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Enhancing dairy farmers' education through ICT in Tanzania

Daniel M. Komwihangilo, Eliamoni Lyatuu, Gilbert Msuta, Julie Ojango, Gebregziabher Gebreyohanes, Raphael Mrode, Chinyere Ekine, Susan Kahumbu, Amos Omore and Okeyo A. Mwai

Introduction

The rapid expansion of Information and Communication Technologies (ICT) alongside mobile-based solutions for 'paperless' exchange of information has catalysed a transformation of information sharing in the smallholder farming systems of Africa (5). The challenge within countries is to adapt and expand critical infrastructure to support ICT adoption, which includes mobile telecommunications networks and cloud computing facilities. ICT-enabled services can use multiple platforms (e.g. radio, e-tools, short message services) to provide information for various actors in the dairy value chain. E-extension provides a great opportunity for effective farmer education, especially in the highly fragmented smallholder farming systems in developing countries (1;7).

Agricultural extension services in Tanzania have evolved over the years and are still vital for the transformation of Tanzania's livestock sector (2; 4). However, because of the highly fragmented nature of smallholder dairy herds, not all smallholder farmers are reached by the public extension services and such limited access to extension services and support significantly hampers the livestock sector's overall performance. Appropriate, locally accessible, affordable and smart tools and applications are required to inform timely decision-making and to improve herd and system's productivity and profitability. Moreover, the use of ICT holds considerable potential to make agriculture more attractive to the youth because of their

Key messages

- Recent expansion of Information and Communications Technologies (ICT) and mobile-based solutions presents opportunities to design solutions to improve access to extension services, thus complementing public extension to improve agricultural productivity.
- Farmer education provided through short message services (SMS) was shown to be valuable to smallholder dairy farmers and should be used to enhance delivery of extension services in Tanzania.
- Collective efforts needed to ensure effective extension include reorienting existing but inadequate public funded extension officers to work with private and other key players in the provision of e-extension services.
- Digital connectivity obstacles can be resolved through the use of offline data capture for later synchronization. Policies that ensure good connectivity and affordable SMS pricing are required for continuous dairy farmers' digital education.

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receptiveness to ICT tools, making it easier for them to access dairy information and other services (3).

The piloted e-extension system in Tanzania

The national database has been established by the African Dairy Genetic Gains (ADGG) project (ADGG Data Platform) as a pilot for on-farm data capture. The data collected is subjected to various analyses using advanced analytical tools and the results are used to develop targeted feedback information that is then shared with farmers and extension service providers to inform their management and service delivery planning or decisions (Figure 1). The platform has also developed electronic training resources that provide valuable information on breeding management practices in dairy herds (ADGG Dairy Tool). The platform so far (2021) has communicated a total of 12,579,397 short educational text messages out of which 578,004 are cow calendar events messages sent through SMS to dairy farmers since 2016. The messages have contributed to the transformation of dairy husbandry practices and raised daily milk yields by 25% (6).

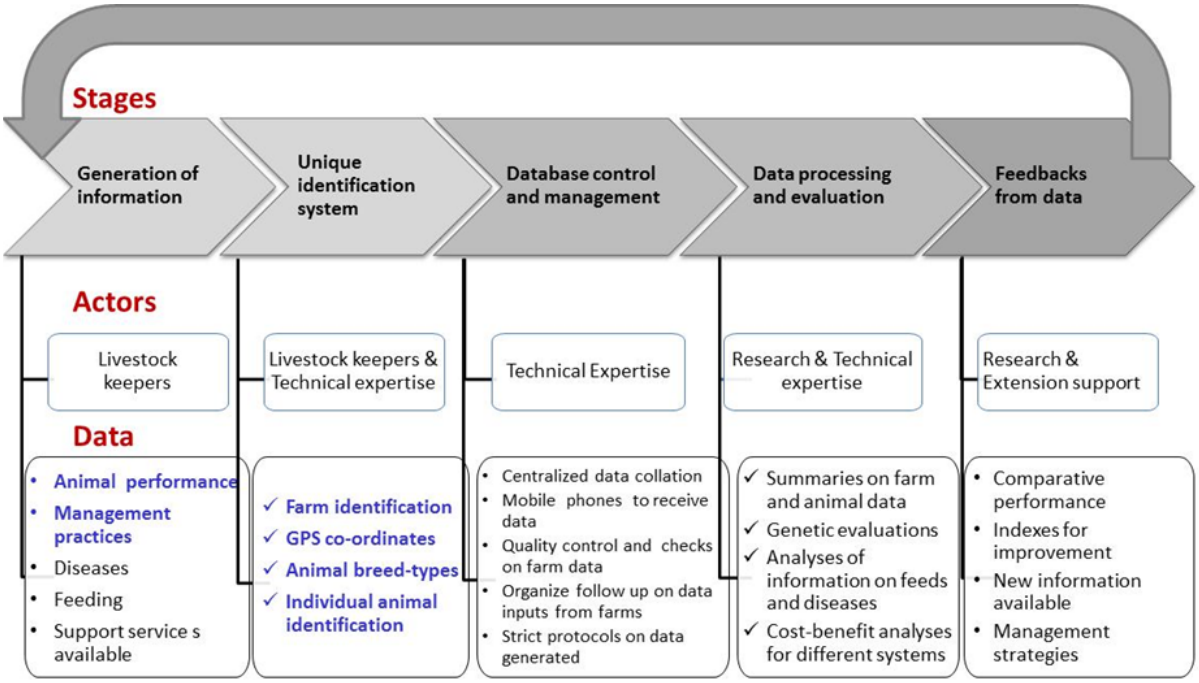
Recommendations

- Policies that encourage innovation around ICT are a major requisite to enable the use of ICT services to promote improvement in dairy herd management.
- The ADGG initiative has clearly demonstrated the value of e-education of dairy farmers in Tanzania and it can benefits many millions of farmers who are yet to be reached by this form of extension. The e-education, supported with the expansion of telecommunication service in the country, could serve as an alternative extension education delivery system to reach out more smallholder farmers.
- The scaling up and sustainability of the e-extension model requires the engagement of stakeholders responsible in the extension service, and close collaboration with telecoms service providers.

ADGG Tanzania project partners

National and international partners who have contributed to the success of ADGG activities in Tanzania include the Tanzania Livestock Research Institute (TALIRI), the International Livestock Research Institute (ILRI), the University of New England, Land O'Lakes v37, Green Dreams Technology, the Ministry of Livestock and Fisheries, and the Regional and District Administrations in respective Local Government Authorities. Similarly, digital service providers and regulators including the e-Government Agency (eGA), Tanzania Communications Regulatory Authority as well as telephone companies (telcos) including Airtel, Halotel, Tigo, TTCL and Vodacom have played key roles in the delivery of valuable information to dairy farmers.

Figure 1. Basic stages, primary actors and key tasks for a successful livestock recording system



Source: Okeyo et al. (2018).

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Contact

Okeyo A Mwai
ILRI, Nairobi;
O.MWAI@cgiar.org

Authors

Daniel M. Komwihangilo and Gilbert Msuta work for the Tanzania Livestock Research Institute; Eliamoni Lyatuu, Julie Ojango, Raphael Mrode, Chinyere Ekine, Gebregziabher Gebreyohanes, Amos Omore and Okeyo A. Mwai work with the International Livestock Research Institute and, Susan Kahumbu works with Green Dreams Technology.

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