SOME ASPECTS OF SOIL EROSION DUE TO SURFACE RUNOFF

SYNOPSIS

The bulk of the sediment transported by rivers and deposited in reservoirs and delta areas is derived from erosion of the catchment area. The wash load of rivers is almost entirely governed by the supply of fine grained soil from the catchment. Erosion of catchment and loss of soil is not only loss of assets to agriculture and forestry but also a liability. Further down the river, silting up can lead to conditions which require expensive embankment and other defensive works in order to prevent flooding along the lower reaches.

Kashmir valley has bowl shaped topography and is surrounded by hills and snow peaked mountains. Soil erosion is a major problem of Kashmir which is known for its sylvan beauty and prevention of soil erosion needs utmost consideration. There are vast barran hills and the large tracts of 'KAREWA' slopes which are eroding rapidly. About 66% of the land area is partially affected by erosion and 33% is severely eroded. The problem of erosion of cohesive soil, has not received much attention yet. Clay forms the major part of the top soil in the Kashmir valley but no research work has been done so far in this field.

It is essential to study the behaviour of cohesive soil under the impact of rain and sheet flow in the laboratory as well as under the field conditions. Ultimately such studies should enable prediction of soil loss for a given set of conditions and assessment of the adequacy of soil conservation measures in the Jammu and Kashmir State.
CHAPTER IV

THE EXPERIMENTAL SET UP AND PROCEDURE:

It also contains the details of sampling equipment for small water sheds and portable rainfall simulators in addition to layout of experimental watersheds and relevant experiments.

CHAPTER V

EXPERIMENTAL RESULTS AND DISCUSSIONS:—

This chapter contains the results of studies on soil erosion of both non-cohesive and cohesive soils and discusses these results in detail. The results of the erosion studies carried out on the above mentioned soils placed under different experimental conditions have been analysed and discussed on scientific lines to clearly highlight the outcome of the investigation. The investigation reveals a simple linear relation between coefficient of soil erosion and hydraulic parameters with varying slopes of the test beds. It further reveals that well developed grass cover can be considered a practical protective measure against the soil erosion and its effectiveness lies in the vast variation in coefficient of resistance of bare and vegetated soil beds. Coefficient of soil erosion has been developed as a function of sheet flow and rainfall conditions for various slopes of cohesive and non-cohesive test beds. From the results three different stages have been identified for cohesive soils. An attempt has been made to establish a simple erosion equation which combines various parameters in a comprehensive manner. The most significant aspect in the present study is the erosion behaviour of cohesive soils about which very limited investigations have been made so far. It is evident that coefficient...
The present study is primarily intended to evaluate erosion rate of non cohesive soils as well as cohesive soils under thin sheet flow. Such soils loss is related to hydraulic and surface characteristic in the soil erosion problem. Soil erosion is largely a result of and therefore, closely related to the flow of thin sheet of water over steep surfaces in the laminar and turbulent regimes. Effect of flow parameters and surface shear strength of soil on soil erosion due to surface runoff is also investigated as also the influence of Reynold number, surface roughness under different land use practices on soil erosion sought to be understood better.

The thesis is divided into Seven chapters as follows:

CHAPTER-I
INTRODUCTION:
This chapter introduces the scope of the subject and also describes different aspects of soil erosion including factors affecting the soil erosion and subsequent economic and social problems created by the phenomenon of soil erosion.

CHAPTER-II
VIEW OF LITERATURE:
In this chapter, existing literature highlighting the basic concepts, techniques of study and equipment devised and adopted, for erosion study is reviewed.

CHAPTER-III
ANALYTICAL CONCEPT:
The general equation for erosion has been described in this chapter. An attempt has been made to define, variables influencing soil erosion and the dimensionless analysis of the variables involved.
of soil erosion is a function of dimensionless flow parameters, dry density and roughness of the surface but cohesion is a predominant force in case of cohesive soils. The limited studies made so far give a qualitative result. In case of cohesive soils very little is known about physical relationship between erosion and basic parameters that govern it. The present research is a preliminary attempt at establishing some simple correlations between dimensionless flow parameter and coefficient of soil erosion.

CHAPTER VI
SUMMARY CONCLUSIONS AND SUGGESTIONS:

In chapter VI a brief account has been given about investigation results and discussions that precede it.

CHAPTER VII

This chapter contains certain recommendations for further research work in the field of soil erosion and steps to be taken towards the prevention of the serious problem of soil erosion.