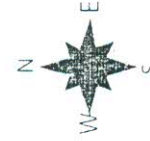
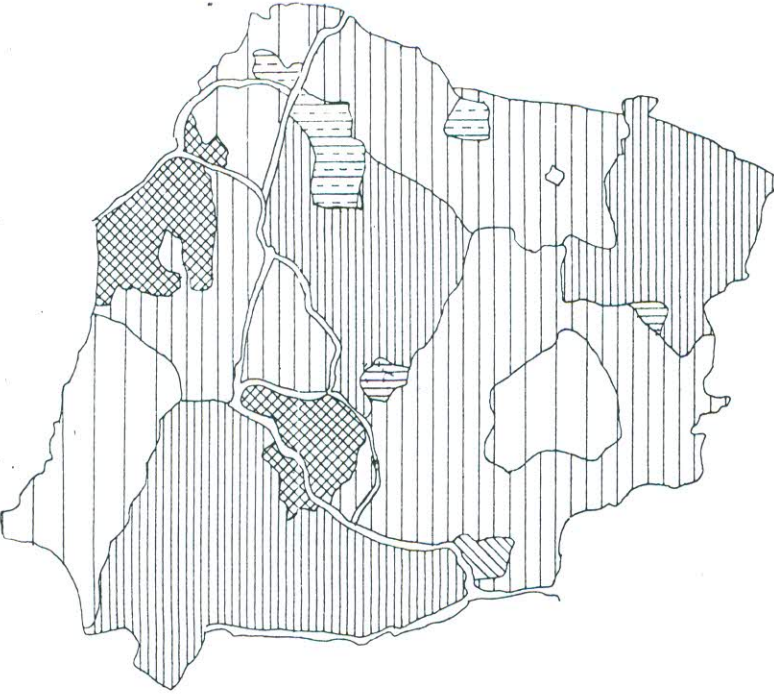
Zotamati, Nachole Upazila



Legend		
Settlement		Double Cropped Area
Roads		Single Cropped Area
Graveyards and others		Cultivable Waste
Commercial Area		Water Bodies
Triple Cropped Area		Khas Land

Land Use Pattern 2006

Zotamati, Nachole Upazila



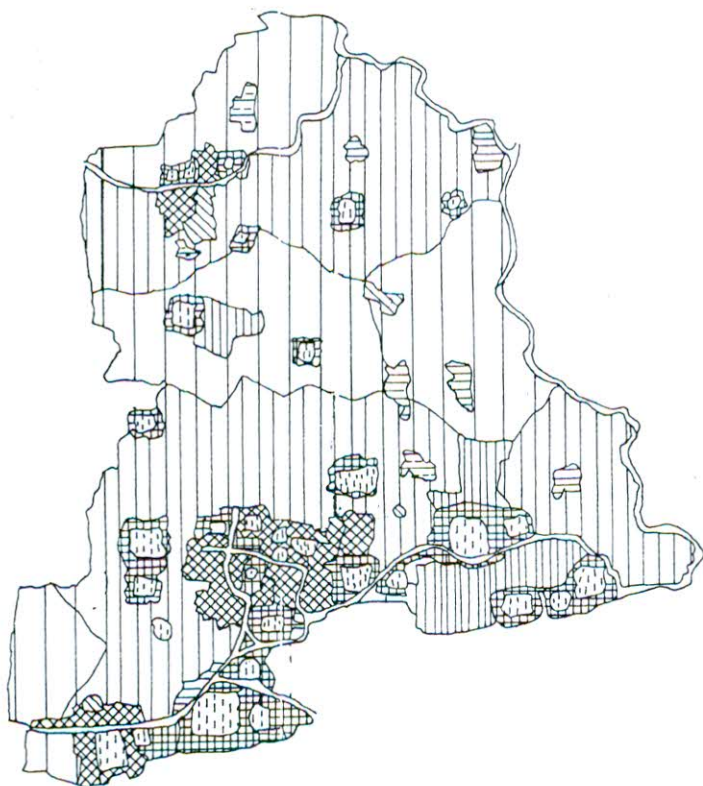
0 330 Feet

Source: Field Survey 2006

Map No. 0040

Land Use Pattern 1976

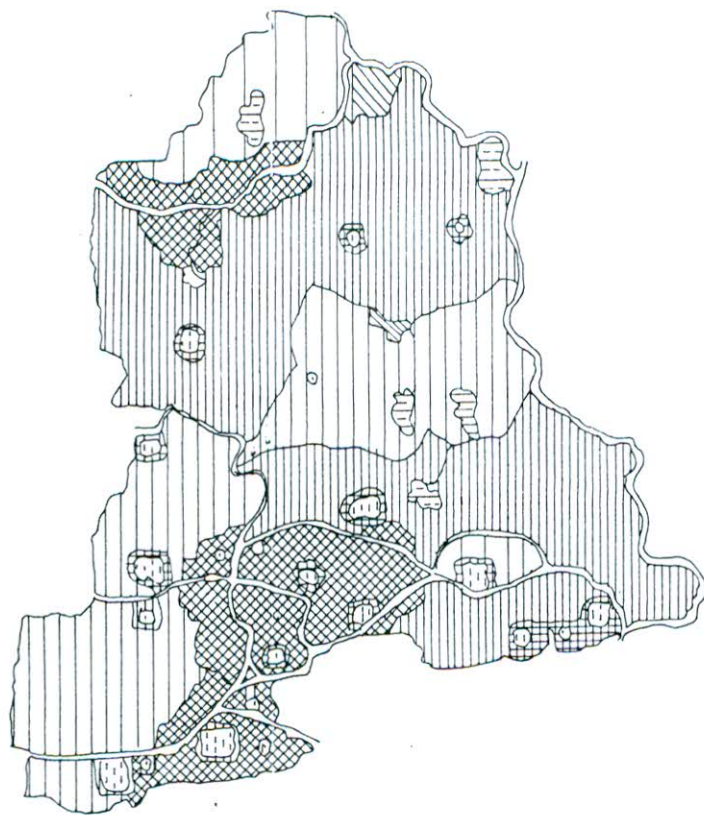
Bhatsa, Nachole Upazila



Legend	
	Settlement
	Roads
	Graveyards and others
	Commercial Area
	Triple Cropped Area
	Double Cropped Area
	Single Cropped Area
	Cultivable Waste
	Water Body
	Khas Land

Land Use Pattern 2006

Bhatsa, Nachole Upazila



600 FEET

Source: Field Survey 2006

Map No. 0041

The Grave yards and others have been also increased in same area respectively 145.08%, 138.46 %, 142.11%, 61.82%, 5.3% and 0% from 1976 to 2006. Grave yards and others have not been changed in Basta and Debatra Sarabari Mouza because these areas are mainly wetland and it is much smaller area than others but the land has been used much rapidly for agricultural purpose and that's why wetlands have been decreased rapidly. About 72% wetlands have been decreased in Basta Mouza from 1976 to 2006.

Various shops, offices, Banks, insurance, small markets etc. have been increased in Bhujail, Zotamati and Bhatsa Mouza of Nachole Upazila respectively 148.42%, 110.86% and 176.79% from 1976 to 2006. And in Katuabari and Debtra Sarabari Mouza of Singra Upazila various trees, garden and orchards have decreased respectively 50.59% and 56.06% in between 1976 to 2006. Various trees, garden and orchards have not been changed in Basta Mouza from 1976 to 2006 because this Mouza is under the *beel* area and this area is little than any other areas of Singra Upazila. So these types data have not been presented in the table No. 5.24. The lands have been used much for agricultural purpose. So rives, canals, *beels*, ponds, lakes etc. wetlands have been decreased in Bhujail, Zotamati, Bhatsa, Katuabari, Basta and Debtara Sarabari Mouza of Nachole and Singra Upazila respectively 41.38%, 66.67%, 77.25%, 37.41%, 61.86% and 72% from 1976 to 2006. *Khas* lands also have been decreased in Bhujail, Zotamati, Bhatsa, Katuabari, Basta and Debatra Sarabari Mouza of Nachole and Singra Upazila from 1976 to 2006 respectively 87.47%, 64.46%, 75.94%, 23.83%, 75.81% and 12.82% for improper distribution, illegal occupation, corruption, want of education, lack in procedures, improper implimentation of rules and regulations etc.

Single cropped area, cultivable wastes etc. have been decreased for various reasons and these reasons are as follows:

- i) Improper land management
- ii) Want of proper planning for land management
- iii) Lack in implementation of procedures
- iv) Want of proper knowledge about land and agriculture

- v) Want of proper training about land and agriculture
- vi) Want of proper education about soil
- vii) Economic problems
- viii) Increasing population
- ix) Corruption in laws enforcement institutions
- x) Want of regular and proper survey and research of land
- xi) Improper distribution of *khas* lands
- xii) Turning agricultural land into non agricultural land

Besides the above mentioned points improper and unplanned land use are increasing rapidly. If this condition is running on then a great problem will be arisen in near future.

From the above discussion it has been proven that the land use is being changed negatively. Some one-crop producing lands have been turned in to two crops, tow crops producing land in to three crops producing. The settlement, commercial and others area are also being used due to increasing population and lack in management. Actually there is no planning for the land management. As a result the land is being changed improperly.

The land use change is very important to land degradation. In this period the roads has been increased. And the water bodies, cultivable waste and single cropped land have been decreased. But these things are very important to sustain the land.

Therefore, we can say from the above discussions that the land use is increasing improperly and creating land degradation for improper implementation of government policies and lack of laws.

CHAPTER SIX

**Case Study: Wetland Environment and Land
Use Change of Chalan *Beel* Area**

6.1.1. Area and location:

The Chalan *beel* has been selected as a wetland to conduct this research. The Chalan *beel* extends over four adjacent districts-Rajshahi, Pabna, Sirajganj and Natore. The major parts of it cover an extensive area of Raiganj *Upazila* of Sirajganj district and Chatmohar *Upazila* of Pabna district. It lies between Singra *Upazila* (Natore district) and the north bank of the river Gumani. The southeastern extremity of the *beel* is at Astamanisha in Pabna district, close to Nunnagar, where the Gumani and the baral meet. Its northern boundary in this district may be marked by a line drawn from the east of Singra to the Bhadai river, which forms the boundary between Rajshahi, Pabna and Bogra. The eastern boundary may be represented by a line drawn north-south in Pabna and running through Tarash *Upazila* to the east of the Bhadai. The greatest breadth of the *beel* is about 13 km from Tarash at the northeast to Narayanpur, near the north bank of the Gumani. Its greatest length is about 24 km from Singra to Kachhikata on the Gumani. The total area of Chalan *beel* is 368 square km (Banglapedia, 2005). The Chalan *beel* is very essential to maintain the balance of environment and biodiversity. The research area of Singra is one of the important parts of Chalan *beel*.

Singra *Upazila* is located between 24°.24' to 24°.41' North Latitude and 89°.01' to 89°.20' East Longitude. The total area of Singra *Upazila* is about 528.46 square km, wetland is 2.5 square km and river is 4.4 square km (Land and soil resource development indicator of Singra *Upazila*, 1997). Singra *Upazila* head quarters is the most important among 12 *Unions*.

6.1.2. Topography:

There are three types of topography of Chalan *beel* area and these are as follows:

- ✧ The Barind area
- ✧ The lower Atrai *beel* area and
- ✧ The Gangatic silt area

6.1.2.1. The Barind area:

This area named as the Barind area for being little higher than other area of wetland. This area is formed in the ancient times. This area is flooded in the rainy reason. The total area is 28,368 hectors (Land and soil resource development indicator of Singra *Upazila*, 1997).

6.1.2.2. The lower Atrai *beel* area:

The Padma has changed much of the topography. Many topographical changes have been taken place in the way of movement of river and it has created many new *Char* land (Mamjumdar, 1971).

Some part of this riverside is little lower than other area. So it is called Atrai *beel* area. This area is little lower than other plain area. The high and low floods are occurred in this area in rainy season. The total area is 47408.15 hector, which is 89.71% of total land of Singra *Upazila*. All area is under cultivation but the lower land goes under floodwater for 3 to 4 months in the rainy season (Land and soil resource development indicator of Singra *Upazila*, 1997).

6.1.2.3. The Gangatic silt area:

Some small parts of Singra *Upazila* are under the Gangatic area. As it is formed with heavy silt so it is called Gangatic silt area. The high and low floods are occurred over the area in rainy season. Its total area is 2853.68 hector, which is 5.40% of Singra *Upazila* (Land and soil resource development indicator of Singra *Upazila*, 1997).

6.2. Wetland environment:

Wetland low-lying ecosystem where the groundwater is always at or near the surface. It includes areas of marsh, fen, bog, floodplain and shallow coastal area. Bangladesh possesses enormous area of wetlands including rivers and streams, freshwater lakes and marshes, haors, baors, *beels*, water storage reservoirs, fish ponds, flooded cultivated fields and estuarine systems with extensive mangrove swamps.

Chalan *beel* one of the largest inland depressions of marshy character and also one of the richest wetland areas of Bangladesh. It is the largest *beel* of the country and comprises a series of depressions interconnected by various channels to form more or less one continuous sheet of water in the rainy season when it covers an area of about 368 sq km. The formation of the Chalan *beel* is historically linked with the demise of the Atrai and the Baral. The Atrai or the Gur was the principal feeder channel of Chalan *beel*, which used to drain the districts of Dinajpur and northern Rajshahi. The Baral worked as an outlet of the *beel* and eventually found its way into the Jamuna. It was about 1,088 sq km in area at the time it was formed.

The southern edge of the *beel* is skirted by the Gumani, which carries the water of the *beel* into Bara *beel*, which in turn carries the water into the Jamuna. During the rainy season the Gumani overflows its banks and pours its water into the *beel*.

Chalan *beel* is rapidly silting up. During the last century and a half, it has shrunk at least 19.32 km from the southern side due to annual deposits of silt from the Ganges. Its other feeder rivers like the Gur and the Baral are also major contributory factors in reducing the size of the *beel*.

A survey carried out in 1909 by the Public Works Department into drainage and silting up of the *beel* found that the previous area of about 1,088 sq km have been reduced to about 368 sq km. The remaining area had been reclaimed either for cultivation or settlement. Even in this reduced area, only 86 sq km was found under water all the year round. It was estimated that the feeder rivers had brought 6.3 million cu m of silt a year of which 1.5 million cu m were washed away by different drainage channels coming out of the *beel*. The remaining 4.8 million cu m had been deposited annually. If distributed uniformly over the whole of 368 sq km, it would have raised the level at the rate of 1.27 cm a year. Another inquiry was made in 1910 to further ascertain the condition of the *beel* during the dry season. It too found that the area had been further reduced. A third investigation carried out in 1913, ascertained that only 31 to 39 sq km remained under water throughout the year. The banks around the core area were under cultivation and the *beel* proper had 2.75 to 5.49m of water in April. In the 1950s, various reclamation works reduced the *beel* to about 25.9 sq km. In 1987, it appeared completely dry except for some small man-made ponds.

Land in Chalan *beel* is being reclaimed and new villages are springing up alongside. In the dry season, all the smaller and larger *beels* dry up except their deeper centre. The outlying marginal lands are cultivated with boro and HYV (High Yield Variety) rice in the dry season. In the wet season, the shallow peripheries are cultivated for deep-water *aman* rice and jute. (Alam and Hossain, 2005)

Wetlands have a wide range of ecological, socio-cultural, economic and commercial importance. These are important habitats of Chalan *beel* area are being destroyed such as kalmi (*Ipomoea aquatica*), helencha (*Enhydra flactuans*), Hijal (*Barringtonia acutangula*), Jaldumur (*Ficus sp.*), thankuni (*Centella asiatica*). Chalan *beel* was an important source of employment in the fishery sector and a supply source of animal

protein but now it is being degraded due to agriculture practice in the beel area.

Many species of freshwater fish exist in Chalan *beel* area. Chalan *beel* is subject to sedimentation composed of clay soils rich in organic matter, and crops, which can tolerate waterlogging, and inundation cover the vast flood.

Over the last three decades, massive physical infrastructures in the form of rural road and flood embankment have been developed in Chalan *beel* area. Many of these infrastructures disregarded natural water flow direction, which has often resulted in poor drainage. Human interference in the wetland area of Chalan *beel* has been damaging the fragile ecosystem and to long term sustainability of the wetlands. This cultural practice was established for centuries. However, in the last two decades this has been abandoned for more agriculture practice. As a result, local ecosystems are threatened because of changed water exchange system and rapid siltation of the channels.

In the chalan *beel* areas, largescale settlement was initiated at the mid-20th century from surrounding densely populated regions and since then the resources of the chalan *beel* are being exploited at an increasing rate causing adverse effects. Continuous largescale exploitation of aquatic vegetation and fruits like *Makna* (*Euryale ferox*), *Singara* (*Trapa bispinosa*), Lotus, Lily, *Hogla* (*Typha elephantina*) has caused serious degradation of the quantity and quality of the habitat required for fish and migratory birds of the chalan *beel* area. Similarly, embankment constructions reduce and obstruct fish movement and migration from rivers. As a result, many fishermen have lost their livelihood.

There have been some positive effects of wetland transformation as well. The major impact has been on cropping patterns and intensity. Dependence on local boro has been shifted towards HYV boro and Bona Aman paddy. The positive impact of development projects in the wetlands relates to improved road transport and communication network. This has led to an enhanced marketing infrastructure and relatively easy access to social and other services.

As a whole, degradation of Chalan *beel* has caused several problems including extinction and reduction of ecosystem, loss of many indigenous aquatic plants, herbs, shrubs and weeds, loss of natural soil nutrients, loss of natural water reservoirs and of their resultant benefits, increase in the occurrence of flooding and degeneration of wetland based ecosystems. Wetlands are dynamic ecosystems, which change over a long time.

6.3. The landuse pattern and its change:

Singra Upazila is mainly a wetland area of Chalan beel. General landuse pattern and its change has been described in Chapter five. Now the discussion of agricultural landuse pattern and its changes' discussion have been added here. Most of the Chalan beel area is now under cultivation. Excess practice of agriculture is changing the landuse pattern. The different types of crops like paddy, wheat and watermelon are being cultivated in this area. Sometimes Bona *Aman* paddy is cultivated when floodwater comes in the *beel* in the rainy season. The total cultivable land is 120168 square acres (Annual agricultural report of Singra Upazila, 2005).

Table: 6.1.

Basic Agricultural information of the study Upazila (in Acre)

Sl No	Description	Singra Upazila	
		Total amount (in Acre)	Percentages (%)
1	Total area	1,30,589.00	100
2	Net cultivated area	1,20,168.00	92.02
3	One crops land	32,986.80	25.26
4	Two crops land	62,970.00	48.22
5	Three crops land	12,079.50	9.25
6	Total crops land	1,89,354.00	145
7	Crops density	173%	173
8	Landuse density	72.62%	72.62

Source: Annual Agricultural Report of Singra Upazila' 2005 and Field Survey'2005.

One cropland is 25.26% and two-cropped land is 62,970.00 acre, which are 48.22% of the total land. While 86.77% land was used for agricultural purpose in 1985, but 92.02% land was used for agricultural purpose in 2005 (Agricultural census, 1986; 1996). So agricultural landuse is increasing, the land of Upazila center is increasing mostly for non-agricultural purpose. But density of crop is increasing, cultivation is also increasing in Singra Upazila area to meet up the demand of food for the people. So with the density of cultivation, the land doesn't have interval in between two

crops. As a result the land is losing its fertility. The net cultivated area and changing pattern of net cultivated area in Singra Upazila from 1985 to 2005 is as follows.

Table No: 6.2.

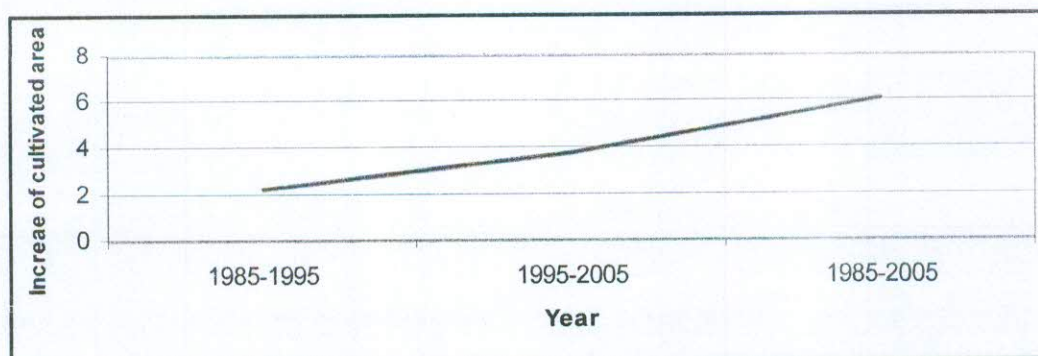
Net Cultivated area of Singra Upazila (in Acre) from 1985 to 2005:

Year	Total area	Net cultivated area	Percentages (%)
1985	130589	113,312	86.7699
1995	130589	115,807	88.6805
2005	130589	120,168	92.02

Source: Upazila Agricultural Office, Singra, Natore and
Field Survey' 2005

Graph No: 6.1.

Changing pattern of net cultivated area in Singra Upazila from 1985 to 1997



Source: Agricultural Census, 1986, 1997

Upazila Agricultural Office, Singra Upazila, Natore and
Field Survey' 2005.

Above Graph (Graph No. 6.1) shows that the landuse for cultivation in Singra has been increased to 2.2% in 1995. The cultivable landuse has been increased to 3.77% from 1995 to 2005 and it has been increased to 6.05% from 1985 to 2005 (Agricultural Census, 1986; 1996 and Field survey, 2005). So the landuse for agriculture is increasing for increase of population. So the density of crops is also increasing. The landuse (in hector) for different crops in different years is given in table: 6.3.

Table: 6.3.

The landuse for different crops in different years (in hector):

No.	Crops	2005-06	04-05	03-04	02-03	01-02	00-01	99-00	98-99
1	<i>Ropa Aman</i>	32300	32300	33100	-	32150	31000	30150	29500
2	<i>Aus</i>	3300	4150	3160	2860	3600	2860	2170	1934
3	<i>Bona Aman</i>	10100	10400	11150	9150	11000	9150	10830	10950
4	Mastered	1900	2000	1650	1800	2300	0	-	1550
5	Wheat	2250	2300	1895	1610	2000	0	-	1670
6	<i>Boro</i>	31500	32100	32000	32100	32050	31310	30930	30660

Source: Singra Upazila Agricultural Office, Natore.

One cropland has been turned into two crops land, two crops land has been turned into three. The above table shows that the maximum land is using for paddy cultivation. The excess cultivation makes land degradation. One crop is sustainable in Chalan *beel* area. It is not sustainable to cultivate many crops in Chalan *beel* area. Excess cultivation in land decreases soil fertility. During the rainy season there remains water in the *beel* area. When the *beel* area is remaining under floodwater then the silt and sand deposition occurs. Even floodwater causes damages to the crops. These types of landuse-changing causes land degradation. Crops pattern of Singra Upazila is as follows (Table No. 6.4.)

Table: 6.4.

The crop's pattern of Singra Upazila

No	Number of Crops	Crop's Pattern	Amount of Land (Acre)	Percent (%)
1	Three Crops	Mastered-Boro-Bona Aman	2,403.36	2
2	Three Crops	Wheat-till-Ropa Aman	1,201.68	1
3	Three Crops	Mastered-til-Ropa Aman	1,201.68	1
4	Three Crops	Wheat-Mug-Ropa Aman	1,802.52	1.5
5	Two Crops	Boro-Bona Aman-0	42,058.80	35
6	Two Crops	Mastered-Boro-0	6,008.40	5
7	Two Crops	Khesary-Boan Aman-0	4,806.72	4
8	Two Crops	Wheat-Bona Aman-0	2,403.36	2
9	Two Crops	Melon-Ropa Aman-0	1,802.52	1.5
10	Two Crops	Mastered- Bona Aman-0	1,201.68	1
11	Two Crops	Melon-Bona Aman-0	1,201.68	1
12	Two Crops	Karla-Ropa Aman-0	1,201.68	1
13	Two Crops	Mastered-Bona Aman-0	1,201.68	1
14	Two Crops	Badam-Bona Aman-0	1,201.68	1
15	Two Crops	Vegetable- Vegetable-0	3,605.04	3
16	One Crop	Boro-0-0	42,058.80	35
17		Others	4,806.72	4
Total =			120,168.00	100

Source: Annual Agricultural Report of Singra Upazila, 2005.

The crop density is increasing for increasing population and economic needs; above table shows that paddy is cultivated mostly in the agricultural land. Another crops should be planted after paddy cultivation. Before using of chemical fertilizer the peasants cultivate various crops after paddy cultivation in agricultural land to increase soil fertility, which caused no harm of the land. But repeated paddy cultivation is decreasing its fertility. As a result the land is losing its fertility.

6.3.1. Use of chemical fertilizer:

A part of land of Singra Upazila is being used for settlements and non-agricultural purpose, so landuse of Upazila center is not as in the rural areas. The main reason is enhanced of population. Agricultural activities have been developed in wetland area. Therefore, the landuse for agriculture has been developed in rural area and non-agricultural landuse has been developed in Upazila center. The population is increasing but not agricultural land. So the farmers are using chemical fertilizers to meet the demand of food for excess population and to take economic benefit from the land. The peasants are using chemical fertilizers and insecticides to increase production. Excess use of chemical fertilizer declines soil fertility. The data of chemical fertilizer use in Singra Upazila is as below (Table: 6.5):

Table: 6.5.

Net Fertilized area of cultivated area in Singra Upazila:

Year	Net cultivable land	Net fertilized area	
		Total	Percentages (%)
1985	113,312	37959.5	33.5
1995	115,807	75981	65.61
2005	120,168	110518	91.9696

Source: Upazila Agricultural Office, Singra Upazila, Natore and
Field Survey' 2005.

Table: 6.6.

Changing pattern of chemical fertilizer use in Singra Upazila (%)

No	Item of changing or increasing	1985-1995	1995-2005	1985-2005
1	Net Chemical fertilized area	100.16	45.45	191.15

Source: Upazila Agricultural Office, Singra Upazila, Natore and
Field Survey' 2005

Chemical fertilizer use in agricultural land was started in 19th century. The people are using chemical fertilizer to produce many crops to fulfill their daily needs. Now the quantity of chemical fertilizer is much more than before when it was started. Now the peasants use much chemical fertilizer for more production. The chemical fertilizers and insecticides mix with water of ponds, *beel*, lake and it pollutes water. So the sufferings are much for excess use of chemical fertilizers and insecticides.

Use of Chemical fertilizer decreases the soil fertility. That's why chemical fertilizer is not favorable for land to hold fertility. Increasing trend of using chemical fertilizer in agricultural land is noted in table: 6.7.

Table: 6.7.

Consumption of fertilizer in Singra Upazila from 1985 to 2005 (per hector in quintal):

Year	Compost		Chemical		Grand total	
	Total	% of total	Total	% of total	Total	Percent (%)
1985	14.28	65.56%	7.5	34.44%	21.78	100%
1995	6.31	17.75%	29.23	82.25%	35.54	100%
2005	2.59	3.09%	81.2	96.91%	83.79	100%

Source: Agriculture Census, 1986, 1998

*Upazila Agriculture Office, Singra Upazila, Natore and
Field Survey'2006.*

The economic condition of the research field of Singra is not well enough. The knowledge about bad effect of chemical fertilizer and insecticides are poor. The knowledge of the peasants about the nature of land is not sufficient. So the chemical fertilizer use is increasing vastly instead of natural fertilizer most particularly for not having proper planning and procedures.

6.3.2. Irrigation:

Irrigation is increasing in Chalan *beel* area. The cultivable land is 120168 acre, which is about 92.02% of total land of Singra Upazila. About 110915.10 acre of cultivable land (about 92.3% of total cultivable land) is under irrigation (Singra Upazila agricultural office, Natore).

Recently mechanical instruments are being used in agriculture. Some modern irrigation tools are being used in the agricultural land. A remarkable quantity of irrigation tools is being used in agricultural land and the different methods of irrigation are being used in Singra Upazila. These data from 1997 to 2004 has been shown below (Table: 6.8).

Table: 6.8.

Irrigation area by means of different method in Singra Upazila, (in Hectares)

No	Method of irrigation	2003-2004	2002-2003	2001-2002	2000-2001	1999-2000	1998-1999	1997-1998
1	Deep Tube-well (Electric)	22	18	15	11	12	12	10
2	Deep Tube-well (Diesel)	1	0	2	0	0	0	0
3	Low Lift Power Pump (Electric)	33	33	31	33	33	36	33
4	Low Lift Power Pump (Diesel)	2	2	1	5	4	4	3
5	Shallow Tube well (Electric)	1240	766	727	859	636	0	0
6	Shallow Tube well (Diesel)	11875	12347	12438	12242	12913	12541	12461
	Total	13173	13166	13214	13150	13598	12593	12507

Source: Upazila Agricultural Office, Singra Upazila, Natore.

There were lots of ponds, rivers, canals in Singra Upazila, which help to irrigate the agricultural land. Many rivers and canals are being blocked up for lack of proper management and procedures. For building dams and bridges over river, the agricultural lands do not get enough water for irrigation from rivers, canals, lakes, *bee*. The underground water is being used much in irrigation. As a result underground water is decreasing and the environment is being polluted. The cultivated and irrigated areas are as follows:

Table: 6.9.

Irrigated area of Singra Upazila (in Acre):

Year	Cultivated Area	Irrigated Area	Percentage of Cultivated Area (%)
1985	113,312	40628.8	33.81
1995	115,807	92685.58	77.13
2005	120,168	110915.1	92.3

Source: Upazila Agricultural Office, Singra Upazila, Natore and Field Survey, 2005

Table: 6.10.

Changing pattern of irrigated area in Singra Upazila:

Item of changing or increasing	1985-1995	1995-2005	1985-2005
Net Irrigated Land	128.13	19.67	173.00

Source: *Upazila Agricultural Office, Singra Upazila, Natore and Field Survey, 2005*

The above table shows that the irrigated areas are increasing. Irrigation in agricultural land has enough advantages but its negative impacts are also polluting the environment and soil. Excessive lifting of water from underground decrease water reserve. The underground water use is increasing day by day in Chalan *beel* area. Underground water use is increasing for the lack of proper management of river and unplanned use of land. There are iron and arsenic in underground water, which decline soil fertility.

6.3.3. Types of fertility:

Rich silt deposition on topsoil for the flows of floodwater over the Chalan *beel* is well for soil fertility. About 6% land is very fertile and 27.33% land is normal fertile. There are many impacts from excess sand deposition on land along with siltation which causes land degradation. The land degradation is occurring for improper landuse, poor economy, lack of knowledge, lack of procedures, over population. The type of soil fertility of Singra *Upazila* is as follows (Table No. 6.11).

Table: 6.11.

Types of fertility in Singra Upazila:

No	Types of fertility	Amount of land (%)
1	Very Fertile	6.00
2	Fertile	27.33
3	Medium Fertile	50.67
4	Little Fertile	14.00
5	Very Little Fertile	2.00
	Total	100

Source: Field Survey'2005

Land has lost its fertility for excess use of chemical fertilizers. Chemical fertilizers should be used in which land, refers from soil specialist. Therefore, the agricultural land related procedures should be implemented properly.

The practical observation and field survey and various secondary data are showing that the landuse in Singra *Upazila* has been changed. The discussions of changing pattern of settlements, educational institutions, trades, industries, communicational statistics of Singra *Upazila* are in chapter five.

Various problems like foods, clothes, shelters, education, treatment are being much for population. "It will be impossible to stop the harms of environment which take place for over population" (Paul, 2002). The daily necessary is increasing for increasing population (Paul and Sarker, 2001) that's why over cultivation is running on which is harmful for soil fertility. There are not enough fair procedures to manage the problems. It will not be possible without fair planning and procedures to protect the land degradation. The Singra *Upazila* is a low land under Chalan *beel* area. Different procedures should be enacted for different types of land. But there is no different procedure for Chalan *beel*. So the land management should have to be more specific.

The land is not being used properly in Singra *Upazila*. The harmful changes have been taken place in Chalan *beel* area for unplanned landuse and infrastructures.

The Institute of Nutrition and Food Science of Dhaka university conducted a research and observed that those peasants use chemical fertilizer in their land, they suffered from different diseases and those who do not use, their health is well (Ahmed et. al., 2002). The chemical fertilizers destroy useful elements of land and these chemical fertilizers kill useful insects of land. The chemical fertilizers and insecticides mix with rain water or irrigation water, cause water pollution. So only those fertilizers which are safe enough by experiments should be used in agricultural land and the land management procedures should have to be sustainable.

6.4. Wetland management policies:

From the above various charts, tables, graphs and discussions it is clear that the land has been turned into a negative way which is not sustainable for land. Total population is increasing in one hand and on the other hand excess pressure is also increasing with the population increasing so rapidly. The land is using excessively and chemical fertilizers, insecticides and underground water are using excessively in

agricultural land. As a result the soil fertility is declining. But the land management policy of Bangladesh is not sufficient and not favourable to protect such situations. From the early period of land management system of Bangladesh could not be said safe and sound for land. The former government enacted too many laws and policies to increase maximum use of land like **The Canals Act'1864**, **The Irrigation Act'1876**, **The Destructive Insects and Pests Act'1914**, **The Agricultural and Sanitary Improvement Act'1920**, **The Tanks Improvement Act'1939**, **The Agricultural Pesticides Ordinance'1971**, **The Bangladesh Irrigation and Water Rate Ordinance'1983**. All these procedures are not adequate for land conservation. The government can demolish destructive insects and pests through **The Destructive Insects and Pests Act'1914** and **The Agricultural Pesticides Ordinance'1971**. But all insects are not harmful for agriculture. Some useful insects like algae, fungi, earthworms, flatworms, roundworms, animals such as moles and ground hays are destroyed during the period of destruction of harmful insects by insecticides and chemical fertilizers. So soil fertility of agricultural land of the study area Chalan beel is declining day by day. The data about this is in the **table no 6.13**.

The government can withdrawal water from underground water resource by **The Irrigation Act'1876** and **The Bangladesh Irrigation and Water Rate Ordinance'1983** in the Chalan beel area. There is decreasing groundwater in this study area. There are not sufficient and proper laws to conserve this limited water resource.

In the Chalan beel area excess agricultural practices are causing various problems like now a days flood is a very common phenomena. Every year flood is destroying the backbone of economy and even to the lives. The government prepared the First Five Year Plan and there was policy to control flood. But there are problems about policy making and real picture of implementation of the policies. So this study area are facing flood every year. There are not so government's initiatives to control such type activities.

By the field observation in Kataubari Mouza of Singra Upazila it has been seen that the agricultural practice is running on in full sewing in the *char* lands but the authority is not taking initiatives to control such activities though there are government orders, notices in **The Land Management Manual'1991**.

These improper agricultural practices are arising environmental problems besides the government has enacted more policies and procedures like **The Land management**

manual'1991, **The Environmental Conservation Act'1995**, **The Environmental Rules'2001**, **The Land Administration Manual'2003**. The temperature is being high and rainfall is being less. The last 25 years rainfall data in the **table no 6.1**, can prove this situation.

Improper land management is not only harmful for environment but also the economy will fell. Many people of Singra study area were fishermen and they could earn a lot by hunting fishes from the Chalan *beel* area but for reducing the Chalan *beel* area now they can not. The Chalan *beel* was much more than 1000 sq km before 1909 but now it is only 368 sq km (Banglapedia, 2005). So the economic condition of the study area is not well. This type data are on Graph No. 4.1. and Appendices Table No. 4.1. To conserve the wetland government enacted **The Land management manual'1991**, **The Environmental Conservation Act'1995**, **The Environmental Rules'2001** and **The Land Administration Manual'2003**. Improper implementation of these laws, acts, procedures, ordinances, policies can not contribute in this matter. So the land management policies should be proper and existing laws should be implemented properly.

CHAPTER SEVEN

Failures and Success of the Policies

The policies of the government related to land management are in chapter three. A short discussion related to land management policies like laws, acts, ordinances, notices etc. are here. Most of the land related laws of Bangladesh were prepared in the British and Pakistan period. After independence of Bangladesh some laws were enacted. These laws have both merits and demerits. Some laws have been changed for its faults and some are not applied and some have been changed a little and some are running on without changes. About some important laws' discussions on which are as follows:

The Bengal Survey Act, 1875 (Act 5 of 1875)

After preparing **The Permanent Settlement Act'1793** and **The Bengal Survey Act' 1875** (Act 5 of 1875) carried important to select boundaries of the *Jamindery* (landlord), setting the *Jamindery* pillar and *Mouza* maps (Alberuni, 2002). **The Survey Act'1875** was prepared in the name of "**The Bengal Survey Act'1875**" (Haq, 2000). This act was published in gazette form and it is being applied from that day. This act is still continuing. This act is 130 years old (Alberuni, 2002). By this act land records and documents of Nachole and Singra *upazila* are prepared. **The Bengal Survey Act'1793** has some faults to the land survey.

Before 1875, the processes applied for preservation of the land related documents were not modern, scientific and effective enough.

Before the establishment of **The Bengal Survey Act'1875**, the *Jaminder* could abolish the peasants' rights on the land if he failed to pay tax and if he denied tax. But after preparation of this act no *Jaminder* could abolish peasant's rights on the land.

Before establishment of **The Bengal Survey Act'1875**, many problems arose for performing survey. The office should have to take permission from the *Jaminder* and sometimes. The *Jaminder* interfered in survey. But **The Bengal Survey Act'1875** removed most of the problems.

There was no permanent law about conducting the survey from the beginning to end. So, many problems were found to conduct survey before establishment of this law. Later for establishment of this law, many problems could be settled. This law carries importance for knowing the area, shape, nature and location of the land. By this act peace is being maintained in Nachole and Singra area after settling too many problems.

Apart from these many advantages are in this act. Those are:

- By this act the land boundary and survey system have become fair
- This act is small but it is chapter wise and easy to understand
- Enough powers have been given to the collector for mutually settle the land related disputes (Alberuni, 2002).

The Bengal Survey Act'1875 is called the forefather of the land management and survey. But for having some limitation in **The Bengal Survey Act'1875** another act was prepared in 1885, which was called "**The Bengal Tenancy Act'1885** (Act-8 of 1885). The tools and instruments have been developed enough in agricultural sector at present (Mia, 1999). So for the need of time, this act should be amended and given new scientific and advanced touch for better performance in survey.

Scientific method has been developed enough. There is much more effective process in the land management and the land survey than the act. So the act has become less affected. It is impossible to measure, identify degradation and observe location of the land in Singra where floodwater exists for 3 to 4 months.

The Bengal Tenancy Act'1885 (Act-8 of 1885):

When the *Jaminder* oppressed the peasants during collecting tax "**The Bengal Tenancy Act'1885** (Act-8 of 1885) was passed. The *Jaminder* and the elite tried to postpone **The Bengal Tenancy Act'1885** but at last this act was passed (Haq, 2000). From the beginning of the permanent settlement till **The Bengal Tenancy**

Act'1885, those peasants' tax were not increased were called permanent tenants (Alberuni, 2002).

After establishment of this act the *Jaminder* didn't increase excess tax against the peasants. Those peasants selected as the permanent tenants, who are established in the land at least for 12 years. After establishment of this act no *Jaminder* could increase tax violating the contract between the peasant and *Jaminder*. Authority to transfer the land was given to the peasant. The Land Survey, the land related document preservation and record preservation processes were provided in this act. This act was a revolutionary step of British colonist in the history of the land management of Bangladesh (Baroi and Shahjahan, 1997).

Some more merits of **The Bengal Tenancy Act'1885** are shown below:

- This act carries importance for drawing accurate land settlement and survey
- This act help establish peasant's rights over the land in Singra and Nachole
- If any peasant cultivated the land for 12 years then he became owner of the land.
- Property rights was institutionalized by this act in Nachole and Singra area.
- The land tax related problems and tax increment problems have been settled by this act.
- Peasant won the rights to buy and sell land.

By The Bengal Tenancy Act'1885, the British tried to give effect to every land related orientation (Rahman, 2003). In this act section number 5 defined about peasant but it was not explained clearly. This act failed to determine the quantity of land tax of the study area.

The Registry Act'1908:

All the land's buying, selling, changing of ownership etc. were brought under **The Registry Act'1908**. As a result it did a great help to stop unfair buying and selling

of land in Nachole and Singra. All permanent assets' selling and buying had to be registered according to **The Registry Act'1908** that solved lots of problems of both buyer and seller. Every document, by which creates any interest, announces, inherit and abolish etc. had to be registered according to **The Registry Act'1908** so that no land related problem would arise. For that reason the Bangladesh government appointed registrar and sub-registrar in every district (Rahman, 2003). Many land related problems particularly **Registry** can't be free from trouble in Singra and Nachole area for the appointment of only one inspector general.

The necessary correction of this act was felt for years. Because the population and technology have been developed enough, photograph and certificate should be attached in the time of registration and every database should be preserved in computer and internet, which should be used in the land registration and the land management so that data transformation should come under fair management and everyone will easily avail the data. Through these many cases will be settled. The land related problems are not settled easily. Many more land related problems are found for the limitation of this act. To registry land in Nachole and Singra areas one has to go to registry office but if any data is needed then one should have to go to the *upazila* Tohsil office. So the land related problem could not be settled for want of available data.

According to **The Land Registry Act'1908**, in the time of selling there is no process to keep signature of buyer and seller. If there was a system to keep photograph of both buyer and seller, it would be easy to identify both. For not having proper system of photography and signature, bad people corrupt through

the gap of law. At present these related cases are enough in the court (Alberuni, 2002).

In the time of preparing laws then there were not so modern technology but now it is necessary to amend this act and apply new rules. By the above description it is clear that **The Registry Act'1908** is old and antique, which needs amendment.

The Non- Agriculture Tenancy Act'1949

The Non- Agriculture Tenancy Act was passed for non-agricultural land use in 1949. In this act how tenant can use non-agricultural land has been described with their related procedures.

The Non agricultural land related law was found except **The Rent Act'1859**, **The Bengal Tenancy Act'1885**, **The Contract Act'1872** and **The Property Transaction Act'1882**. As a result non-agricultural tenants oppressed much by the *Jaminder*. The *Jaminder* could not increase tax and abolish the tenant even after the end of the contract.

1st and 2nd section includes title, introduction, definition etc. It described about nonagricultural tenants from 3rd to 5th sections. It described about the rights of non-agricultural tenant in 3rd chapter's 6th to 15th section. Fourth chapter's 16th or 22nd section, it described about the rights of peasants. Fifth chapter's 23rd and 26th sections were about the agricultural land transaction to non-agricultural tenant. Sixth chapter's 27th and 42nd sections described about settlement and tax. Seventh Chapter's 4 to 63 sections described about tax payment rules. Eighth chapter's 64th to 68th sections described about the land development procedures. Ninth chapter's 69th and 71st sections described about the non-agricultural tenant's right. In 10th chapter's 72nd sections described the procedures about changing the agricultural land to non-agricultural purpose. From 11th chapter 73rd to 82nd sections described

about the procedures of judiciary division. It described about different subject of this act from 12th chapter's 84th to 91st sections (Haq, 2000).

The non agricultural tenant's class, non agricultural peasant's rights, servant's rights settlement, non agricultural land transaction, to determine nonagricultural land settlement and to determine land taxation, the process transaction of agricultural land to non agricultural tenants, the judiciary divisional procedures were in **The Non- The Agriculture Tenancy Act'1949**.

Many important parts of that act were changed. But most of the parts are still inexistence. This act includes about buildings, mosques, temples, churches, digging of ponds etc. But in which cases the house and buildings could be built were not described. The people build infrastructures on agricultural land and plugged up the Chalan *beel* to transact agricultural land and keep a great ham to wetland and environment. The clear procedures should be referred for sustainable land management and environment by changing old rules and need to establish new laws.

The State Acquisition and Tenancy Act'1950 (Act-28 of 1951)

The main matter of this act is relation to abolish of *Jamindery* and making peasant's ownership. **The State Acquisition and Tenancy Act'1950** (Act-28 of 1951) contains 40 rules. By this act the *Jaminders* lost their *Jamindery* (Rahman, 2003).

There was no direct relationship between the government and tenant before but after promulgation of the act, the government and tenant came to a direct relationship by tax collection. On the one side, the government has been profitable and for not having middleman taxation came under tolerable position. By the land

survey in Nachole and Singra peasants owned the ownership of land. By this act sublet process was stopped. And re-settlement system was abolished. The rights and responsibilities of land owner, Alluvion and Dilluvion related procedures, land transaction, pre purchase, increase and decrease of tax, land accumulating, circular, the land related application etc. are fairly combined in **The Non-Agriculture Tenancy Act** (Alberuni, 2002). There are many clear land related procedures in this act, which has been selected as a new milestone of the land settlement. But this act has some limitations. These are described as follows:

From 11th to 16th section of this act described about the procedures about *Chakran* and *Nanber* land. When the ordinance was created there was the need of such kind of procedures for 10/12 years. But now there is no need of such kinds of laws. The reason is that there is no *Chakran* land in Singra and Nachole. There was no practical application of that law from ten years.

20th section of that law determined the optimum quantity of land. When the act was opened then the optimum the land limit was 100 *Bigha*. It was amended and turned into 375 *Bigha* and again changes were taken place and determined 100 *Bigha*. But again this act was amended and the land limit was determined 60 *Bigha* in 1984. But for the increasing population of Nachole and Singra this limitation should be determined again. By this act *Jamindery* and middlemen rights' were abolished in chapters from 8 to 10 but now there is no need of such types of procedures.

The East Bengal Tenancy Rules, 1954:

For proper land management this act includes very unique process about land survey. According to this act, any area suffered by flood has a process to decrease taxation considering natural calamities. For flood the Chalan *beel* area's people get

opportunities from taxation decrement but there was no rules about drought for Barind area. If Barind area suffers from drought, the people are to pay tax as usual. Therefore, these rules have to be amended.

The Board of Land Administration Act'1980:

Land administration board was formed and applied by this act (Rahman, 2003).

The Permanent Land Acquisition Act should be ordered by this act. The land administration board did that types duties as the land revenue board can do. In different times the government gave different powers to the board. Moreover, sometimes the government decreases some power of the board. So this act has too many problems that needs to come under amendment

The Land Reform Ordinance'1984 (Ordinance No. 10 of 1984):

For the benefit of peasants and to reform the land this ordinance was prepared and applied. This ordinance includes 22 sections and deals about *Borgader*, *Adhi Borga* and optimum land limitation to 60 *Bigha* (Albruni, 2002).

This act also needs to be changed. Now it seems to be necessary to decrease the land limit to less than 60 *Bigha* in Nachole and Singra *upazila*. Considering the conditions of landless peasants, the poor people of Nachole and Singra *upazila* this land limit should be decreased bellow 60 *bigha*.

The Contract between the land owner and *Bargader*:

In the land reform ordinance of 1984 ordered to perform contract between *Bargader* and owner of the land on pre determined paper (Alberuni, 2002).

Although the peasants of Nachole do not perform any contract with owner of the land in written documents, they make it orally.

The land Reform Rules'1984:

The Land Reform Rules'1984 includes some important procedures like land related disputes, compensation, rate of compensation, contract form and other rules and laws about the duties after the death of *Bargader* or the land owner etc. (Rahman, 2003). According to these rules, if any owner likes to give his land under *Borga* then he should have to make contract on certain form with *Bargader*. When *Bargader* gives the percentage of crops for cultivation in the land of the owner, he will give payment receipt to the *Bargader*. By this act *Borga* related all rules were described in this act and it helped to establish the rights of peasants over land in Nachole and Singra *upazila*.

These procedures said that all owners of land and *Bargader* have to make contract on certain form during *Borga* contract. According to these rules *Bargader* gives a certain parts of crops but owner doesn't give any receipt of payment. This rule plays important role to establish the *Bargader's* rights over land. But there is no obligation for owner to come under this contract when he made the contract orally. As a result some times it is observed that owner of the land abolish the *Bargader* without observing the stipulated duration. So *Bargader* are anxious in Nachole and Singra *upazila*. The *Bargader* has nothing to do in this contract. So all this matter needs analysis and explanation and even needs amendment.

The distribution of *Khas* land and model village:

The *Khas* land settlement and model village act was passed in 1987 (Land Management Manual'1991). But there is no village, which observed in the same study area of Nachole. No model village is found in Singra *upazila* except Ninguin Model village. The environment of the model village is very poor. The rules to preserve the environment should have been there.

The Loan Arbitration Act' 1989:

According to the President ordinances number 88 and 136 of 1972 and **The State Acquisition and Tenancy Act's** correction number 95 and the addition of the section number 95 (A), it is difficult to save the peasants from the owner of the land. Owner has lots of opportunities to cheat the peasants. The landowner can recollect the land from *Bargader* without rules. The landowner can collect signature of the *Bargader* on empty deeds because the *Bargader* cannot do any alternative. The government prepared **The Loan Arbitration Ordinance** in 1989 to save the peasants. This law's major purpose was to form **Loan Arbitration board** in every *upazila* and to save the poor peasants from evil design of the lords.

The Loan Arbitration Rules'1989:

Without any objection this procedures 'Act' means the certain form by which the contract form made to perform contract between owner and *Bargader* in **The Loan Arbitration Act'1989**. The government formed a board. The peasant (seller) can apply to the board within 6 months for getting back his sold land from the buyer. But the seller can apply who has maximum 2 acre of land.

Both sides have to be presented to settle the problem and show *Solenama* (contract) with their signature to the chairman of the board and all members will put signature to settled *Solenama* that has been ordered by the board. If any side has any objection, he can appeal to the collector. Appeal should be settled to give the opportunities to both sides with a show cause notice.

By this law there was a fair effort to save the poor peasants from the clutches of *Mahajan* (Lord). But there is no fair application of this law practically in Nachole and Singra. The rich *Mahajan* (Lord) purchases the land from the poor peasant with little price. Hire purchase system of crops is absolutely forbidden but still they are doing that. According to **The Loan Arbitration Act'1989's** 27 section (Rahman, 2003) every *upazila* should have a Loan Arbitration board to save poor peasants from the oppression of the *Mahajan*. But there is no application of such

kind of rule in Nachole and Singra upazila. The lord is still collecting rent before total harvesting. The people are still taking thumb impression and signature on blank stamp for taking loan in Nachole and Singra. Tendency to cheat peasants by the lord is noticed in Nachole and Singra.

The land Reform Board Act'1989:

The Land Reform Board was formed in 1989 by **The Land Administration Act**. Duties on the board were to settle judiciary type of problem. But the board obliges to settle lots of land related problems. Day by day land related problems were increasing. So apart from board land reformation ordinance was prepared in 1989.

- Marking sealing of land, bringing under the government control, determined loss and arrange to make good of that
- Marking the *Khas* land; distribution of *Khas* land among landless peasants according to the government procedures, other settlement and management or recollection of the government *Khas* land
- The recollection and distribution of *Khas* land
- Implementation of *Borga* rule
- Selection and collection of land after development and sending it to concerned ministries
- Sealing of land marking, which have much more than 60 *Bigha* of land (Rahman, 2003; Haq, 2000; Alberuni, 2000). But the implementation of this rule is not found in Nachole and Singra upazila.

The Land Appeal Board Act'1989:

By the ordinance of land administration act land administration board was formed and enjoyed the appealing ability. Most particularly semi judiciary activities were performed by the board. The government has no authority to interfere in this matter and the government could not appeal against it. For those reasons the

government abolished this act and formed land appeal board instead of land administration board by land appeal board ordinance of 1989. Next this ordinance was approved by the parliament of Bangladesh and transmitted as the law of land appeal board. This law is being applied from 16th March 1989 (Rahman, 2003). But this law is carrying no importance to the people of Nachole and Singra.

The Land Management Manual'1991:

For land management "**Land Management Manual'1991**" was established in place of "The Government Estates Manual, 1958". The success and failures of Land Management Manual are as follows:

***Khas* agricultural land management:**

The total land area of agricultural *Khas* lands of Singra *Upazila* is 2726.02 acres, among these 0873.94 acre was distributed. The distributable *Khas* agricultural land is 1975.08 acre. But to keep some *Khas* land for the need of the *Upazila* distributable lands are 1101.14 acre (Assistant Commissioner's office (land), Singra *Upazila*, Natore)

The total *Khas* land of Nachole *Upazila* is 2213.99 acre, among them 358 acre was distributed and 1770.96 acre *Khas* land is waiting for distribution. The Distributable lands are 85.03 acre (Assistant Commissioner's Office (Land), Nachole upazila).

Vast descriptions are there about land management in **The Land Management Manual'1991**. But there is nothing about conservation of land. It refers to the optimum use of agricultural land but no concern about land degradation. The cultivable land selection and distribution among poor peasant is ordered by the manual. But there was no fair reflection of it in Nachole and Singra *upazila*. Now a fair *chart* about the *Khas* land distribution till 2005 is described below (Table No. 7.1):

Table 7.1.

Sl No	Description of <i>Khas</i> Land	Nachole Upazila	Singra Upazila
1	Total <i>Khas</i> Land	2213.99	2726.02
2	Suitable for Distribution	1855.99	1975.08
3	Distributed	1770.96	0873.94
4	Waiting for Distribution	0085.03	1101.14

Source: Assistant Commissioner's (land) Office, Nachole and Singra Upazila.

The illegal occupant's elimination activity was not satisfactory. The real landless people didn't get the government *Khas* land in Singra and Nachole *upazila*. The rich people, who have much land, they are occupying the government *Khas* land illegally. Singra *upazila* has much more *Khas* land than Nachole. Because the area of Singra is larger than Nachole and being more rivers in Singra. So there are more *Khas* lands than in Nachole. Although these lands were controlled by the government but they never come under proper management. These *Khas* lands are being used abundantly. So the environment of Singra faces great harm and the Chalan *beel* is being degraded.

***Khas* Non Agricultural Land Management:**

According to **The *Khas* Non Agricultural Land Management Procedures'1995** non-agricultural land should be sold by tender notice in urban area. But the rules, which are in practice, are full of corruption and are not followed properly. So, real owner is suffering. A tender committee was formed to sell non-agricultural *Khas* land according to ordinance number- Bhuma/Sha-8/Khazab/70/98/617 (70) (Land Management Manual, 1991). But this procedure was never applied in Nachole and Singra *upazila*.

According to **Land Management Manual of 1991** *upazila* land administrative officer or assistant commissioner (land) with the help of surveyor will take proper steps after rainy season. But there was none to conduct survey in those areas.

Wetland Management:

The Protection and Conservation of Fish Act'1950's 2nd section's 1 (A) sub section ordered to conserve natural or artificial closed or open source of fish. Fish conservation, reproduction and protection in river, *beel*, *hoar*, *baor* etc. procedures are in this manual. According to this manual, Chalan *beel* is wetland so *beel* area should be conserved. The government can add procedures if necessary according to **The Fish Preservation Act'1950**. Above described act no.3 concerns about the wetland management. To manage properly this wetland infrastructure could be built in wetland area (Farooque and Hasan, 1996). But very little fishes are collected and sold in market. The fish re-reproduction processes are destroyed. So, it is being impossible to conserve the Chalan *beel*.

The government felt importance of rivers, ponds, canals, lakes, *beel*, etc. so these closed and opened fish source are being tried to preserve. The government noticed to preserve the important wetland. This type of notice is bhuma/7-bibidh-11/95/576 by the ministry of land in 1995 (Land Administration Manual, 2003). Before publishing those notices the wetlands which were settled and again that were canceled. Those wetlands were allotted bid, that would not be re-bided for settlement expiry of finishing the duration of the contract. For the concession of fishermen no one can collect tax from fishermen. One who would violet the rules would be punished (Land Management Manual, 1991).

Some corrupt people with their influence have kept the Chalan *beel* under their control and the fishermen lost their rights to catch fish. In Nagar river near Baluvara village, some people collect very little fishes. But local administration

didn't take any step against them according to the notice No. bhuma/7-bibidh-11/95/576.

There was no rule in this manual to preserve the environment. The Government of peoples' Republic of Bangladesh enacted **The Environment Rules'1992** to ensure the proper management of land. This rule refers to land degradation protection, fertility preservation and development, new raised land preservation and management etc. In Singra *Upazila* the people plugged up low land and make it cultivable which is harmful for environment. But there is no fair step of this procedure. The people plant seeds on riverbed and they cut the banks of the river for cultivation. These activities decreased the original shape and size of the area. But there is no rule against it.

The government enacted **The Environment Policy'1992** to ensure the proper management of land and to develop the fertility of land, which was a revolutionary step but there was no fair application of that act, policy and procedures. Therefore, the success in this regard is very little than it needs.

Char land Management:

New raised *Char* is completely the property of the government. So it is the duty of the collector to keep government ownership and to abolish illegal owner from this land. But no step is found in the *Chalan beel*. The government ordered to distribute *Char* land among the landless people by the notice No. 8-5/86/111 in 28th February'1987 (Land Administration Manual, 1st part, 2003). But there was no application of it. By practical observation it is found that the people made harm to the Gur river but no related authority took any step against them.

The survey did not take place in new raised *Char* land on time although the procedures ordered to do that. The government ordered to abolish illegal occupants, recollect occupied land, recollect government *Khas* land, make security in *Char* land by the notice No. CD/DA-1/12/(65)/83(part-3)/241 on 17th December

of 1987. By this ordinance the government ordered the collectors to abolish all illegal occupants and distribute land among landless people (Land Administration Manual, 2003). But there is no such rule and procedure, which have been implemented properly.

The government is the owner of both agricultural and non-agricultural *Khas* lands. The government enacted a procedure to settle *Khas* land by the notice No. vuma/sha-8/khazb/46/84/260 in 4th April, 1997 (Land Administration Manual, 2003). On the other hand population is increasing day by day and as a result the landless people are increasing.

To look after the distribution of agricultural land and making policy, a national *Khas* land management committee and a district *Khas* land management committee were formed. But still it is not under practical touch. The formation and activities were described in the land management manual of 1991. These rules and procedures could not be applied for some reasons like vast population increment, economic problem, ignorance, want of mass awareness, lack of communication, carelessness of the government and corruption of land related officers and for not applying land related rules.

CHAPTER EIGHT

CONCLUSION

The present investigation was carried out on “**Sustainable Land Management: Policy Implication and Sectoral Achievement**” in two areas of Rajshahi division. One is Barind tract, which is high land and another is Chalan beel, which is low land. The Nachole upazila of Chapai Nawabganj district has been selected as the high land and Singra upazila of Natore district represent the low land. The main objectives of the investigation were to analyze the land management, its lack, the fact whether the laws being properly utilized or not and its success. The information were collected through field visit, observation, using questionnaire, review of document, discussion with peasant, local leader etc from the study area. The information on the nature of the use of land, socioeconomic condition, land management and land use law and government policies were analyzed. Some essential features, findings, discussions, conclusions and recommendation on land management were discussed below in the following subheads.

Area, Population and Government's Policy:

The present research indicates that the total area of Nachole Upazila is 70,097 acre and it has four unions of them Nachole union is important. The total area of Nachole Union is 18,250 acres. The population of Nachole upazila is 1,32,308. The population of this upazila was 60,780 in 1974 and 1,32,308 in 2001. Settlement, roads, offices etc. are being made in an unplanned way due to the demand of the rapid growth of population. The total area of Singra upazila is 1,30,589 acres. It has twelve unions and Singra union is important among them. The total are of Singra union is 9,935 acres. The population of Singra upazila is 3,20,818. So the density of population in Singra upazila is more than Nachole. The population of Singra upazila was 1,81,180 in 1974, 2,24,850 in 1981, and 2,89,952 in 1991. The population is more than the capacity of its area. The government's polices have not been properly used to control the growth of population. In most cases it is seen that those who are poor and suffering from want of dwelling place, foods and clothes have more than one child. The overpopulation pressure on land

is being increased. As a result, the necessity of more cultivation is being felt and land is being cultivated in an unplanned way, which degrades the land.

Soil fertility and government's policy:

The land of Nachole upazila seems as arranged in stairs from a far. The soil and the land of Nachole area are favorable for agriculture. But the fertility is decreasing day by day due to over cultivation. The fertility is also decreasing by the excessive use of chemical fertilizer and this practice is rather increasing than being stopped. On the other hand, the nature of the land of Singra upazila is low. The color of soil is gray. The low land of Singra is being made suitable for cultivation by filling them up. Besides this, *Chalan beel* is also being filled by the deposition of silt. As a result the depth of the beel is decreasing and this process creates flood, which causes damages to crops, lives and properties. A local paddy called *Bona Amon* is cultivated here, the height of this paddy increases with the increase of the height of water during flood. The cultivation of such kind of paddy is being increased day by day as the silt carried by the flood cannot cause damage to it. When the water of river enters into this area, silt is deposited more due to obstruction of Aman paddy, this process is interpreted by that kind of paddy plants. The result of this process is the deposition of silt on the beel-bed and the decrease of the beel area thereby. The total area of Chalan beel was 1088 square km in 1909. But it became 368 square km in 2005 through this process. The cultivation of crop in this area is being hampered for the decrease of beel area. As a result, the cultivation is hampering both the soil and the environment of this area. If this procedure continues in the future this problem will be more acute. The fertility of land of Nachole and Singra upazila are decreasing as a result of increase cultivation and the use of the chemical fertilizer. The government has not taken any effective measure to prevent the decrease to the fertility of the land of these two areas.

Law and Policies:

This is generally imperative that implementation of laws, and understanding of the problems before the law was enacted in parliament, leaves a gap. This is due to complicated system of cultural practices and the changing nature of landuse. There has always been an effort to improve this situation by updating laws during the last several hundred years parallel to local administrative change and socio-cultural need. The effectivity of the government's effort thus depends on these aspects, *i. e.* the changing nature of socio-cultural an economic system of the landuse, the nature of the government and the attitude of both people and government towards the understanding of the landuse problems. The attempted research maintains an effort point out the gaps between these aspects.

There are many rules and policies in Bangladesh. Most of them were made and prepared in British period like **The Canals Act'1864, The Alluvion and Dilluvion Act'1875, The Irrigation Act'1876, The Agricultural and Sanitary Improvement Act'1920, The Bengal Tenancy Act' 1885, The Destructive Insects and Pests Act'1914, The Forest Act'1927, The Tanks Improvement Act'1939**. There are many land laws enacted by the British ruler to develop different sectors of land such as agriculture, wetlands, fisheries and forestry. But the laws are not treated as sustainable land management. These laws can not protect the degrading situation of land in Bangladesh. Th land related problems are being acute due to improper, old and insufficient land laws. To cope with the degraded situation of land, the government in different periods prepared and enacted many laws and policies and made them effective to take necessary measures against land related problems.

After the separation of the Indian subcontinent, Pakistan government also made many land laws and policies to manage the land problems like **The State Acquisition and Tenancy Act, The Non Agricultural Tenancy Act'1949, The East Bengal Tenancy Rules'1954, The Agricultural Pests Ordinace'1962** but these laws also could not contribute for sustainable land management. In Bangladesh period, newly formed government realized the land-related problems that are why the former government took

in hand many initiatives for land management. During the present Bangladesh period different governments in different times have prepared and enacted different laws and acts like **The Land Development Tax Ordinance'1976, The Chittagonj Hill Tracts Act'1984, The Emergency Property Acquisition Act'1989, The Land Revenue Act'1989, The Land Reformation Ordinance'1984, The Land Reformation Rules'1984.**

Bangladesh is an agricultural country. Most of the people are engaged with agriculture and agricultural activity is one of the major land related activities. Because our entire major needs come from land like foods and shelter. So a large number of land laws are related to agriculture such as **The Irrigation Act'1876, The Destructive Insects and Pests Act'1914, The Canal Act'1914, The Agriculture and Sanitary Improvement Act'1920, The Non-agricultural Tenancy Act'1949, The State Acquisition and Tenancy Act'1950, The Embankment and Drainage Act'1952, The Agricultural Pest Ordinance'1962, The Agricultural Pesticides Ordinance'1971, The Bangladesh Agriculture Research Institute Ordinance'1976, Bangladesh Institute of Nuclear Agriculture Ordinance'1984, The Bangladesh Agricultural Research Council Act'1996, The Bangladesh Irrigation Water Rate Ordinance'1998, The Environment Action Plan'1992, The Agriculture Extension Policy'1997, The Seed Policy'1992, The Irrigation Policy'1998, The National Water Policy'1999, The Land Management Manual'1990 and The Land Administration Manual'2001.** As a result the agricultural production has been increased but on the impact of it the land fertility has been decreased abundantly. In this present investigation, it is found that the crops will not be produced if the chemical fertilizer or natural fertilizer is not used in agricultural land but in past the scenario was not same as present.

To provide a huge demand of foods, the land is being used much. The chemical fertilizers, insecticides, HYV (High Yield Variety) crops are being used in agricultural land and that's why the government has made laws and rules regarding this. Whenever we need to reduce the using of chemical fertilizers and insecticides in agriculture then we are using these harmful things in land to increase food production.

Wetland is most important component of the environment. It is also most important for fisheries resources. Many people's employment source is wetland and it is most important for biodiversity conservation. But this important wetland area are being reduced and degraded rapidly. In Chalan Beel area these resources are depleting due to over cultivation, increasing population and harmful human intervention. So the government prepared and enacted many rules and policies relating to wetland and fisheries. To improve and develop the resources, the laws and policies are **the Private Fisheries Act'1889, the Tank Improvement Act'1939, the Protection and Conservation of Fish Act'1950, The Government Fisheries Protection Ordinance'1959, the Protection and Conservation of the Fish (Amendment) Act'1985, the Environment Policy'1992 and the Environment Action Plan'1992, the Fisheries Extension Policy'1998, the National Water Policy'1997**. But the success and implementation scenarios are poor. As a result of it the wetland can not be saved and wetland are also being reduced. The total area of *Chalan beel* was 1088 square km in 1909 but now it is turned into 368 square km in 2005. It is observed that some negative impacts of laws and policies on wetland and fisheries. The existing laws and policies are improper and inadequate.

Since independence to till present, the fifth five year plan are prepared and enacted like First Five Year Plan, Second Five Year Plan, Third Five Year Plan, Fourth Five Year Plan and Fifth Five Year Plan. The First Five Year Plan emphasized to improve the production of agriculture. The Second Five Year Plan also emphasized on agricultural development. The fourth Five Year Plan tried to improve and develop the environmental impacts of different activities in agriculture. It mentioned about sustainable agricultural development. The Fifth Five Year Plan also indicated to develop the agriculture and to conserve the land. But these policies' implementation was not satisfactory. Land related many problems are being arisen for mismanagement and improper implementation of these policies.

Effect on climate and Environment for insufficient policy:

The climate of Nachole is as like as other area of the country. It sometimes rains in winter. The climate of Singra is also under tropical monsoon climate like other areas of the country. The temperature is comparatively low and the quantity of rain is also less in winter and the temperature and the quantity of rain are comparatively high in summer.

The cultivable land of Nachole is being cultivated with the help of irrigation. Underground water is the only source for Irrigation. As a result the level of underground water is decreasing due to the excessive use and tube-wells cannot lift water in this area where it was possible twenty years ago. The iron, Arsenic mixed with underground water causes damage to the cultivable land, when it is used excessively. To dig canals, ponds, rivers, *beels*, lakes etc. are necessary as a solution to this problem. The canals of Nachole area have turned into that land for want of care and preservation. Many canals have been lost their existence. Besides excessive irrigation is also being adopted in Singra for cultivation. Underground water is being lifted for this purpose. Deep-tube-well is being set up to serve this purpose. Though according to the rule of government pre-permission for the local government is necessary to set up deep tube well, it is not maintained at the time of setting it up. But the government is also not conscious about it. During this investigation, no effective finding from the government sector is found.

Flood and government's policy to protect:

No flood is seen in Nachole upazila because of its high area and having no river. But drought sometimes becomes natural calamity. The Mahananda flows by the last border of Nachole upazila. The height of the land of Nachole is also another factor of its not being affected by flood. On the other hand, flood is seen almost in every year in Singra because of its having river and branches. No government takes necessary measure to protect silt deposition and excessive cultivation in the beel area. Most of the land of Nachole is being used for cultivation. About 91.69%

cultivable land is being used for cultivation. In some place modern scientific tools are being used. Cow dung, plough, power tiller and other means are also used. The number of houses and bridges on land are being increased and the result is the decrease of agricultural land. Besides, land is being used for buildings, offices, factories, educational institutions and commercial institutions. It is also decreasing land to grow crops, over population and pressure on land is being found.

Irrigation system and government's policy:

Most of the land of Nachole is being used for agricultural purpose. The number of deep-tube-well used to 183 in 1998 and 308 in 2004. So from 1998 to 2004 irrigation increased to 66.12%. In Singra upazila, 92.12% area of total land is used for agriculture. The deep-tube-wells were only 10 in 1998 but in 2004, it increased to 23. So from 1994 to 2004 total of 130% various irrigation machines are increased in Nachole upazila. Total number of irrigation machines are much more in Nachole than Singra upazila. Though Singra upazila is bigger than Nachole. There is low land in Singra upazila besides this the land of Singra upazila remains under water during rainy season. Numbers of irrigation machines are not equal as that of Nachole. The irrigation machines are being increased very much. The ground water is used in the two study areas of Singra and Nachole. Excess use of groundwater for irrigation purpose decrease ground water rapidly. Most of the shallow tube-wells used before 20 years, do not work now; it is very much regrettable matter. on the other hand iron and arsenic contamination is being caused in Nachole upazila.

Irrigation is increasing. Iron and arsenic mixed water is being used of irrigation in the study areas. So arsenic contaminated water increases in the possibility of toxicity in the soil. Iron deposition in soil causes declination of the soil fertility in Nachole area, There is no laws and rules to control the problem. The government prepared and established **The Environmental Rules'1992** and **The Irrigation Act** etc. to control the use of ground water in agricultural land. These rules are

applicable to set up any tube-well in any place of the country. If any one sets up a tube-well or deep-tube-well, he/she has to take permission from the authority but in both the study areas it is not followed.

Chemical fertilizer use and control:

Chemical fertilizer use is much more in both the study areas. It has decreased natural fertilizers in Singra and Nachole upazila. Continuous use of chemical fertilizers turns makes the fertile land into sterile. The land is being resistant of chemical fertilizers. The chemical fertilizer use is increasing day by day. About 92% chemical fertilizer use has been increased. At present the land needs 20 kg chemical fertilizer per *bigha* of land in Nachole upazila but in Singra upazila about 15-kg chemical fertilizers are used per *bigha* of land. The use of chemical fertilizer is increasing. The agricultural production of Singra upazila has increased but the low land areas have been changed. The chemical fertilizer use is increasing. The land of our country is not the same.

Peasants class:

There are 32.5% landless among the total people in the study area Nachole upazila. Two hundred household's interviews have been taken from the study area Nachole upazila. About landless peasants are 24% who have only 1.5 acre of cultivable land or less than 1.5 acre of land. Who have 1.5 to 3 acre of cultivable land, their percent is 19%. On the other hand, there are 29.33% landless among total people in the study area of Singra upazila. One hundred and fifty household's interviews have been taken from the study area of Singra upazila. About landless peasants are 27.33%, who have only 1.5 or less than 1.5 acre of land. Who have 1.5 to 3 acre of cultivable land their percent is 19%. So it is observed that the people of the study area are much landless. Many peasants cultivate another's land for increasing population. The members of the family defrag their big land among them. So population makes defragment of land. For this reason man land ratio is

decreasing and pressure on land is increasing. Excessive pressure on land makes land degradation.

Family Structure:

Combined family is not much than single. About 22% family is combined and about 78% family is single in the study area Nachole upazila. On the other hand, about 15.33% family is combined and about 84.67% family is Single family. Most of the family members of the two study areas want to live in single family. In Singra upazila, houses and settlement are damaged every year. After damage some want to build new house in other place so the land defragmentation is also liable to make new settlements in the study area.

Live stock and Poultry:

Live stock is very important for development of agriculture of any area. Livestock is important for economic purpose. The wastes of live stock are used as natural fertilizer and natural fertilizer is important for land sustainability. Chemical fertilizers degrade the land. But natural fertilizers increase the soil fertility. It does decline soil fertility. The conditions of livestock of the study area in Singra and Nachole are not well. Quantity of live stock is fewer. Most of them are hens and ducks. Cows are very little in quantity in both Singra and Nachole upazila.

There are about 74.81% hens and 19.17% ducks among poultry stocks in Nachole upazila. The cow's percent is 28.57% and goats are 51.1%, 10.44% bulls and rest 9.89% are another live stock in the study area of Nachole. Their physical condition is not well. About 31.87% live stocks are very sick, 31.32% of them are sick, about 16.48% live stock are well.

On the other hand the condition of poultry and live stocks in Singra upazila are the same. There are about 71.1% hens and 23.44% ducks among poultry stocks in Singra upazila. The cow's percent is 30.39% and goats are 50%, 10.78% bulls and rest 8.82% are other live stocks in the study area of Nachole. Their physical

condition is not well. Most of them are sick and a few is well. Therefore, the condition of live stokes is not well. It will be helpful if there are enough live stokes in the study area, then wastes of them can help produce natural fertilizers. And natural fertilizers do not degrade the land.

Mass Awareness about laws:

This present research has been conducted 200 respondents from different villages in Nachole upazila. It is observed that most of them are not consciousness about land laws and land. Just only a few people know just a little about land laws. These people's quantity is 0.50% of the total people. On the other hand in Singra upazila, 150 correspondents were under the field survey. About 99% of them do not know about land laws and government policies. They do not know clearly about land. Especially they do not know about land degradation causes. Its causes are want of proper and enough education, want of awareness, want of proper policy, economic problems, want of eagerness etc.

Types of Management:

In Nachole and Singra upazila, the information has been obtained from the interview that most of the people do not take any measure to preserve the land and they do not take any steps to protect the land degradation. About 97.33% of the people do not know how to preserve the land because they are not educated, their knowledge is very poor about land, their experience in agriculture is poor, their eagerness is also very poor to preserve the land, as well as the socio-economic condition is not well. Other causes of the land degradation are want of mass awareness, want of soil-related knowledge, want of money, lacking in the government policies and want of eagerness etc. Most of them do not take any necessary measure to conserve the land for future. The government organization (GO), Non Government Organization (NGO) and other organizations do not help them to do this. Just a few organizations have disbursed loans to the peasants after

flood in Singra upazila and some of them such as BRAC (Bangladesh Rural Advancement Committee), ASA (Association of Social Advancement) Proshika are mentionable. These NGOs help the villagers to buy fertilizers, seeds, etc. Some of them have initiated different technologies in agriculture. Some NGOs cultivate plants beside roads. So these limited activities are not well enough to preserve the land.

The government does not take any effective measures to preserve the land and soil fertility. The government's role is very important in this matter because the people of this country are poor and illiterate. The populations of this country are much more than its area. Though there are some rules to preserve the soils and environment, some of the rules are being implemented little and some of them are not being applied properly.

Causes of no implementation of laws:

It is observed that the laws and policies of the government are not sufficient and these are not being properly applied in the research area both Nachole and Singra upazila. In Nachole upazila the ground water is lifting up very much and the people of the area are being used chemical fertilizers and pesticides. According to **The Environment Rules'1992**, no one can set up any tube-well in any area of the country without taking permission from the local authority but in the research area it is not observed. There is none who have taken this type permission or license from the authority of the *upazila*. There is much procedures and policies which are sufficient like and some of them are not sufficient like “**The Irrigation Act and The Pesticides Control Act** etc. but these rules are not properly implemented in the study area both in Nachole and Singra. Some of the acts and rules are not applied properly because of corruption, excess population, weak economy, lack of education, knowledge, awareness, modern technologies, lacking in laws and rules of the government, inefficient transport and communication facility, interfere of the ruling party etc.

RECOMENDATION

As a country of the third world it has passed century after century depending on lands. Those who ruled this country did nothing to develop the lands because of their greediness.

A sound and balanced land management is necessary for the development of all sectors. The source of foods, clothes, houses, education, medical facilities of this country is land. A huge number of people live under poverty line. Most of the men who live under poverty line are farmer and they are dependent on land. It can surely be said that the unplanned land use will create serious problem in future.

We shall have to cast our eyes open on the land pollution. If we do not take necessary steps considering both the production increase and land pollution, we shall have to face a difficult situation.

It is worth mentioning that land is very much important in this village based country. The development of village people depends on land otherwise we will have to face a great problem in future.

The problems concerning land will be acute. The economy will be weak. The total development of the country will stop. It will affect education, medical facilities and communication system. The land management of Bangladesh was laid down by the old foreigners now modern and time befitting land management is necessary. So importance should be given on it.

Proper planning

More population needs more foods. The land use is increasing. The land is using for two or three crops where it is necessary to cultivate one or two crops in a year. The peasants are using chemical fertilizers to increase crops' production from land. As a result the soil fertility is declining.

To grow more in a little amount of land chemical fertilizer is being used but chemical fertilizer causes damage to various elements existing in land.

The chemical fertilizers cause damage to various kinds of insects such as earthworm. This destruction of insects decreases the fertility of land. Earthworm makes land fertile and other insects supply some inorganic elements.

To kill insects of agricultural land insecticides are used and these insecticides kill some useful insects that contribute to the soil fertility. To preserve the soil fertility, we should decrease the use of chemical fertilizer. We should prevent harmful insects by adopting other means except insecticides and we shall have to find other methods for irrigation so that the pressure on underground water decreases otherwise the situation will be dreadful. It is seen in research that the shallow tube-well and wells cannot supply water because of decreasing ground water. It shows that the condition of underground water. So, the pressure on underground water will have to be decreased and necessary steps will have to be taken to make the proper use of surface water.

The soil of different areas of Bangladesh is of different types. Land of some areas is so fertile and land of some areas is not fertile, some lands are suitable for paddy and some are not. The crops are not being grown on the land suitable for them. So, land will have to be used with the help and advice of the research fellows. Sound and planned use of land is not profitable if there is no suitable law concerning it. Different methods will have to be used for different kinds of land. But it does not exist in our country.

Proper land use:

Land in Singra of Chalan *beel* area is not being properly used. Unplanned using of land causes degradation. The land of Nachole is not also being used properly. So land will have to be used properly.

As a planned way brings good result so all infrastructures will have to be formed in a planned way. Land will have to be cultivated considering the nature, structure and suitable elements.

Chemical fertilizer and insecticides are getting mixed up with water and polluting it. So Natural fertilizer and some other means to kill insects will have to be used to avoid pollution of water.

Forests contribute to raining. If there is much forest, they will have many vapors that causes rain. So to have much rainwater to fill ponds, rivers, *beels*, canals, we will have to plant more trees.

The corrupt people have occupied most of the *khas* land of rivers, *beels* and others. They cultivate the land in unplanned way and they make harm to the *beels*, canals, rivers etc. On the other hand, the landless peasants do not get *khas* land to mitigate their poverty. The illegal occupants of the government *khas* land will have to be eliminated. The *khas* land will have to be distributed among the landless and poor peasants.

The using of agricultural land in non-agricultural use affects agricultural land. The buildings, houses, offices, banks, factories, industries affect the nearby land by leaving wastes on agricultural land and creating problem in irrigation and ploughing. So the using of agricultural land in non agricultural use should be stopped.

Establishment of proper laws and regulation:

The British laid the existing laws and regulations, which seems to be old and unworthy for the present situation. It takes many years to end a case concerning land. The trust on law of people are being decreased day by day. The illegal occupants are occupying *khas* land. Updated laws will have to be enacted. In **The Environment Conservation Act'1995**, the use of land is emphasized. But no protection rules of land have been taken to ensure in it. So necessary steps should be taken for the welfare of whole nation and for avoidance of land degradation.

Amendment of leasing laws and establishment:

It will not bring any profit if any law concerning land is not implemented properly. Most of the farmers of the country are poor. They cultivate the land of others. They are called *Bargader*. They are not getting their rights on land. Laws should be laid down to preserve their rights. Loan should be provided to them. In this way they will be well off and country will develop thereby.

Establishment of village court:

Many disputes like the quarrels for the rights of land, for the water of ponds or river, for the damaging of one's crop by the animal of other are often found in the court of law. So, to solve the above mentioned cases, the village court can be established. In this case the judge of that court should have to be honest, educated and acceptable to all.

About 80% cases in a court are about land. Most of the land cases are for forgery. For want of proves and faulty method one person sells the land of others. In this process, a man is made the false owner of a piece of land and the signature of the real owner is forged. Besides as the information of the heirs of a dead person is not available in Registry officer or *Tohshil* office, the land of a dead person is sold and bought by means of forgery. To avoid this forgery the photos of seller and buyer should be attached to documents and the information of the heirs of a dead person should be supplied to registry office and *Tohshil* office.

Established of tribal and minority rights on land:

There are some tribal people in Nachole and Singra upazila. But they are deprived of the rights concerning land. The powerful people of that area have occupied some of their land by unfair means. As they are poor, they cannot preserve their rights. So to preserve their right the existing laws should be implemented and new laws should have to be made. Besides the organization can be established to help them in their affairs of laws.

The minorities have been deprived of their rights by the name of the land of those who went to India during the war between India and Pakistan was declared enemy property and those were distributed among people. This land was as entrusted property, later on though all the activities of entrusted property were postponed by an advertisement in 1984. But with the help of the service holder of land office their entrusted land was occupied by some rogue. So the existing law will have to be amended to preserve the right of the Hindus.

Sealing of non agricultural land:

The sealing of agricultural land was 100 *bighas* according to the ordinance of 1947. This sealing became 60 *bighas* by the ordinance of 1987. But the sealing of non agricultural land in town has not been fixed. As a result, many industrialist are using agricultural land in non agricultural purpose and the amount of non agricultural land should be fixed and the land beyond this sealing should be distributed among the homeless people for the welfare of nation. The rich people are being the owner of non-agricultural land in town or city. Some of the land are being unused. And on the other hand many people are being landless. Their number is increasing. Some people buy agricultural land to build infrastructures though in some cases the land remained in town or city. In this way the agricultural land is being used in non-agricultural purpose. So it should be stopped so that the government can prepare sustainable management.

Proper khas land management:

Many people of the country are landless and homeless. But much *khas* land exists in the country. This *khas* land is under the control of the rich people. If this land could be recovered and distributed among the above mentioned people then they will be somewhat well off and they will be free from the grasp of poverty. As a result, the country will be free from snatching, terrorism, killing and after all

poverty. The following steps can be taken to prevent the illegal occupation of *khas* land:

- a) Proper management
- b) The role of the law enforcing authority
- c) Economical development
- d) Proper education
- e) The increase of mass awareness
- f) Prevention of poverty
- g) Balanced economic development
- h) Removing unemployment problem.
- i) Controlling population growth.

The responsibility of the *khas* land settlement is on the revenue authority. The influential people take the *khas* land in the name of other people and use it. Sometimes it is seen that the people in whose name land has been taken don't exist. Besides the influential people make the way of getting land for the poor on the condition that the poor will hand over this land to that influential people and the poor will cultivate this land in return of this process the landless people agree to this condition. The influential people take signature of the poor people on bare stamp, In this way the *khas* land are being distributed. Such activities should be stopped and it should be managed properly.

Regular land survey:

During the rule of the British a land survey was undertaken. This process was continued from 1899 to 1940. The settlement in this survey is called C. A. settlement. It was done for establishing a proper land management system. During the rule of Pakistan one survey of land was made. The settlement is called S.A. it is the refinement of C. A. settlement. Another last survey was completed after independence of Bangladesh. This survey is called Revisional Survey (R. S.) settlement. It is very essential because always land related data and information

are being changed for various causes so this survey should be continued. And land related data should be preserved in computer and internet. The modern technology can be applied in the survey systems.

Training:

The knowledge and experience about land law, land management and land pollution is necessary to run the offices concerning land. It is difficult to work on land management without proper knowledge so the employee connected with the land management should be well trained. They should also be given the knowledge about land law and land management.

After the abolition of landlord (*Jamindery*) system the responsibility of vested property, land occupation obtaining of distribution of *khas* land among the landless people have come upon revenue officers.

To collect the *khas* land from the illegal occupants and to distribute it among the poor, landless peasants, courageous steps of the collectors are necessary.

The poor among whom *khas* land has been distributed can be brought under small-loan program to help them in cultivation of land and to play a great role to remove the curse of poverty from the country thereby.

To make people aware of the land law a program can be taken in hand by the collector of the respective area. In this way, land management system and the completed system of land can be presented in an easy way.

In conclusion it can be said that the only source of food, cloth and house of the people of this country is land. The crops are produced from land to meet the demand of daily foods. Besides, the source of settlement, education, medical facilities, recreation etc. is dependant on land. But the gradual arrangement of population of towns or cities or upazila is decreasing the land day by day. For use of chemical fertilizer and insecticides are polluting lands. If immediate steps are not taken to prevent the pollution of land and if it is not managed properly the nation will face a dreadful situation in near future.

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APPENDICES

Appendices Table No: 1.1.

Total Population and Population Density of Bangladesh in different years:

Year	Population Density per Sq. km
1901	182.96
1911	195.84
1921	211.43
1931	224.98
1941	240.56
1951	283.93
1961	285.29
1974	369.32
1981	517.72
1991	609.20
2001	834.18

Source: Population Census of Pakistan, 1961,
Bangladesh Population Census, 1974, 1981, 1991 and 2001.

Appendices Table No: 2.4.1.

Forest Area of Some countries:

No	Name of Country	Forest's Amount (in %)
1	Australia	14.34
2	Canada	34.40
3	Russia	41.40
4	Germany	36.40
5	Italy	20.69
6	Japan	67.60
7	Nepal	28.60
8	India	19.40
9	Bangladesh	16.50
10	Total World	30.40

Source: Siddiqi, 2001.

Appendices Table No: 4.1.

Pattern of Income in the Study Area

No	Class of Income	Nachole Upazila (%)	Singra Upazila (%)
1	0-1000	27.50	29.33
2	1001-2000	29.50	30.67
3	2001-3000	15.50	16.67
4	3001-4000	10.50	7.33
5	4001-5000	8.50	5.33
6	5001-6000	4.50	4.67
7	6001-7000	2.50	2.67
8	7001-8000	1.00	2.00
9	8001-9000	0.50	1.33
10	9001-10000	0.00	0.00
11	10000+	0.00	0.00
	Grand Total	100.00	100.00

Source: Field Survey'2005

Appendices Table No: 4.2.

Population density per sq. km of Nachole and Singra upazila

Census Year	Nachole	Singra
1974	214	343
1981	264	425
1991	342	548
2001	466	607

Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

Appendices Table No: 4.3.

Man land ratio of Nachole and Singra Upazila and Bangladesh from 1974 to 2001:

Sl. No	Name of Place	Area (Km2)	Man Land ratio (in hectare) {Area/Population}			
			1974	1981	1991	2001
1	Nachole Upazila	283.68	0.466	0.378	0.292	0.214
2	Singra Upazila	528.46	0.279	0.235	0.182	0.170
3	Bangladesh	147570	0.191	0.162	0.134	0.129

Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

Appendices Table No: 4.4.

Educational Qualification of the family heads in the Study:

Sl No	Educational Qualification	Nachole (%)	Singra (%)
1	Illiterate	87.50	88.67
2	Literate	9.00	7.33
3	Eight Standard	1.50	2.00
4	S. S. C. Standard	1.00	1.33
5	H. S. C. Standard	0.50	0.67
6	B.A Standard	0.50	-
7	M.A Standard	-	-
	Total	100.00	100.00

Source: Field Survey'2005

Appendices Table No: 4.5.

Land Ownership in the Study Area

No	Amount of Land (in Bigha)	Singra (%)	Nachole (%)
1	Ladles	29.33	32.50
2	5 and Bellow of 5	27.33	24.00
3	6 to 10	19.33	19.00
4	11 to 15	12.67	10.50
5	16 to 20	6.67	7.00
6	21 to 25	2.67	3.50
7	26 to 30	1.33	2.00
8	31 to 35	0.67	1.00
9	36 and Above	0.00	0.50
	Total	100.00	100.00

Source: Field Survey'2005

Appendices Table No: 5.1.

Urbanisation of Bangladesh from 1931 to 1991:

Year	Urbanisation (%)
1931	2.62%
1951	4.01%
1961	5.1%
1974	8.78%
1981	15%
1991	20.14%

Source: Population Census of Pakistan, 1951, 1961, Bangladesh Population Census, 1974, 1981, 1991 and 2001.

Appendices Table No: 5.2.

Settlement in Nachole Upazila from 1974 to 2001

Sl No	Name of Place	Area in Acre	Total House			
			1974	1981	1991	2001
1	Nachole Upazila	70097	10910	12245	16878	25912
	Name of Union					
1	Fatepur	18176	2427	2418	3623	5811
2	Kasba	15183	2380	2839	3845	5856
3	Nachole	18250	3736	4352	6002	9136
4	Nizampur	18489	2367	2636	3411	5109

Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

Appendices Table No: 5.3.

Settlement in Singra upazila:

No	Name of Place	Total House			
		1974	1981	1991	2001
1	Chamari	2423	3209	4498	6106
2	Chaterdighi	2461	2744	3975	5806
3	Chougram	2171	2541	3431	3879
4	Dahia	2959	3173	4367	5646
5	Hatiandah	2596	3151	4495	5893
6	Italy	2479	2948	4287	6024
7	Kalam	2704	3090	4410	5312
8	Lalore	2347	2791	4059	5628
9	Ramananda Khajura	2549	2964	4233	5828
10	Sherkole	2589	3108	4649	6437
11	Singra	2776	3344	5382	7089
12	Sukesh	2832	3466	4880	6577

Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

Appendices Table No: 5.4.

Types of house in Nachole Upazila from 1981 to 2001

Sl. No.	Types of House			
		1981	1991	2001
1	<i>Pucca</i>	0.39	1.45	2.05
2	<i>Semi Pucca</i>	1.02	2.25	3.02
3	<i>Kacha</i>	98.59	96.3	94.93
	Total	100	100	100

Source: Bangladesh Population Census, 1981, 1991 and 2001.

Appendices Table: 5.5.

Settlement in Singra Upazila from 1981 to 2001 (in %)

Sl No	Types of Settlement	1981	1991	2001
1	<i>Pucca</i>	0.21	1.01	1.49
2	<i>Semi Pucca</i>	2.33	4.27	6.26
3	<i>Kachha</i>	97.46	94.72	92.25
	Total	100	100	100

Source: Bangladesh Population Census, 1981, 1991 and 2001.

Appendices Table: 5.6.

Literacy Rate in Nachole Upazila

Sl No	Name of Place	Area in Acre	Literacy Rate (in percentage)			
			1974	1981	1991	2001
1	Nachole Upazila	70097	11.47	14.9	24.6	40.3
	Name of Union					
1	Fatepur	18176	11.32	11.9	19.8	29.8
2	Kasba	15183	11.61	14.5	20.5	41.9
3	Nachole	18250	14.43	16.2	30.3	45.9
4	Nizampur	18489	11.53	16.4	23.6	42.0

Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

Appendices Table: 5.7.

Literacy Rate in Singra Upazila

Sl No	Name of Place	Literacy Rate (in percentage)			
		1974	1981	1991	2001
1	Chamari	14.66	15.4	22.6	33.11
2	Chaterdighi	17.51	18.5	25.4	41.01
3	Chougram	22.31	22.8	32.1	40.1
4	Dahia	14.17	15.1	20.2	27.89
5	Hatiandah	17.33	18.1	25.8	35.09
6	Italy	16.22	18.9	23.3	32.52
7	Kalam	20.93	21.6	22.9	34.55
8	Lalore	17.52	18.5	23.7	36.11
9	Ramananda Khajura	17.97	18.2	25.2	34.8
10	Sherkole	16.49	17.8	26.6	37.3
11	Singra	24.06	25.5	35.1	41.5
12	Sukesh	16.92	17.8	19.7	35.42

Source: Bangladesh Population Census, 1974, 1981, 1991 and 2001.

Appendices Table: 5.8.

Changing Pattern of land use in Nachole Upazila from 1985 to 1997

Sl. No.	Land Use Pattern	1985-1997
1	Agricultural Land	3.47
2	Housing and Settlement	28.22
3	Industrial Land	24.46
4	Commercial Land	19.92
5	Others	12.46
6	Total Operated Area	4.54

Source: Bangladesh Agricultural Census' 1984, 1997 and
Upazila Agriculture Office, Nachole Upazila, Chapai Nawabgonj.

Appendices Table: 5.9.

Changing Pattern of Land Use Pattern in Singra Upazila (in %)

Sl. No.	Land Use Pattern	1985-1997
1	Agricultural Land	1.52
2	Housing and Settlement	34.02
3	Industrial Land	167.38
4	Commercial Land	42.66
5	Others	30.46
6	Total Operated Area	3.68

Source: Bangladesh Agricultural Census' 1984, 1997 and
Upazila Agriculture Office, Singra Upazila, Natore.

Appendices Table No: 5.26.

Land use pattern and Changing pattern in Bhujail Mouza of Nachole Upazila from 1976 to 2006 (in %)

Changing pattern (Increase/Decrease) = {(Present - Before) x 100}/Before

Sl No	Land Use Pattern	1976		2006		Changing pattern from 1976 to 2006 (%)
		Area (Acre)	% of total	Area (Acre)	% of total	
1	Settlement	11.25	4.13	24.25	8.89	115.56
2	Roads	1.35	0.50	2.25	0.83	66.67
3	Graveyards and others	1.22	0.45	2.99	1.10	145.08
4	Commercial/Orchard	0.95	0.35	2.36	0.87	148.42
5	Triple Cropped Area	16.25	5.96	22.25	8.16	36.92
6	Double Cropped Area	78.25	28.70	170.58	62.56	117.99
7	Single Cropped Area	141.25	51.81	35.25	12.93	-75.04
8	Cultivable Waste	10.25	3.76	7.89	2.89	-23.02
9	Water-bodies	7.25	2.66	4.25	1.56	-41.38
10	Khas Land	4.63	1.70	0.58	0.21	-87.47
	Total	272.65	100	272.65	100	

Source: Field Survey'2006.

Appendices Table No: 5.27.

Land use pattern and Changing pattern in Zotamati Mouza of Nachole Upazila from 1976 to 2006 (in %)

Changing pattern (Increase/Decrease) = $\{(Present - Before) \times 100\} / Before$

Sl No	Land Use Pattern	1976		2006		Changing pattern from 1976 to 2006 (%)
		Area (Acre)	% of total	Area (Acre)	% of total	
1	Settlement	5.25	3.25	10.25	6.35	95.24
2	Roads	1.25	0.77	2.11	1.31	68.80
3	Graveyards and others	0.65	0.40	1.55	0.96	138.46
4	Commercial/Orchard	2.21	1.37	4.66	2.89	110.86
5	Triple Cropped Area	7.25	4.49	12.25	7.59	68.97
6	Double Cropped Area	61.25	37.97	99.36	61.59	62.22
7	Single Cropped Area	77.23	47.87	27.20	16.86	-64.78
8	Cultivable Waste	4.25	2.63	3.25	2.01	-23.53
9	Water-bodies	0.33	0.20	0.11	0.07	-66.67
10	Khas Land	1.66	1.03	0.59	0.37	-64.46
	Total	161.33	100	161.33	100	

Source: Field Survey'2006.

Appendices Table No: 5.28.

Land use pattern and Changing pattern in Bhatsa Mouza of Nachole Upazila from 1976 to 2006 (in %)

Changing pattern (Increase/Decrease) = $\{(Present - Before) \times 100\} / Before$

Sl No	Land Use Pattern	1976		2006		Changing pattern from 1976 to 2006 (%)
		Area (Acre)	% of total	Area (Acre)	% of total	
1	Settlement	6.98	1.57	18.25	4.11	161.46
2	Roads	3.26	0.73	5.23	1.18	60.43
3	Graveyards and others	0.19	0.04	0.46	0.10	142.11
4	Commercial/Orchard	0.56	0.13	1.55	0.35	176.79
5	Triple Cropped Area	42.87	9.66	93.25	21.02	117.52
6	Double Cropped Area	235.12	52.99	271.86	61.28	15.63
7	Single Cropped Area	135.00	30.43	45.25	10.20	-66.48
8	Cultivable Waste	5.56	1.25	4.55	1.03	-18.17
9	Water-bodies	9.89	2.23	2.25	0.51	-77.25
10	Khas Land	4.24	0.96	1.02	0.23	-75.94
	Total	443.67	100	443.67	100	

Source: Field Survey'2006.

Appendices Table: 5.29.

Land use pattern and Changing pattern in Katuabari Mouza of Singra Upazila from 1976 to 2006 (in %)

Changing pattern (Increase/Decrease) = {(Present - Before) x 100}/Before

Sl No	Land Use Pattern	1976		2006		Changing Pattern from 1976 to 2006 (%)
		Area (Acre)	% of total	Area (Acre)	% of total	
1	Settlement	9.12	2.56	23.25	6.51	154.93
2	Roads	2.78	0.78	4.25	1.19	52.88
3	Graveyards and others	0.55	0.15	0.89	0.25	61.82
4	Commercial/Orchards	0.85	0.24	0.42	0.12	-50.59
5	Triple Cropped Area	-	-	21.29	5.97	102.00
6	Double Cropped Area	73.05	20.47	179.78	50.37	146.11
7	Single Cropped Area	208.00	58.28	81.25	22.77	-60.94
8	Cultivable Waste	4.66	1.31	2.25	0.63	-51.72
9	Water-bodies	4.25	1.19	2.66	0.75	-37.41
10	Khas Land	53.63	15.03	40.85	1.45	-23.83
	Total	356.89	100	356.89	100	

Source: Field Survey'2006

Appendices Table: 5.30.

Land use pattern and Changing pattern in Basta Mouza of Singra Upazila from 1976 to 2006 (in %)

Changing pattern (Increase/Decrease) = {(Present - Before) x 100}/Before

Sl No	Land Use Pattern	1976		2006		Changing Pattern from 1976 to 2006 (%)
		Area (Acre)	% of total	Area (Acre)	% of total	
1	Settlement	1.09	0.47	3.06	1.32	180.73
2	Roads	2.95	1.27	6.25	2.70	111.86
3	Graveyards and others	-	-	1.23	0.53	5.3
4	Commercial/Orchard	-	-	-	-	-
5	Triple Cropped Area	-	-	16.25	7.02	70.20
6	Double Cropped Area	-	-	139.29	60.17	601.70
7	Single Cropped Area	203.41	87.86	55.21	23.85	-72.86
8	Cultivable Waste	4.88	2.11	3.55	1.53	-27.25
9	Water-bodies	14.55	6.28	5.55	2.40	-61.86
10	Khas Land	4.63	2.00	1.12	0.48	-75.81
	Total	231.51	100	231.51	100	

Source: Field Survey'2006.

Appendices Table No: 5.31.

Land use pattern and Changing pattern in Debatra Sarabari Mouza of Singra Upazila from 1976 to 2006 (in %)

Changing pattern (Increase/Decrease) = {(Present - Before) x 100}/Before

Sl No	Land Use Pattern	1976		2006		Changing pattern from 1976 to 2006 (%)
		Area (Acre)	% of total	Area (Acre)	% of total	
1	Settlement	0.65	1.21	1.55	2.89	138.46
2	Roads	0.23	0.43	0.38	0.71	65.22
3	Graveyards and others	-	-	-	-	-
4	Commercial/Orchard	0.66	1.23	0.29	0.54	-56.06
5	Triple Cropped Area	-	-	2.36	4.40	-
6	Double Cropped Area	-	-	36.15	67.47	674.7
7	Single Cropped Area	49.07	91.58	11.25	21.00	-77.07
8	Cultivable Waste	0.55	1.03	0.23	0.43	-58.18
9	Water-bodies	1.25	2.33	0.35	0.65	-72.00
10	Khas Land	1.17	2.18	1.02	1.90	-12.82
	Total	53.58	100	53.58	100	

Source: Field Survey'2006.

Appendices Table : 6.1.

Changing Pattern of Net Cultivated Area in Singra Upazila

Sl. No.	Year	Change (%)
1	1985-1995	2.2
2	1995-2005	3.77
3	1985-2005	6.05

Source: Bangladesh Agricultural Census' 1984, 1997 and Upazila Agriculture Office, Singra Upazila, Natore.

Sustainable Land Management: Policy Implication and Sectoral Achievement

Field Survey Questionnaire

Ph.D. Research works

Md. Shamsul Alam

Session: 2003-2004

Identity No: 03101

Institute of Environmental Science

University of Rajshahi

Rajshahi, Bangladesh

01.	Name:				
	Father's Name:				
02.	Address:				
	Village:				
	Post Office:				
	Police Station:				
	District				
03.	Family Structure	Joint	☐	Single	☐

04.	Sex:	Male	☐	Female	☐
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05.	Age:	Year	☐	Month	☐	Day	☐
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06.	Religion	Muslim	☐	Hindu	☐	Buddha	☐	Christian	☐	Other	☐
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07.	Marital Status:	Married	☐	Unmarried	☐	Widow	☐	Divorce	☐	Other	☐
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08.	Educational Qualifications		09.	no	Profession	Income
a.	Illiterate		Profession and Monthly Income	a.	Farmer	
b.	Literate			b.	Businessman	
c.	Class v to vii			c.	Job	
d.	Class viii to x			d.	Other	
e.	SSC to HSC					
f.	BA to MA					
g.	MA+					

10. Land ownership of the family head (Bigha):

Agricultural Land	☐	Settlement	☐	Other	☐
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11. Information of the family Members:

No	Name	Age	Sex	Education	Marital Status	Occupation
i.						
ii.						
iii.						
iv.						
v.						

12. Housing Type:

Sl. No	Types	Amount of Room
i.	Pucca	
ii.	Semi Pucca	
iii.	Katcha	
iv.	Others	

13.a. Water and Sanitation

No	Water Sources	
i.	Pond	
ii.	Tube-well	
iii.	Deep tube-well	
iv.	Ring/dug well	
v.	River/canal	
vi.	Other	

13.b. Sanitation

No	Types	
i.	Pucca	
ii.	Semi Pucca	
iii.	Katcha	
iv.	Other	

14. Landuse (in Bigha) and Land ownership:

No	Types of ownership	
i.	Private	
ii.	Paternal	
iii.	Maternal	
iv.	Other	

14.

No	Types of Landuse	Amount of land	Amount of Crops
i.	Homestead		
ii.	Agricultural		
iii.	Vegitables		
iv.	Orchards		
v.	Water bodies		
vi.	Other		

15. Information of Crops:

Sl. No.	i. Name of Crops	ii. Amount of land	iii. Amount of Crops	Quality			Using of fertilizers and Insecticides					Purpose of Production		
				Very Well	Medium	Bad	Urea	T.S.P	Phosphorus	D.F.P	Other	Personal Demand	Business	Other
a.	Paddy													
b.	Wheat													
c.														
d.														
e.														
f.														
g.														
h.														

16. Livestock and Poultry:

Types	Name	Number	Income	Physical Conditions			
				Very Well	Medium	Bad	Very Bad
Livestock	Cattle						
	Buffalo						
	Goat						
	Sheep						
Poultry	Chicken						
	Duck						
	Others						

17. Infrastructures:

	Type	Number
Academic	Pucca	
	Semi Pucca	
	Katcha	
Religious	Pucca	
	Semi Pucca	
	Katcha	
Communication	a) National Way	
	b) Pucca Road	
	c) Semi Pucca Road	
	d) Katcha Road	
Irrigation	a) Deep tube-well	
	b) Semi deep tube-well	
	c) Tube-well	
	f) Rivers	
	g) Canals	
	h) Beels	
	i) Ponds	
	j) Rain water	

18.	a) Flood occurred every year?	Yes	No
	b) If yes, what type?	i) Very Sever ii) Sever iii) Medium	
	c) If yes, how many later?	i) Every year ii) Every tow years iii) Sometimes	
	d) If yes, what types harm occurred?	i) Increase soil fertility ii) Decrease soil fertility iii) No change of soil fertility iv) Sever harm of crops? v) Harm occurred of settlement vi) Other	

19.	Soil fertility?				Yeas		No	
20.	a. If no, why?	i.	Excess chemical fertilizers use					
		ii.	Excess cultivation					
		iii.	Changing pattern of cultivation					
		iv.	Want of knowledge					
		v.	Natural causes					
		vi.	Other					
	b. If yes, why?	i.	Less chemical fertilizers use					
		ii.	Less cultivation					
		iii.	No changing pattern of cultivation					
		iv.	Enough knowledge					
		v.	Natural					
		vi.	Other					

21.	What types of Soil fertility?	i.	Very well		iv.	Bad	
		ii.	Well		v.	Very bad	
		iii.	Medium		vi.	Other	

22.	How was soil fertility in past?				Good		Bad	
23.	If good, what types fertility?	i.	Very well					
		ii.	Well					
		iii.	Medium					
		iv.	Bad					
		v.	Very bad					

24.	Do you think? occurred of fertility change				Yes		No	
25.	If yes, what types?	i.	Increased soil fertility					
		ii.	Decreased soil fertility					
		iii.	No change					
		iv.	Others					

26.	Do you think? landuse change has been occurred				Yes		No	
27.	a. If yes, what types?	i.	Changing cultivation pattern					
		ii.	Increasing cultivation					
		iii.	Increased unplanned infrastructure					
		iv.	Increased unplanned roads					
		v.	Much devideation of agricultural land					
		vi.	No changing					
		vii.	Three crops instead of one crops					
		viii.	Three crops instead of two crops					
		ix.	Two crops instead of one crops					
		x.	Other					
	b. If no, what types?	i.	Economic problem					
		ii.	Social problem					
		iii.	Other					

28.	What measures has the government taken to increase soil fertility?	Yes	No	
29.	a. If yes, what types?	i.	Establishing the laws and orders	
		ii.	Increasing knowledge of soil fertility	
		iii.	Training	
		iv.	Other	
	b. If no, what types?	i.		
		ii.		
		iii.		

30.	What measures has N. G. Os or G. Os taken to increase soil fertility	Yes	No	
31.	If yes, what types?	i.	Establishing the laws and orders	
		ii.	Increasing knowledge of soil fertility	
		iii.	Training	
		iv.	Easy loan	
		v.	Other	

32.	Is it possible to preserve the soil fertility?	Yes	No	
33.	a. If yes, How?	i.	Establishing the laws and orders	
		ii.	Increasing knowledge of soil fertility	
		iii.	Training	
		iv.	Easy loan	
		v.	Finding another water source	
		vi.	other	
	b. If no, why?	i.		
		ii.		
		iii.		

34.	What measures have you taken to increase soil fertility	Yes	No	
35.	a. If yes, How?	i.	Establishing the laws and orders	
		ii.	Increasing knowledge of soil fertility	
		iii.	Training	
		iv.	Finding Natural fertilizers and chemicals for soil	
		v.	Finding another water source	
	b. If no, why?	i.		
		ii.		
		iii.		

36.	Do you think that the soil fertility can be preserved properly?	Yes	No	
37.	a. If yes, How?	i.	Establishing the laws and orders	
		ii.	Increasing knowledge of soil fertility	
		iii.	Training	
		iv.	Establishing the laws and orders	
		v.	Family planning	
		vi.	Reducing values of agricultural machinery	

		vii.	Finding another water source	
		viii	Other	
	b. If no, why?	i.		
		ii.		
		iii.		

38.	Has the government taken initiatives to fulfill the harm of soil fertility?			Yes		No	
39.	a. If yes, How?	i.	Increasing knowledge of soil fertility				
		ii.	Establishing the laws and orders				
		iii.	Arranging proper training of the farmers				
		iv.	Reducing values of agricultural machinery				
		v.	Preparing proper laws and policies				
		vi.	Finding water sources for irrigation				
		vii.	Supplying natural fertilizers				
		viii	Supplying natural insecticides				
		ix.	Increasing mass awareness				
		x.	Other				
	b. If no, why?	i.					
		ii.					
		iii.					

40.	Are the measures of the government proper?			Yes		No	
41.	If no, how?	i.	Arranging proper training of the farmers				
		ii.	Reducing values of agricultural equipment				
		iii.	Preparing proper laws and policies				
		iv.	Finding water sources for irrigation				
		v.	Supplying natural fertilizers				
		vi.	Supplying natural insecticides				
		vii.	Other				

42.	Do the local knowledge have to increase soil fertility?			Yes		No	
43.	If yes, how?	i.	Interval between two crops cultivation				
		ii.	Other crops cultivation				
		iii.	Various crops cultivation				
		iv.	Cow dung				
		v.	Other				

44.	Do you know about land laws?			Yes		No	
45.	If yes, how?	i.					
		ii.					

46.	Do you know about protection of soil fertility laws?			Yes		No	
47.	If yes, how?	i.					
		ii.					

48.	Do you know about environmental laws?			Yes	No
49.	If yes, how?	i.			
ii.					

50.	Do you think that land laws are proper?			Yes	No
51.	If no, why?	i.			
ii.					

52.	Do you think that the laws are implementing properly?			Yes	No
53.	If no, why?	i.	Want of awareness of the government		
ii.		Want of knowledge			
iii.		Want of awareness of the people			
iv.		Want of awareness of the farmer			
v.		Want of proper training			
vi.		Intervention of ruling party			
vii.		Want of awareness of the law enforcement institutions			

54.	Do you have patients in your family			Yes	No
55.	If yes, how?	i.	Skin diseases	v.	Cold
ii.		Want of foods	vi.	Cough	
iii.		Diseases of throat	Vii.	Cancer	
iv.		Fever			

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