EVIDENCE OF THE POTENTIAL BENEFITS OF DIGITAL TECHNOLOGY INTEGRATION IN ASIAN AGRONOMY AND FORESTRY: A SYSTEMATIC REVIEW

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Abstract

Context

The agronomy–livestock–forestry nexus is critical as it influences ecosystem services, food production, and land use. Asia, a diverse and technologically dynamic region, faces disparities in agronomy tech adoption. Studies emphasize agronomy and forestry's pivotal role in determining livelihoods in the region. Challenges like rising food demand, land scarcity, climate change, and biodiversity loss require innovative solutions. Digital technologies offer enhanced productivity, sustainability, and resource management opportunities, defining the era of smart agriculture and forestry.

Objectives

This work presents a Systematic Literature Review (SLR), which examines the potential for using digital technology in agronomy and forestry across Asian countries and evaluates evidence of the potential benefits for practitioners and the environment.

Methods

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The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) method guided the choice of relevant publications. Of the 375 papers located in Scopus and Web of Science (WoS) databases, only 24 were considered relevant to the research questions.

Results and Conclusions

In the agronomy and forestry sectors in Asia, the adoption of digital technologies has the potential to contribute toward the promotion of biodiversity, the preservation of ecosystem services, improved labor efficiency, risk reduction, and the promotion of climate change resilience. Geospatial tools, modeling tools, decision support systems, Unmanned Aircraft Systems (UAS), and the Internet of Things (IoT) have emerged as prominent technologies driving these positive outcomes. The study lists evidence from various articles supporting these benefits, although most demonstrate indirect causation. This underscores the need for more direct experiments to establish the broader contribution of digital technologies as well as provide evidence showing farmer uptake and the potential negative impacts of implementation.

Significance

The findings from this study offer a comprehensive view of the potential use of digital technologies for agronomy and forestry in Asia, as well as evidence of their potential benefits. It gives stakeholders valuable information on digital technologies and provides a springboard for future studies regarding the application of digital technology in agronomy, animal husbandry, and forestry.

keywords: Agriculture; Agronomy; Biodiversity; Forestry; Livestock;Digital technology; Asia; Systematic review

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