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# Modelling and Simulation of Complex Adaptive System: The Diffusion of Socio-Environmental Innovation in the RENDRUS Network

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Additional information is available at the end of the chapter

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## Abstract

Socio-environmental innovation is a process of social change that implies both the participation of agents on social and environmental initiatives and the generation and diffusion of relevant information, which lead social transformations for collective benefit. During the diffusion of socio-environmental innovations through a communication network, the information is created and shared among participants until mutual understanding is reached. In the case of National Network for Sustainable Rural Development (RENRUS) network, getting innovations adopted is very difficult by people in rural communities due to the lack of effective communication channel. This study aims to develop a novel agent-based simulation model of socio-environmental innovation diffusion in the RENDRUS network based on complex adaptive systems approach. First, the conceptual model of socio-environmental innovation diffusion in the RENDRUS network based on complexity approach is developed. Then, an agent-based simulation model is implemented using Netlogo software, followed by the simulation model analysis and the design of plausible simulation scenarios. The simulation results illustrate how S-curve emerges from the interrelationships between agents considering endogenous and social cohesion effects. The conclusions argue that more social cohesion and popularity of socio-environmental innovations between small rural producers and their organizations, governmental institutions, academic institutions and the knowledge society corresponds to less time to adopt socio-environmental innovations.

**Keywords:** complex adaptive systems, modelling and simulation, socio-environmental innovation, diffusion