University of Zabol

Graduate School

School of Agriculture
Department of Agronomy and Plant Breeding

Thesis for Master's degree Agro-ecology

Title:

Evaluation of crop sustainability in Sistan region with emphasis on optimal water distribution

Supervisor:

Dr. M. Ramroodi

Advisor:

Dr. M. Ahmadpour

Dr. Z. Marzban

By:

M.R. Rezaee asl

May 2021

Abstract:

Cropping pattern refers to a method of planning that, taking into account the technical, economic conditions and strategic goals of the country, determines and targets the amount of production in each geographical unit for specific time periods. The purpose of this study is to develop a fuzzy ideal planning model in order to optimally allocate irrigation water between wheat, barley, weed, sorghum crops in Sistan region. The geographical area studied was all the regions of Sistan (Zabol, Zahak, Helmand, Nimroz and Hamoon counties). In this research, information and data were obtained through the offices of Jihad Agricultural Organization of different regions of Sistan and also interviews with selected farmers in the region and finally the desired cultivation levels were obtained through the ideal planning model according to the goals of farmers. In order to solve the model, Excel and GAMS software from version 22.9 was used. The results of this study showed that the current pattern of cultivation in Sistan region is not optimal and with the continuation of this pattern, problems such as water shortage and environmental problems will be created due to the use of chemical inputs in the region. Considering objectives such as maximizing gross profit, minimizing irrigation water consumption, fertilizer risk and chemical pesticides in the optimal cultivation pattern, the area under cultivation of some selected crops decreased and the area under cultivation of other crops increased, which included reasons such as income. The product and the amount of inputs used were the reason for this. It is possible to reduce the use of irrigation water in all models. Based on the findings of this study, it is suggested that more water be used for products that generate more revenue per cubic meter of water consumed. Also, since in the optimal cultivation pattern, the production of barley and sorghum, which is animal feed, has been removed from the pattern. It is suggested that in future research, an integrated crop-crop pattern be designed instead of the cropping pattern. In that case, barley and sorghum will be used as inputs to the livestock sector and will not be removed from the template.

keywords: Cropping pattern, Optimization, Weaving, sustainable agriculture, Helmand