Competing field crops and energy orchards by multiperiodic linear programming model and simulation programme package

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There are several opportunities to sole the problem of less-favoured areas in Hungary. In the North Great Plain Region there are several waste lands, and set-aside areas that can be suitable again for production.
Considering the land use of Hungary there is a need to develop a rationale land use, in which beside the less-favoured areas the use of set-aside areas are also permitted.
We prepared a multiperiodic linear programming model in order to model the crop structure, in which beside field crops – wheat, corn, turnsole and winter colza – woody energy orchards – locust, poplar and Swedish willow – were also competed. After having each field and orchard technology compiled, we set the dynamic simulation model, that we prepared in MS Excel. After running the model we analyzed the shadow prices of the constraints and the marginal cost of variables. Considering the result of the analysis and the professional information we made a sensitivity analysis, which gave a basis to create new decision variants.
In the course of our work, we compared the linear programming model with the model made in the Crystal Ball simulation program. We applied the distribution types that can be apllied in practice when we set the parametres.
After the comparative analysis of the formed decision variants it becomes possible to choose the most favourable optimal strategy.
However, we have to take into consideration the fact that by choosing the agricultural production it is important to analyze that on those areas where the producer cannot or can hardly manage the production costs, those enterprises must come to the front that can be maintained profitable with less costs – material and energy expenditure. On those agricultural lands where economical production cannot be realized one possible utilization mode can be to plant energy orchards in our country.

Keywords: simulation, linear programming, rational land use, biomass