

LAND SUITABILITY EVALUATION BY FUZZY LOGIC METHOD AS COMPARED WITH PARAMETRIC APPROACHE FOR WHEAT CULTIVATION IN MAHYAR PLAIN, IRAN

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INTRODUCTION

Land evaluation is carried out to estimate the suitability of land for a specific use such as arable farming or irrigated agriculture. This paper aims to apply fuzzy theory and compare with parametric for wheat in Mahyar plain of Esfahan province, Center of Iran. Fuzzy sets proposed by Zadeh (1965) are a generalization of classic logic. In classical sets theory, the membership of a set is defined 1 or 0. Membership of a fuzzy set is expressed on a continuous scale from 1 to 0. Fuzzy eliminates the sharp boundary that divides members from non-members in the group by providing a transition between the full membership and non-membership (Wang, 1990).

MATERIALS AND METHODS

The region covers 11000 hectares and is located in the Mahyar plain part of the Esfahan, center of Iran, within coordinate of latitude 32° 25' and 30° 15' N and longitude 51° 51' and 51° 40' E. In this theory, Membership function, states the degree of effectiveness of each characters on production. Each characters and qualities effective on product have different weights, so in this study Artificial Neural Network used for weighting for characteristics for land suitability classification and output data put in weights matrix then land suitability matrix was calculated and to calculate land index, the sum of components of land suitability matrix is set to standardize and the new components are multiplied by average of land indices.

RESULTS AND DISCUSSION

Results showed that, for wheat, land suitability indices produced by FS method showed higher correlation with observed yields than those produced by parametric method.

Results showed that the quantitative land suitability classes is lower than the qualitative classes in all of the land units and there is no different between fuzzy method and parametric method in quantitative land suitability classes in all of the land units. Results showed that, The coefficient of determination (R^2) between land index and observed yield using fuzzy method and parametric method are 0.85, 0.71 so land suitability evaluation can be calculated that even in situations where parametric method cannot estimate crop yield, fuzzy set method can improve the qualities of land suitability assessment.

Keywords: : land suitability, fuzzy method, parametric method, wheat.

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