Environmental Engineering and Management Journal

August 2025, Vol. 24, No. 8, 1683-1693
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu
http://doi.org/10.30638/eemj.2025.131

"Gheorghe Asachi" Technical University of Iasi, Romania

A STUDY ON THE DECISION-MAKING MODEL FOR PRECISE ENVIRONMENTAL GOVERNANCE IN RURAL REGIONS

Xiuli Yang[1*], Yishan Shao[1], Lei Wang[2], Xiaodong Lai[3], Simin Bai[1], Jujun Feng[1], Xiaoping Zhang[4]

[1]School of Humanities and Management, Shaanxi University of Chinese Medicine, Xianyang, China, 712046
[2]Business Administration School, Hehai University, Chabgzhou, China, 213022
[3]Rural Economic Research Center of the Ministry of Agriculture and Rural Affairs, 100125
[4]School of Nursing, Shaanxi University of Chinese Medicine, Xianyang, China, 712046

Abstract

In order to solve the problem of sparse data samples in dealing with multiple dimensions such as farmland environment, crop growth status, and meteorological conditions, which affects the accuracy of decision-making models in existing research, an agricultural governance decision-making model under the rural revitalization strategy is constructed. Based on the stock and emission rate of pollutants in the agricultural environment, a net present value function for agricultural governance is constructed to search for the governance investment decision that maximizes the function. Evolutionary factors are used to learn factor optimization particle swarm optimization algorithm to solve complex multidimensional data samples and output the optimal agricultural governance decision results. The experimental results show that the model can formulate optimal agricultural environment precise governance decisions based on the actual situation of the agricultural environment, and improve the economic and environmental development level of the research area. It also provides strong decision support for agricultural environmental governance under the rural revitalization strategy, and has important theoretical and practical significance.

Key words: agricultural environment, governance decision model, objective function, particle swarm optimization algorithm, rural revitalization strategy

Received: March, 2024; Revised final: November, 2024; Accepted: November, 2024; Published in final edited form: August, 2025

[*] Author to whom all correspondence should be addressed: e-mail: xlyang1012@sntcm.edu.cn; Phone: +86-15291867706