Abstract

Agricultural sector as one important sector in economy of Iran needs to coherent planning in order to development and confronting with the present crises. In the current study, game theory with multiple objectives under uncertainty was used in the framework of goal and meta - goal programming. Various farming strategies (cropping patterns) was determined according to Wald, Savage, Agrawal and Heady and Gross margin expectation criteria, under without and two levels of risk (zα=٥ and ١٠٪) in the quantity of available irrigation water in the interval of control parameter λ= [٠, ١], in the region of Sistan. The synthesis of meta - goal programming and game theory, *meta-goal programming game*, and also incorporating chance constraint programming in the two models, goal and meta- goal programming game, was the contribution of this research. The results in the two game models were about the same and wheat, barley, sorghum, melon and onion have the most area under cultivation. Total area under cultivation was different in the proposed strategies of the two models, at two levels of risk in irrigation water available and decreased by increasing risk in the quantity of irrigation water available. By considering the current cropping pattern in the region, the results of the goal programming game recommended as a base for optimizing cropping patterns in the region under study.

Key words: Game Theory, Meta- Goal Programming Game, Uncertainty, Sistan

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Determination of farm planning using game theory in conditions of uncertainty in Sistan region

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