ABSTRACT

Agriculture forms the backbone of the regional economy of Uttar Dinajpur District. Changes in agricultural land use are not a new phenomenon rather this is a constant process which has been continuously taking place over time and space. Changes in agricultural land use in all the revenue blocks in Uttar Dinajpur District are not uniform. It varies from one revenue block to another revenue block in accordance with the variation in the quality of land, its productivity potential and availability of water resources. Most of the revenue blocks in the District are facing the problem of acute water shortage, increasing population and urbanization, large agricultural plots are fragmented into several small plots and encroachment of cultivated field leads to small land holding. For these reasons, day-by-day agricultural land use changes in Uttar Dinajpur District. Land use changes to fulfill man's needs. Man's needs can be classified into six major categories, viz. the need of wood, house, food, transport & communication, defence and recreation. To fulfill his needs, man utilizes the land into various forms.

Uttar Dinajpur District's total geographical area is 3,140 km^2 which accounts for 3.54 per cent of the total area of West Bengal (88,752 km^2). The general land use type of Uttar Dinajpur District can be classified into four groups- (i) Cultivable area (which include - Net Sown Area, Current Fallow, Fallow and other than Current Fallow, Culturable Waste Land, Land under misc. tree crops and groves, Permanent pastures and other grazing lands) (ii) Barren and unculturable land (iii) Net Cropped Area (iv) Forest Land (PAO, Uttar Dinajpur District, 2015).

The study area has an average elevation generally does not exceed 30 m above mean sea level and no hill is found in the District. Climatically, this region falls under the subtropical monsoon climatic zone, oppressive hot summer (38^oC in May) and monsoon rainfall, dry and cold winter season (15^oC in January) are some of the typical characteristics. The area is drained mainly by the River Mahananda, Nagar, Gamari, Chhiramati (Srimati) and Tangan flowing from North to South.

As per the 2011 census, Uttar Dinajpur District recorded a total population of 30,07,134 persons which are distributed over the 9 Blocks. The rapid growth of the population was observed in the district from and after 1971 when the Indo-Pakistan war occurred (Census of India, 1971-2011). Almost all villages and blocks have experienced considerable growth of population due to decreased death rate and infant mortality. The birth rate has not decreased to a substantial amount. Medical services have enabled the permanence of human life and the annihilation of epidemics.

The average population density of the district is 958 persons per km^2 and among the 9 Blocks, Raiganj is the block having the highest population density with 1,096 persons per km^2 (Census of India, 2011) because Raiganj is the district's headquarter. Population pressure makes a piece of agricultural land converted into homestead land.

The term land capability is broad and relative which shows that certain land can produce better crops with fewer conservation and better practices than the others. Not only that, land capability classification suggests the ability of different soil types for better production of crops in the different ecological situations and different blocks of the district. For the better concept of the capability of land, some climatic, soil profile characteristic and external factors which broadly control the land capability have been determined. After weighing these positives and negative variables in shaping the land capability, different blocks of land capability have been determined for agricultural development and proper justification. The land capability is also a proper help to the agricultural planning and providing management for the healthier use of the land in a specific capability zone. On the other hand, land suitability is another process for justification of suitability practices of agriculture. The productions of crops suitable in different blocks have been determined.

The study of mechanization in agriculture in the district reveals that the level of mechanization of agriculture led to changes in relations of production. About 25 per cent of the total farmers have a high to the very high category of awareness level i.e. used mechanical method in the farming sector. On average, there are 4 tractors per 1,000 hectares, 138 pump sets were used per 1,000 hectares of irrigation and an average of 191 kg chemical fertilizer used (NPK) per hectare.

A traditional instrument like ordinarily local wooden plough, harrow, weeding hook, sickle basket etc. in agriculture and many others are used by the farmer in the agricultural sector. Not only that, to collect the crop from their field they use *kachi, hasua* and *dao*. But for transporting of crops bullock cart, buffalo cart and head portage are used. But some farmers have started the use of modern instruments. Modern transportation instruments are bi-cycle, bhut-bhuti, pick-up van and tractor and for prepared agricultural land farmers are using an iron plough, weeder, power tiller, hoe and spade and sprayer etc. It is significant that, the use of modern instruments in the district has been increasing slowly and it is assured that the production of crops increases day to day in the district. Mechanization has brought significant changes in the method and practices of land use specially ploughing, manuring, watering, transporting and threshing etc. On the other

hand, most of the farmers are using traditional varieties of seeds rather than that the HYV seeds. It is an interesting fact that the rate of HYV seeds usage amount is increasing day to day in the study area.

The major source of irrigation in the district is a shallow tube well. About 94 per cent of the total irrigated area is covered by the shallow tube-well. But in the summer season sometimes water layer falls. So, farmers are devoid of irrigation supply in their agricultural land. Irrigation is a major gap to increase the production and productivity of different crops in the district. Only 3,51,631 hectares are was irrigated area in 2015-16. This constituted 65.26 per cent of the total gross cropped area. Seed farm facilities are inadequate for a good supply of cereal and vegetable seeds. Normally farmers are bound to use the traditional seeds in the agricultural sector. Although, seven seed farms are located in six blocks. The rest three blocks have no seed farm and most of the seed farms are located far away from the farmer's households. In harvest time most of the farmers depend on the exported seeds. Moreover, most of the seed farms are of small size. So, available seeds cannot be supplied by the farm in seed growing time. Hence, there is small scope for HYV crop production all over the district. The district is also very backward in respect of the transport and communication system. Even non-metalled road is not there in many villages of the district. All types (NH, SH and ZP) road density per 100 km^2 is only 21 km in 2011 which is very lower than the state average of 103.68 km per 100 km^2.

In the district, total 160 bank branches are spread. Among the banks, about 57.76 per cent banks are national banks and these are located mainly in the centre of each block town. Only 22.98 per cent of the total banks in the district are Bangio Gramin Vikas Bank and 9.94 per cent is Raiganj Central Cooperative Bank which is located mainly in rural areas. So, farmers cannot contact national banks easily and they go to the nearest bank branch. Although the rate of interest in loaning amount is very high nevertheless they are bound to take loans from the banks. Not only that, the loaning process is very lengthy.

There are two types of crops which are considered in changes in cropping pattern like food crops and non-food crops in the district. Food crops are cereals, pulses, fruits and vegetables and non-food crops are oilseeds, fiber and drugs etc. The proportion of total area under paddy was 2,651 hundred hectares in the year 1995-96, and it has increased to 2,966.50 hundred hectares in 2015-16. The scenario of changes in paddy production in 1995-96- the total production of paddy had 5996.90 hundred metric tonnes and it has decreased to 5733.53 hundred metric tonnes in 2015-

16. But the productivity rate of paddy was 2,117 kg per hectares and it has increased to 2,490 kg per hectare. The annual growth of the paddy production per hectare is -4.39 (negative change) per cent and positive productivity per annum is 17.61 per cent.

In the year 1992, a total of 262.23 thousand hectares of land was under the net sown area and it has been increased to 275.84 thousand hectares in 2016. A total of 13.61 thousand hectares of net area sown is increased over the study period. It is an interesting matter that except net area is sown land, all categories of land area has been decreased over the study period in the district which is a good sign for agriculture. But the picture of the current fallow land in the district is about 5.78 thousand hectares of land was under this category in 1992 and it has significantly decreased to 0.32 thousand hectares in 2016.

In the district, about 18.32 per cent of the total sampled households members are illiterate and 42.83 per cent of the total are 5^{th} standard to 8^{th} standard passed. But 20.57 per cent of the total farmer's family members are 10^{th} standard passed. It is bedazzled matter that only 11.54 per cent of the sampled members have studied up to 10+2 standard and 6.74 per cent are graduate and professional passed. Thirdly; per hectare yield rate of the major crops have overall increased due to the practice of seasonal crop rotation, proper water drainage as well as increased water supply facility, mechanization in agricultural sectors, electrification in rural area, use of a high yielding variety of seeds, use of the tremendous rate of chemical fertilizers etc. The picture of the yield rate of major crops in the district potato is a high growing crop. In 2000, per hectare potato production was 14,176 kg and it has increased to 18,256 per hectare in 2017. Per annum average increase of potato production is about 240 kg per hectare. But the lowest growth crop is jute whose per hectare yield rate was 1,482 kg in 2000 and it has increased to 1,770 kg in 2017.