CHAPTER I
INTRODUCTION

Water is one of the most vital natural resources of a nation. Rational use of water is of great importance to the economy and prosperity of a country. Water is also an important factor in crop production. Conservation and efficient use of water are essential for increasing agricultural production in a country. The basic source of water is precipitation. The farmer is concerned with rain that falls on his agricultural land. The efficient utilization of water that falls on land is essential for increasing crop yields. Again large sums of money are spent to create irrigation facilities to overcome the vagaries of monsoon rains. It is therefore imperative that the irrigation water made available is judiciously used so that with economy in water use, more area can be brought under irrigation. Further, with efficient management of water, better crops can be raised. Judicious and economic use of water depends largely upon the knowledge accumulated through systematic study and research.

North-East Karnataka is covered by vast areas
of black soil. The area receives about 450 to 850 mm of annual rainfall during the period from May to November. Over a large portion of the area, the rainfall is low and not well distributed. It is estimated that about 20 per cent of rain water is lost due to run off because of high intensity of rainfall coupled with low permeability of black soil and uneven distribution of precipitation. The utmost conservation of rain water in the soil where it falls and harvest of run-off water for supplemental irrigation are essential for increasing agricultural production.

In the North-East Karnataka where there are four major irrigation projects, Tungabhadra project irrigates 2,72,100 hectares of land in Raichur and Bellary districts. When Ghataprabha project will be completed, 19,426 and 1,91,175 hectares of land will be irrigated in stage I and stage II respectively in Belgaum and Bijapur districts. Another area of about 2,02,350 hectares will be irrigated in Dharwar and Belgaum districts when Malaprabha project will be completed. Upper Krishna project will irrigate 2,42,820 hectares in Bijapur and Gulbarga districts. As a result of these four projects
the largest stretch of land of black soils in the world (8,38,871 hectares) will be covered under irrigation. There are a number of problems on land development, seepage from channels, irrigation and drainage that need to be studied so that suitable methods and techniques are evolved for developmental work.

Considerable water is lost due to seepage, breaches or over-flow from the irrigation channels. Not only that water is lost, but also the land adjoining the channel gets waterlogged and timely cultivation is not possible. Besides, the land gets infested with perennial weeds.

The clayey nature of the soil and occurrence of saline and sodic soils in certain places, indicate that there is every danger that large areas may soon become unsuitable for successful cultivation of crops. There is, therefore, an urgent need to develop suitable types of drains so that rise in water table and increase in concentration of salts are avoided right from the beginning. About 40,000 hectares of irrigated land has already reported to have been affected by waterlogging and salinity. Methods and techniques to reclaim
the same are essential to put them back to high production on sustained basis.

Investigations were therefore undertaken with the following objectives:

1. To develop techniques of land shaping for soil and water conservation, run-off water harvest, storage of run-off in farm ponds for supplemental irrigation.

2. To find out the necessity and relative costs of land grading using bullock and machine power, in the slopes ranging from 0.5 to 2.0 per cent in irrigated areas to reduce the gap between development of irrigation potential and its efficient, immediate and economic use.

3. To reduce seepage in earthen irrigation channels and to work out the cost and efficiency of different lining materials for field channels.

4. To determine optimum depth, spacing, types, filter materials and economics of sub-surface drainage for waterlogged and salt affected areas.