

عنوان مقاله:

Optimizing Agricultural Profitability and Environmental Sustainability using Whale Optimization Algorithm in the Miyandoab Plain : An Integrated Hydrologic-Agronomic-Economic Model

محل انتشار:

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خلاصه مقاله:

Water scarcity and droughts in arid regions pose significant challenges to agricultural production and environmental sustainability. This study presents an integrated hydrologic-agronomic-economic model designed to optimize water allocation strategies in the Miyandoab Plain, located in the Urmia Lake basin in northwest Iran. The model aims to maximize agricultural profitability while sustaining adequate environmental flows to Urmia Lake during droughts. Through multi-objective optimization, the model identifies Pareto optimal solutions that balance economic and environmental objectives. The integrated model incorporates physically-based hydrologic modeling, agronomic crop production functions, and economic analysis of agricultural profits. Results demonstrate the trade-offs between agricultural profitability and environmental sustainability, highlighting the potential benefits of proposed water management strategies. The model provides valuable insights for sustainable water resources planning in semi-arid agricultural regions facing water scarcity and climate variability.

کلمات کلیدی:

.Water scarcity, Whale optimization algorithm, sustainable water allocation, agricultural profitability, environmental flows

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