

## ABSTRACT

The importance of selecting the best alternative in irrigation development strategies is examined in the multiobjective context. Sri Ram Sagar Project, a major irrigation project in South India is taken as a case study. The study is divided into two parts. In Part I of the study, three conflicting objectives, namely, net benefits, agricultural production and labour employment are considered. A three stage procedure combining multiobjective optimization, cluster analysis and Multicriterion Decision Making (MCDM) methods is adopted. Spearman rank correlation test is utilized to assess the correlation between the MCDM methods employed. Comparison of the results indicate that almost all the MCDM methods are showing the same alternative policy (s) as the potential one. Finally Analytic Hierarchy Process is employed to find the suitable MCDM method for irrigation planning scenario.

Part II deals with the studies of performance evaluation of the five selected canal distributories of Sri Ram Sagar Project. Eight different criteria, namely, 1) On Farm Development Works (OFD), 2) adequacy of water, 3) supply of inputs, 4)conjunctive use of water resources, 5) productivity, 6) farmers participation, 7)economic impact, and 8) social impact are considered for evaluating the five distributories and to select the best one among them using MCDM methods to serve as a model for improving the performance of other distributories in the system.

More importance is given to the methodologies such as building the MCDM models, exploring the advantages of cluster analysis, suggesting a simple and effective group decision making methodology, systematic methodology to reduce the computational effort in the sensitivity analysis studies etc. The conclusions mainly relate to the methodologies that can be followed by command area authorities for adoption and improvement.

Key words: Optimization, Multicriterion Decision Making, MCDM, Cluster analysis, performance evaluation, Spearman rank correlation, Sri Ram Sagar Project, Irrigation system development, system planning strategies.