

CHAPTER-1

INTRODUCTION

Reservoir based irrigation schemes developed in many countries are being criticised for not producing the desired output envisaged at the time of project planning. Recent studies in countries like Phillipines, Thailand, Srilanka, India have indicated that major lacuna in achieving the target is unreliability of water availability at the farm level in desired quantities with respect to both space and time. The traditional thinking of professionals a decade earlier was that the problems were principally at the farm level. Large scale efforts were made through on-farm development programmes in India to improve the situation. But, later it was realised that poor water management, absence of water courses or inadequate water course maintenance below the outlets, and conflicts between the farmers are not just independent maladies which farmers would inflict on themselves, but rather they are symptoms of deficiencies in the main system management. The problems in general of farm water management can not be improved unless the management of the main distribution system is also improved.

The causes of main system management deficiencies and the nature and extent of problems depend on project manager, farmers and the physical conditions of any particular irrigation system, soil and crops. There is one important feature of this which is amenable to improvement. The project managers who are generally the engineers of irrigation department can improve

the management of the distribution system by systematic collection and use of data on the status and water requirement at different components of the system. This is to be followed by judicious decisions, regarding the water releases at different sections of the system taking into consideration the available resources, expected quantum of water from the catchment for the next time period and rainfall if any, occurring in the command area or expected to occur during that time period.

This requires division of the irrigation command into smaller management units and develop data base and format and procedures for collection of data at regular intervals. Most convenient units in India for this purpose would be outlet or turnout command areas because of many obvious reasons. The comparative position on availability of irrigation water to different tracts in a irrigation system can be highlighted by quoting some finding of a study in Northern Srilanka. Average relative water supplies(RWS) or the ratio of supply to requirement of various tracts range from 0.96 to 2.94. Studies conducted in Kuanria project in India also indicated that the RWS varied from 0.13 to 17.6 during wet season of 1988(annexure-A). It is convincing that a predictable, adequate, and timely delivery of water to outlet command is a precondition for farmers participation in a highly productive system which includes application of higher level of farm inputs, equitable and better distribution of water and required maintenance of water courses and other on-farm works.

All this requires regular processing of crop and climatic

data and preparation of suitable water delivery schedules. It is difficult to accomplish this job manually and is also tedious and time consuming since the computations are to be repeated at shorter intervals. Most of the managers will not be willing to do such jobs in a routine manner. One way to improve performance of water resources systems is complete automation and computerised control of water delivery as followed in developed countries like U.S.A. and France. But for most third world countries this is not possible primarily because of three reasons. First the system is not designed and constructed for automatic control; second due to less institutional capability to adopt such technology and maintain and manage them and third due to the policy of the department creating irrigation schemes as a source of employment generation. So the alternative left is to manually control and manage the system with the existing structures by the help of better operational policies and schedules decided by data processing through computer. This can be termed as computer assisted management of irrigation systems.

Modelling of irrigation systems and development of appropriate computer programmes become the immediate necessity to practice computer assisted management strategy for improving system performance. Due to large variations in irrigation systems, utilisation of commercial packages becomes impossible in many projects. Research work in this area is scanty and has been taken up very recently. The present research programme is aimed at developing such a package by modelling a typical reservoir based irrigation scheme in the Kuanria river basin located in Orissa