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## the Changing Nature of Icts for Agricultural Extension in Developing Countries - A Review

RASHID KHAN<sup>1</sup>, THOMAS DAUM<sup>2</sup>, SAURABH GUPTA<sup>3</sup>, REGINA BIRNER<sup>4</sup>, CLAUDIA RINGLER<sup>5</sup>

<sup>1</sup>*University of Hohenheim, Institute of Agricultural Sciences in the Tropics (Hans-Ruthenberg-Institute) (490c), Germany*

<sup>2</sup>*University of Hohenheim, Inst. of Agric. Sci. in the Tropics (Hans-Ruthenberg-Institute), Germany*

<sup>3</sup>*Indian Institute of Management Udaipur, Centre for Development Policy and Management,*

<sup>4</sup>*University of Hohenheim, Inst. of Agric. Sci. in the Tropics (Hans-Ruthenberg-Institute), Germany*

<sup>5</sup>*International Food Policy Research Institute (IFPRI), Environment and Production Technology Division, United States of America*

### Abstract

Information is essential for accessing key inputs to agriculture, including climate information, for improving farming practices, and for providing a better reach to markets. Information and Communication Technologies (ICTs) and their applications in agricultural extension have witnessed dramatic changes over the last seven decades (1950–2020): moving from an era of “transfer of technology” and no use of ICT—by largely involving face-to-face meetings with extension staff and farmer field days—to the current era of “co-innovation” using a series of advanced ICT tools, including smartphones and internet-based services. This evolution was spurred by advances in ICT and the need for more complex responses to agricultural challenges given climate change, and growing pressures on natural resources. Changing access to information has been a key to rural livelihoods and a significant enabling factor for improving agricultural practices, strengthening market access, and overcoming weather uncertainties. It is clear that the move toward modern forms of communication has helped change extension approaches from a top-down model toward a more networked and interactive format. However, many questions remain regarding the extent to which new ICT methods of transmitting agricultural information have positively affected the livelihoods of farmers in developing countries. This is particularly important for smallholder farmers in Sub-Saharan Africa and South and Southeast Asia that are less likely to have direct access to advanced ICT tools. To address this question, this review analysed 196 papers that focused on the use of various extension methods in the target regions. The results suggest that extension information disseminated through mobile phones has the potential to democratize diversified and complex agriculture practices.

**Keywords:** Agriculture Extension, Information Communication Technology, Mobile, Video