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Structural Equation Modeling of The Relationship between Environmental, Social and Economic Characteristics of Rural Settlements and Their Population unsustainability (Case Study: Rural Settlements in Ferdows township)

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Abstract

Population sustainability and the continuity of residence in villages are dependent on their migration status. The environmental, social, and economic characteristics and conditions of each rural spatial system significantly influence its population unsustainability; however, the impact of these conditions varies in intensity across different rural settlements. This study investigates the relationship between the environmental, social, and economic characteristics and conditions of inhabited villages in Ferdows township and their population unsustainability using structural equation modeling. To assess the quality of the model, the R^2 criterion, Q^2 criterion, Cronbach's alpha, composite reliability, and convergent validity were applied. The R^2 value of the model is 0.35, which exceeds 0.33, and the Q^2 value for the unsustainability variable is 0.297, indicating moderate predictive capability of the model. The Cronbach's alpha value for all three variables of social, economic, and environmental along with the composite reliability values for these variables is above 0.7, indicating adequate reliability and acceptable construct validity. The Average Variance Extracted (AVE) for all three variables is greater than 0.4, demonstrating appropriate convergence of the model. The results of the study indicated that the t-statistic for the effect of natural characteristics on unsustainability is 5.01, for social characteristics is 3.03, and for economic characteristics is 2.36, all exceeding the threshold of 1.96, with a significance level below 0.05. This suggests a relationship between the environmental, social, and economic characteristics used in this model and the population unsustainability of the villages. The findings show that with a decrease in water resources, an increase in height, a decline in literacy rates, an increase in individuals over 65 years old, a reduction in the number of service facilities, a decrease in the ratio of employed in handicrafts and in the industrial and service sectors, and an increase in absentee landowners, the population unsustainability of the villages has increased.

Key Words: Migration, Structural Equation Modeling, Rural Settlements, Ferdows Township

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Introduction

Population sustainability and the continuity of residence in rural areas are influenced by the migration process from villages to cities. Various theories have been proposed regarding migration and its determining factors, including those by "Ravenstein," "Shastad," and "Downs." In Iran, extensive research has been conducted on the factors affecting rural-urban migration and its impacts and outcomes, including studies by Mahdavi (2000), Mahdavi et al. (2004), Amar & Hassanpour (2010), Rostamalizadeh (2017), Esfandiari & Nabieian (2018), and Jamshidi et al. (2018). Most of the research has examined the phenomenon of migration in relation to one of the social, economic, or natural dimensions. This study aims to investigate population unsustainability in relation to three aspects: environmental, social, and economic characteristics.

The calculation of the annual growth rate of the rural population in Iran over a 25year period from 1986 to 2011 in the studied area showed approximately -2.5%, while this figure for the entire country was -0.83%. Additionally, the studies revealed that during this 25-year period (1986-2011), out of a total of 30 inhabited villages in this county, only 3 villages had a positive population balance, while the other 27 villages had a negative population balance with varying degrees of intensity. Regarding the necessity to examine this issue in the study area and the fact that the population unsustainability of rural settlements in this area has not been researched, this study seeks to answer the question: What are the environmental, social, and economic characteristics related to the population unsustainability of these villages?

Data and Method

The statistical population of the study consists of 30 inhabited villages in Ferdows township. To measure the dependent variable of this research, namely population unsustainability, calculations were based on the "migration status of the villages." To examine the environmental, social, and economic characteristics related to rural unsustainability, a conceptual model was presented and tested using structural equation modelling.

Results and Discussion

This research examined the relationship between the environmental, social, and economic characteristics of the inhabited villages in Ferdows township and their population unsustainability using structural equation modelling. To assess the quality of the model,2R, 2Q, Cronbach's alpha, composite reliability, and convergent validity were used. The 2R value of the model was 0.35, exceeding 0.33, and the 2Q values for the unsustainability variable were 0.297, indicating moderate predictive capability of the model. The Cronbach's alpha value for all three variables (social, economic, and environmental) and the composite reliability values for all three variables were above 0.7, indicating appropriate reliability and acceptable construct validity. The AVE value for all three variables was greater than 0.4, indicating suitable convergence of the model. The results showed that the t-statistic for the effect of natural characteristics on unsustainability was 5.01, for social characteristics was

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3.03, and for economic characteristics was 2.36, all exceeding 1.96, with a significance level below 0.05, indicating a relationship between the environmental, social, and economic characteristics used in this model and the population unsustainability of the villages. The findings indicate that with the reduction of water resources, increase in height, decrease in literacy rates, increase in individuals over 65 years old, reduction in the number of service facilities, decrease in the ratio of employed in handicrafts and in the industrial and service sectors, and increase in absentee landowners, population unsustainability in the villages has increased. The highest impact coefficient belongs to social characteristics.

Conclusion

The research results showed that with the decrease in water resources and the increase in height, the population unsustainability of villages has increased. The study also indicated that with the decline in literacy rates, the increase in individuals over 65 years old, the rise in absentee landowners from the villages, the decrease in the proportion of employed in handicrafts and the decrease in the proportion of employed in the industrial and service sectors, the population unsustainability of villages has increased.

The research indicated that villages with more wells and higher extraction from wells are currently more demographically stable; however, considering the climatic conditions and average rainfall of the area, as well as the results indicating a decrease in population unsustainability with an increase in employment in industry and services, an increase in employment in handicrafts, and an increase in the number of production units, the following suggestions are made for the demographic sustainability of the villages in the area:

- Reduce the dependency of the villages in the area on water resources and strengthen the human and economic foundations of rural settlements.

- It is recommended to rural managers:

- Promote the advantages that the villages in the area create for small entrepreneurs, such as tourism, leisure, and the production of quality food.

- Utilize the knowledge, experience, and economic resources of the rural residents who have migrated to the city.

- Given the growing demand for local products, create the necessary conditions, including information dissemination and training for villagers, and establish the tools and infrastructure needed for innovation in local products and the creation of added value from local resources.

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