Comparison Application of the Analytic Network Process (ANP) and Analytic Hierarchy Process (AHP) in Analysis of the Agricultural Water Poverty Index: The Case of Dezful County

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Abstract
Agricultural water poverty, generally, means the scarcity of good quality of water for agriculture. Agricultural water poverty index (AWPI) through a combination of natural, physical, social, economic and institutional factors in agricultural context helps to analyze the agricultural water poverty of each place, according to its situation. This characteristic depends on its ability to take advantageous of appropriate weighting techniques by involving the viewpoints of important subjects regarding the issue. In line with this, using Analytical Network Process (ANP) and Analytical Hierarchy Process (AHP) a study was carried out to weighting the components and sub-components of the AWPI in Dezful County. A purposive sample including five agricultural water and soil experts, who showed high academic qualifications and practical experience in Agriculture Jihad Services Centers across Dezful, were selected. They were asked to complete the study questionnaire which contained several paired comparison matrices. The ANP model was constructed according to the original format of the AWPI, in which all the components (5 nodes), criteria (9 nodes) and sub-criteria (27 nodes) were analyzed and weighted using paired comparison. For analyzing the data collected, Excel, Super Decisions and Expert Choice software were used. Results revealed that the ANP model compared with AHP one is more capable to analyze the Agricultural Water Poverty Index based on the region. In addition, among the effective sub-criteria, drainage system, fertilizer consumption and distances between water source and farm were the most important ones, respectively. On the other hand, upstream lands in water allocation and distribution, land leveling and attending water management classes demonstrated the lowest weight, and also the least important sub-criteria, respectively.

Keywords: Water Management, Agricultural Water Poverty Index (AWPI), Analytic Network Process (ANP), Analytic Hierarchy Process (AHP), Dezful County

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