

**URBAN DEVELOPMENT DIRECTORATE  
MINISTRY OF WORKS  
GOVERNMENT OF THE PEOPLES REPUBLIC OF BANGLADESH**

**Land Use/Master Plan  
Atrai Upazila Shahar  
NAOGAON ZILA**

**May-1990**

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Naogaon Zila

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The Land Use/Master Plan of the Atrai Upazila  
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bare and found acceptable.

 12/12/12

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উপায়ুক্ত  
উপজেলা পরিষদ  
আত্রাই।



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## 1. INTRODUCTION

In the Government's recent policy of overall administrative re-organization, the upazila has been recognised as the most significant tier of administration. Each upazila centre will be focal point of all upazila level administrative activities. Thus the development of upazila centre is the government's key strategy for social, economic and infrastructural upliftment of the upazila region. This also reflects the national policy of bringing the development activities to the door step of vast majority of rural population. The administrative re-organisation has delegated more power to the upazila authority for planning, programming, implementing and controlling activities within the upazila region. It is expected that with geared up administrative, social and economic activities the upazila headquarters will gradually emerge as sprawling urban centres. It is evident that most of the urban centres of the country have already been grown in an unplanned haphazard way leading to a jumbling civic problem. The newly created upazila headquarters can be relieved from the curse and ills of unplanned growth through the preparation and implementation of the land use plan.

The upazila headquarters is conceived as focal point of development of the upazila as a whole. The activities performed in the headquarters will act as propulsive factors for generating development trend in the upazila. The land use plan prepared for the headquarters will serve as a guide line for a planned and co-ordinated development of prospective

headquarter's town upto the year 2001. When successfully materialised, the land use plan will cause orderly growth of the town and its land uses. It will provide efficient transport network, promote development of commerce and industries, extended marketing facilities resulting in generation of more employment opportunities and will induce more rational use of scarce land resources. The plan will reserve all provisions necessary for modern civic life. It is a promise to the potential dwellers of the headquarter for a healthy, pleasant and functionally efficient living environment. Preparation of land use plan is the first step of the programme for bringing the whole of the upazila under planned development. It is expected that other important alternative settlements of the upazila based on hierarchy of settlements will be taken up soon for planning and development to render them healthy, pleasant and growth generating centres.

Planned development is the prime objective of the land use plan. However, there is a common feeling that planning means a total development involving huge volume of fund. But such an idea is not fully correct. Planned development, to a large extent, can be ensured through effective enforcement of development control regulations. But before regulations are formally passed the land use plan itself will require to be given legislative validity in the form of act.



In the light of the above circumstances, it is felt that the upazila centre should grow up expeditiously and the preparation of land use plan for such centre is of utmost importance for better utilization of regions land, people and natural resources. With this end in view, the Govt. has planned to engage consultants for preparation of land use plan for some of the upazila shahars of Bangladesh.

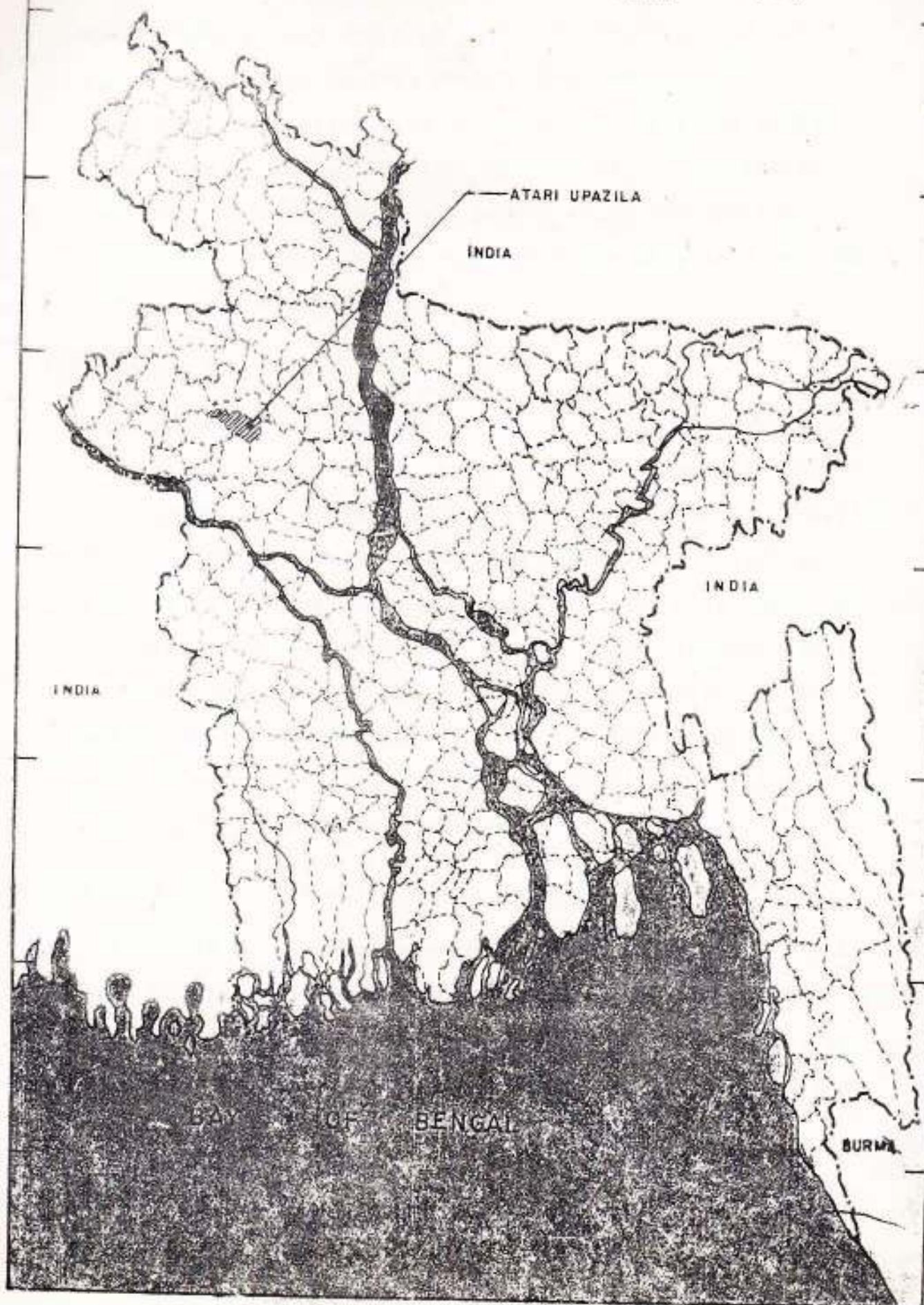


MAP OF BANGLADESH

SCALE: - 1" = 48.28 K.M.

LOCATION OF THE PROJECT

4





## 2. METHODOLOGY OF SURVEY AND ANALYSIS

The objectives and scope of services for preparing the land use plan for upazila shahar have been stated in section-2 and section-3 of the terms of Reference (TOR) respectively. To fulfill the requirements of objectives and scope of services it was needed to go through the following methodology for conducting existing land use and socio-economic survey.

### 2.1. Existing Land Use Survey:

Mouza maps in the scale of 1"inch equal to 330' feet were collected from the D.L.R. covering whole of the designated study area and traced out with plot boundaries and numbers. Thus the field survey sheets were prepared. Detailed and plot to plot survey of current uses of land were marked on the survey sheet. The layout of the special features like mosques, schools, offices, mazars etc. were drawn on the survey sheets as well as on the survey note book. The survey for current uses of land was completed for the whole of the designated study area.

### 2.2. Preparation of Existing Land Use Map:

The survey sheets were compiled in the laboratory and existing land use map were prepared in colours. The land use map was examined and analysed and finally study plan area was delineated. From the survey sheets a base map of existing

land uses was prepared in graphics according to the instructions given in the page - 11 of the TOR.

### 2.3. Existing Land Use Analysis:

A table on current uses of land of the upazila centre was prepared from the survey map. The quantity of land under different uses were calculated by grid method and consequently there might have some errors. The percentages of land under different uses were also calculated.

### 2.4. Socio-Economic Survey and Data Analysis:

A format of questionnaire containing nine items and 115 variables was prepared and administered to collect the data on socio-economic condition of the people of the study area. Three percent of the total households were interviewed by field investigators on random basis. The data collected through socio-economic survey were tabulated and analysed to find out the socio-economic characteristics of the people of the study area. The land use plan will be prepared based on this survey and analysis to meet the socio-economic needs of the people of the study area and catchment area.

### 2.5. Detailed Land Use Survey:

A detailed land use survey was conducted and completed by the survey team for 200 acres of core area of upazila shahar (Scale of R.F. 1:1000). Layout of man-made structures were plotted to the correct scale. The level of land and



flooded area were demarcated through physical verification of land in and around upazila headquarters. Contour maps were collected from the BWDB and compared with the survey map and finally the contours were interpreted on the survey map in a correct scale.

#### 2.6. Determination of Hierarchy of Settlements:

The hierarchy of settlements were determined on mouza basis depending on population, economic activities, social infrastructures provisions, transport linkages and related other characteristics. In order to determine the hierarchy of settlements, necessary socio-economic indicators were selected. Data and information on selected indicators were collected during the field survey from the upazila headquarters. These data were tabulated and they were given assumed weightages to find out the gravity of each mouza of the upazila. According to the weights ranking of mouzas were made. According to the weight of each mouza socio-economic infrastructural developments will be suggested. Special attention will be given to the linkage developments for the whole of the upazila region so that the service provisions located in the upazila shahar can serve the upazila region properly.

## 2.7. Determination of Catchment Area and Study Area:

To determine the sphere of influence of the catchment area, data on commuting distance and service area of the upazila shahar were collected during the field survey from the upazila headquarters. The physical features in and around the upazila shahar study area were analysed. The sphere of influence or the catchment area was determined and delineated through studies on commuting distances, service area and physical features of the upazila headquarters and surroundings. Population and labour forces would be forecasted for the delineated catchment area to provide service provisions in the upazila shahar. The shahar area was determined on analysis of existing land use survey map of the study area. Trend of development of settlements, availability of buildable lands and physical features of the centre and surroundings have been given due considerations.



### 3. THE UPAZILA IN ITS DISTRICT CONTEXT

#### 3.1. Location and physical characteristics:

##### 3.1.1. Background:

The administrative reorganization initiated by the Government has been acclaimed by the people as epoch-making for development of the country. The reorganized hierarchy at the upazila level is the most significant pivot of the new administrative set up. This has transferred a good number of permanent civil servants of the government to the Upazila Parishad which is to be an elected local body to initiate plan and develop its own area. Development control or its implementation requires first the preparation of a Land Use Plan, its approval and then execution. Thus the government have rightly decided to prepare the Land Use Plans for the Upazila Shahars by phases by the UDD.

##### 3.1.2. Location:

The Upazila Raninagar is one of the upazila of Naogaon Zila. It is at a distance of 100 km. from the Zila Headquarters. It lies between  $24^{\circ}38'$  and  $24^{\circ}47'$  north latitude and  $88^{\circ}51'$  and  $89^{\circ}10'$  east longitude. It is bounded in the north by Naogaon Bogra Zila and in the south by Atrai Upazila in the east by Bogra Zila and in the west by Manda Upazila. It comprises a total area of 256.2 sq.km. (98.9 sq. miles) including an area of 0.50 sq.km. of



river with 8 union, 190 mouzas and villages. The density per sq.km. is 405 and the average size of household is 5.6 and the sex ratio is 103 male for every females in the upazila as against 105 for the Zila.

### Principal Topographical Features:

Geologically, Maogaon Zila was a sub-division of Rajshahi Zila is a part of Indo-Gangetic trough which includes almost all of Sind, Northern Rajasthan, almost the whole of the Punjab, Uttar Pradesh, Bihar, Old Bengal (Bangladesh and West Bengal) and part of Assam. Several theories have been suggested concerning the origin of Indo-Gangetic trough. Compression, depression and tension are considered to be the main force responsible for the origin of the trough. Oldham (R.D.) has suggested that the primary force was the weight of the sediments deposited by the rivers from the Himalayan mountains, whatever be the reasons, the alluvial deposits are fairly thick. We know that the Zila lies in the sub-merged Indian Platform known here as the Dinajpur Slope and the thickness is not more than 2,000' ft. developing a sedimentary complex above the bed rocks.

Maogaon was a small Trading Centre on the right bank of the river Januna. The records of the collectorate show that the East India Company had a factory here as early as 1782, which was under the resident at Kumerkhali. Later, when in 1877 a sub-division was formed with the northern thanas of Rajshahi District it was made the headquarters of this new sub-division, which was also named after it.

The Zila is intersected by the river Atrai, to the east of which there is much swampy water logged land; on the north-west in the elevated, slightly undulating tract called the Barind. The Atrai river flows past Bahadurpur and Manik on



the south of the Barind and is joined by Jamuna, which runs from north to south near the Bogra border and passes through Naogaon town. East of the junction, the Atrai bifurcates, and most of the water passes down the northern branch known as the Gull, the southern branch is a narrow shallow stream choked with weeds and moribund. The high bank of these rivers are fringed with villages, and there are several large river-marts on the Atrai. Beyond the villages, the land slopes away to cultivated paddy land or perennial marsh. The most notable of these beels is the Manda Beel near Thakur Manda, a clear sheet of water with rapidly sloping banks. It continues in a chain of beels to the south and east. There is also an enormous stretch of perennial swamp all round Debahati village in the angle between the Atrai and the Jamuna. The area west of the Atrai beyond the beels, in Manda and Mahadebpur upazilas, is typical Barind. It is undulating country cut up by streams, called kharis, flowing in deep channels. The gentle slopes leading down to these streams are terraced into rice fields.

#### Soil:

The kind of soil found in the Naogaon Zila is known as stiff soil of reddish clayey loam distinguishes it from the remainder of the Zila. 'Barind' is the part of old alluvium of middle pleistocene age, later slightly raised and compressed to the surrounding area due to tectonic movement. A characteristic feature of this old alluvium is the abundance of impure calcareous matter in the form of irregular concretions - locally



known as 'Kankar'. The 'Kankar' concretions are formed due to the separation of calcareous and ferruginous material of the alluvial deposits in the nodules.

The red clay of the 'Barind' contains an excess of iron and lime but is deficient in silicious matter as it gets no deposits of sand from flood water. When dry this soil becomes slippery rather than soft. Winter rice is practically the only crop grown in this tract. In the south of the Zila this soil is known as 'Pali' and is very valuable. It produces those crops which are most profitable to the cultivator namely; Jute, Sugarcane, Potato, Turmeric, etc. as well as autumn rice. The higher land along the bank of the Ganges is not so fertile but also produces a variety of autumn and spring crops. The soil is ordinarily black loam, very fertile, most suitable for paddy and, where not too low, for jute. The soil of the 'Beels' of some depth contains black clay enriched by vegetable matter.

#### Climate:

Naogaon does not characterised by great extremes of heat and rainfall, owing to the geographical situation of Zila which ensures it against the direct action of disturbing influences, such as the sea in the south, the strong monsoon current in the east and the Himalaya to the north. Humidity is fairly high during the monsoon period, decreasing gradually from August. Humidity in June is 82 percent, in July-August it is 83 percent, in September 82 percent, and in October 78 percent. For more clarification, the chart below shows the Mean Monthly and Annual Evaporation, in inches, of the Naogaon Zila.

The mean temperature increases from 63°F in January to 85°F in April, May and June. It is about 83°F during the monsoon months, and falls to 72°F in November and 65°F in December. The highest average maximum temperature is 96°F in April, and the highest average minimum is 78°F in July and August. The lowest average minimum is 51°F in January. The daily variation is often great e.g. in May the temperature rises to 106°F and falls at night to 78°F.

The rainfall is very light from November to February, increases somewhat in March and April, the season of local disturbances and continues uniformly at about 10 inches during the monsoon months, June to September, at Raogaon. In May and October, the rainfall is about 5 inches and is due to the occasional incursion of cyclonic storms when heavy rain may fall for several days at a time. The main causes of rainfall are shallow land depressions, which frequently, form during the monsoon months, and the shifting winds which, with the small oscillations of the atmospheric pressure and the high humidity then prevailing are sufficient to maintain daily and, at times, heavy rainfall.

The hot season commences early in March with the cessation of the northerly winds, which are a marked and agreeable feature of the cold weather. South-westerly and hot westerly winds prevail during the closing days of March and the whole of April, when dust storms are of frequent occurrence. Southerly winds prevail in May and south-easterly winds during the monsoon from June to middle of October when cool nights begin to give indication of the approach of the season.

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Source: Bangladesh District Gazetteers Rajshahi, 1976, P.17-18.



### 3.2. Population and Settlement Distribution:

#### 3.2.1. Zila:

According to the district census report of Rajshahi-1981, the total area of Naogaon Zila is 3434 Sq.km. out of which 9.1 Sq.km. or 0.26 percent of the total area of the Zila is Urban. According to the same report the total population of the Zila in 1981 was 17,21,959 persons of which 52,975 persons or 3.09 percent of the district population was urban. The total number of households was 307,258 and that of the total of urban was 7156. The average density of population of the district was 951 persons per sq.km. and that of urban area is 5821 persons per sq.km. The annual rate of growth of population in the Zila and Urban area are 2.73 and 1.92 percent respectively.



### 3.2.2. Upazila:

The total area of Atrai Upazila is 285 Sq.km. out of which 6.6 Sq.km. or 2.31 percent of the total area of upazila are covered by the urban area. The total number of households of the upazila is 22,845 and that of urban area is 1125. The total population of the upazila in 1981 is 138756 persons and that of the urban area is 7582 persons or 5.46 percent of the upazila population. The average density of population of the upazila is 485 persons per Sq.km. and the density of population of the urban area is 1149 persons. The annual rate of growth of population of the upazila is 2.95 persons and that of the urban area is unknown, because the population of the upazila centre has been declared recently as urban.

### 3.2.3. Migration:

As per the district census report of Rajshahi -1981, the annual rate of growth of population in between the census years 1974 -1981 has been recorded as 2.90 percent. The population of Naogaon Pourashava in 1974 and 1981 were 39,955 and 56,754 persons respectively. The annual rate of growth of population inbetween these census period was 5.01 percent. From this analysis we may assume that the annual rate of migration is  $5.01 - 3.09 = 1.92$  percent. The cause of migration may be due to movement of people from rural areas to urban areas for socio-economic reasons.

Table No. 1  
Distribution of Population and Settlement  
Atrai Upazila  
Naogson Zila

	Area in Sq. Km.		Households		Population		Population		Population Density of Pop.		Rate of Growth	
	Total	Urban	Total	Urban	1961	1974	1981	1981	1981	1981	1961-1981	1961-1981
Upazila	285.90	6.6	22845	1125	76919	N.A.	111739	N.A.	138756	7582	485	1149 3.68 3.09
Zila	3434	3.1	307258	7156	997315	N.A.	1424082	N.A.	1721959	52975	501	5821 2.73 18.62

Source: 1. Rajshahi District Statistics - 1983.

2. Upazila Statistics Vol. I, 1985.

3. Bangladesh Population Census, Thana Series.  
Rajshahi District Part-I.



According to the census report of Rajshahi District-1981 the urban population of Atrai upazila is recorded as 7582 persons. The density of urban population of the upazila is higher than that of the surroundings rural areas. It is not possible to determine the rate of migration from rural areas towards the urban centres, because it is the first time that all rural upazila centres of Bangladesh have been treated as urban irrespective of its area, population and level of urbanization. Under this circumstances, it may be assumed that due to upgradation of upazilas, a considerable number of population have been migrated to the upazila centre.

### 3.3. Economic Performance and Transport Linkages:

#### 3.3.1. Employment and Underemployment:

##### Zila:

The total population of Naogaon Zila is 17,30,078 persons out of which 8,81,642 persons are male and 8,48,436 persons are females. The total number of population at the age group of 10 years and above is 11,52,147 or 66.6 percent of the total of Zila population. The total number of labour force are 4,75,229 persons or 41.24 percent and the rest 58.76 percent are house-wives, students and underemployed. In the total labour force the percentage of male are 93.92 and that of female are 6.08% .

The total number of employed persons of Naogaon Zila are 475229 out of which 365010 persons or 76.81 percent are employed in agriculture. In non-agricultural sector 110,219 persons or 23.19 percent engaged which is not reliable. For details Table No. 2 and 4 may be seen.

Upazila:

The total number of population of Atrai upazila is 138756 persons out of which 71167 persons are male and 67589 persons are female. The total number of population at age group of 10 years and over is 90952 persons or 65.54 percent of the total population. The total number of employed persons of the upazila are 37638 persons or 41.38 percent and the rest 58.62 percent are house-wives, students and underemployed. The percentage employed of upazila labour force is higher than that of the zila by 41.38 percent. In the total labour force, the participation of male is 96.42 percent.

The total number of persons employed are 37638 persons out of which 30048 persons or 79.83 percent are engaged in agriculture. In non-agricultural sector 7590 persons or 20.16 percent are employed. For details Table No. 2 may be seen.



Table No. 2  
Population and Labour Force - 1981  
Atrai Upazila  
Naogaon Zila.

Locality	Population		Population (10 Years +)		Labour Force (10 Yrs. +)	
	Total	Male	Female	Total	Male	Female
Upazila	1,38,756	71167	67589	90952	47162	43790
Zila	1730078	891642	848436	1152147	598372	553775
					36,292	1346
					475229	446376
						28853

Source: Upazila Statistics Vol. I, 1985  
Table No. 2.02, Page-41  
Bangladesh Bureau of Statistics.

## Occupational Classification of Population - 1981.

Atrai Upazila

Naogaon Zila

Locality	Agriculture		Non-agriculture		Others
	Cropping	Non-cropping	Manufac-ture	Business	
Upazila	29205	843	463	2906	4221
Zila	3,56,514	8,496	3,888	33,775	72,556

Source: Upazila Statistics Vol.I, 1985.  
 Table No.2.04, Page-71.  
 Bangladesh Bureau of Statistics.

## 3.3.2. Income and Expenditure:

The data on income and expenditure structures of the Zila and upazila are not available. The data on income and expenditure structures of the people of study area have been collected through the questionnaire survey which will be discussed in the section on 'socio-economic data analysis' of the report.

## 3.3.4. Transport Linkages:

The Naogaon Zila has a total network of roads 2526 kilometres, out of which 114.26 kilometres are metalled, 56.32 kilometres are semi-metalled and rest 4055.54 kilometres are non-metalled.

The total network of roads in the Atrai upazila is 31.60 kilometres, there is no metalled rd. Semi-metalled is 1.60 km. roads in the upazila.



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The communication system of Naogaon Zila is very good. The zila headquarters is well connected with the surrounding regions by rail, road and by water ways. It is also connected with capital city both by roads and rail ways.

Table No. 4  
Road Kilometres by type, Distance & Modes  
of Communication 1981-1982.

Atrai Upazila  
Naogaon Zila.

Area	Road Kilometre by type			Distance from D.H.Q.	Modes
	Metalled	Semi-metalled	Non-metalled		
Upazila	-	1.60	350	73.60 Km.	Train, buses.
Zila	114.26	56.32	4055.54	-	Bus, Auto-rickshaws, Rickshaws

Source: Upazila Statistics, Vol.I, 1985  
Table No. Page-200  
Bangladesh Bureau of Statistics.

The upazila headquarters of Atrai is well connected with the zila headquarters both by rail and roads. The distance between the zila headquarters and the upazila headquarters by rail is 73.60 km. The upazila is also connected with zila headquarters by kutchha road.

The mode of transportation are train, Bus and auto-rickshaws. In rainy season small country boats also play a dominant role. The upazila headquarter is connected with most of the union parishads by kutchha road.

### 3.4. Social and Economic Infrastructures of Upazila Region:

#### 3.4.1. Markets/Commerce:

In most cases the village markets are the centre of commerce and they play an important role in the rural economy of Bangladesh. According to the information collected from upazila headquarters, there are 17 hat/bazars or centre of commerce in Atrai upazila. They meet once or twice in a week. Most of the markets have daily morning bazar facilities. There is one market for 454 persons of the study area.

#### 3.4.2. Education:

There is 1 college, 19 high/junior high schools, 10 madrasas and 67 primary schools in this upazila. This shows that there is one college a high/junior high school a madrasa and a primary school for every 2550 persons in the age group of 15-24 years; 287 persons in the age group of 10-14 years; 2837 persons in the age group of 2-24 years and 59 persons in the age group of 5-9 years respectively. The teacher-student ratios in college, high/junior school, madrasa and primary school are 28, 18, 14 and 47 respectively.

#### 3.4.3. Health and Welfare:

There are 1 hospital with 25 beds 4 doctors and 7 paramedics in the upazila. This shows that there is one doctor. One bed and one paramedic available for every 5550, 34689 and 19822 persons respectively.



#### 3.4.4. Urban Services and Utilities:

There is only one police station in the Raninagar upazila. There are 6 post and 1 telegraph offices in the upazila. One post office is serving 23,126 persons. There are electricity in 1 villages of the upazila have so far been provided with electricity. This means that 16.66% of villages of the upazila have electricity facilities. Playing fields exist in almost all unions there are 6 bank branches in the upazila, 1 cinema hall having 400 and 325 seats.

#### 3.4.5. Current Development Projects:

The most important development project taken by the Water Development Board is to protect the shahar from the erosion of the river Atrai and the development of Kutcha road to a highest flood level by the Upazila Parishad. In the UNO Complex the construction of Haliped is yet to be undertaken by the authority. The buildings for the accomodation of officers and staffs have already been completed.

#### 3.4.6. Synthesis: Identification of Hierarchy of Settlements in the Upazila.

In the upazila region of Bangladesh, functions are found neither concentrated in one particular centre nor fully dispersed. They have unique characteristics of their own and differ from one region to another. Sometime commercial activities are found to be concentrated with social activities and sometime they are also found dispersed in different places. For this reason, it will be a wise policy to

determine the hierarchy of settlements on mouza basis. Determination of hierarchy of settlements on mouza basis will indicate specific location of functions. The hierarchy of settlements are determined depending on population, economic and social infrastructures provisions, transport linkages and related other characteristics.

To determine the hierarchy of settlements 18 main socio-economic indicators have been selected (See Table No. 5 ). Data on these selected indicators have been collected on mouza basis from the upazila headquarters during the field survey in the month of May-1989. The mouza-wise distribution of socio-economic indicators have been shown in Table No. Selected socio-economic indicators have been given assumed range of weightage for each (See Table No. 6 ). According to the given weight, the gravity of each function located in related mouza have been calculated (See Table No. 7 ). Finally, the total weight of each mouza have been found out. According to the respective weights, and ranking of each mouza have been made. The mouzas having score below ten avoided. According to the analysis, the highest score is gained by Pathail Jhara, Beharipur mouza where the upazila administrative headquarters, police station, College and high school are located. It is also found that most of the important functions are located in the upazila centre. The ranking of scores gained by mouzas are categorized as shown in the Table.



## Indicators of Hierarchy of Settlements and their Weights.

Sl. No.	Infrastructures	Abriviation	Weight
1.	Public Institution ...	Pi	5 - 10
2.	Commerce ...	Ch	1 - 5
3.	Industrial Establishment	In	1 - 5
4.	Police Station ...	Ps	1 - 5
5.	Health and Welfare ...	HW	1 - 5
6.	College ...	Ec	5 - 10
7.	High School ...	EH	3 - 6
8.	Primary School ...	Ep	1 - 2
9.	Post Office ...	Po	1 - 5
10.	Telegram and Telephone ...	Tt	2 - 5
11.	Electricity ...	Et	2 - 5
12.	Religious Institution ...	Ri	1 - 5
13.	Road Pucca ...	Rp	1 - 5
14.	Station (Rail, Water, Bus)	St	1 - 5
15.	Recreation (Park, Playing Field, Cinema)	Re	1 - 5
16.	Bank ...	Bk	1 - 6
17.	Area 500 Acres ...	Ar	1 - 6
18.	Population 500 Persons ...	Pn	1 - 5

Table No. 6

Atrai Upazila  
Maozon Gila

## List of Indicators of Settlement Hierarchy

J.L. No.	Name of Village	P1	Cn	Tr	Pa	Sw	So	En	Ln	Co	St	R1	R2	St	Ho	Bk	Ar	In
4	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
69	Choudhury Bhabanipur	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	163	1555
186	Panchupur	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	467	3176
86	Beharipur	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	79	510
94	Saidpur	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	344	1454
99	Bhopara	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1319	2374
202	Bisa	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	954	1652
281	Patisar	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1082	973
321	Nandanali	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	344	1288
329	Paharpur	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	225	938

Source : Upazila Statistical Office.



Table No. 7

Determination of Hierarchy of Settlements by Weightage Method.

Atrai Upazila  
Naogaon Zila.

S. No.	Name of the Union	Pi	Ch	In	Ps	Lv	Sc	Sh	Sp	Yo	Tt	St	Ri	Rd	St	no	Bk	Ar	Total	
69	Choudhury Bhabanipur	5	3	3	-	2	-	-	1	2	-	3	2	-	-	1	2	1	5	31
186	Panchupur	-	2	2	-	-	-	3	1	2	-	3	2	3	-	1	3	3	5	30
86	Beharipur	7	5	3	-	5	-	6	3	2	5	5	2	4	2	1	6	1	6	63
90	Saidpur	3	3	2	-	-	-	3	1	2	-	3	2	3	-	1	3	3	5	34
99	Bhopara	-	3	-	-	-	5	6	1	-	-	-	1	-	-	-	-	3	6	26
202	Bisa	-	2	2	-	2	-	3	1	2	-	-	1	-	-	1	-	1	4	19
203	Patisar	3	3	-	-	-	-	3	1	-	-	-	1	-	-	-	-	3	6	20
321	Nandanali	-	2	-	-	-	-	-	1	2	-	-	-	-	-	-	-	1	2	11
329	Paharpur	-	3	2	-	-	-	-	1	2	-	-	1	-	-	-	-	1	3	16

Note : Weightage used on assumptions.

Range of Score	Category of Settlements	Name of Settlements
----------------	-------------------------	---------------------

41-60 and above

A

Beharipur

21-40

B

Panchupur, Choudhury

11-20

C

Bhabanipur, Bisa

Patisar, Nandanali, Paharpur

The ranking of mouzas are marked by 'A', 'B' and 'C' as per the calculated respective weights and garvity of each mouza. Here the highest score 'A' are gained by Pathaljhara and Beharipur mouzas. The second highest score 'B' are gained by Panchupur, Choudhury Bhabanipur and Bisa mouzas. The third ranking 'C' are gained by Patāsar, Nandanali and Paharpur mouzas etc.



According to the instruction given in the scope of work 4.3 of the TOR, the socio-economic survey for the study area of Atrai Upazila Shahar was completed. The main objective of socio-economic survey was to find out the socio-economic conditions of the people of study area. The results of analysis of socio-economic data may help to locate adequate provision of functions of government's services and facilities of basic needs in the upazila centre which may bring some significant improvements in the quality of life of the rural people. The data so collected through socio-survey are analysed in the following paragraphs.

#### 4.1. Population Characteristics:

##### 4.1.1. Population Growth:

For the study area of Atrai upazila headquarters the socio-economic survey was completed for 55 dwelling households containing 280 persons, out of which 168 persons are male and 112 persons are female. There are 122 males for 100 females in the study area. It is possible to assume that due to upgradation of the upazila economic activities have been started in the upazila headquarters of Atrai which resulted in generation of jobs. Males have come to the upazila headquarters for job.

The age and sex composition of the people of the study area shows that the age group of 11-45 years contains 138 persons or 52.27 percent of the total population. Above this age group population of the study area falls sharply.

## 4.1.3. Literacy:

According to the socio-economic survey there are 207 persons in the age group of 6 years and above out of which 162 persons are literate. The rate of literacy is 82.61 percent. The rate of literacy of the upazila as a whole is 22.36 percent only and that of the national is 23.80 percent. The rate of literacy of the study area of the Atrai is much higher than that of the upazila and than that of the national.

## 4.2. Household Characteristics:

## 4.2.1. Household Size:

It has been observed that there is a tendency of increasing the households in the study area. But the exact number of households could not be ascertained. According to the socio-economic survey 50 dwelling houses contains 264 persons that is the size of households is 5.28. But according to the census report of 1981, the average size of households of the upazila was 5.7 persons. Accordingly, we may say that the size of households of the study area is smaller than that of the upazila average.



Age and Sex Composition of Population of the Study Area  
May -1989

Age Group	Population			Percentage
	Total	Male	Female	Total
0 - 5 years	57	29	28	21.59
6 -10 "	69	36	33	26.13
11 -15 "	33	16	15	12.50
16 -20 "	19	11	8	7.20
21 -25 "	15	6	9	5.63
26- 30 "	24	8	16	9.09
31- 35 "	14	10	4	5.30
36- 40 "	17	12	5	6.44
41- 45 "	5	4	1	1.89
46- 50 "	4	3	1	1.52
51- 56 "	2	1	1	0.76
56- 60 "	2	1	1	0.76
61 + above	3	1	2	1.14
	264	140	124	100.00

Source: Socio-Economic Survey.

## 4.3.2. Household Structures:

According to the socio-economic survey there is a pucca structure and households are semi-pucca. Most of the structures are kutcha. We may say that the structural conditions of households of the study area are poor. The classification according to the household structures and their percentage are shown in Table No.9

Atrai Upazila  
Naogaon Zila  
Household Structures of Study Area  
May - 1988

Type of Structures	No. of Households	Percentage
Pucca	21	2.91
Semi-pucca	449	20.64
Thatched	552	70.45
	722	100.00

4.3. Economic Performance:

The total number of population of age group 10 years and above is 159 persons, out of which 21 persons or 2.91 percent are employed in different sectors of economic activities. The number of persons unemployed are 118 or 69.81 percent which includes housewives, students and underemployed persons. 3- person or 1.89 percent is invalid..

Table No. 10  
Atrai Upazila  
Naogaon Zila  
Employment Structures of Study Area  
May - 1988

Sl. No.	Employment Structures	Persons	Percentage
1.	Employed	42	30.19
2.	Unemployed	108	67.92
3.	Invalid	3	1.89
	10 + Population	159	100.00



The total number of employed persons are 49, out of which 14 persons or 28.57 percent are agricultural labour force. Percentage of agricultural labour force is low because there are many rice mills and jute godowns in and around the upazila centre of Atrai. The number of professional and technical labour forces are 3 persons. In business sector, 18 persons or 36.74 percent are employed. The production and transport sector employ 12 persons. For details of professional structures Table No. 11 may be seen.

Table No. 11  
Atrai Upazila  
Naogaon Zila  
Professional Structures of Study Area  
May - 1988

Sl. No.	Profession	No. of Persons	Percentage
1.	Agriculture	14	28.57
2.	Professional and Technical	3	6.12
3.	Administrative and Management	2	4.08
4.	Business	18	36.74
5.	Production and Transport	12	24.49
		49	100.00

The annual income of 13 households or 28.26 percent of the total households lie between Taka 18,000 to 25,000/- only. The income of highest income group lies between Taka 26,000/- to 50,000/- and number and percentage of households in this income group are 26 and 65.00 respectively. Only 2.50 percent of households have income between Taka 76,000-100,000/- only. The analysis of expenditure group shows the same trend.

The lowest income of households is Taka 18,000/- only. The highest income of households is Taka 80,000/- only. The average annual income and expenditure of the households are Taka 33,800/- and 33,425/- respectively. The average annual savings of per households are Taka 375/- only. For details Table No. 12 may be seen.

According to the survey, the main sources of income of households are agriculture and business or both. The mentionable fields of expenditure are food and dress. Only a small amount of money is spent for education.

Table No. 12  
Atrai Upazila  
Naogaon Zila

Average Annual Income and Expenditure of Study Area  
May-1989

Rank in Thousand Tk.	Income		Expenditure	
	Households	Percentage	Households	Percentage
+ 25	13	28.26	13	28.26
26 - 50	28	60.87	28	60.87
51 - 75	2	4.37	2	4.37
76 - 100	3	6.50	3	6.50
	46	100.00	46	100.00



There is no small scale and cottage industries in the study area of Atrai . . Most of them are rice husking and saw mills. There is one Brick field and one oil mill .

The total area covered by these industries 6.4 acres. The average area covered by an industry is 0.60 acre only.

The average number of workers in a mill are 5 persons. The highest number of workers found in a rice mill are 9 persons. Even a single person works in a rice husking mill.

Most of the workers live near the mills. Maximum distance of a worker is 5 km. some workers come from a distance of 2 to 5 Km.

#### 4.5. Educational Institutions:

##### 4.5.1. Primary Schools:

There are 2 primary schools in the study area having 2110 children and covering only 1.50 acres of land. The land used by primary schools are inadequate. The average of land used by a primary school is approximately 0.75 acre. The average of enrolment in a primary school is 682 children. The average of teachers in a school is 113 persons. There is one teacher for 56 children. Most of the primary schools have facilities of drinking water and toilets. The space for playing field is inadequate.

#### 4.5.2. Secondary School :

There is one secondary school for boys and girls. The area for the school is 0.60 acre enrolling 610 students. The total number of teachers are 14 persons. The ratio of teacher and students are 1:44.

#### 4.5.3. College:

There is a college in the study area. The college has been located on 1.0 acre of land. The college enrolls 540 male & female students. There are 15 teachers in the college. The ratio of teacher and student is 1:36 only.

#### 4.6. Administrative Institutions:

Administrative institutions include both the public institutions and semi-government institutions. Besides the upazila complex, there are other offices. The total number of officers are 9 and that of staff are 61 only. The commuting distance of officers and staff ranges 1-5 km. The land use analysis of upazila complex will be felt later on in the existing land use survey and analysis section of this report.

#### 4.7. Financial Institutions:

There are 3 financial institutions in the study area namely the Janata Bank, the Sonali Bank and the Bangladesh Krishi Bank. There are 11 officers and 62 staff working in these banks.



There is only one health centre in the study area. The area of the health complex is 7.00 acres. There is a 31 bed hospital in the health complex. The number of doctors and employees are 5 and 110 respectively. The average of outdoor patients per day is 300 only.

## 4.9. Recreational Facilities:

There is a cinema hall attached to the Post office and a Press Club attached to the school in Beharipur mouza.

## 4.10. Distance of Important Places From Homes:

The distance of main roads, working places and other service centres from residences of the people is needed to analyse the adequacy of services in any urban area. The following analysis showed the distances of service facilities from the residences.

## 4.10.1. Main Road:

The distance of almost all households are approximately 0.50 km. and the average distance of households is 0.35 km. only. The roads are found kutcha and brick soling.

## 4.10.2. Working Place:

The place of working is very nearer for most of the people of the study area. The average distance households from the places of work is 0.80 km. The maximum distance of working place from the households is 2.5 km. only.

The average distance of households is 0.67 km. from the primary schools. This distance can be the desirable walking distance of primary school children. The maximum distance of some households from primary school is 1.50 km. It is necessary to locate more primary schools in the study area.

## 4.10.4. High School:

The average distance of the households and the high school is 0.74 km. One kilometre distance may be considered as desirable walking distance of high school going boys and girls. The maximum distance from the households to high school is 2.00 km.

## 4.10.5. Hospital:

The average distance of households from the hospital is 2.75 km. The maximum distances of hospital from households is 6.00 km. The hospital has not been located in the centre of the upazila study area. It means more health centre is needed to be located in the study area.

## 4.10.6. Post Office:

The postal service of the study area is not quite good. The average distance of households from the post office is 1.54 km. Even the distance between the households and post office ranges 5-6 km.



#### 4.10.7. Rail/Bus Stations:

The distance of the households from the Bus/Rail station is 1.82 km. The maximum distance is 4.00 km.

#### 4.11. Available Facilities:

According to socio-economic survey almost all facilities are available in the study area. Water is available from tube-well. Supply of electricity is not adequate. Telephone service is very poor. The Upazila has Railway facilities but it is not directly connected with the newly builtup shahar area and the upazila H.Q. At present people from Railway Station come to the upazila H.Q. and other offices by boats. It is to mention here that during survey the local people have very much expressed their interest in constructing the bridge on the existing piers parallel to the Railway bridge. This will make people easier to come to upazila offices in a shortest time.

## 5.1. Definition of Sphere of Influences/Attractiveness:

Functions located in space have dynamic influences on surrounding areas. It may be assumed that the zone of influence of any functional centre varies directly with the potentiality of the centre. Physical barriers and discontinuation of settlements are the main constraints of the zone of influence. But specialized functions have greater zone of influences.

In an upazila headquarters, located government services have zone of influences over whole of the upazila region. The social functions like hospital, college, sports stadium etc. may have greater zone of influences spreading even beyond the territorial boundaries of the upazila region. The zone within the commuting distance of a upazila headquarters may be called the catchment area of that upazila headquarters. The information and data collected during our socio-economic survey from the upazila headquarters and surroundings have been analysed and described in the preceeding chapter on "socio-economic condition of the study area". Here we shall throw a little light of socio-economic analysis.



The Atrai upazila headquarter lies on south of Santahar railway track. It is connected by a semi-metalled road with Naogaon. It is also connected with other upazilas by road. The officials both government and non-government, workers in industries and customers can commute from distant places. Studies on commuting distances of govt. officials showed that their distance ranges 3 km. to 5 km. and average distance is 4 km. The industrial workers come from 2 km. to 5 km. distances and average distance of workers is 3 km. The buyers and sellers of Atrai Hat and Bazar comes from 3 km. distances.

Due to the location of upazila headquarters on railway line and good semi-metalled road, the analysis above showed a special facilities of commuting. But walking distance must be considered here to define the zone of influences. From analysis and assumptions, we may say that zone of influence may vary 3-5 km. distance from the headquarters of Atrai upazila (See the map of hierarchy of settlements).

Details of area and population of 1961, 1974 and 1981 of catchment area Table No. 13 may be seen.

Table No. 13  
House-wise Area and Population  
1961, 1974 and 1981 (Catchment Area)  
Atrai Upazila

J.L. No.	Name of House	Total Area		Total Population		Involves Area		Involved Population			
		Acres	Hac.	1961	1974	1981	Acres	Hac.	1961	1974	1981
	Jat Amrai	371	150	1175	907	1458	371	150	1175	907	1458
	Amrai Basha	1758	711	2024	999	3517	1758	711	2024	999	3517
	Kunghat	155	63	372	528	549	155	63	372	528	549
	Rachandrabati	382	154	337	616	745	382	154	337	616	745
	Thartetulin	339	137	2490	802	1001	339	137	2490	802	1001
	Saidpur	344	139	636	654	1454	344	139	636	654	1454
	Balaranchak	204	82	453	670	846	204	82	453	670	846
	Mohadighi	1009	408	1299	1985	2436	1009	408	1299	1985	2436
	Beharipur	79	32	317	316	510	79	32	317	316	510
	Panchpakhia	159	64	345	290	821	159	64	345	290	821
	Pathail Jhara	324	131	720	1109	1625	324	131	720	1109	1625
	Bilgolia	189	76	212	361	446	189	76	212	361	446
	Gurnai 30%	354	143	326 (30%)	192	618	354	143	326	192	618
	Kasunda	377	152	353	532	636	377	152	353	532	636
	Khanjar	220	89	417	619	806	220	89	417	619	806
	Kole	125	50	230	306	386	125	50	230	306	386
	Madhugurnai	313	126	318	568	854	313	126	318	568	854
	Malipukur	170	69	247	446	544	170	69	247	446	544
	Panchupur	467	189	1798	2146	3176	467	189	1798	2146	3176
	Parkasunda	224	91	203	322	500	224	91	203	322	500
		7563	3056	14282	14358	22931	7563	3056	14282	14358	22931

Growth rates : 1961-74 = 0.04 (low)  
1974-81 = 6.69 (high)  
1961-81 = 2.37 (medium)



To prepare the land use plan for Atrai Upazila shahar in order to serve as locational guidelines indicating places of work, residence and recreation and to facilitate public and private developments at the upazila centre through physical planning approach, a plot to plot survey of current uses of land was completed for 1462 acres of land in and around the upazila headquarters. The survey map was analysed very carefully and found that most of the non-agricultural functions including the residential areas have been concentrated in between and along the railway line and metalled road. The land of peripheral areas of centre are mainly under the use agriculture with a few home-steads which should not be brought under any non-agricultural use. A branch river of the Jamuna bounds the centre from the east. Finally, 1462 acres of land have been included in the shahar area of Atrai. The shahar area includes the mouzas are shown in the Table No. 14 with area and population of 1961, 1974 and 1981.

### 5.3. Existing Land Use; Facilities and Utilization Characteristics:

The study area of Atrai upazila includes 1462 acres of land. According to survey, the current uses of land of Atrai upazila shahar planning have been classified as shown in Table No. 15. The facilities and utilization characteristics with locational description have been discussed in the following paragraphs.

Table No. 14

Mouza-wise Area and Population of  
1961, 1974 and 1981 (Study Area)  
Atrai Upazila  
Naogaon Zila

J.L. No.	Name of Mouzas	Total Area		Total Population		Involved Area		Involved Population			
		Aores	Hec.	1961	1974	1981	Aores	Hec.	1961	1974	1981
	Jat Anrui (part)	371	150	1175	907	2171	111	45	1175	907	850
	Bhartentulia	339	137	2490	802	1001	339	137	2490	802	1001
	Saidpur (part)	344	139	636	654	1454	209	85	636	654	883
	Beharipur	79	32	317	316	510	79	32	317	316	510
	Panchpakhia (part)	159	64	345	280	821	87	64	345	280	449
	Pathail Jhara	324	131	720	1109	1625	324	131	720	1109	1625
	Mohugurnai	313	126	318	568	854	313	126	318	568	854
	Study Area	1929	779	5001	4536	7723	1462	620	5001	4536	5972

Growth Rates: '61-'74 =  
1961-'74 = -0.02 (low)  
1974-'81 = 7.29 (high)  
1961-'81 = 1.26 (medium)



Table No.15  
 Mouza-wise Existing Landuse Analysis  
 Atrai Upazila Shahar  
 Naogaon Zila  
 1989

Name of Mouzas	Agricu- ulture & Forestry	Comm- erce and In- dustry	Educa- tion	Health and Welfare	Admini- strative Govt. & Semi-Govt	Recre- ations	Socio- Cul- tural	Urban Servi- ces	Roads	Resi- dent- ial	Re-se- rve Water	Total Area
Jat Amrul (Part)	62.70	7.60	5.00	-	5.75	-	0.30	1.25	4.00	14.5	6.50	111.00
Bhartentulia	248.25	3.40	0.50	-	2.15	0.20	0.15	1.25	21.00	46.75	30.0	339.00
Saidpur	135.00	-	1.15	-	-	-	0.10	-	5.50	22.25	45.0	209.00
Beharipur	51.55	6.25	-	7.00	4.90	0.65	-	0.25	7.00	8.00	-	78.00
Panchpakhia(part)	62.20	0.75	-	-	-	-	-	0.80	1.25	14.50	0.75	87.00
Pathalghara	254.23	0.50	3.50	-	3.15	-	0.15	3.00	3.00	34.50	12.00	324.00
Kachhujurna	289.25	-	-	-	-	-	-	-	4.00	15.75	4.0	313.00
Shahar area =	1109.78	17.00	10.15	7.00	24.92	0.25	0.70	6.55	50.75	156.25	36.25	1462.00

The total land covered by agriculture and forestry amount 1109.73 acres or 75.91 percent of the shehar area. The land on the south of the Baninagar-Atrai metalled road is char land which can not be brought under any urban uses. The agricultural lands should be kept reserve.

## 5.3.2. Commerce and Industry:

Commerce and industry together cover 17.90 acres or 1.22 percent of the Shehar Area. Market and shops cover 5.25 and 4.25 acres respectively. For small scale and cottage industry purposes 8.40 acres of land are used. The market is located beside the railway station and on the other bank of river Atrai in Balubhara and Beharipur mouzas.

## 5.3.3. Administrative:

The total land used for administrative purposes amounts to 25.27 acres or 1.73 percent of the shehar area. Office and quarters are located in the south of the river Atrai in Pethaljheramouza. The govt. godown is also located on the Beharipur mouza. The U.P.O. Complex alone uses 16.00 acres of land. The land used by other government departments amount to 9.27 acres only.

## 5.3.4. Socio-cultural:

The land used for socio-cultural activities amounts to 0.70 acres or 0.05 percent of the available land. For mosque and eddghah 0.25acre of land is used. The graveyard covers an area of 0.45 acre of land and are located in the Beharipur mouza.



### 5.3.5. Urban Services:

The total land used for urban services amounts to 6.55 acres or 0.45 percent of shahar area. The land used for post office is 1.25 acre. Telephone exchange used 0.05 acre and the land used by police station amounts to 0.25 acre. Bus and rail stations covers 0.50 acres of land. The police station is located in between the Health Complex and the Bazar on Beharipur mouza. The railway station is located on the west of the bazar. The T & T and Post office is located on the east of the railway tract opposite the College and Bus-Stand. The site for upazila Halipad is selected on the southern side of the U.P.O Complex in Pathaljhara and Part in Madhugurnal mouza.

### 5.3.6. Recreational:

This sector used only 0.25 acre or 0.02 percent of the shahar area is covered by recreational facilities. Recreational facilities are insufficient in the study area. There is a Cinema hall of only 0.10 acre and located in the north of the road to Kasa Bari Hat and western side of the Post Office.

#### 5.3.7. ROADS :

Roads cover 50.75 acres or 3.47 percent of land of the shahar area. The Semi-metalled road on which most of the functions are located covers 2.00 acres of land. The rail way covers 21 acres and the local roads covers 29.75 acres of land approximately.

#### 5.3.8. RESIDENTIAL :

The existing residences cover 124.75 acres or 8.53 percent of the shahar area. Residences are concentrated in between and along the roads and mostly are found scattered through out the shahar area.

#### 5.3.9. URBAN SERVICES :

Ponds and Rivers cover 98.25 acres or 6.72 percent of the shahar area. The River Atrai alone covers 74 acres of land while ponds and low lands cover 14.25 acres. They cannot be brought under any urban uses. They should be kept reserved for fish cultivation as well as for irrigation. They are found scattered through out the shahar area.

#### 5.4. PHYSICAL OPPORTUNITIES AND CONSTRAINTS :

The south-eastern part of the shahar area in Pothuljhara mouza and Madhugurnai mouza are tract of high land where most of the urban functions are located. The level of land in between road and land is 45' or more. Lands in the south western parts of the shahar is low and bounded by 35'-40' contour is very low and not buildable. Lands on east of the railway line has agricultural value and kept reserved.



The land tenure system in Haogson is similar to that of almost whole of Bangladesh. The land revenue system introduced by the British Ruler was inherited after Independence in 1947. By a legislation known as the East Bengal Estate Acquisition and Tenancy Act 1950 all proprietary rights of the middlemen that is the Zamindars and other sublessees were abolished and agricultural tenants were given permanent, heritable and transferable rights in their lands. They were entitled to use the land in any way they liked. They were to pay rent direct to the government. Thus direct relation was established between government and the majority of the governed and the tillers of the soil became also the real proprietors.

Recently the present government has made an important amendment that land used by dwelling houses are not transferable. The government has also distributed acres of lands to the landless cultivators and clucher which are not transferable.

#### 5.4.2. Land Value:

As the information collected during the field survey, the value of land in and around the upazila headquarters has greatly been increased due to the upgradation of upazila. At present the value of an acre of residential land ranges from Tk. 15 to 11.25 lacs. The value of fertile agricultural land ranges from Taka 1.20 to 2.25 lacs per acre.

The value of medium agricultural land which produces two crop in a year lies between Taka 1.20 to 1.50 lacs. The value of poor agricultural land which produces one crop ranges from Taka .75 - .90 lac per acre. The poor agricultural land includes low lands of the upazila. The mouza-wise land value in detail has been shown in Table No.16

Table No.16  
Atrai Upazila Shehar  
Naogaon Zila  
Shehar Area  
Value in Lacs Taka.

S.L. No.	Name of Mouza	Category of Lands			
		Residential Land	Fertile Ag. Land	Medium Ag. Land	Poor Ag. Land
	Chak Monu	13.00	3.60	2.25	1.25
	Pali Bahadurpur	13.00	2.25	2.00	0.90
	Balu Bhara	15.00	2.50	2.00	1.15
	Khatteswar Raninagar	12.00	1.50	1.00	0.50
	Ranasinga	11.50	1.75	1.25	0.75

Source: Chairman, Baulia Union Parishad 3.5.89.



## 6.0 FORECASTING :

Forecasting is an important planning tool. Prediction of population, household structure and density of population is necessary to estimate land for various functions & uses. Projections of population under different growth conditions and rates are often pursued for formulating plan alternatives.

In this study for Atrai, three population projections were considered, viz. high, medium and low. These growth rates have been calculated with an interval of 7, 13 years and 20 years. The highest figure among these 3 is considered as 'high' and lowest one is 'low' and the rest figure as 'medium'. The population figure of 1981 was considered the base for these projection which are shown in Table-17 years intervals upto 2001 A.D.

### 6.1 POPULATION PROJECTION, ATRAI CATCHMENT AREA, 1981-2001 A.D.

#### 6.1.1. Within the Sphere of Influence:

The sphere of influence or the 'catchment Area' recorded 14282, 14358 and 22931 persons in the year 1961, 1974 and 1981 censuses respectively. Here the annual growth rate is 0.04, 6.69 & 2.37 is calculated in between the year 1961-74, 1974-1981 and 1961-1981 censuses. This indicate that the average growth rate is almost same the national growth rate (2.36). We have indications that the growth rate in urban areas will be on the higher side. We therefore, assumed 2.75 as medium growth rate for the catchment areas.

Population projection from 1981 to 2001 A.D. for the catchment area are shown in Table-17. The base population of 1981 for the catchment area, i.e. 22931 is projected to 39451 in the year 2001 A.D. following a medium growth rate.

Household projections for the Upazila catchment area are given in Table-18. Average family size of the Upazila was used to divide the figures of catchment area population projection to reveal the household projection. The average household size of the upazila and the catchment area are approximately the same, i.e. 5.6, which is comparatively similar to that of the national average of 5.3 persons per household. According to the medium projection the number of households in the catchment area is expected to be 5874 in the year 2001 A.D.

Table-17  
Atrai Upazila  
Naogaon Zila  
Population Projection for the Catchment area

Projection Types	Projected Population and years				
	1981	1986	1991	1996	2001
High	22931	31698	43818	60572	83733
Medium	22931	26262	30077	34447	39451
Low	22931	22976	23022	23068	23115

Growth rate : L= 0.04  
M= 2.75 (assumed)  
H= 6.69



Population density in the catchment area in 1981 was 3.73 persons per acre. It is projected to be 6.00 persons per acre in 2001 A.D. in a medium growth rate. Projection of population density in the catchment area is shown in Table - 19 .

Table 18  
Atrai Upazila  
Naogaon Zila  
Household Projections for the Catchment Area

Projection Types	H.H. Size	1986		1991		1996		2001	
		Pop.	H.H.	Pop.	H.H.	Pop.	H.H.	Pop.	H.H.
High	6.07	31698	5222	43818	7219	60572	9979	83733	13794
Medium	5.93	26262	4428	30077	5072	34447	5809	39451	6653
Low	5.80	22976	3961	23022	3969	23068	3977	23115	3985

Table 19  
Atrai Upazila  
Naogaon Zila  
Density Projections for the Catchment area

Projection Types	Projected density and years				
	1981	1986	1991	1996	2001
High	3.03	4.19	5.79	8.00	11.07
Medium	3.03	3.41	3.83	4.31	4.84
Low	3.03	3.04	3.04	3.05	3.06

### 6.1.2. WITHIN THE SHAHAR AREA :

The Atrai Upazila Shahar area induced a comparatively higher annual growth rate than the catchment area in between 1961-1981 censuses. Here we have assumed growth 3.0% as the growth rate in urban areas are normally on the higher side.

Population projection for the Shahar area is given in the Table-20. The medium projection of the Table show a base population of 7723 of 1981 will increase to 9920 by the year 2001 AD.

Household projections for the Shahar area are provided in Table-21. Average household size of the shahar area is approximately same as the catchment area, which is 5.93 in medium projection according to Table-21. Shahar area will have to sustain 1673 households by the year 2001 A.D. This figure also relate the amount of residential land that will be required by 2001 A.D. and is discussed later in this Report.

Population density of the Shahar area is shown in Table-22. The 1981 density of 4.00 per acre in the shahar area is expected to increase to 5.14 in the medium growth rate. It is important to note that the Atrai Upazila shahar area population density (4.00 persons per acre) is higher than the catchment area, which in 1981 was 3.03 persons per acre.

### 6.1.3. ASPECTS OF MIGRATION :

Migration are common population phenomena, however, the most important type of migration in Bangladesh that frequently draw planners attention, is rural to urban migration. Factors for this category of migration are numerous, but economic reason is the general one. As the centre will grow as a upazila shahar, the need for administrative, social, professional and other related services will also be gradually growing. Such job oppertunities will attract population from areas around the Upazila shahar.



As discussed earlier the annual rate of growth of such rural to urban migration in the Zila is around 3.45% . from the analysis of socio-economic data gathered during the field survey in Raninagar Upazila region and the Shahar area, two categories of migration into the shahar area can be expected. These will be due to the upgrading of the Upazila and establishment of Upazila headquarter and they are :

- (1) Induced by the public sector- inflow of population to saturate the government and semi-government administrative positions; and
- (2) Induced by the private sector - concentration of population in service sectors as transportation, business and commerce, professional and other urban services.

Table-20  
Atrai Upazila  
Naogaon Zila

Population Projection for the Shahar area.

Projection Types	Projected population and years				
	1981	1986	1991	1996	2001
High	7723	10979	15609	22190	31548
Medium	7723	8953	10379	12032	13948
Low	7723	7715	7707	7699	7692

Growth Rate : High= 7.29

Medium 3.00 (assumed)

Low =-0.02

Table-21  
 Atrai Upazila  
 Naogaon Zila  
 Household Projection for the Shahar Area

Projection Types	Projected Households and years				
	H.H. Size	1986	1991	1996	2001
High	6.07	1809	2571	3656	5197
Medium	5.93	1510	1750	2029	2352
Low	5.80	1330	1329	1327	1326

Table-22  
 Atrai Upazila  
 Naogaon Zila  
 Population Density Projection for Shahar Area

Projection Types	Projected Population per acre and years				
	1981	1986	1991	1996	2001
High	4.00	5.69	8.09	11.50	16.35
Medium	4.00	4.26	4.54	4.83	5.14
Low	4.00	3.98	3.99	3.99	3.98



## 6.2. LABOUR FORCE AND EMPLOYMENT:

General types of employment in an upazila are broadly classified, by the Bangladesh Bureau of Statistics(BBS), as (1) Agricultural (with two sub-categories of i) Cropping and ii) Non-Cropping) and (2) Non-Agricultural (with three Sub-categories as i) Manufacturing, ii) Business, and iii) others).

BBS considered population with age 10 years and over as target labour force.

The 'Bangladesh Population Census 1981 Rajshahi District Part-I' published in January 1986 by the BBS, illustrated distribution of this target labour force in different employment types (listed above) in Table C04, on page 506-508.

It is from this BBS Table, using the percentages of population aged 10 years and above to that of the total population in different type of employment in the Upazila as a template over the medium growth population projection of the catchment area (table-17), it was possible to project the labour force for the catchment area upto 2001 A.D. This projection of labour force is shown in Table 23.

Table-23, however, need to be treated with caution. The projected labour force indicated in Table is the total number of labour force that would be available in the projected year of intervals. It is important to note here that according to the socio-economic survey conducted by this consulting agency, it was found that, of the total sample population of age group of 10 years and above more than 62.68% were unemployed. This unemployed group includes housewives, students and the actual unemployed. Definite figures unemployed or under employed persons in the catchment area were not available.

Table -23  
 Atrai Upazila  
 Naogaon Zila  
 Medium Projection of Labour Force for Catchment Area  
 (Population age 10 years and above)

Type of Employment	10 Yr+Pop. as% of Total Pop.	Projection				
		1981	1986	1991	1996	2001
<u>Agricultural :</u>						
Cropping	26.23	9186	10343	11545	13111	14762
Non-Cropping	1.83	640	721	812	915	1030
<u>Non-Agricultural:</u>						
Manufacturing	0.22	77	87	98	110	124
Business	3.21	1124	1266	1425	1604	1806
Others	5.82	2038	2295	2564	2909	3275
Total L.F.	37.32	13065	14712	16564	18649	20997

- \* Calculated from 'Bangladesh Population Census 1981 Rajshahi District' BBS January 1986, Table C04 page 506-508
- \*\* Based on Catchment area medium population projection of this Report, Table .

Another point also worthy to note here from the socio-economic survey is that business and commerce as occupation accounts to more than one half and is followed by jobs in agriculture which constitutes only one third of the total number of persons employed.



### 6.3. LAND REQUIREMENTS AS PER PROVISION STANDARDS :

The Terms of Reference (TOR) for the Consultancy Services for the preparation of Land Use/ Master Plan of Upazila Shahars' circulated by the Urban Development Directorate (UDD) in December 1988 outlines some specific standards for preparing Upazila Shohar Land Use Master Plans. All provision standards, as listed in page 7 of the TOR, relate to the catchment area of the Upazila Shohar except the residential land use allocations, which are for Shohar populations only.

In calculating the land requirements as per TOR a medium population projection for the catchment/shohar area, whichever appropriate, was based. The resulting calculations are provided in Table .

Table-24  
Atrai Upazila Shahar  
Narayan Zila

Land requirements as per Provision Standard

Land Use Classes	Provision Standard. Acre/Pop.	Medium Projection to 2001 vis.	Break up of land reqd. as per TOR	Existing Area in Acres	Area in Acres	Total Area in Acres
1. Commerce & Industry				17.90	15.00	32.90
1.1 Commerce				7.25ha.	5.00	13.32
1.2 Industry	1.5/ 1,000	39451	59.17		10.00	
2. EDUCATION :				10.15	15.00	25.15
2.1 Primary	2.0/ 5,000	"	15.78	4.10ha.	10.00	10.18ha
2.2 Secondary	5.0/20,000	"	9.86		5.00	
3. HEALTH :				7.00	8.00	15.00
3.1 Dispensat. Cl.	1.0/ 5,000	"	7.89	2.83ha.	5.00	6.07ha
3.2 Health Comp.	5.0/20,000	"	9.86		3.00	
4. ADMINISTRATIVE: 12.0/Upazila			12.00	24.92		24.92
5. RECREATION:				10.09ha.		10.09ha.
5.1 Park, Open Sp.	1.0/- 1,000	"	39.45	0.25	16.00	16.25
5.2 Cinema, Closed	.5/20,000	"	0.98	0.10ha.	10.00	6.58ha
5.3 Sports	3.0/20,000	"	5.91		5.50	
6. SOCIO-CULTURAL:				0.70	3.00	3.70
6.1 Community Cent.				0.28ha.		1.50ha
6.2 Library	1.0/20,000	"	1.97		1.00	
6.3 Mosque/Church	.5/ 5,000	"	3.94		2.00	
7. URBAN SERVICES :				6.55	8.50	15.05
7.1 Post Office	0.5/20,000	"	0.98	2.65ha.	0.50	6.09ha.
7.2 Tele. Exchange	.5/20,000	"	0.98		0.50	
7.3 Police Station	2.0/20,000	"	3.94		3.50	
7.4 Bus, Rly, Ghat	1.0/20,000	"	1.97		1.00	
7.5 Graveyard	5.0/20,000	"	9.86		3.00	
7.6 others (fire)	1.0/20,000	"	1.97		1.00	
8. RESIDENTIAL :						
(Shahar Area)	1.0/100	13948	139.48	156.25	50.00	206.25
9. ROADS				53.24ha.	10.00	83.46ha
10. Reserves				50.75		60.75
				20.54ha.		20.54ha
				98.25		98.25
				39.76ha.		39.76ha
11. Urban Deferred 10% of built up area					22.40	22.40
12. Agriculture/Forestry				1089.28		972.10
Total				1462.00	154.9	1462.00
				591.66ha.		591.66ha



## 6.4 THE LAND USE PLAN

### 6.4.1 APPROACH, CONCEPT AND PLANNING PRINCIPLES

#### 6.4.2 APPROACH:

Land use plans are normally prepared within a given guideline and regulation based on available land and priority of it's use for a target population in a especific period of time. The underlying theme of land use planning is to enable effective and economic use of a given piece of land in terms of it's location, value and funtionability. In the regional or urban planning view, a land use plan is prepared for controlled and balanced growth of human settlements in a related hierarchical system.

In the past most of the lower tier urban centres of Bangladesh grew in an uncontrolled and uncoordinated way. Many of these centres failed to bring out a development that is rational in term of environment, accessibility, shelter and services point of view. The upazila Shahar land use planning is a measure recently adopted by the government to remedy the situation. Upazila head quarters or the Shahar area is conceived as a focal point of development of the Upazila as a whole. The land use plan prepared for the head quarters will serve as a guideline for a planned and coordinated development of prospective headquarters town upto the year 2001. When successfully materialized, the land use plan will cause orderly growth of town and it's land uses.

### 6.4.3 CONCEPT :

With a view to prevent excessive congestion and to limit concentration of people and their activities upto the year 2001 A.D. The present Government has taken a plan programme to provide an orderly and co-ordinated growth of the urban areas through the decentralisation policy. The basic aim of the policy is to make an upgradation of the services that have been concentrated in the heart of the city now allowed in the sub-urban areas. A well managed plan have been prepared to establish this sectoral development as social, commercial, industrial infrastructural and economic services provisions at the Zila level.

Various factors have been taken into consideration before preparing the landuse plan for the upazila shahar, such as :

1. The hierarchy of settlements, on the basis of population, economic activities and social infrastructural provisions.
2. The transportation and communication system in relation to the density of the area so that the roads do not become over crowded.
3. The standard for community facilities.
4. The new development area which would not prove to be uneconomical in the future.
5. The minimum standard of living accomodation that is going to be adopted.
6. The rural electrifications and
7. The standard of open spaces.

Taking all the above factors into consideration the plan proposed an appropriate amount of land allocation that have been allocated at various purposes according to the development needs of the



respective areas, and of course keeping in mind the population projection up to the year 2001 A.D.

#### 6.4.4 PLANNING PRINCIPLES :

The present proposed planning is prepared mainly on the basis of various factors, discussed before. Most of the sectoral uses has been selected by considering its past and present functions, its sphere of influences, its accessibility or simplification of circulation system in relation to the upazila shahar. In turn the planning also highly considered its existence to the whole regional context.

Due to the previously unplanned builtup area and accessive land uses in the same area, it was very difficult to propose a site for a particular sectors. Finally the area has been detached by considering its location, services and its sphere of influences. The catchment area has been determined by calculating its commuting distances and services area and physical features of the upazila headquarters and surroundings. For the determination of the shahar area, existing land uses, trend on development of settlements, availability of builtup area, and physical features of the headquarters and surroundings have been taken into consideration. The UNO office has built before the plan was proposed. Besides this, the proposed land requirements for each sectors has been given on the basis of TOR.

### 6.5 PLAN DESCRIPTION :

The Shahar area of Atrai upazila includes 1455 acres of land Table-24 shows the total land requirements for the Atrai Upazila Shahar as per provision standard TOR are 295.75 acres. Where as the existing land uses is 342.00 acres. Land in over used as per TOR under Administration is 8.75 acres.

Present survey reveals that Atrai upazila shahar is a comparatively new grown up shahar. It needs careful planning. The proposed plan has determined its catchment area in the centre parts of the Zila, along both sides of the rail road. However rail communication plays an important role in the development of the area planning. The plan proposed in some what different kind of sectoral uses. It devides the whole planning area in different parts, which follows the intersected trans portation system of the Upazila Shahar.

Table-24 shows existing and proposed use of lands and break-up of each uses. Let us describe the plan which is prepared carefully and logically.

### 6.5 COMMERCE AND INDUSTRY :

Total land requirements as per provision standard TOR for this sectoral uses 15.00 acres of land have been allotted. At present Commerce and Industry together cover only 17.90 acres or 1.23% percent of the available lands of the shahar area. The site selection for Commerce and Industry proposed for the Atrai Upazila Shahar is unlike to others. Here this two has been placed in areas . The area along the northern side of the Singra railway line in Madhugurnai mouza for Industry and Shops and Markets are in Pthailjhara and Panchgakhia mouzas. Both the areas have well established communication and transportation system. Let us describe the impor-



tance of setting the proposal categorically.

#### 6.6.1 Shopping Centre :

The Commercial zone includes shops and bazar has been placed along the north of the road beside the Atrai River bank in mouzas Pthaljhara and Madhugurnai and the other one on the eastern side of the Health complex in Panchpakhia mouza. The commercial offices and the financial institutions will also be located here under the commercial area.

#### 6.6.2 Whole sale and Warehouse :

The location for whole sale and warehouse are selected where the communication and transportations are better off in Panchpakhia and Pthaljhara mouza. The road pattern will be great help to transport the goods and materials at a lower cost and in time.

#### 6.6.3 Industry :

The site for the Industries has been earmarked at the Madhugurnai mouza on the north of the Singra road. The area has direct road linkage from the upazila parisd and a road proposed to connect the Atrai river ghat on the north. Besides this the area is isolated from the rest of the service areas. Here any large or small industries which make noise and pollution can be easily built up.

#### 6.7 EDUCATION :

Educational Institutions have been placed in a way that could serve the whole catchment area of the Atrai upazila shahar. Total land requirements for educational institutions as per the provisions standard TOR is 23.81 but at present only 10.15 acres of land are in use under this sector. Seven different sites have been selected for educational institutions of which

one college has been placed in the south of the Health Complex in Panchpakhia mouza. One high school in Madhugurnai mouza along the road and the river Atrai. Out of the five primary schools two are placed in Pathaljhara, one in Bhartentulia, Saidpur and Beharipur mouzas. These educational institutions are for both sexes.

#### 6.8 HEALTH :

The existing land uses for the Health services in the Atrai Upazila shahar is only 7.00 acres, where as the total requirements of land as per provision of standard TOR is 16.48 acres. It reveals that 9.48 acres of additional land is required for the Health and Family Planning services. The proposed plan has selected five sites for these sectoral uses of which two in Pathaljahara and one each in Madhugurnai, Bhartentulia and Beharipur mouzas. All these clinics are placed along the road sides. It includes dispensaries, maternity clinic and child care health centres.

#### 6.9 ADMINISTRATION :

Existing land use for the Administrative purposes is 2 . acres, the total land requirements as per provision standard TOR is 12.00 acres for the shahar area. The figure shows that the provision of land allocation for the administrative purposes was quite satisfactory and more than the provision standard TOR.

#### 6.10 RECREATIONAL :

Recreational facilities are almost absent in this upazila shahar only 0.25 acre of land is under this sectoral use, where as land requirements as per provision standard TOR is 42.74 acres. At present there is only one Cinema hall and a Press club in the upazila shahar. The present plan has proposed a wide range of recreational facilities provided with



Parks, Stadium and Play grounds. The Stadium and a Park is placed along the Singra Road in Pathaljhara mouza. One more Park and a Playground is being placed adjacent to the College and the Health Complex in Saidpur and Pathaljhara mouzas respectively. The area is well communicated by all other parts of the shahar area, with good road system.

#### 6.11 SOCIO-CULTURAL :

This sectoral uses shows another existing negligible amount of land uses in the Atrai upazila shahar. Table shows only 0.70 acre of land is existingly used under this purposes where as the total land requirements as per provision standard TOR is 5.49 acres. The site allotted for this socio-cultural purposes is in Pathaljhara mouza. The site for Central Mosque and a Community centre is being selected along the singra Road and adjacent to the Helipad. Another site for the community is selected by the side of the existing Post Office in Bhar-tentulia mouza.

#### 6.12 URBAN SERVICES :

The existing land under the Urban Services is 6.55 acres. But according to the provision standard TOR total land requirements for the Urban Services is 18.30 acres, the land for this purposes is proposed for 8.50 acres it includes Bus-Terminal, T & T , Post office, Ghat , Garbage disposal, Graveyard and a Burning ghat. A site for fire service is selected by the side of Jute Godown in Beharipur mouza. No new site for Post office and graveyard is selected only proposed to extend the existing sites. Bus stand is placed near the College in Saidpur mouza. Site for Ferry ghat and Garbage disposal is selected on the Atrai river bank in Madhugurnai mouza.

### 6.13 ROADS :

The Roads including the Railway track covers 50.75 acres of the available land. The area has Road circulation system but not developed. like others, it needs improvement and at the same time development also an additional of 5.0 acres is proposed for a new road connecting Panchupur and Singra road across the Mid of Madhugurnai mouza.

### 6.14 RESIDENTIAL :

The total land requirements for the residential uses as per provision standard TOR is 99.20 acres of the available land but at present the shahar area covers 156.25 acres land this shows 25.55 acres more than the provision standard more over an additional land of 50.00 acres are proposed for this sectoral uses. Residential areas are found scattered throughout the area. There is no housing estate at all. Only staff quarters for the upazila parishad is constructed. The present plan has proposed some new residential areas at the eastern side of the Upazila Parishad in Pathaljhara mouza. It has good road connection and perhaps this is the most suitable site for the residential purposes, because it is located at a suitable distances from the crowded and service areas,

### 6.15 URBAN DEFERRED :

As per provision standard TOR 10% of the builtup area is required to be kept as Urban deferred at the northern part of the Madhugurnai mouza.

### 6.16 RESERVES :

The existing land uses under the reserve area is 98.25 acres. The present plan proposed a location for reserve at the eastern part of Bhartentulia mouza includes water bodies and cultivation etc.



## 6.6 PROGRAMMING AND IMPLEMENTATION :

### 6.6.1. Priority actions and cost implecations :

Priority has already been given on the immediate construction of Upazila Headquarters and construction of their ancillary uses like Upazila Jail, Officers quarters and Staff quarters. In first place socio-cultural infrastructure should be developed according to the need at the population of 1990. Next priority may be given to the social facilities like health and welfare and educational facilities. As we know that the Upazila urban centre will be the tier of all the development activities and more than two thousand people will concentrate, there should have necessary social facilities and infrastructures. There should have commercial institutions, utility services, electricity and telephones. Roads connecting the upazila region should be constructed immediately so that people may come to the centre. As well the internal roads of the upazila centre should be constructed on priority basis. Along with the development of roads, the transport facilities should be developed.

### 6.6.2. Phasing and Urban Deferred:

For development of the Upazila centre, we may suggest two phases one upto 1990, when most of priority given infrastructures are required to be constructed according to the requirements of the people of 1990. The second phase may be 1990-2001 A.D. when other infrastructure including social infrastructure will be required. The speed of developments will depend upon the growth of the centre and growth of the potentiality. If the proposed projects are not required to develop within the plan period, the land will be deferred to next phase of development. It is needed to review the plan by 1990 to study the speed of growth and development and to review the land use plan prepared.



It is essential that all planning matters should be administered by a single authority. All development whether private or government should be subject to control. The implementation of land use plan will be spread over many years. Planning is an over continuing work and an essential part of local government administration. The land use plan must be kept under continuous reviews, but in itself only constitutes a small part of the planning work of the upazila shahar area. Urban planning is a profession in its own right and is recommended that an experienced planner should take its charge.

## 6.6.4. Monitoring and Review :

The monitoring of all activities may remain under the charge of UNO or of Chairman Upazila Shahar who is well aware of the upazila as a whole. If the manpower of the UDD is sufficient an officer may be placed in every Zila to look after the urban development. The plan prepared should fulfil the settled objectives of the TOR and may be reviewed in the light of land allocation and distribution.

The site for administrative headquarters has already been selected by the government. The land use plan prepared has the provision for other Govt. and Semi-Govt. institutional locations near the administrative headquarters, so that Government services can be provided to the door step of the masses of Upazila.

In any shahar big or small, the most essential zones are places of work, residences and recreation. In the Upazila Shahar the buildable lands are shown in an organised way through urban planning principles. The public and private facilities have also been provided through urban planning concept.

The land for small and cottage industries has been earmarked and shown on the plan with justifications. Land allocated in terms of available labour force and density per acres Land for social facilities has also been provided, which will help the people to live and work in the upazila shahar and resulting in reducing the rate of migration to big cities. The plan if implemented will provide the people of the upazila shahar and region with comfort, amenity and security.