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STUDYING DEFORESTATION AND CHANGES IN FOREST LAND COVER USING AGENT-BASED MODELLING (CASE STUDY: TONKABON, IRAN)

Maryam Jadidi[1], Farhad Hosseinali[2]*, Hossein Aghamohammadi[1]

[1]Department of GIS and Remote Sensing, Faculty of Natural Resources and Environment, Islamic Azad University, Science and Research Branch, Sattari Highway, 14778-93855, Tehran, Iran
[2]Department of Surveying Engineering, Faculty of Civil Engineering, Shahid Rajaee Teacher Training University, Lavizan, 16785-163, Tehran, Iran

Abstract

Deforestation and changes in forest cover are subject to the effects of many factors: economic, social, cultural, political, and environmental and their interactions. To assess these factors, one should necessarily know their nature and then model them. Nowadays many models have been introduced to explore deforestation, however most of them are based on past events and do not pay enough attention to socioeconomic factors. Moreover, considering the future is sometimes absent in those models. The present study develops an agent-based model for studying deforestation and changes in forest land cover using a case study. The model assesses deforestation in the past and then concentrates on the future of forest land cover. The study area is located in the north of Iran. The socioeconomic factors considered in this research as agents are farmers, ranchers and lumberjacks. The information and statistics of the agents were gathered over 10 years and so their manner in the forest was simulated. To validate the model, satellite imagery was used. The comparison between the simulated forest and the real one shows the power of the model as being 76% correct considering the Kappa coefficient. The results of forecasting reveal that the forest land cover will be reduced by 189 ha in 10 years' time. Also, the results show that in the study area the ranchers have more severe effects on deforestation than the beneficiaries.

Key words: agent-based modelling, deforestation, forest destruction, Iran, simulation

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*Author to whom all correspondence should be addressed: e-mail: f.hosseinali@sru.ac.ir; Phone: +98 21 22970021; Fax: +98 21 22970021