Chapter 6
Decision Support Systems for Water Resources Management in Dudhi and Bewas Watersheds, Madhya Pradesh, India

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Abstract In recent years, the concept of watershed management has grown rapidly due to the importance of water as an increasingly precious natural resource that is, at the same time, very difficult to manage within the overall development of any nation. Watersheds integrate many physical, biological, social and economic processes and information. Water resource management is a continuous process requiring attention at various levels because of its inherent nature and the extent of interventions being made at various levels and scales. Small-scale interventions, at the village level, are mainly for soil and water conservation and fulfil the requirements of a small community. It is essential to generate biophysical information that can be used to generate scenarios, which in turn can help in local-level planning and management of land and water resources in the watersheds. The present study demonstrates the methodology for development of a decision support system for planning a sustainable watershed management programme at village level which can be used for sustainable root level planning for development, implementation, monitoring and evaluation of watershed management programmes in semi-arid regions.

Keywords Decision support system, soil and water conservation, participatory, and community

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1 Introduction

In India, integrated watershed management has been adopted as a part of the National Water Policy 2002 for the conservation of natural resources. Recently, greater emphasis has been placed on ensuring that local-level users participate in the planning and management of the natural resources at the watershed level. Although the intention is in place, the mechanism to achieve this goal is inadequate. It is imperative that new tools be provided to handle the complexities of the integrated watershed management philosophy in a scientific manner. At the same time, it is equally important to ensure that these new technologies be disseminated through highly user-friendly interfaces to help planners in reaching the appropriate decisions.

The study demonstrates the use of hydrological modeling for generating information and scenarios for possible manmade interventions, which would be highly beneficial for community participation as well as for the effective handling of the integrated watershed management approach.

Decision support systems (DSSs) and GIS-model linkages have become a new area of research in watershed management programmes in India and therefore this study attempts to develop a participatory DSS for watershed management in semi-arid regions.

2 The Decision Support System (DSS) Approach

Decision support systems are defined as computer-based information systems designed to support decision-makers interactively in thinking and making decisions about relatively unstructured problems. Traditionally, DSSs have three major components: a database, a model base and a user interface as depicted in Fig. 1.

GIS (Geographical Information System) is a general purpose technology for handling geographic data in digital form, with the ability to pre-process data into a form suitable for analysis, to support analysis and modeling directly, and to

Fig. 1 Components of DSS