CHAPTER I

INTRODUCTION

1.1 : Statement of the Problem

Land has been an indispensable resource for human survival since time immemorial. During his existence on the earth, man has depended upon soil either directly or indirectly for the production of food and other materials used by him for fuel and shelter. Though land is one of the most important components of life support system, it has been overused and even abused by human being especially during the last few decades. And now, due to exploding population, especially in the third world countries, land is under high stress due to growing human settlements, agricultural use and urban-industrial sprawls. At the same time demand for various other uses of land is ever increasing. The cumulative effect of all these is the land degradation due to soil erosion, desertification, waterlogging, increase in alkalinity and salinity and the toxic effects of agricultural chemicals and industrial effluents.

Assam is a state in India which has recently experienced a phenomenal growth of population. Its total population of 33 lakhs in 1901 has increased to 84 lakhs and 224 lakhs in 1951 and 1991 respectively. After Independence during 1951-91, the percentage of increase in population has gone upto 179 per cent as against country's increases of 134 percent. Such an alarming growth of population has its obvious pressure on land resources. In the wake of increasing population pressure on land in the state, it has been observed that due to two types of misuses of land i.e, use of land
for a purpose to which it is not properly suited and adoption of improper methods of farming, grazing, and deforestation, there occurs marked deterioration of productive lands. The process of wasting land is, however, human induced as well as natural. Most of the time, it is difficult to separate them. But it is the human interference with the natural system which finally produces most of the problems relating to the economic use of land. The human and natural factors collectively or singularly are responsible for turning productive lands into unproductive ones e.g. wastelands. Thus conservation of land becomes an important issue which needs to address the aspects more than prevention of exhaustion or depletion of soil. In fact, conservation of land means that land should be put to the best use. Keeping this point in view, the Govt. of India had commissioned the National Wasteland Development Board (NWDB) on 5th January, 1985 to deal with the various land degradation problems and formulate appropriate plans to develop the wastelands or various forms. The Govt. of Assam has also constituted a Wasteland Development Board for the development and management of the wastelands in the state.

The word 'wasteland' is a broad term and different authors have defined it differently. According to Dudley Stamp (1954), 'wasteland is that land which has been previously used, but which has been abandoned, and for which no further use has been found'. Wasteland Survey and Reclamation Committee, Ministry of Food and Agriculture (1961), has defined wastelands as those lands which are either not available for cultivation or left out without being cultivated like fallow and culturable waste. The National Remote Sensing Agency (1985) has defined wasteland as that land which is presently
lying unused or which is being used to its optimum potential due to some constraints. The National Remote Sensing Agency (1986) has again defined wasteland as that land which presently lying unutilized except as current fallow due to different constraints. According to National Wasteland Development Board (NWDB), 1987, wasteland is the degraded land i.e., loss of land productivity, quantitative or qualitative through a variety of processes, which can be brought under vegetation cover with reasonable effort, and which is deteriorating for lack or proper water and soil management or on account of natural causes.

In Assam, out of its total geographical area of 78438 km², wasteland occupies an area of 12975.20 km², which constitutes about 16.54 percent. In Kamrup District, 286.38 km² comes under wasteland, which is 6.59 percent of the total geographical area of the district. Again in Kamrup district, the Dimoria Development Block which has a total area of 308.8 km² covers 86.56 km² of wasteland, constituting about 28.03 percent of the total block area. It has been observed that this block with highest wasteland area in the district represents all class of wasteland. In view of the increasing pressure of population on land in the state, wasteland development it thought to be a pressing need for agricultural as well as overall economic development of the state. Keeping this point in mind, an attempt has been made in this study to access the states of wastelands, examine the development problems and evolve an integrated development Plan for the wastelands of Kamrup district of Assam with special reference to Dimoria Development Block.
1.2 : Study Area

Kamrup district is situated in the lower Brahmaputra Valley of Assam between 25°44' N and 26°51 N latitudes and 90°56' E and 92°10'E longitude. It occupies a total area of 4345 km² which accounts for 5.5 percent of the state. The Dimoria Block is located in the southeastern part of the Kamrup district between the 26°N and 26°10' N latitudes, and 91°.5' E and 92°45' E longitude. The Block consists of twelve Gaon Panchayats, viz. Kamarkuchi, Barkihat, Baruabari, Sonapur, Digaru, Nartup, Tetelia, Hahara, Khetri, Maloibari, Dhopguri and Topatoli with a total number of 144 villages and a total area of 308.8 km². The block are lies partly on the northern margin of the Meghalaya plateau and partly on the plains created by rivers Digaru, Kalong and their tributaries. The area falls under sub-tropical monsoon climate characterised by warm humid climate with an average annual rainfall of 1740 mm and average temperature of 36°C in summer and 20°C in winter. The relative humidity of the area is more than 80 percent. The area supports various types of tropical monsoonal vegetations as found in other parts of the Brahmaputra Valley. The major soil groups found in the block are mainly the Recent Riverine Alluvial Soils (Entisols) and old Riverine Alluvial Soils (Inceptisols). The pH value of the soils ranges between 4 and 8. The soils of the plains are ideal for agriculture. The productivity of rice in the Dimoria Block is 1450 kg/hectare against the state's record of 1060 kg/hectare.

1.3 : Review of Literature

The review of literature pertaining to the evaluation and management of wasteland of Kamrup district is an attempt to survey the works done so far in
this line. The emergence of wasteland studies to have effective plans for better land use option is, in fact, quite recent. However, many works have been done in this line of research. Nowadays, literature on land use studies has become voluminous and newer and newer literatures on different brands are gradually emerging. Therefore, it is difficult to provide a comprehensive review of works in this very extensive and rapidly developing field. The pertinent publications are found in variety of academic journals and survey reports. For that reason, it is quite impossible to incorporate all these in this review.

The contribution of applied geomorphology in regional appraisal of resources and management of geomorphological problems has been examined by various persons in their respective countries and in various environment. Thornbury (1954), devoted some attention to applied geomorphology and since then geomorphologists have made concerted efforts to cover those aspects of applied geomorphology that are directly related to environmental problems and decision making processes.

The geomorphologists who have contributed usefully in the studies of environmental problems are Johnson and Barlowe (1954) who have discussed about the Land problems and Policies. Leopold (1962) studied on land use and sediment yield in the context of man’s role in changing the face of the earth. Nicholson (1972) has authored the book “The Environmental Revolution” and analysed the land use problems in different environment.

As regards the studies on geomorphology and land use especially emphasising on wasteland studies, there are many works of interest. But it is found that different studies have attempted to define wastelands differently. As
such there is no well accepted definition of wastelands. The concept and
definition of wasteland is highly controversial. Inspite of the continous efforts
of the individual schools and research institutions together with several voluntary
and government organisations, a precise definition of wasteland has not yet emerged.

The common understanding of wasteland is that of a vast dry,
uncultivated, uninhabited expand, the mining devastated areas, deforested
mountain slope, the land turned into desert like condition, and even the areas
subject to nuclear test explosion or chemical warfare (Tolba, 1982). The
Chamber’s Dictionary explains wastelands as “Uncultivated and almost sparsely
inhabited, lying unused, unproductive, devastated, and ruinous” while Webster
International Dictionary describes it as “uncultivated barren land”. The Longmen
Dictionary of geography explains it as “any wild, uncultivated, and uninhabited
land....” In these descriptions and explanations the major emphasis has been
given on the suitability or otherwise of land for agricultural purposes which
speaks the partial truth. In several other definitions being attempted by
economists, the economic potential and the actual returns from the land seems
to have formed the basis of identifying wasteland. According to it any land which
gives less than 25 percent of its potential may be considered as wasteland.

Agarwal (1986) defines wasteland a those land which one is
producing much less than their potential. According to Matto (1986) it would
be appropriate to define wastelands as those areas which are not utilised to their
full potential and whose productivity could be increased making reasonable
efforts and investment. Sir James (1928) defines it as an uncultivated land
producing little or nothing, a wild desolate region, a desert, a barren land. Dudley
Stamp (1954) had defined ‘wasteland is that land which been abandoned, and for which no further use has been made’.

The Wasteland Survey and Reclamation Committee (1961) defines wastelands as those lands which are either not available for cultivation or are left out without being cultivated for some season or the other. The former includes unculturable barren lands and the latter the culturable wastelands and follows. The Technical Committee on Co-ordination of Agricultural Statistics (TCCAS) in 1950 have a separate category entitled “Culturable wasteland”. Mohammad (1978) and Singh (1974) have simplified the definition and have defined as those lands which are ecologically instable or whose top soil has completely lost its fertility status and which has developed toxicity for growth of crops and trees due to environmental or anthropogenic problems have been abandoned and no further use has been found” (Yadav, 1986). Bhumla and Khare (1987) in their article ‘Estimates of Wastelands in India’ have defined wastelands as the land which are ecologically unstable, have nearly completely lost their top soil, and have developed toxicity in the root sense for growth of most plants, both annual crops and trees. This definition covers the lands affected by water erosion, wind erosion, floods, waterlogging, soil cover and also certain other categories of lands which are wastelands.

After examining the conflicting definitions and view points and the threat posed by the expanding wastelands demanding their control and reclamation in 1984, a National Wasteland Development Board (NWDB) under the Ministry of Environment and Forest, Govt. of India was constituted to look into the matter and a “Technical Task Group” was formed to define and classify the wastelands so that effective measures could be taken to control and reclaim
The National Wasteland Development Board's Technical Task Group's report (1986) considered various definitions of wastelands or that land which is presently lying unutilised due to different constants. This issue was discussed in a National Conference held on 21 April 1986 and a definition was unanimously adopted as “wastelands are those lands which are presently lying unused or which are not being used to its optimum potential due to some constraints”. Also the methodology to develop a data base on existing status of wastelands has unanimously been adopted with some additions in the sub-categories. This comprises two categories i.e. culturable and unculturable with 14 sub-categories, 11 belonging to the former and 3 to the latter. The 11 categories of culturable wastelands are such as gullied and/or ravinous land, undulating upland with or without scrub, surface waterlogged land and marsh, salt affected land, shifting cultivation area, degraded forest land, degraded pastures/grazing land, degraded non-forest plantation land, strip land, sands, and mining/industrial/wastelands. Unculturable wastelands have been divided into three categories which are barren rocky/stony wastes/sheet rock areas, steep sloping areas, and snow covered and/or glacial area. The group has arrived at this nomenclature and classification of wasteland after considering easier understanding of the technical terms at different administrative hierarchy and scientific circles to enable identification and delineation of wastelands, feed back from field extension units based on tentative classification of wasteland circulated by the National Remote Sensing Agency (NRSA).

The spatial distribution of wastelands is complicated because of definitional problem and lack of authentic mapping and surveying. Therefore, the Planning Commission had appointed the Wasteland Survey and Reclamation
Committee in 1963 which has included in its report the sketch map of different states showing locations of wastelands. On the basis of that report, National Atlas and Thematic Mapping (NATMO) has prepared land use maps on a scale of \(1'' = 4 \text{ miles}\). The National Remote Sensing Agency has published the maps of almost all the states on a scale of 1:35,00,000 showing the spatial distribution of wastelands. It has also produced a map on wastelands of India on a scale of 1:1,000,000 which shows the pattern on distribution of all six categories of culturable wastelands. Besides, some authors have contributed their papers regarding the genesis of wastelands. In this regard, the works of Singh (1968), Chaturvedi et.al (1987), Gupta et.al (1995), Kumar and Pandey (1989), Kundu et.al (1997), Mayalaqu and Manickaur (1988), Mukhapadhyay (1992), Madguni (1998), Narayan (1988), Yadav (1996) and Roy and Verma (2001) are noteworthy.

In North-East India the scientific agency like Assam Remote Sensing Application centre (ARSAC) has been involved in mapping of wastelands of Assam. The Regional Centre for National Afforestation and Eco-Development Board, NEHU, Shillong in the State of Meghalaya has been carrying out projects related to wasteland development of the North -Eastern region. So far the individual works are concerned, the works of Das (1984), Goswami ct.al (1996) and Deka and Bora (2002) are important to mention.

1.4 : Aims and Objectives of the Study

The aims and objectives of the study are -

(1) to examine the detailed landuse pattern of Kamrup district as well as the Dimoria Development Block.

(2) to identify and classify the wastelands of the district and the
block into various types using standard classification scheme suitable for the study area.

(3) to study the status and capability of wastelands of the district in general and the block in particular.

(4) to examine the problems and prospects of wasteland development in the district and the block;

(5) to evolve an integrated wasteland Development Plan for Dimoria Development Block.

1.5 : Research Questions

(1) How do the physical settings of Kamrup district and the Dimoria Block influence the distributional patterns and types of wastelands?

(2) What are the natural and human processes of land degradation leading to creation of wastelands in the study area?

(3) What is the present status and capability of wastelands of the district as well as the block?

(4) How can the socio-economic development of Dimoria Block be achieved through an integrated wasteland development plan?

1.6 : Database and Methodology

In the present study for the preparation of base map from conventional sources like topographical sheets of 1:50,000 of the Survey of India are used. For the preparation of wasteland and landuse maps the IRS satellite imageries are used. Considering the definition of wasteland given by the National Wastelands Development Board (NWDB) and the National Remote Sensing Agency (NRSA), Department of Space, Government of India
a suitable scheme of wasteland classification has been proposed based on the definition adopted for the present study. Intensive field works have been carried out in order to examine the present status and potentiality of the wastelands and also for verifying wasteland and landuse mapping. The soil samples are collected from different locations of the Kamrup district and the block to access the soil properties, wasteland fertility and potentiality. Aspects pertaining to the distributional patterns, types, status, potentiality, factors and processes of wasteland genesis have been examined and analysed thoroughly at goan-panchayat levels in all the twelve gaon-panchayats of the Dimoria block. Here, an attempt has been made to divide the landscape into some terrain units and to build up an inventory landscape through maps and descriptive materials. Quantitative techniques have been applied on topographical maps, aerial photographs and satellite imageries and detailed maps of various morphological variables are worked out. After superimposing these maps some distinctive landforms are delineated and the terrain classification map has been prepared. Finally, the suitability and capability of the wastelands for best landuse options has been analysed to manage the wastelands. Further, GIS technique has been applied to show the digital elevation model of the Dimoria Block.

1.7 : Significance of the Study

Land is a precious resource and a vital component of the life-supporting system. Because of high growth of population everywhere on the earth, there is a concomitant pressure on land. In order to meet the increasing demand for food and shelter, it is urgently required either to increase land productivity or to increase land area under cultivation. As land productivity
can be increased to a certain extent only, the best option remains in the aerial increase of cultivable land. The wastelands which assume greater prospects for agricultural and other economic uses can be reclaimed and developed. From this viewpoint, such a study which concentrates on the problems and prospects of wastelands development is quite significant, relevant and useful. Moreover, no such type of study has so far been carried out taking Kamrup District and the Dimoria Development Block as study area. Thus, this study bears both academic as well as utilitarian value.