



Tropentag, September 16-18, 2026, hybrid conference

“Towards multi-functional agro-ecosystems  
promoting climate resilient futures”

## Digital knowledge systems and farmer adoption: Evidence from post-conflict Syria

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### Abstract

The digital agriculture literature has identified numerous factors that influence the adoption of information technologies. However, only a limited number of studies examine the role of integrated digital knowledge systems, especially in the case of emerging artificial intelligence tools. This dimension may be essential due to the growing interconnections between digital access, institutional support, and knowledge dissemination in shaping agricultural decision-making, particularly in post-conflict agricultural systems where traditional knowledge channels are often disrupted or weakened. In such contexts, digital platforms may play a critical role in rebuilding information flows and supporting farmers' adaptive capacity. This study investigates the patterns of digital platform adoption and their determinants using survey data from 400 farmers in a post-conflict setting in Syria. It specifically focuses on the combined use of artificial intelligence tools, social media, and search engines as complementary sources of agricultural knowledge. The study employs a multivariate probit estimation approach to examine the joint adoption of multiple digital platforms and to capture potential complementarities or interdependencies in their use, as well as the factors influencing adoption decisions. The study finds that access to digital infrastructure, particularly mobile internet and Wi-Fi, significantly increases the likelihood of adopting digital knowledge platforms. Farmers with better connectivity are more likely to engage in diversified digital information systems and to rely on multiple sources simultaneously. Furthermore, institutional support, especially extension services, is found to have a stronger effect on platform adoption compared with traditional household and farm characteristics, highlighting the importance of organised knowledge dissemination even within digital environments. Further robustness analysis confirms the consistency and reliability of these findings. The study has important implications for promoting inclusive digital agriculture in post-conflict settings. Expanding reliable internet access and strengthening digitally integrated extension services are recommended to enhance farmers' participation in digital knowledge ecosystems and to accelerate the effective and sustained use of diverse agricultural information sources.

**Keywords:** Adoption of innovations, agricultural extension systems, digital agriculture adoption, information asymmetry, rural digital divide, smallholder farmers

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