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Applying Mathematical Programming Model to Optimisation of Cropping Patterns with the Aim of Food Security: A Case Study in Iran

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Abstract

Iran is the second largest country in the Middle East, after Saudi Arabia. The World Bank describes the state as 'an upper-middle income developing country'. Limited agricultural production is creating challenges for Iran's long-term food security. This limitation is due to many reasons, including soil quality, economic factors, climate change, etc. Despite such constraints, planning a coherent and targeted programme for the cultivation of crops and overcome the existing problems is inevitable. Since achieving food security requires the development of agricultural products, paying attention to the agricultural structure in different societies and improvement of agricultural situation, as well as optimal allocation of production factors in order to produce more per unit area are of great importance. In this regard, it is clear that the more reliance on domestic products, the more strengthened food security, and this will contribute to the stability of national security. But too much attention to domestic production should not lead to exorbitant national costs and non-optimal allocation of production factors. The present study introduced a model for optimisation of regional cropping pattern decisions and addressed the objective of minimising the net import of energy), which implicitly maximises the production of more caloric crops. In order to evaluate the proposed model, agricultural arable lands located in the political-geographic divisions of 23 cities of Isfahan province (Iran) were selected for examination. The results showed that in the main groups of grains and forage, a significant increase was observed in the optimal crop area by 26 % and 5 %, respectively. Decreasing the crop area of horticultural products by 10 percent

Keywords: Food Security, Iran , Multi-Objective Structural Planning, Regional Cropping Pattern

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