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LATERITE AND LANDSCAPE DEVELOPMENT IN BALLABPUR-4, BOLPUR SRINIKETAN BLOCK, BIRBHUM DISTRICT, WEST BENGAL

Ranjan Kumar Das

Abstract

India is rapid growing developing country. There are several project are running such as industrializing, road construction urbanization etc in different part of our country. On the other hand inspite of developing the some environmental hazard and degradation also occurring parallely .The Ballabpur is well known that type of laterite terrain. It has great impact on rill and gully erosion. It has an economical value to product agricultural commodity also.

Keywords :*Morphometry, Laterite, Ballabpur, Denudation.*

Short Profile

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INTRODUCTION :

Geomorphology (Derived from the 'Greek 'word 'geo' means earth, 'morphe' means form and 'logos' means discourse) is the scientific study of geomorphic feature of the earth's surface. In other words, it is systematic and organized description an analysis of various aspects static, dynamic genetic and ecological aspects of land form of the earth. Here, the term land form is said to be used in its widest sense and includes relief feature of various orders, i.e. the dimension of land form ranging from micro topography to continent an oceanic basins.

Since the latter half of the last century, with the advent of new techniques and methods for Geomorphological research works, the traditional qualitative techniques has been changing to quantitative techniques. Besides, the study of geomorphology of the earth surface is changing from pure geomorphology to applied geomorphology, i.e. terrain evaluation, where the suitability of train for its use general specific purpose are identified and accordingly planning is done for society development. An attempt has been analysis the lateritic terrain in the study area which is occasionally an extensive area of ferruginous developed due to deposition by the drainage channels running through the region. Although an idealize laterite profile is absent in the region what really is found, nodular deposits which have been broken down developed to climatic force upon laterite cemented surfaces. In fact the area is characterized by secondary laterites which are being modified by sub-aerial denudational processes.

Ballabpur mouja has a great important for his geomorphic feature i.e. "Khoai" region which is built up by lateritic landscape. It is very much affected by the work of denudation. The geomorphic process/characteristic, I have attempt the Morphometric study with its economic value of the area. Prof. V.C. Jha well defined this area has great importance for its economic value through several study such as ecogeomorphological assessment (2003, 2009), terrain evaluation, rills and gullies studies, land degradation etc. And he also guides several research scholars for this type study.

LATERITE: Laterite is the name originally suggested by Buchanan (1807) for a highly ferruginous weathered product used as bricks in Malabar. According to new old (1844) 'the laterite generally

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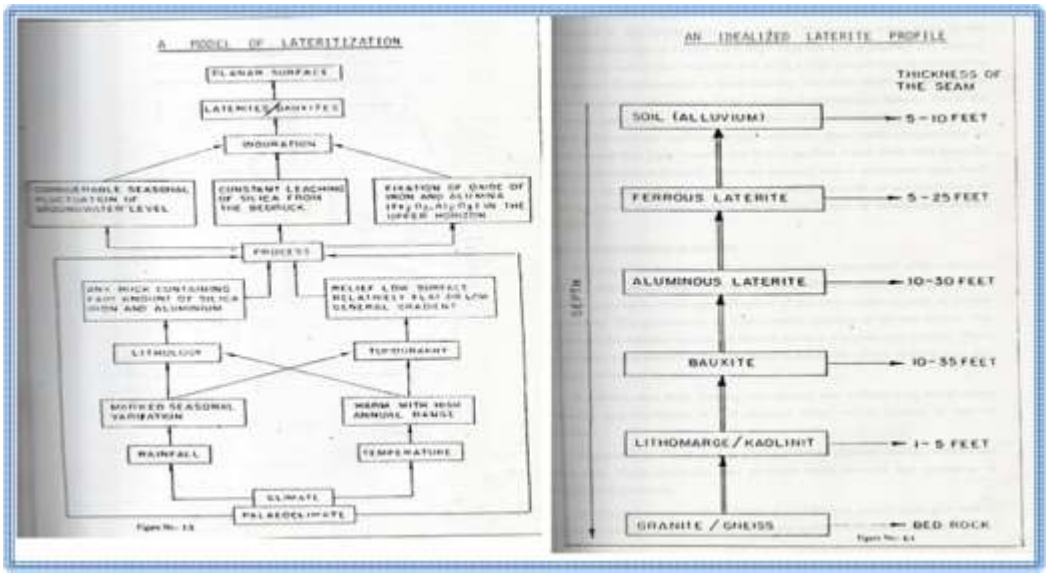
speaking is a purplish or brick red, porous rock, passing into liver brown perforated by numerous sinuous and fortous tabular cavities either empty, filled or partially filled with a grace white clay passing into acherous reddish and yellow brown dust, or with lilac tinted litho margie earth .....the softness of this rocks is such that if it maybe cut with a spade, hardening exposure to sun and air"

Laterite is certainly intra zonal occurrence. Its development being depends upon special geomorphic condition. Laterization is associated with warm and humid tropical areas where wet and dry season alternate. Lack of humus is characteristic of soil formed under this region.

Laterites are highly weathered materials, rich in secondary oxide of iron alluvium or both. It is nearly valid of bases and silicates, but it may certain large amounts of quartz and kaolinite. It is either hard or capable of hardening on exposure to writing and drying (Alexander and Cady 1962).

Laterization: It is a weathering process in which iron and aluminum oxides become concentrated in the upper layer of the soil. This process takes place in the tropical and sub tropical region with high rain fall and a marked dry season. Rocks that are low in iron minerals but with a high proportion of aluminum are converted by laterization to form bauxite. The zone above the permanent water table in alternatively saturated and dried according to season, this is the zone where laterization take place. In the dry season water passes up with iron and alters salts by capillary action and has them while evaporating. In the wet season this layer reaches the lower ground water table and hydraulic silicate of alumina is form, these are washed out or sometimes may leach down wards. In this way the laterite layer comes up with an accumulation of iron salt. Along with iron oxide the hydrated form of aluminum oxides also occur.



Purpose and Scope of the Study: The purpose of the study is to examine the geomorphological relationship, climatic significance and mechanism of laterite formation of the study area. It also helps in understanding the geographical features which have been developed in the area. The process which might have operated in the formation of laterite will also be sought to be understood. The present study also focuses the use of laterite for the society development from the land economics point of view.
The main of the study is to identify the laterite and lateritic landscape as well as to find out the stages of geomorphic development through the various geomorphic processes operating in the region. It also aims to know how this area is affected by the anthropogenic factors. It has also discussed the human impact of laterite and their resultant as well as their land forms ecology in the study area. The whole area denuded upland with rolling surface. Lateritic is the main terrain characteristic of the area.

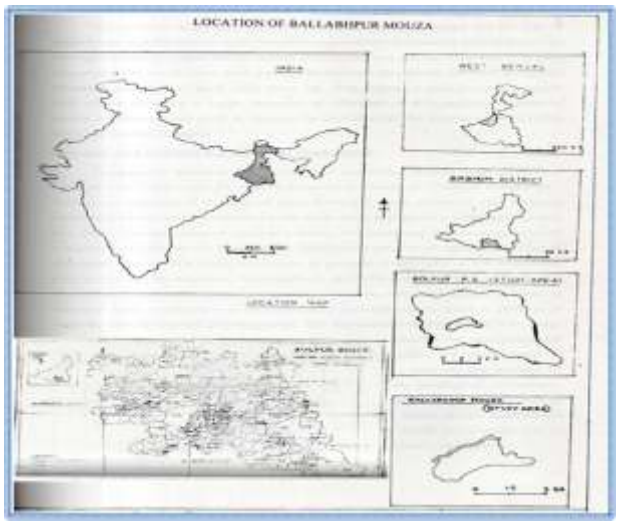
METHODOLOGY:- The work has been done mainly bases upon field observations and identification of several of geomorphological features found in the area. Necessary photographs have also been taken of the problems area which shows to the various

geomorphic processes.

LCATION OF STUDY AREA: For the present investigation the Ballabpur Mouza in Bolpur-Sriniketan Block has been selected. The Bolpur Sriniketan Block situated in the extreme southern part of the Birbhum District of West Bengal.

The Ballabpur Mouza, of Ruppur Gram Panchayet is situated in the central part of Bolpur P.S .it line between 23 °40'8'' N to 23 °41'56'' N latitude and 87 °38'8''E 87 °40'38''E longitude.

The mouza covers an area of 6.75km². Its length (E-E) and width (N-S) at their widest are 4 kms and 2.6 kms respectively.



IDENTIFICATIN OF GEOMORPHICK FEATURE:-

The geomorpholgical studies is required for the study area with the followings aims and objective-

1) The existence of land form in the study area and their significance for the production of micro land form.

2) The importance of land form with the geomorphological processes.

3) The signification of the land form for human use.

In the study area we find two types of micro land forms-

1) Erosional types: a) Isolated mesa type of feature, b) Cascade type of feature, c) Lateritic ridges, d) Very narrow gorge type feature, e) V-shaped valley type of feature, f) Step-like column, g) Unsaturated cave like hollow, h) Flat topped laterite plateau capped by massive laterite.

2) Depositional Types: a) Alluvial fan type of feature, b) talue cone type of feature, c) Colluviam deposits.

RESULT AND DISCUSSION: It as an attempt to describe the lateritic and landscape development of the Ballabpur mouja, Birbhum District, West Bengal, India. It deals with the physical and cultural landscape of the study area.the study area lies between 23 °40'8''N to 23 °41'56''N latitude and 87 °38'8'' E to 87 °40'38'' E. The study area covers an area of 6.75km².It's block headquarter is at Bolpur and Dist headquarter is at Suri.

MORPHOCLIMATIC MECHANISM IN THE STUDY AREA:

In the study area MORPHOCLIMATIC MECHANISM or processes are endogenetic in nature. Although the endogenetic processes are also responsible for the formation of the basic structure of the area. Geomorphic processes are mainly controlled by a set of climatic parameters-such as rain fall and temperature condition of the area. The study area is mainly influenced by following geomorphic processes-

1)weathering,2)mass movement, 3)erossion, 4)slumping, 5)creeping, 6)subsidence or lowering of relief, 7)wind action.

So all this above mention process and morphoclimatic mechanism are responsible for the formation of the landscape in the Ballabpur Mouza.

MORPHOGENESIS OF LATERITES: The weathering, slow mass movement, rill and gully erosion are main morphogenic processes of the area which are engaged in modifying the landscape and ultimately resulting the problem of land use. During the course of denudational processes, the roll of marked seasonal fluctuation of water table, constant leaching of silica from bed rocks and fixation of oxides of ferrous, aluminium in the pisolitic zone are significant. The roles of biotic and abiotic processes are also very significant in formation of lateritic landforms in the study area.

The process of lateritic formation has influenced the evolutions of land form in the study area. In several ways, for example – The original Surface of Birbhum laterite plateau has been broken by springs and gullies associated with them. Occurrence of two water tables in lateritic terrain of Birbhum is present. One perched above the massive

lateritic and other above the Kaolinitic horizon at the base of pallid zone, have been noted. The former is Seasonal but the lateritic is permanent in nature.

The process of spring sapping, guided by the permanent water table has led to the breakup of the lateritic plateaus and sub sequent development of the wide flat bottom valleys. Slumping and subsidence are also very much evidence of the study areas.

FROM THE MORPHOMETRIC ANALYSIS THE AREA IS CHARACTERISED BY –

1) It is founded that the general topography of the study area is moderately undulating.

2) General Configuration is dissected by rills and gullies.

3) There is extensive barren land with lateritic formation.

4) The soil is mainly bared type..

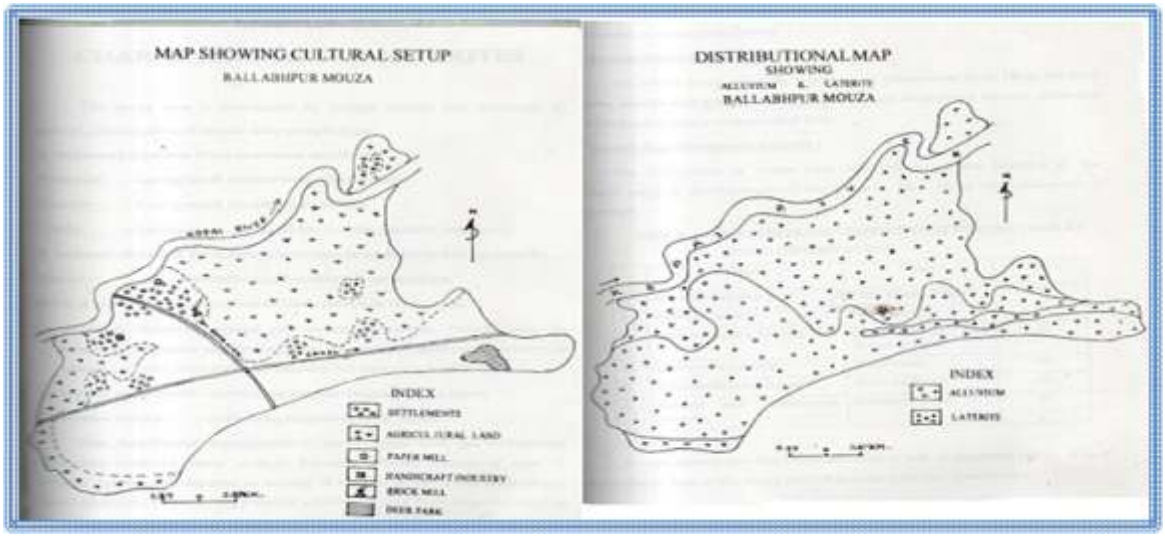
5) We find with physical and chemical weathering. (Oxidation)

6) There is a sheet wash erosion in the upper red soil lear and deposition in the lower zone rain water.

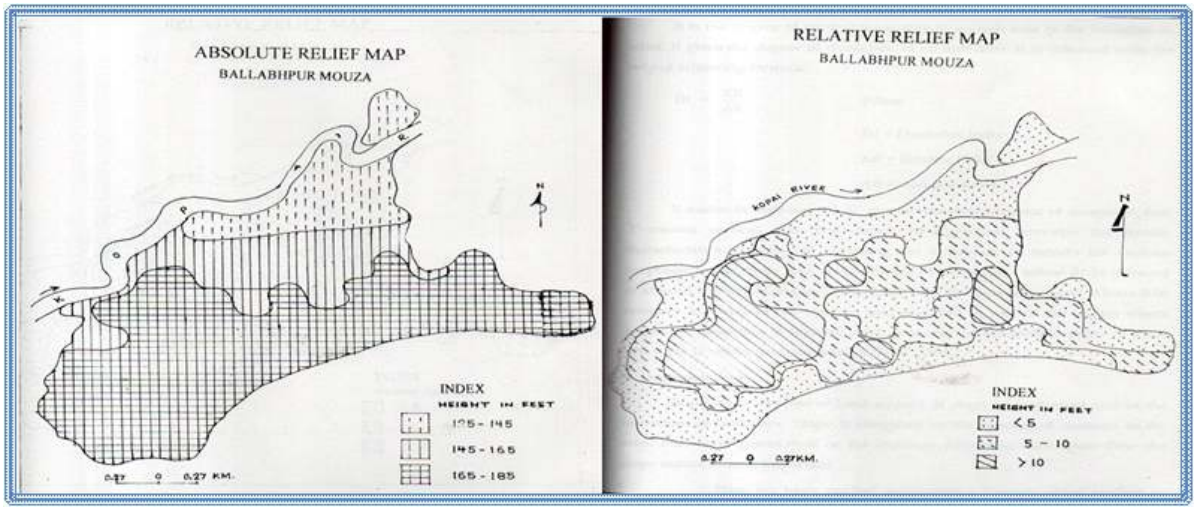
7) The Kopai river is Characteristic by steep valley walls.

MORPHOMETRIC ANALYSIS OF TERRAIN:

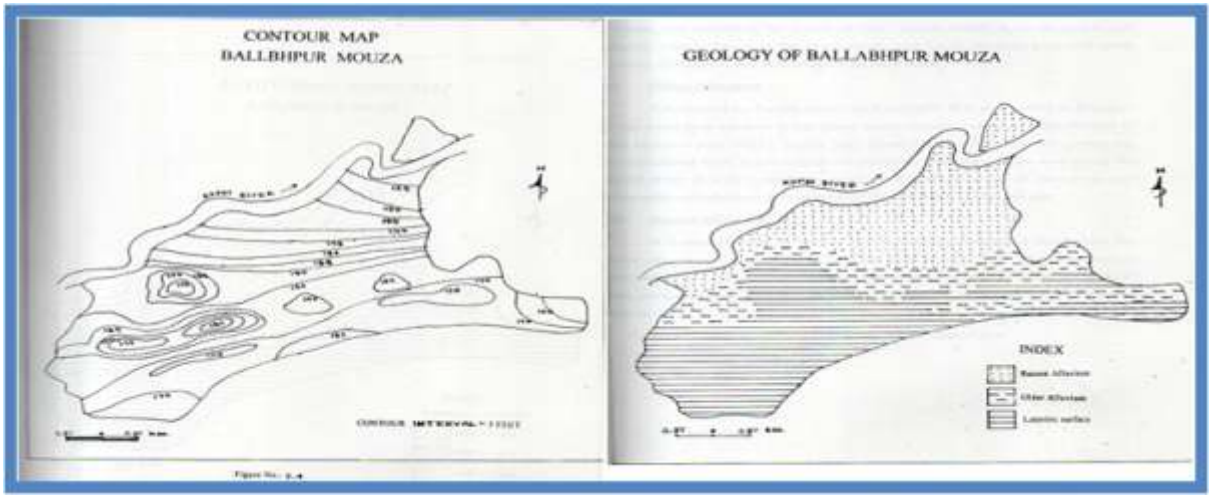
Morphometry is consisted of two words "morpho" means form and "metry" means measurement of the shape and size any features of the earth surface. There are two types of morphometry-

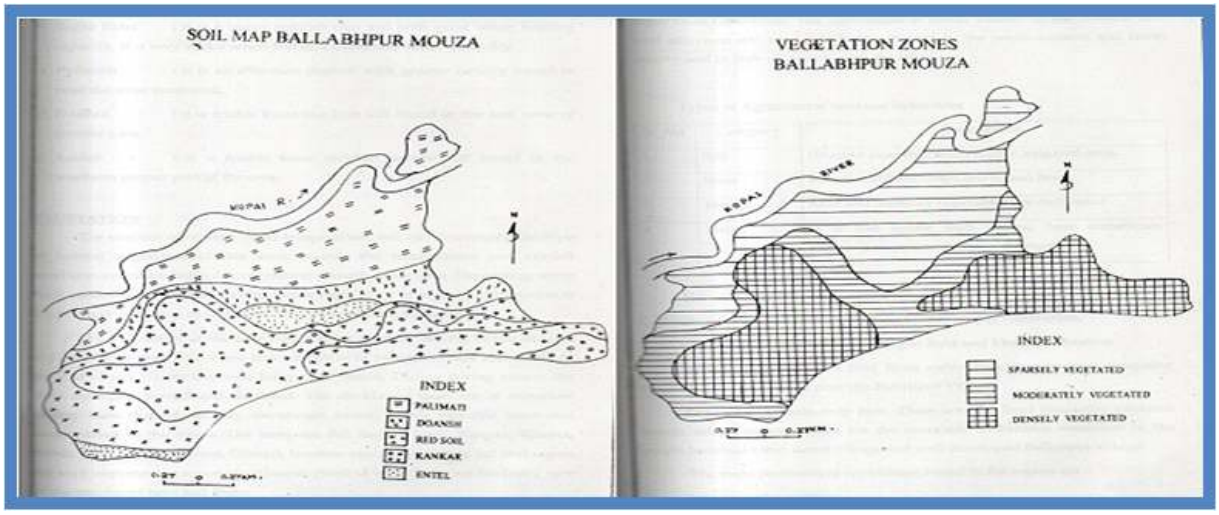


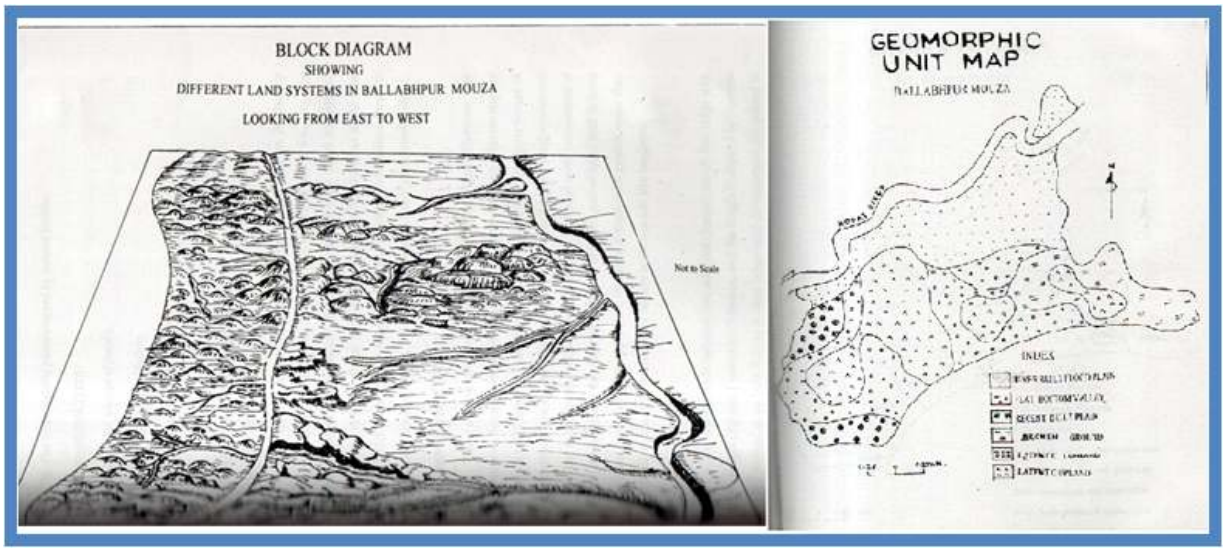
1) Relief morphometry: - It is Quantitative measure ment and mathematical analysis of the surface configuration of the earth. It has some parameters- a) Absolute relief (AR), b) Relative relief (RR), c) Dissection index (DI), d) Average slope, e) Profile analysis.



2) Basin morphometry:- It has some properties- i) Linear Properties (stream ordering, number Bifurcation ratio etc), ii) Areal Properties, iii) Relief Properties







LATERITE AND LAND USE: The study area or the Ballabpur Mouza is divided into two major types of land use-

1) Cultivable land (net sown area): - Where

agricultural operation is possible. It is divided into several groups.
*according to cropping season-(a) Khrif,(B) Rabi,(C) Pre- Kharif.
*according to cropping pattern-(a) Single Croping, (b) Double Cropping.

2) Non cultivable land: –Where cultivation is not possible due to mainly physical barrier. It is of different type- a) Settlement and others cultural purpose, b) Water Bodies, c) Barren lands, d) Forest and grass land, e) Other fallow land/waste land) Roads and Canal.

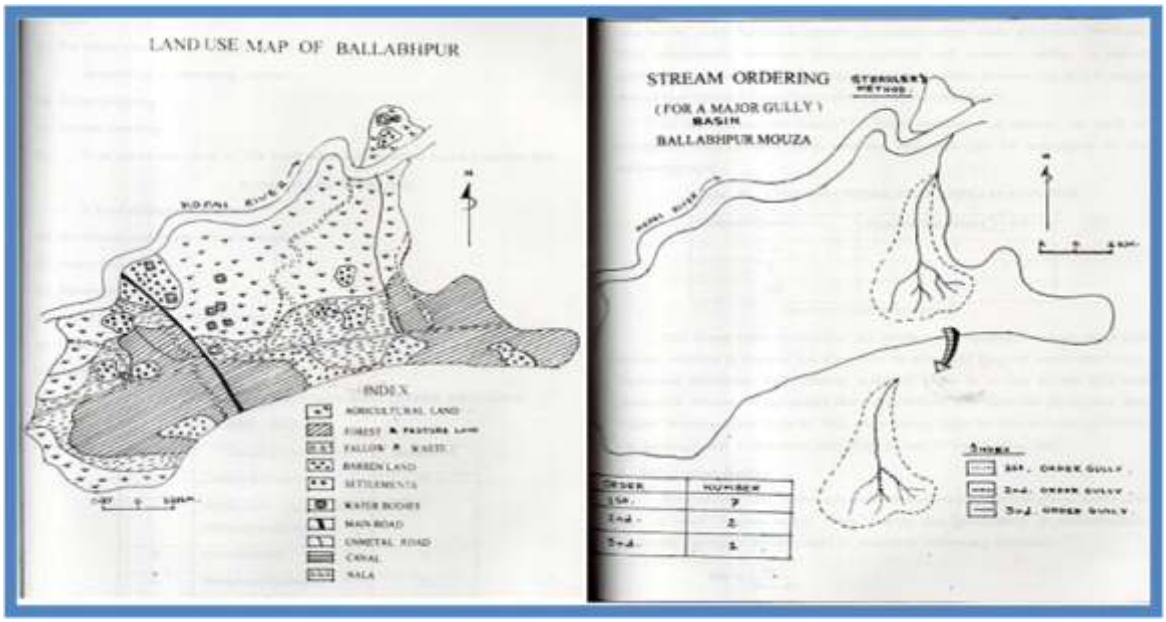


Table: 1 GENERAL LAND USE AND LAND COVER IN THE STUDY AREA.

Sl No.	Land use Category	Area in %
1	Cultivated Land	37
2	Settelment and other cultural activities	7
3	Water Bodies	4
4	Forest and Pasture	33
5	Road and Canal	13

Source: Field Study (Primary computed data)

Plate : 15
A view of the natural pond developed in the lateritic terrain near Ballabpur forest.

Plate : 16
A closer view of ridge which contains quartz, gravels etc.

Plate : 17
A view of hollow type feature.

Plate :18
A view of the concretionary format of laterite.

Plate : 19

Plate :20
Soil erosion at a high rate in the natural forest zone.

PROBLEM, PROSPECTS, AND SUGGESTIONS:

Phyosiographically the area is characterized by lateritic upland and alluvium tracts. The weathering, mass-movement, rill and gully erosion are the main morphogenic processes resulting the land not favourable for land use hereafter having a thorough analysis field observation and social interaction, the study area is concerning with the following problems.

1. Problem due to Denudation: Landforms are changed by average rate of denudation, uplift and seafloor spreading for long period but due to erosion the land form change rapidly.

2. Problems of Land Degradation: It is the result of soil contamination, soil extortion soil stripping, water erosion, flooding, soil compaction pollution of water, waste disposal and degradation by human beings especially human settlement.

3. Problem of soil Erosion: The action of wind, Rain fall and human beings are also responsible for the soil erosion.

4. Flooding: During rainy season the Kopai River overflows and causes damages to the local settlement and agricultural field.

5. Problem Due to Extraction of Surface Material: Sometime for the building or road making purpose the local people extract laterites and soil which causes ultimately the soil erosion and lowering of relief in the area.

6. Environmental Problem: It is mainly limited with different kinds of pollution- land, water, air, pollution etc.

7. Problem due to Deforestation: It is mainly done for fuel, timber and to increase agricultural land.

SUGGESTION:

Some steps have been taken by state's agricultural departments and local bodies to solve those problems. These are as follows-

1) Contour building and gully plugging to stop erosion.
2) Conservation of seasonal surface water resource.
3) Planned extraction of grown water.
4) Afforestation to reduce evaporation of Soil Surface.
5) Due to Public awareness the problem of Pollution is now solving lastly.
6) Prohibit the denudation of existing forested land and cutting of trees in erosion prone area.
7) Under agro forestay trees may be planted for obtaining fuel, timber, fodder along the road side river banks and field boundaries and waste land is not for Cultivation.
8) Organic and green manures should be emphasized in the soil of the area.

Finally the intensity of agronomic activities can be increase to solve the problem in the area. In this respect social forestry and long term Sal plantation cam also is suggested specially to protect the lateritic tract from the hand of high grade erosion.

CONCLUSION :

Laterites are highly weathered materials rich in secondary oxides of iron, aluminum or both. It is nearly void of bases and silicates, but may contain large amounts of quartz and Kaolinite. It is either hard or capable of hardening or expose to wetting and dry. Economically the area is undeveloped due to that type of terrain which is not suitable for primary activity. So they depend upon mainly secondary activites, particularly small scale industries e.g. (handicraft paper, leather, ice cream etc).

Thus the population of this area is very low. They also work as a agricultural laborer's here the tribal population are mainly found here and there.

In the entrance study area, it is found that different types of laterite are available in this region. These are massive; pisolitice; concretionary; columnar; re-consolidated recent and Pleistocene laterite. The physical and chemical properties of this laterite are responsible for the development of various land form in this area. The land forms are isolated mesa type of feature, cascade type of feature, lateritic ridge, very narrow gorge type of feature, v-shaped valley, step like column, unsaturated cave like hollow, sink-hole and flat topped lateritic plateau capped by massive lateritic all this are erosion an type of feature and depositional type of feature and alluvial fan type, termite mounds etc.

From the extensive field observation, it is clear that the study area facing serious problems of land degradation which is the function of physical as well as socio-economic influence. The denudational process is very much effective in many parts of the study area. This problem cannot be completely solved. but some protective measures must be taken, viz. afforestation by the rapid growing trees, irrigation network should be improved to increase the agricultural intensity as wel as economic condition should be developed, check dams should be made in the affected area. Above all the awareness of the people must be grown so that they fill the necessity of land use improvement, that means they should not built-up the unplanned settlement. The deforestation should also be totally stopped. Although the land use problem of the study area is vital problem due to denudation all processes but with the help of above measures this difficulty can be minimized.

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