Abstract No: MR-02

Linear programming approach to assess an optimal cultivation plan: A case study

N. M. Hakmanage[*], N. V. Chandrasekara and D. D. M. Jayasundara

Department of Statistics & Computer Science, University of Kelaniya, Sri Lanka
navodi93mekala@gmail.com*

An optimal cultivation plan refers to the procedure or action of making the best or most effective use of resources for cultivation in a sustainable manner while maximizing net return. Reaching an efficient cultivation plan and utilization of resources and requirements is often a challenging problem. To utilize resources and requirements such as water, land, manpower, fertilizers and seeds, optimization techniques are used. The objective of this research is to maximize the net return of the cultivation using linear programming technique and allocate the arable land optimally. Linear programming is the most convenient and effective tool to handle the objective function with many constraints. This study was carried out in a rural village located in Dompe divisional secretariat in Gampaha district using 150 farming lands, to determine the land resource allocation for twelve selected crops: bitter gourd, lady's fingers, manioc, potatoes, rambutan, banana, pineapple, beetle, rice, coconut, tea and pepper. The linear programming model is formulated for the optimal land resource allocation of 4477.2 perches. The maximum net return projected by the proposed model is Rs 6,370,512.00 for cultivation seasons. The proposed solution is a 34.96% increase in profit as compared to the actual profit obtained from the cultivations. Crops like rambutan, rice, manioc and pineapple which provides a higher return should be developed and cultivation extended under the supervision of the agricultural expertise or officers. The model suggests that some crops such as lady's fingers, potatoes, banana and coconut may not be providing comparable returns versus the other selected crops. The results reveal that linear programming approach will significantly improve the net benefits with optimal crop area allocation. The limitation of this study is that it is considered the soil condition is the same for all crops in the study area. Advanced operations research techniques like multi objective nonlinear programming models will be employed for this study in future work.

Keywords: Linear programming, Objective function, Cultivation, Net return