

GOAL PROGRAMMING MODEL TO DETERMINE MINIMUM SUPPORT PRICE FOR PADDY FARMERS

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Paddy is the main agricultural crop in Sri Lanka, and 1.8 million Sri Lankan families are involved in paddy cultivation. Farmers are facing economic difficulties due to the lack of a fair price for their paddy production, as they are unable to cover production costs and basic living expenses. This study developed two nonlinear goal programming models to determine the minimum support price (MSP) for paddy farmers and to find the minimum amount of land to be cultivated to achieve that MSP. There are two seasons for paddy cultivation in Sri Lanka, namely “Yala” and “Maha”, and the “Yala” season (May-August) was considered in this study. Paddy farmers' one-season income should at least cover the season's production costs and six months of living expenses. This study considered the five major paddy-growing districts of Sri Lanka; Ampara, Anuradhapura, Hambantota, Kurunegala, and Polonnaruwa. In the first model, the five districts were considered separately, and the MSP values of those districts and the minimum land to be cultivated to achieve those MSP values were obtained. The second model was focused on finding a common MSP value for all the selected districts, as well as determining the minimum amount of land required to be cultivated to achieve that MSP. The proposed models were solved using MATLAB programming language. As a local minimum was expected to be found, the solution was tested using four different algorithms: Sequential Quadratic Programming, Interior Point Sequential, legacy Sequential Quadratic Programming, and the Conjugate Gradient algorithm, to see if they all converged to the same value. Here, only one type of paddy has been considered, and the model can be extended by considering paddy varieties.

Keywords: Land allocation model, Minimum support price, Paddy cultivation, Sri Lanka