

Applying the Fuzzy Pairwise Comparison Method in Goal Programming Models for Agricultural Decision Making: A Case Study of Rice Producers in Langaroud City

Abstract

The base of this study is a critical view to using methods and models for farm planning. As in many of those, firstly farmers' goals have not had enough emphasis and instead, maximizing profit has been the main criterion, usually. Secondly even if the goals are included in the models, but importance degree of the goals for farm manager as a decision maker (DM) haven't been considered, effectively. As a result of these two omissions, the proposed (crop) patterns derived from ones haven't been practically accepted by DMs in farms or expected outcomes haven't been achieved. So in current study, a new method of integrating fuzzy pairwise comparison (FPC) method with goal programming (GP) models according multiple criteria decision making (MCDM) was presented to solve this problem. The land-use planning problem for production of the principal crops (different varieties of rice) of Langaroud agricultural regions in Gilan, Iran is considered to illustrate the proposed FPC-GP methodology. After investigating the rice farmers' goals, the data has collected with filling the designed questionnaires through a random simple of 118 farmers interviewed. According to the findings, switch to optimum farm plan can improve both goals of *maximize profit* and *maintain and conserve land and minimize environmental damages*, simultaneously that the pattern obtained by solving the FPC-WGP is preferred to existing plan and FPC-LGP plan. Moreover, there is a high expectation to accept the obtained plans by farmers because the planning process in these combined models is based on knowing farmers' goals and preferences. Therefore it's suggested that this method be used in farm planning. It's obvious to achieve better results, more complete modeling of goals and exact data are required.

Keywords: Fuzzy Pairwise Comparisons, Goal Programming models, Agricultural decision making, Rice producers, Langaroud city



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