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## A Spatial Model of Vegetable Production in Thailand: Results and Policy Implications

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### Abstract

In the past decades, vegetable production in Thailand has experienced considerable problems: Increased competition for land and labour from rapid urbanisation and industrialisation has put pressure on traditional peri-urban vegetable production sites. Intensification of the use of external inputs including chemical pesticides and nitrogen fertiliser and the relocation of vegetable production sites to more distant rural areas were some of the consequences. These adjustments on the producer side however were not sufficient to support output growth on par with a growing demand as a result of rapidly rising consumer incomes. Consequently, real prices of vegetables increased with negative implications for the poorer segments of the population. Also consumer safety and food quality is increasingly becoming a concern. The regional programming model presented in this paper addresses these issues by analysing the technological and spatial dimension of vegetable production in Thailand. The model is based on the concept of typical production units and uses cost data elicited by means of expert workshops as well as statistical data on the resource endowments of vegetable farms in Thailand. The model includes supply and demand of 23 vegetable crops disaggregated for 8 regions, 12 periods and different production systems. Positive mathematical programming has been used to calibrate regional supply to baseline data from official production statistics. Results show that on average only 43 % of vegetable demand is satisfied from regional sources. The Bangkok metropolitan region imports more than 80 % of its vegetables from other regions. The impact of increasing fuel prices on the spatial pattern of vegetable production was only moderate. However, improvements in transportation technology result in a significant increase in the share of production areas, where the pressure on natural resources is less severe, which in turn favours less input-intensive production systems. Government policy aiming at reducing over-use of external inputs in vegetable production should therefore encourage the relocation of traditional peri-urban vegetable production to the more developed rural areas.

**Keywords:** Mathematical programming model, Thailand, vegetable supply analysis