

ABSTRACT

The work aims at developing integrated plan for the command area of Suhagi Minor Irrigation Project situated in the state of Orissa. Twelve alternate plans with explicit consideration of the capital, the water and the farmer's affinity for the cultivation of specified crops were developed. Solution of the planning problems was done by system engineering techniques. Specifically, four multiple objective techniques like Goal programming, Global criterion, Step method and Fuzzy linear programming were used. Maximisation of benefit, the maximisation of production and the minimisation of investment were the three objectives considered. A ranking method was used to compare the results obtained from the four multiple objective programming techniques and then to select the best technique of solution appropriate to the area. Sensitivity analysis was done for the selected plan to provide useful guidelines to the development authority to make it implementable.

The results reveal that Goal programming is the best and the next in order is the Step method. Global criterion method gives uniformly poor result. The recommended plan if implemented ensures the increase in labour use from 2.5 months to 5.5 months per year. The per capita income increases from Rs 404/- at present to Rs 1056/-. Food and nutritional requirements of the population is adequately met.

Sensitivity analysis of the recommended plan shows that for a 10 per cent increase in oilseed production, a subsidy of Rs 171.76 per quintal is to be provided to the farmers, if no cereal import is made to sustain for the poultry feed. An import of 2.28 per cent food grains from other regions reduces the subsidy to zero. Similarly, for an increase in cereal production, subsidy figures are worked out. Sugarcane cultivation is found to be uneconomical for the region. The analysis shows that the water resource availability could be increased by 20 per cent through the increase in the height of the dam by one metre. This increase is found to be viable both from technical and economic considerations.

Key words : Alternate plan, Multi-objective technique, Subsidy, Goal programming, Minor Irrigation Project, Command area, Ranking method, Water resource, and Dam height.