

ABSTRACT

Agro-natural resources management is one of the important key for sustainable development. Sustainable development is a systematic approach and continuous process for growth and development in which natural, produced and social capital is managed for the welfare of own and the future generations. At present, in every country sustainable process is very much essential for development. Therefore, this concept has been repeatedly emphasized in various national and international conferences which are held in different countries of the world. Sustainable agro-natural resources management is a system in a sustainable way that is directed based on understanding the environment, economy and society. The main intention of agro-natural resource management activities is to maintain the long-term ecological and biological integrity of natural resources by increasing productivity in agriculture and proper utilization of agricultural products. In this context, now the study of physiographic micro zonation of Purba Medinipur district for sustainable agro-natural resources management is most important. Here, the major agro-natural resources are agriculture, fishery and vegetation. The study illustrates the village wise distribution of agro-natural resources and its pattern and related problems in the district. This study reveals the village wise amount of cultivated land, various crop cultivated area, cropping pattern such as cropping intensity, crop combination and crop diversification of the district. Characteristics of agriculture and its types and methods practiced in the district have also been described. In this study, seasonal nature of uses of agricultural land has been analyzed. In this context, the amount of non ploughed arable land has been determined during three crop season in an agriculture year such as kharif, rabi and zaid crop season and which reveals that the amount of non ploughed arable land in most of the villages of the district is highest in rabi crop season and then in zaid crop season. But in kharif crop season almost all agricultural land is used for cultivation in all the villages. Spatial distribution of vegetation in the district has been analyzed and also

highlighted the nature of forest and its types. There are two types forest like forestry planted by farmer and forestry planted by government or semi-government organization. The study also discussed the distribution of inland fishery of the district. The important analysis of the study is to determine the conversion of land into fishery. The analysis reveals that day to day agricultural land and forest land is converted into fishery. It is estimated that the amount fishery was 17107.2 hectares in 2013, it increased to 35832.69 hectares in 2019. Another important analysis is the different physical properties of the district such as, nature of soil salinity, soil pH, nature of inundated tidal water salinity, tidal water influence zone, drainage types, drainage density and some other socio-economic analysis such as population density, distribution of different worker population, transport system and transport density of the district. In addition, it is important to highlight how those resources are currently being used. The study also explains the growth rate of different agro-natural products for the past few years, i.e., 2003-04 to 2013-14. The study describes about the various types of agro-based industries that have developed based on the local resources. Different environmental problems arising from fishery are also described here. Another important focus of the study is to develop the methodological process for sustainable management of agro-natural resources, like physiographic micro zonation, land suitability for agriculture and fishery. The district has been divided into 8 physiographic micro zone based on drainage basin area for management and development of agro-natural resources from grass root level. Apart from, all the villages of the district is divided into 14 categories based on salinity level of soil and inundated tidal water which help in selecting the suitable crop for cultivation. Suitability of villages for development of fishery has been determined considering the location factors of the district. All the analysis is crucial for policy making and formulation and decision making in agro-natural resources management. Village wise agricultural data from all block of the district has been used for the analysis of different crops area distribution, cropping pattern and nature of

agricultural landuse. To extract the vegetation cover area and fishery, Sentinel-2 image, June 2019 has been used. Four years LANDSAT-8 OLI satellite data like April 2013, March 2015, April 2017 and May 2019 has been used to show the changing agricultural land into the fishery. Field data has been collected for the analysis of soil salinity, soil pH, nature of inundated tidal water salinity, tidal water influence zone and environmental problems arising from fishery. Others secondary data has been collected from different offices and website for different analysis. Crop combination of J.C Weaver's (1954), Gibbs-Martin Index of Diversification (1962) is used for the analysis of cropping pattern. Normalized Difference Water Index (NDWI) for water body extraction, supervised image classification technique for vegetation mapping is used in the study. Remote sensing and GIS is most powerful technique for this analysis. Some statistical methods related to analysis are also been applied.

Key Words: Agro-natural resources, Sustainable Development, Micro Zonation, Land suitability, Remote Sensing and GIS.