Linking Road Network Projects on Environmental Sustainability in Urban Communities in Sultan Kudarat: An Institutional Policy for Sustainable Infrastructure Development

Florante E. Agduma II
https://orcid.org/ 0009-0007-2850-6707
kidd_uap@yahoo.com
Philippine Christian University, Manila, Philippines

Abstract

This study examines the influence of road network projects on environmental sustainability in urban communities in Sultan Kudarat, Philippines, with the objective of determining how transportation infrastructure development contributes to ecological protection and sustainable urban growth. Specifically, the study investigates the effects of road quality, accessibility, infrastructure development, and traffic management on key environmental sustainability indicators, including air quality improvement, water quality protection, biodiversity conservation, and climate resilience. As urbanization and population growth continue to increase transportation demands, local governments face the challenge of balancing infrastructure expansion with environmental preservation. Consequently, the study seeks to provide empirical evidence on the role of sustainable road network development in promoting environmentally responsible urban communities. A descriptive-correlational research design was employed to examine the relationships between road network project components and environmental sustainability outcomes. Data were gathered from local government officials, urban planners, engineers, business owners, environmental specialists, and community stakeholders through structured survey questionnaires, interviews, and field observations. Descriptive and inferential statistical techniques were utilized to analyze the data and determine the significance of the relationships among the study variables. The findings reveal that road network projects significantly influence environmental sustainability when supported by strategic planning, effective maintenance programs, and environmentally conscious infrastructure policies. High-quality roads and improved accessibility contribute to reduced vehicle congestion and emissions, thereby enhancing air quality. Infrastructure development that incorporates sustainable drainage systems and green engineering practices positively affects water quality and flood mitigation efforts. Moreover, traffic management initiatives, including intelligent transportation systems and mobility optimization measures, strengthen climate resilience and support biodiversity conservation by minimizing environmental disturbances. The study further highlights the importance of integrating green infrastructure, environmental governance, and stakeholder participation into transportation planning processes. Based on the findings, the study proposes a sustainable road network framework that promotes environmentally responsible infrastructure development while supporting economic growth, urban mobility, and long-term ecological resilience in Sultan Kudarat. The framework provides practical guidance for policymakers, planners, and local government units in achieving sustainable and climate-responsive urban development.

Keywords: road network development, environmental sustainability, urban infrastructure, climate resilience, sustainable transportation planning.