

QUALITATIVE LAND SUITABILITY EVALUATION USING IN FUZZY METHOD AND PARAMETRIC FOR RICE IN ZARRINSHAHR OF ISFAHAN PROVINCE

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ABSTRACT

Land evaluation procedures focus increasingly on the use of quantitative procedures to enhance the qualitative interpretation of land resource surveys. Crucial to the estimation of land suitability is the matching of land characteristics with the requirements of envisaged land utilization types. Land evaluation results from a complex interaction of physical, chemical processes via evaluation models which are reliable enough to predict accurately the lands behavior. Physical land suitability evaluation is a prerequisite for land-use planning and development (Van Ranst,1996). This paper aims to determine the qualitative land suitability evaluation for rice, using fuzzy set (FS) theory and compare with parametric method in Zarrinshahr region of Isfahan. In fuzzy thinking, determination of specific border is difficult and belonging of various elements to various concepts and issues are relative. Zadeh (1965) defined a Fuzzy set as "a class of objects with a continuum of grades of memberships". Membership of a fuzzy set, however, is expressed on a continuous scale from 1 (full membership) to 0 (full non-membership). To determine degree of membership for each land characteristic and via square root method, land index in each land unit was obtained. Finally, land suitability classes were determined. Each characters and qualities effective on product have different weights, therefor in this study Artificial Neural Network was used to determine the weight of each effective land characteristic in irrigated rice and put in weights matrix (W). The results of parametric and fuzzy method represented that the lands are inappropriate and it has Low-class land suitability evaluation for planting rice in the Zarrinshahr region of Isfahan. The main limitation is climatic, ie. relative humidity is very low in the region(29%) this in parametric method limitation lead to N2 and N1 land suitability classes. but in fuzzy set method land suitability in all of soil unit improved to N1 and N2 and S3.

The results also showed, predicted yield in Fuzzy method had higher correlation with observed yields than those produced by parametric method. Correlation coefficient between the land indicators with observed yield in fuzzy system and parametric method were 0.83 and 0.56, respectively. In fuzzy set theory the determination of specific order is difficult and belonging of various elements to various concepts and issues are relative.

KeyWords

Fuzzy set theory, land suitability evaluation, parametric method, rice,

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