

Planning of Rural Settlements: A Study on Tarabo Union

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Abstract. Dhaka represents one of the most extreme examples of rapid growing megacity of the century. As all the major manufacturing industries are concentrating here attracting hordes of migrants, the population has been growing at a pace of almost four percent annually. In contrast, surrounding rural areas are not developing in compare to the city. Environmental, social and economic problems have turned the city into one of the least livable places. Much pressure can be released from the megacity by the proper development of the surrounding areas of the capital, Dhaka. So, a study has been taken with a view to develop and strengthen those areas following a planned design.

The study has been conducted in Tarabo union of Rupganj Upazila. The objective of this study is to propose a conceptual planning for this area through which it will keep pace with the capital and stop migration to Dhaka. It focuses on socio-economic condition of the inhabitants; strength and weakness of the area; the perception of the people how they want to see their area in future. Land use pattern of Tarabo union is primarily agriculture based with some industrial use. Though it is an appropriate place for agriculture, its use is now converting to industries in an alarming rate. The industries are growing without any plan and the fertile lands are getting covered by the industrial waste. These unplanned industries are neither getting raw materials easily nor finding proper market for their business. At the same time people expertise on farm activities are moving to non-farm activities resulting in losing their skills. The greatest strength of this area to develop is the Jamdani (hand loom woven fabric made of cotton) culture. This area has the greatest opportunity to flourish if this business is properly managed. The area also lacks in community and amenity facilities which is a hinder towards development. In this respect, a conceptual design of the whole union has been proposed based on Integrated Rural Development (IRD) model to solve following problems of the area. A well integrated design has been proposed for Jamdani Palli following this method. As it is a rural area, some rural industries have been also proposed considering the backward and forward linkages. Amenities for the residential and industrial zone have also been proposed. The concerning

issues will boost up the agricultural production, create employment opportunities, promote the existing Jamdani culture and marketing of the commodities produced within the study area.

1. Introduction

Over the last couple of years, the disappointment over the results of past development efforts in many countries has been growing in the world at large. The gap between urban and rural has only been widening so far. In many cases, it has led to worse conditions for the poorer sections of the population. The traditional socio-economic environment of the rural population has often been destroyed without being replaced by a better alternative. The increasing population could not be facilitated by the existing rural system. This situation is leading to massive migration to cities.

Bangladesh is known as the rural agro based country. Nowadays it is very evident in our country that some major cities are developing and enjoying the facilities of modern life. On the other hand, a major portion of the rural areas are set aside. They are deprived of proper housing, employment, education and health care [1]. For the real development of Bangladesh, it is essential to develop the rural areas. As Bangladesh has an agro-based economy, it is important to give emphasis on increasing the agricultural production of the country. In addition to this, rural industries can be developed there simultaneously.

Whenever the question of development arises, it must be kept in mind that development should occur at the root level. It is necessary to prepare a conceptual plan at the union level considering social, physical and economic aspects [2]. In this research, Tarabo union has been taken as the study area. The study area lacks employment opportunity, health care, education facilities and other necessary services. There is also insufficient number of community facilities in the area. But there is enough opportunity to overcome these problems. Therefore the physical planning of Tarabo union is required for solving the existing problems.

This study focuses on the geographic condition and socio-economic profile of the area; the future perception of the people about the study area. It also focuses to develop a conceptual planning proposal for the area that can compete with the urban areas by creating skilled manpower in multi sectoral activities, making rural poor people self reliant and introducing modern techniques in agriculture, fisheries and livestock.

2. Methodology

To fulfill the objectives of the research, a study area has been selected. Study area is included in the "DPZ-10 Rupganj, Shitalakshya East" in Detailed Area Plan (DAP) for DMDP area: Group A, RAJUK. The area is totally rural and limited links with the metropolis; urban development of any significance is unlikely in the near future [3]. It has an area of 5850 acres. It is bounded by Murapara union on the north, Narayanganj sadar on the south, Sonargaon on the east and Shitalakshya River and Demra on the west.

A detailed GIS database from DAP (Detailed Area Plan) has been collected containing information of Tarabo union.

A reconnaissance survey has been conducted to become familiar with the study area and acquire a primary view of the area. It has been done to correct any information that might be wrong in GIS database & other secondary sources. Interview of local administrative officials has also been taken to collect different information.

A questionnaire survey has been conducted to know the socio-economic profile of the study area and the future perception of the local people about the area.

After data analysis a design has been proposed for the Tarabo union with necessary blow ups. Location of community facilities and area required for each facility has been also proposed following the standard.

Integrated Rural Development (IRD) program has been chosen for the development of the study area. IRD means multi faced development of rural economy by utilizing the optimum potential of all local

resources, such as- land, water, manpower, capital etc. there should be integration of all development activities, social activities, infrastructure development within an area which have mutually reinforcing effect on the rural economy. There are four concepts in this program. *Production Oriented Model* focuses on accelerating production in different sectors such as agriculture, livestock, fisheries and rural industries, through introduction of new technologies and inputs. *Area Development Model* aims at the integrated socio-economic development of a geographical area. The model has some activities such as economic dynamism, physical infrastructure, agricultural development and human resource development. The third concept is *Suitability Analysis* of the study area in the context of theoretical framework. Suitability analysis is a process to determine the appropriateness of a given area for a particular use [4].

3. Result and Discussion

3.1 Socio-economic profile and land use

Socio-economic profile refers to the gender distribution, employment status of an area. It also provides demographic information of an area.

3.1.1 Population

Study area has a total population of 4177. Male population is 53% while the rest 47% are female [5]. Age and gender distribution is a key variable that indicates the possibilities of natural growth of population of the study area.

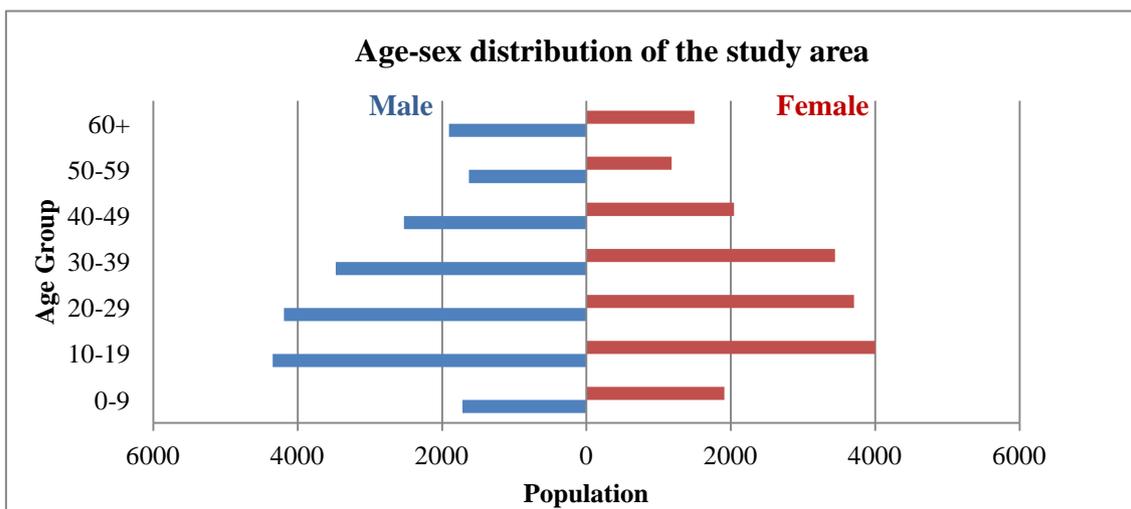


Fig.1. Age-sex distribution of the study area

The conceptual planning of the Tarabo union has been proposed for the population of 2021. The projected population for this year is 46690.

3.1.2 Occupation

Relatively low percentage of people (15%) is engaged in traditional activities related to agriculture. Business is one of the main occupations of the people of the study area and 22.89% people are engaged in it. Service in government / non-government organization is the second highest and about 17% people are involved in this occupation [6].

From the questionnaire survey, the trend of occupational change has been seen. Due to the increase of industrial land use in areas along side Shitalakshya River after 1990s people have started to engage in industrial sector for their livelihood. Now less than 24% people take it as an occupation.

Until 1990 Tarabo union was an agro-based area. After 1990 people have started to be engaged in industrial sector due to high growth rate of this sector in areas adjacent to Shitalakshya River.

In contrast to the above two, business trend shows a rapid increase of taking it as a profession or occupation pattern. Due to the decrease in agriculture activities and increase in industrial activities in Tarabo union, different types of small shops, small home based industry etc is increasing day by day. A large portion of the population has been engaged in Jamdani Sharee making in Tarabo union for livelihood. For these reasons business trend shows a vertically upward slope.

3.1.3 Land use

From figure 2, it is seen that more than half portion of the study area (53%) are covered by agricultural zone. Flood flow zone, rural settlement zone and urban residential zone each covers 10% of total land of the study area.

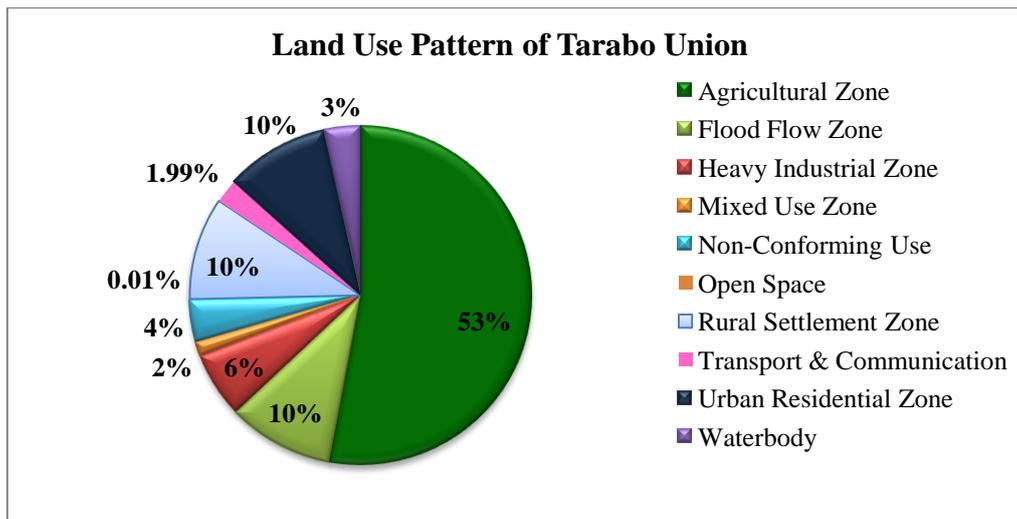


Fig. 2. : Land use distribution of the study area

3.2 Proposal for development planning

From the questionnaire survey, it is found that most of the residents wants to see their area as a agricultural enriched area with residential facilities from them with sufficient commercial facilities.

So the proposed design gives emphasis on the agricultural sector. Then residential land use has been given priority. The related rural resource sectors, such as- livestock, fisheries, rural industries are also considered in the design. The details of the proposed design has been shown in the figure 2 and the description has been discussed below:

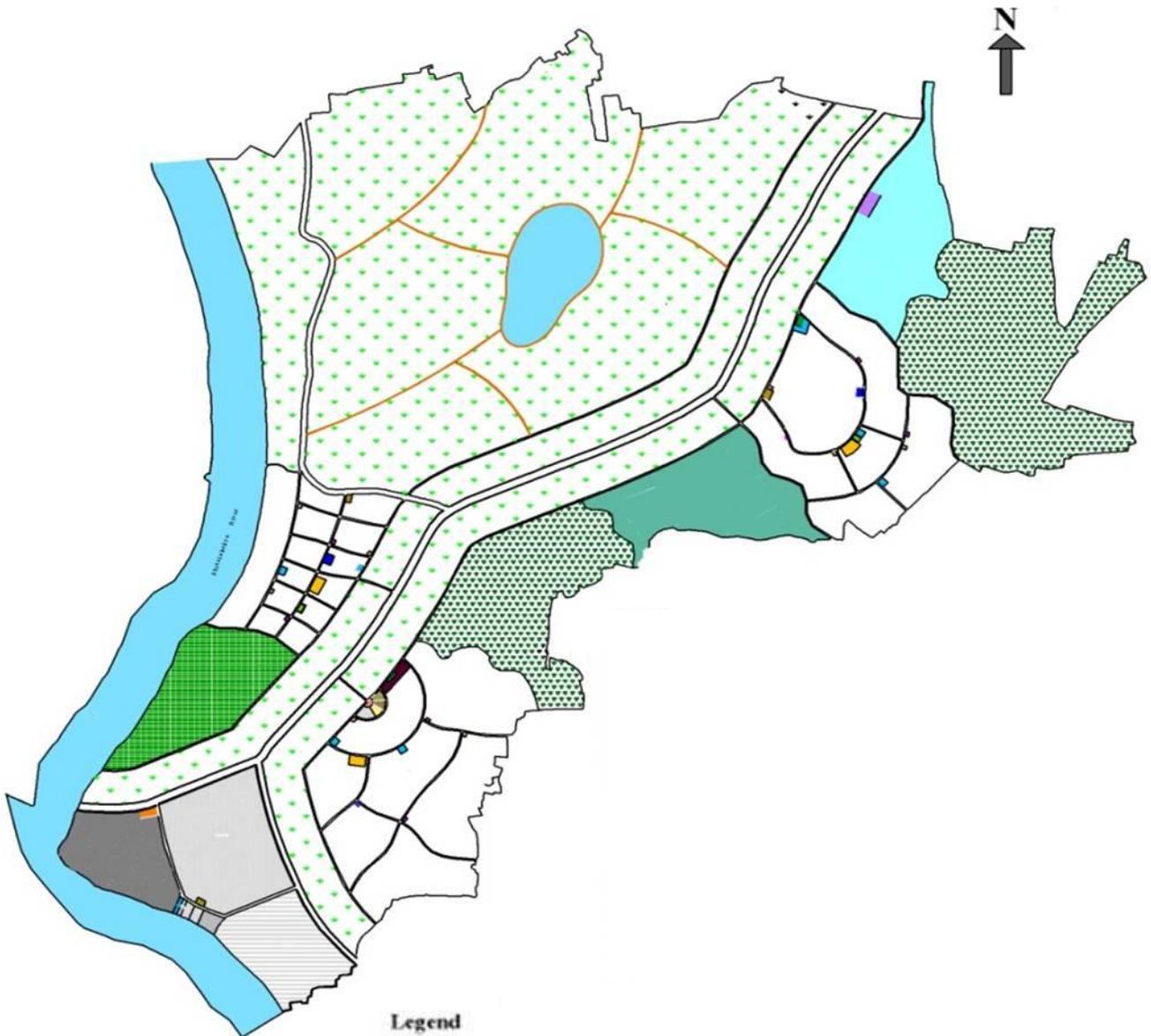
3.2.1 Residential land use

Three residential zones are proposed in the design of Tarabo union. The location of the zones is determined following the contour line map. Zone 1 with an area of 408.65 acres is planned as the higher level service area of the union. It is located in the south-east of the highway following the proposed residential location of DAP. Existing Union Parishad Complex of Tarabo union is retained there. A central godown, an Agricultural Development Complex, a training center has been proposed in this zone. A radial pattern is followed there to provide other amenities and facilities.

Zone 2 (707.54 acres) is a purely residential zone. It is proposed on the north-east of the highway. This zone is proposed there to provide manpower to livestock and fisheries.

Zone 3 (190.61 acres) is specialized for the people related with Jamdani industry. It is suggested to locate on the south-west of the highway following its existing location. As water is necessary for dyeing and washing purposes, Jamdani palli is proposed beside the Shitalakshya River.

Proposed Landuse Map of Tarabo Union



Legend

Land Use		Community Facilities	
	Rice Cultivation		Primary School
	Vegetable Cultivation		Secondary School
	Live Stock		College
	Fishing		Small Clinic
	Sugar Cane		Hospital
Industrial Zone			Mosque
	Sugar Mill		Play Ground
	Cotton Mill		Play Field
	Textile Mill		Market
	WTP		Katcha Bazar
	ETP		Union Parishad
	Solid Waste Management		Agriculture Development Complex
	Godown		Godown
	Jetty		Cold Storage
			Training Centre
			Fire Service
			Power Station

RF = 1: 26000

3.2.2 Agricultural Land Use

The planning proposal of Tarabo union is an agriculture oriented design. There are three major sectors in agricultural zone, such as agriculture, fisheries and livestock. Agriculture sector is subdivided into rice cultivation, vegetation and sugarcane cultivation.

Agriculture: To achieve surplus production more lands are provided in agriculture sector. Maximum priority is given to the irrigation system. Rotational irrigation and buried irrigation method is introduced for upgrading this system. These irrigation systems save the wastage of water. HYV (High Yielding Variety) seeds are used instead of low quality seeds. Use of fertilizers, insecticides and pesticides are to be controlled. Technological advancement is also ensured to increase production. Mechanized cultivation, proper harvesting and storage are practiced for improving the production system.

Rice is proposed to cultivate here with an area of 2032.74 acres. Well known Dhaka red clays are found in the study area. During the monsoon season these soils are mainly flooded 8-15 feet or more deep. These soils are well suited to rice cultivation. Boro is preferred in the deepest braids. These soils become very dry in the dry season. Dry season irrigation from the Shitalakshya River would enable high yields of Boro to be obtained. With flood protection and irrigation within the Dhaka–Narayanganj–Demra Project Area, the possibility exists of growing rice at any season of the year on these soils together with jute in the early kharif season.

Vegetables cannot grow in flood flow zone. So, vegetables are suggested to plant in 633.14 acres of agricultural land above the flood level. They will be planted in a special manner. It is known that plants of leguminosae (pea, bean, pulse etc) family have the ability to take the Nitrogen (N₂) gas out of the air. These plants can convert it to a form of nitrogen that is usable to plant. As a result the plants do not need any kind of nitrogen fertilizer. Potato is suggested to plant in the middle land surrounded by pea and bean. So the cost of fertilizer will be minimized.

Riverside soil is fertile to produce sugarcane. Considering it, sugarcane will be cultivated in 94.72 acres of land beside the river Shitalakshya.

According to the consumption rate of each crop or vegetable, the total consumption has been calculated. If there is deficit, the total cultivable land of that crop has been increased. In other case, the total land has been increased for exporting the surplus products to other regions.

Table 1: Present and Proposed Consumption-Production Situation

Crop	Consumption [kg/person/Year]	Total Consumption [metric ton]	Present Production [metric ton]	Surplus/ Deficit [metric ton]	Proposed Production [metric ton]	Surplus/ Deficit [metric ton]
Rice	166	6933.82	3788.8	-3145.02	11300.05	4366.23
Vegetables	44	1837.88	4004	2166.12	6604.1	4766.22
Potato	16.5	689.21	123.2	-565.92	5836.46	5147.25

Fisheries: Fishery is a profitable sector for rural areas. There is a number of lake, khal, pond and other water bodies. Moreover, fishery projects require less financial investment and small organizational set up. So, fishery is proposed in this region. 123.13 acres land is proposed for fisheries. Hatchery,

fish meal production and disease control facilities are provided in each unit to ensure higher fish production. Poultry farms are proposed above the fishery pond. The manure of poultry will be used as the meal for fish. Ice plant and cold storages are proposed for longer preservation of fish. Training center is provided to train up the fishermen with advanced technology.

Land choice for fishery is very important. Fisheries in flood flow zone can cause major loss during flood. So, the land is chosen above the flood flow zone. The north-east side of the union is provided for this sector because the land is above flood flow level.

Livestock: There are 50 units of livestock with an area of 149.51 acres. Each unit consists of two livestock sheds, heap of straw, room of diseased livestock, veterinary service center, marketing room, training center and room of caretaker in a livestock unit. 200 cattle will be kept in each unit. There are ditch for disposal of waste.

Livestock is located in the area adjacent to zone 2. Livestock need continuous look after. So, livestock is proposed close proximity to that residential zone.

3.2.3 Industrial land use

The proposed map of DAP has been followed to locate industrial zone. The proposed industries will be located in the southern part of the area. This portion is separated from the rest of the area by national and regional highways. Three linked industries sugar mills, cotton mill and textile mill are proposed there. A buffer is proposed surrounding this industrial zone.

The climate and soil condition of the study area favors the sugarcane cultivation. So, two sugar mills (77.1 acres area in total) are proposed for the study area. Local sugarcane will be used there as raw materials.

There is huge production of cotton in Narayanganj Sadar upazila. Tarabo is the adjoining union of it. This cotton is used as the raw material in the cotton industry. One cotton mill (87.70 acres) is proposed in Tarabo. The output of this mill will also be used as backward linkage for textile mill and local Jamdani industry.

Textile mill is retained in its existing location with an area of 129.31 acres. The final products of cotton mill will be used as the raw materials for this industry.

Some facilities have been provided for the proposed industries. Water Treatment Plant, Effluent Treatment Plant, solid waste management, godown, jetty, loading-unloading and parking places are provided for the industries. A fire station and a power station are also provided in the industrial zone.

3.2.4 Educational institutions (13.46 acres)

Eight primary and three secondary schools have been proposed for the study area. These schools will be located along with the union roads for easy communication purpose. It is ensured that primary schools are situated within 10 minutes walking distance from each household. Each residential zone will be served by a secondary school. Secondary schools are situated in the central part of the residential zone.

Study area is devoid of any college. So, a college has been proposed in the study area. The college will be situated in the central residential zone; zone 1. Central zone has good communication facility and connectivity with other two zones. There is a play filed beside the college. The college is adjacent to the service road of the union. So, the students get easy access to it.

3.2.5 Health facilities (3.6 acres)

A hospital is proposed in the residential zone 1. It is connected with both the service roads and union roads. Tranquil environment around the hospital will be ensured by some regulatory measures. A mosque is proposed beside the hospital.

Residential zone 2 and zone 3 will be served by two small clinics. The clinics are provided in the central part of the zones. Transportation facility has given due priority in proposing the clinic.

3.2.6 Mosque

As 98% people of this area is muslim, eight mosques have been proposed for the study area. These mosques will be scattered in the residential zone. Every locality will be served by a mosque within walking distance.

3.2.7 Market (2.3 acres)

Two markets are proposed in residential zone 2 and zone 3. In 'Jamdani Palli', market place will serve as wholesaling and retailing unit of Jamdani sarees. Market of zone 2 will be used for shopping of the inhabitants. Market will also be used as Hat and growth center of the union.

Eight katcha bazars will serve the Tarabo union. Katcha bazars serve the functions of corner shop too. So, katcha bazars are proposed within walking distance from each homestead.

3.2.8 Water body (Irrigation pond)

Rotational irrigation is the modernized irrigation method. Through this method small quantity of water can irrigate vast agricultural lands. For swift and proper irrigation, an irrigational pond is proposed in agricultural zone. The pond will help in rotational irrigation system.

3.2.9 Play ground (7.11 acres)

Two play grounds are proposed for Tarabo union. One will serve zone 2 and another for zone 3. These play ground are proposed near the primary and secondary schools. As a result these will serve as the open place for both the students and the local children.

Two play fields are proposed in the study area. One play field will be in front of the college of zone 1. Another play field will serve zone 3.

3.2.10 Road

No plan can be successful without safe and convenient transportation and communication facilities. For easy and comfortable transport facility service roads are provided in Tarabo union. Service road is the road parallel to Highways. It has connection with highways after a long interval. Service roads make the inter-zonal communication safer. Union roads are provided inside the zone. These roads will serve movement within the zone.

3.3 Management

Besides planning for an area, it is important to manage the planned facilities. Following is the list of some aspects those should be managed properly:

- Road network, market places, growth centers, educational institutes and hospitals will be developed for the social development of the study area.
- Training centers, godowns, cold storage, irrigation facilities, technological advancement will be introduced to improve the economic condition of the area.
- To make healthy environment and keep silent in the residential zone any type of commercial activity other than katcha bazar inside the zones will be restricted.
- Prawn cultivation may be strictly prohibited in order to protect the soil from salinity.
- The manure of the livestock will be used as fertilizer and in the bio-gas plant as fuel.
- Green fodders will be prioritized, as the leaves of the trees are used as the food of the cattle.
- Unplanned and illegal filling of water bodies and encroachment of water body will be restricted. .
- Godown, cold storage, power station will be under regular monitoring for getting best service.

4. Conclusion

Tarabo's predominantly rural nature makes it possible to develop a self-sufficient community. But, lack of technological know-how, substandard irrigation system, land grabbing, improper waste management etc are posing a threat to the development of the region. All these pitfalls have a huge bearing on the crop production of this region. It is a high time to rethink about the development of the area. Sustainable development of the area can only be possible through the integration of locally available resources and all development activities, social activities, infrastructure development within the area simultaneously.

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