CHAPTER -1
INTRODUCTION

1.1 INTRODUCTORY NOTE

Ajay Damodar Interfluve, Asansol Subdivision, provides a unique example of widespread as well as continuous interactions between physical as well as cultural elements existing within the region. These interactions result into dual effects-in one hand they turn natural elements into resources, on the other hand they produce some disturbing effects in nature which accelerate the pace of environmental degradation. These disturbances in nature are the consequences of some endeavors, specially human activities like mining, industrialisation, urbanisation etc.

Environmental problems are one of the most burning issues of modern times. Since the last century these issues have been echoing from all comers of the world creating human consciousness regarding environment. Environmental problems are important aspects of Ajay-Damodar Interfluve, Asansol Subdivision, which is chosen as the study area by the present researcher. Ajay Damodar Interfluve is one of the richest resource potential regions in India. Increasing rate of environmental problems besieges the resource utilisation. Moreover life-supporting ecology is also getting deteriorated day by day.

The region was once intensely forest-cladded undulating terrain which, in most of the places, does not have similarity with the present landscape, except for few small patches which were left out of human activities. The undulating terrain of this region, has been plained in many places mainly after the advent of human activities. Relics of past landscape and forests can only be observed in few isolated pockets in the western margin of the region.

It is very difficult to particularise the date of the genesis of the environmental problems. It is, however, true that the environmental problems have started affecting the land use of the present study area some where in between the mid-nineteenth and early twentieth century coinciding with the boom phase of mining-industrial activities in this region. From this time the adverse effects of human activities have begun to outpace the limit of natural neutralising potentiality. Thus the limit of deterioration of the environment of this region is ascending to reach up to a hazardous level nowadays.

1.2 AREA AND LOCATION

Ajay Damodar Interfluve, Asansol Subdivision is bounded by latitudes 23°34' north and 23°56' north and longitudes 86°48' east and 87°14' east (Fig1.1) covering an area of 838.5 sq.km (Plate 1.1). Limited totally within Burdwan district of West Bengal, it is skirted by Durgapur Subdivision of the same district in the east, Bankura and Purulia districts of West Bengal in the south, Dhanbad district of Bihar in the west and Birbhum district of West Bengal and Santhal Pargana district of Bihar in the north.
Fig. 1.1
Plate 1.1: A False Colour Composite of all area within latitudes 23°30'N and 23°53'N and longitudes 86°48' E and 87°14'E including the present study area - Ajay Damodar Interfluve, Asansol Subdivision (IRS - 1B LISS2 image of January, 2003).
The area comprises four 1:50,000 Survey of India Sheets—73 I/13, 73 I/14, 73 M/1, 73 M/2. Again the region falls within the Calcutta Plate (Physical 33) with a scale of 1:1,000,000 of National Atlas of India published by National Atlas and Thematic Mapping Organisation (NATMO).

The region possesses a special locational importance both with respect to geomorphic as well as economic view point. Geologically it is a transitional zone between Chotanagpur Plateau in the west and Lower Ganga plain in the east. Thus it bridges two different landform units lying on its both sides. Naturally it sustains the characteristics of both of the landforms. Culturally it is important from another viewpoint. The region is located in between Chotanagpur Mining-Industrial Region in the west and Hooghly Industrial Region in the east. Thus from both respects the present study area is very much important.

The locational importance of the region has been increasing since the time of the commencement of coal mining. Later on various kinds of industries have developed taking the advantage of well developed transport network. On the other hand it has given boost to the immigration of people from different parts of the country and abroad in search of jobs in mining, industrial and trading sectors. Thus the region has become one of the densely populated regions of India. In concomitant with the advantageous location, the cultural sector of the region is flourishing day by day increasing the importance of the region. Moreover the environmental degradation has attracted the sight of scientists, geographers, demographers and scholars to a large extent.

The area of the interfluve falls entirely within the Burdwan District of West Bengal. The interfluve comprises eight police stations—Chittaranjan, Salanpur, Kulti, Barabani, Asansol, Hirapur, Jamuria and Raniganj (Fig 1.2).

1.3 OBJECTIVES OF THE PRESENT STUDY

The objects of present study can be highlighted as follows:—

1. To present a clear spatial pattern of existing land use.
2. To identify the environmental problems which are affecting the land use of Ajay Damodar Interfluve.
3. To assess how the environmental problems, as existing in the present study area, are affecting the land use pattern.
4. To study all these over three geomorphic surfaces.
5. To suggest some alternative approaches for the betterment of land utilisation in Ajay Damodar Interfluve.

1.4 DATABASE AND LIMITATIONS

The present study is based mainly on the data collected from primary and secondary sources. Primary data have been collected during the field survey by the researcher herself. The secondary data have been collected from different offices like G.S.I., NBSS and LUP, CGWB, SWID, NATMO etc. Further personal field checks were also done in some areas.
THE AJAY-DAMODAR INTERFLUVE
ASANSOL SUB-DIVISION
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Fig. 1.2
In the present study area relief, drainage, slope etc. maps are obtained from the Survey of India Toposheets - 73 I/13, 73 I/14, 73 M/1, 73 M/2 with a scale of 1:50,000. The geological, hydrological, soil etc. maps that have been consulted during the present study have been collected from the concerned departments. The landsat mosaic of the study area and its adjoining area is also prepared from black and white print. The false colour composite landsat imageries as well as prints have been collected from Regional Remote Sensing Service Centre, ISRO in Kharagpur.

A lot of inconveniences specially lack of reliable data, completeness of data and uniformity of data are faced. In some places the study remains confined within certain limits due to some other physical inconveniences.

1.5 METHODOLOGY

The present study is based on the modern methodology and intensive fieldwork in relation to applied geographical significance. The analysis of the data and information relating to the present study have been made in terms of (1) pre-field, (2) field, (3) post-field phases (Mukhopadhyay, 1980).

(1) The pre-field phase includes identification of the study area and collection of relevant maps, data and information from various sources.

(2) The field phase includes intensive fieldwork. The same phase of work includes personal discourses with local inhabitants and workers of different offices and institutions. Structured questionnaires were distributed among the people to collect necessary information regarding some parts of the present study. Further personal field checks of the collected information from different offices are also an important part of this work.

(3) The post field stage includes the analysis of data and information for deriving necessary tables, maps and diagrams. On the basis of that tables, maps and diagrams have been prepared.

Different morphometric measures have been adopted on the basis of contours and drainage information of Sol toposheets. To obtain the morphometric data, the interfluve has been divided into a number of grids, each has an area of 16 sq. km. The morphometric measures applied consist of relative relief, drainage, density, roughness index (after Hook) and average slope (after Wentworth). The measures of land use variables include area under cultivation, area under mines, area under forest including social forestry and area under miscellaneous uses.

Relationships between the morphometric and land use variables have been analysed through correlation and regression using standard statistical packages.

1.6 PREVIOUS LITERATURE

With few literatures regarding the physical as well as economic background of Ajay Damodar Interfluve the present researcher claims her originality for a co-ordinated study of a large number of aspects with special reference to environmental problems, their effect on the existing land use and
to unearth the potential land use, for the betterment of the region.

Ajay Damodar Interfluve, being a part of coal-bearing Gondwana formation and a hub of mining and industrial activities, is geologically and economically a prosperous region in West Bengal and in Eastern India too. However, a number of environmental problems, are affecting adversely the land use and life of its inhabitants. Not a single co-ordinated work has still been done to assess the adverse impacts of the environmental problems generating from different sectors like mines, industries, urban sectors etc. in the present study are. The present researcher with her intensive field work, personal experience, personal discourses with local inhabitants has tried to assess all these factors in a complied work.

Mukherjee(1938), Bose (1968), Singh(1971) have provided regional accounts with general physical and economic attributes of West Bengal within which Ajay Damodar Interfluve, Asansol Subdivision, is merely a small part. Dunn (1896), Fox (1931), Gee (1932) have studied the underground geology of this region in details which have given the researcher a scope to correlate this particular aspect with other aspects like environmental problems, their mitigation and their effect on land use.

Environmental problems like subsidence, underground fire, waste heaps, disrupted hydrology which are threatening the region since a considerable decades have got immense awareness from the authorities of mines, industries and local development institutions. The reports, journals, magazines published by these authorities have helped immensely the present researcher to make her present paper. Special motion should be made of Basu (1988), Ghosh (1988), Sachdev (1995), Lahiri and Lahiri (1998), etc. for throwing much light on different adverse effects of coal-mining activities in Raniganj coal-field area.

No detailed investigation, however, has so far been done associating the environmental problems generating from mines, industries and urban sectors and their hazardous effects on the existing land use pattern.

The researcher has studied environmental degradation, quality of life and peoples perception about Raniganj and at the same time the viability of the development of a new township of Mangalpur named, “Environmental Vulnerability of Raniganj and Viability of Mangalpur Satellite Township” as the Term Paper of M.A. part II (1991). In the Symposium Abstracts published in 1992 by the Indian Institute of Geomorphologists the researcher has discussed the “Environmental Impact Assessment of Open cast coal Mine”. These articles are resourceful for the researcher herself.

The present researcher, however, has not come across any detailed study exclusively on her study area.

1.7 GEOMORPHIC AND ECONOMIC RELATIONSHIP WITH ADJACENT AREAS

Ajay Damodar Interfluve is geomorphologically and economically closely related with adjoining areas. The region is located in the eastern part of the Chotanagpur Plateau. The western part of the interfluve bears almost similar geomorphic attributes like Chotanagpur Plateau. This is evidenced
by the extension of tongue-like projects in the western part of the interfluve. Chotanagpur Plateau is a polycyclic erosional zone with step-like flat surfaces lying at different elevation descending gradually from west to east. The lowest step is assumed to be extended up to the present study area, although, limited only within the western part. There are some micro features, which are present in both of these two regions. There are — (1) accordant of summit levels, (2) monadnocks i.e. residual hills over an ancient erosional surface, (3) scattered knolls, (4) undulating tracts etc.

Ajay Damodar Interfluve sustains geomorphic properties very much similar to other interfluves in chotanagpur Plateau. The wide undulating or almost level surface of the present study area with isolated monadnocks and scattered knolls is closely related to a complex geomorphological history. This region actually constitutes one of the major interfluves of the east-going Chotanagpur rivers like Brahmani-Mayurakshi, Mayurakshi-Ajay, Ajay-Damodar, Damodar-Darakeswar etc.

The eastern part of Ajay Damodar Interfluve bears the attributes more of Lower Ganga Plain than Chotanagpur Plateau. Here the landsurfaces are almost level with some local peculiarities like rock exposures, isolated low ridges, scattered knolls etc. which brake the monotony of landscape. Although some areas in the eastern part of this region are formed of the deposition of river-borne alluvium, but the thickness of the alluvium is not so deep like lower part of the Lower Ganga Plain. The two big rivers - Ajay and Damodar, which form the northern and southern boundary of the study area come from the Chotanagpur Plateau, lying at the west of the present study area, and flow towards southeast.

Economically Ajay Damodar Interfluve is a developed region sustaining almost all kinds of economic activities like mining, trading, industries etc. Raniganj coal-field area produces best quality coal in the country. So, coal produced in this region is distributed to the various parts of the country. For industrial purposes the region has to bring various kinds of raw materials, mainly minerals like iron ore, fireclay, manganese etc. from Chotanagpur Plateau region. Thus Ajay Damodar Interfluve has a continuous economic linkage between mining - industrially rich Chotanagpur Plateau in the west and Hooghly Industrial Belt in the east. Such economic linkage with the adjoining areas is only possible due to the existence of well developed transport system - both roadways and railways.