STUDY OF DRAINAGE PROFILES IN JHARIA COALFIELD, EASTERN INDIA
FROM AERIAL PHOTOGRAPHS : IMPLICATION FOR LAND USE PLANNING

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ABSTRACT

Drainage analysis of an area through aerial photographs helps a lot in knowing its soil texture, mainly its porosity, permeability, grainsize and compactness. These observations may be used as a guide for land use planning over the area.

Studies have been conducted in Jharia Coalfield through scanning of aerial photographs to know the textural characters of soil/rock cover over the area. Nature of valley profiles have been studied in detail. The overall drainage pattern and drainage texture have also been studied. The observation have been used to infer about the texture of the materials (rock/soil) traversed by the drainage lines in the region. The observations suggest that the major part of the field is covered by materials of moderate cohesiveness with good porosity, permeability and recharge capacity. These informations have been used as critical inputs for future land use planning in the area.

INTRODUCTION

Aerial photographs of Jharia coalfield have been studied in detail with a special care to know the gully characteristics, mainly the cross profiles of rivers and rivulets passing through the area (Fig. 1). Analysis of drainage pattern and drainage texture over the region have also been done. The ultimate aim of the study was to know the texture of the lithocover over the area, its grainsize, compactness, porosity, permeability and water retaining capacity, which in turn will help as a critical input for land use planning for the field.

In total 39 aerial photographs were studied. These were taken in January 1982. These photographs have 60% forward overlap and 30% lateral overlap. The scale of photographs used is approximately 1 : 25,000.

Photographs taken in dry seasons yield more information regarding drainage texture and nature of valley cut because of absence of vegetation and drying of stream channels. This helps much in identifying the physical characters of the soil in the area. Thus the aerial photographs taken in the month of January were preferred for the study.

METHODOLOGY & PRINCIPLE

Methods used for the present work are similar to those suggested in Miller (1961). Aerial photographs were arranged on a flat table into successive flight strips and following the photograph numbers in each strip so as to form a mosaic pattern. Index maps were not available, and toposheets were used to aid as reference.

As photographs in each strip were gathered and arranged numerically, they are kept in separate folders and marked accordingly on their covers.

The photos in each strip were then scanned under mirror stereoscope after marking the principal points to get an overall geomorphological picture. These principal points are then transferred to the adjacent photographs so that continuity within the strip is followed and checked.
FIG 1 SOIL/ROCK TEXTURE MAP FROM DRAINAGE ANALYSIS IN JHARIA COALFIELD
SOURCE: AERIAL PHOTOGRAPHS

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HH HARD & COMPACT ROCK 
MM MODERATELY COHESIVE ROCK 
LL FINEGRAINED & LOOSE ROCK/SOIL 
--- WATER AND RIVER SAND 
--- SOIL/ROCK TEXTURE BOUNDARY 

SCALE

8 4 0 1 2 3 MILES