

**LAND ALLOCATION MODEL FOR SELECTED UPCOUNTRY VEGETABLES
IN SRI LANKA AND CASE STUDY IN NUWARA ELIYA DISTRICT**

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Due to the practical essentiality of the land allocation models for crops, such models play an important role in operations research in agriculture. Vegetables could be essential to the agricultural food sector, contributing significantly to the national economy. Vegetables are wasted due to excess supply; on the other hand, if there is not enough supply of vegetables, the price will increase. High price fluctuations in vegetables can often be seen in local vegetable markets. One of the main reasons behind this instability of vegetable prices is a lack of proper cropland allocation. Therefore, it is essential to have a cultivation plan for vegetables. In Sri Lanka, vegetables are categorised into up-country and low-country vegetables. This study aimed to determine the optimal land allocation for selected crops in four upcountry districts: Nuwara Eliya, Badulla, Kandy, and Matale. This study developed a linear goal programming model to allocate land for eight selected upcountry vegetables and tested this model using the Nuwara Eliya District as a case study. Twenty-two agrarian divisions in the Nuwara Eliya District, covering a total of 7,270 hectares of land, were considered. Data were collected bi-weekly throughout the year 2023 and analysed using the model. The results indicate that the demand for beetroot, cabbage, and leeks can be met, and beans, carrots, and radishes have a sufficient supply relative to demand. However, there is a shortfall in the supply of tomatoes and wild cabbage (“knol khol”). The proposed model provides a framework for determining how much of each vegetable to cultivate, when, and in which region to meet demand while minimizing costs.

Keywords: Agricultural operations research, Land allocation, Linear goal programming, Vegetable cultivation