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Optimization of landuse of Patapur Goladinni-nala watershed of Manvi Tq., Dist. Raichur, Karnataka

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Department of PPE, College of Agricultural Engineering, University of Agricultural Sciences, RAICHUR (KARNATAKA) INDIA Email : plgouda0426@gmail. com ■ ABSTRACT : Managing a watershed for satisfying the inhabitant's demand is a difficult task if one has to maintain a reasonable balance between usually conflicting environmental flows and demands. The solution to these complex issues requires the use of mathematical techniques to take into account conflicting objectives. Many optimization models exist for general management systems but there is a knowledge gap in linking practical problems with the optimum use of all land resources under conflicting demands in a watershed. In the present study, an optimization problem has been formulated for the Patapur Goladinni nala watershed of Manvi Tq. Raichur Dist. Karnataka, India. Comprising 446 ha to find out the most suitable crops allocation to different land covers, viz., bajra, cotton, pigeonpea, sunflower and green gram fallowed with sorghum are the major crops, rainfall considered as a constraints and targeting maximization of profit. Considering average rainfall of 35 years and average 3 year cropping pattern considered as constraints, maximizing the net benefit and area under cultivation, benefit under crop and cost of cultivation to the crops are provided as inputs to formulate the objective functions and governing constraints in a multi-objectives linear optimization problem. The problem was then solved using the simplex method with the help of MS Excel solver software package and the optimal solution was ultimately determined. The results of the study revealed that the amount of net benefit increased to considering the existing cropping pattern of area 446 ha with profit worth Rs. 29,645 per ha. After optimization of land use based on crop water requirement and rainfall net profit increased to Rs. 31,429 per ha. The results of sensitivity analyses also showed that the objective functions were strongly susceptible to the constraint of maximum profit considering suggested cropping pattern without affecting to the existing land use pattern.

- **KEY WORDS :** Watershed management, Optimization, Land use allocation, Linear programming, Patapur Goladinni- nala watershed
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