

REPOA Brief



Smallholder farmers' access and use of knowledge and information to enhance agricultural productivity in rural Tanzania

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Key Messages

Expand access to timely, reliable, and actionable agricultural information to accelerate productivity growth, market participation, and climate resilience among smallholder farmers.

Modernize agricultural extension systems through digital technologies and farmer-centered communication models to close persistent knowledge gaps in rural Tanzania.

Invest in rural connectivity, information literacy, and inclusive advisory services to ensure women, youth, and remote communities can benefit from emerging agricultural opportunities.

Introduction

Access to information and knowledge is increasingly recognized as a critical production factor in modern agriculture. Timely weather information, input availability, pest and disease management, market prices, climate risks, and improved farming technologies enables farmers to make better decisions, increase productivity, reduce losses, and improve household incomes (Mkenda et al., 2017; Lwoga et al., 2011). Agricultural transformation in Tanzania depends not only on physical inputs and infrastructure but also on effective agricultural knowledge systems that facilitate information generation, dissemination, and utilization among farmers.

According to the 2019/20 National Sample Census of Agriculture, approximately 7.8 million households in Tanzania are engaged in agricultural activities, representing 65.3 percent of all households (URT, 2021). Smallholder farmers cultivate approximately 5.1 million hectares and produce over 75 percent of total agricultural output, making them central to food security, poverty reduction, and inclusive economic growth. Despite their importance, many experience low productivity due to limited access to quality agricultural information, inadequate advisory services, and weak linkages with agricultural research and extension systems. Only 6.9 percent of crop-growing households receive extension support (URT, 2021). Although mobile technology and digital platforms expand information opportunities, disparities in infrastructure, digital literacy, affordability, and network coverage limit effective use, particularly in remote rural communities.

Against this background, strengthening agricultural information systems is important for enhancing agricultural productivity, market participation, climate resilience, and sustainable rural livelihoods. This policy brief assesses smallholder farmers' access to and utilization of agricultural information and knowledge, identifies the constraints and proposes policy actions to strengthen Tanzania's agricultural information ecosystem.

Methodology and Data

This policy brief is based on a systematic literature review synthesizing empirical evidence on smallholder farmers' access to agricultural information and knowledge in Tanzania. The review followed the methodology proposed by Kitchenham and Charters (2007), which provides a structured approach for identifying, assessing, and synthesizing relevant research evidence. The search covered studies published between 2010 and December 2024, drawing from Research4Life, Emerald, Google Scholar, and Google Search platforms. Search terms included combinations of "smallholder farmers," "agricultural information," "agricultural knowledge," "ICT," and "Tanzania." Additional studies were identified through reference tracking and snowballing techniques.

An initial search yielded 115 potentially relevant studies. Following screening and quality assessment based on reporting quality, methodological rigor, relevance and credibility, 30 high-quality studies were retained for detailed synthesis and analysis. The appraisal ensured that findings are based on robust, reliable evidence from relevant literature on agricultural information systems and knowledge dissemination among smallholder farmers in Tanzania.

Findings

Sources of Agricultural Information and Knowledge among Smallholder Farmers

The review findings indicate that smallholder farmers in Tanzania obtain agricultural information through a diverse combination of traditional, interpersonal, and digital channels. However, although multiple sources of information exist, access remains uneven across geographical locations and socioeconomic groups, thereby limiting the ability of many farmers to utilize knowledge effectively for improving agricultural productivity and livelihoods. The evidence suggests that while the availability of information channels has expanded over time, disparities in accessibility, reliability, and quality continue to affect knowledge dissemination throughout rural Tanzania.

Radio and television remain the most widely used sources of agricultural information. A review of the literature found that 92 percent of the reviewed studies identified radio and television as the dominant communication channels (Table 1), reflecting their extensive reach across rural communities. Agricultural extension officers were identified in 77 percent of reviewed studies as key providers of information, while 69 percent highlighted mobile phones and 62 percent reported reliance on interpersonal communication through neighbours, friends, family members, and lead farmers.

Table 1: Sources of agricultural information and knowledge in Tanzania

Sources of information and knowledge	Frequency	Percent	Rank
Radio	12	92	1
Television	12	92	1
Agric extension officers	10	77	2
Mobile phone	9	69	3
Person-to-person interactions (e.g., neighbour, friend, family, parents	8	62	4
Newspapers	7	54	5
Farmers’ association	7	54	5
Village meeting	6	46	6
Brochure, leaflet, fliers	4	31	7

Source: Literature

The continued importance of interpersonal communication demonstrates the central role of trust within rural knowledge systems. Farmers often consider information obtained from people they know because it can be discussed, verified, and adapted to local conditions. Although these social networks facilitate knowledge exchange and strengthen community learning, excessive dependence on interpersonal communication also limits the speed, scale and geographical reach of knowledge dissemination.

Growing Role of Digital Technologies in Agricultural Information Delivery

The review further demonstrates that digital technologies are gradually transforming the way agricultural information is generated, disseminated, and accessed by smallholder farmers in Tanzania. Increased ownership of mobile phones, expansion of mobile network coverage and the emergence of digital agricultural platforms have created new opportunities to provide timely advisory services, market intelligence and climate-related information directly to farmers. More than 60 percent of Tanzanian smallholder farmers now own mobile phones, making mobile platforms increasingly important channels for disseminating market prices, weather forecasts, extension advice, and agricultural innovations (Mwageni et al., 2022). Digital platforms such as M-Kulima have already profiled more than 1.3 million farmers, linking them to advisory services, insurance products, and market opportunities (Mwakifwamba et al., 2024).

Smallholder Farmers' Agricultural Information Needs

The findings also reveal that farmers’ information needs are highly practical and market-oriented. Market information is the most preferred category, accounting for 15.3 percent of identified information needs (Table 2). This is followed by agricultural input information (13.1 percent), soil-related information (12 percent), farming techniques (10.9 percent), pest and disease management (9.8 percent), credit and financing opportunities (8.7 percent), and weather information (6.5 percent). These preferences underscore farmers’ desire to improve both production and profitability.

Table 2: Typology of information preferred by smallholder farmers

Information type	Frequency	Percentage
Market information	14	15.3%
Agricultural input	12	13.1%
Soil characteristics	11	12%
Farming techniques	10	10.9%
Pests and disease control	9	9.8%
Sources of Credit	8	8.7%
Weather	6	6.5%
Storage methods	5	5.4%
Crop varieties	4	4.3%
Agricultural product processing	3	3.2%
Climate change	3	3.2%
Irrigation techniques	2	2.1%

Source: Literature

Barriers to Accessing and Utilizing Agricultural Information

Despite progress in ICT adoption, major obstacles continue to limit access to agricultural information. Infrastructure deficiencies represent the most frequently cited constraint, mentioned in 57 percent of studies (Table 3). Poor roads, unreliable electricity, weak telecommunications networks, and limited internet connectivity reduce access to both conventional and digital information services.

Table 3: Barriers hindering smallholder farmers from accessing and utilising agricultural information and knowledge

Barrier category	frequency	Percentage
Infrastructural Deficiencies	17	57
Limitations in Extension Services and Weak Linkages	15	50
Economic Constraints	14	47
Knowledge, Skills, and Awareness Gaps	11	37
Quality and Timeliness of Information	11	37
Socio-cultural and Gender Aspects	8	27
Policy and Systemic Gaps	7	23
Market and Produce-Related Barriers	6	20

Source: Literature

Weak extension systems constitute another major challenge. The ratio of extension officers to farmers ranges from 1:1,500 to as high as 1:20,000, far exceeding the World Bank recommendation of 1:200–500. As a result, many farmers receive little or no direct technical support.

Economic barriers also remain significant. Limited incomes restrict farmers' ability to purchase communication devices, access internet services, or attend training programs. Knowledge and skills gaps, including low literacy and digital literacy rates, further constrain utilization of available information. Gender disparities are particularly pronounced. Women often face lower access to education, communication technologies, extension services, and financial resources, limiting their ability to benefit from agricultural information systems. These constraints contribute to lower productivity and wider inclusion gaps across rural areas.

Conclusion

Agricultural transformation in Tanzania depends not only on improved inputs and technologies but also on farmers' ability to access, interpret, and apply reliable information and knowledge. Information improves productivity, market participation, climate resilience, and smallholder incomes. Although radio, television, extension services, and mobile phones remain important, gaps persist in accessibility, quality, and effectiveness. Infrastructure limitations, inadequate extension systems, low information literacy, financial constraints, and gender inequalities restrict information use. Digital technologies offer opportunities, but sustainable improvements require integrated approaches combining digital innovation, stronger extension services, improved infrastructure, localized content, and farmer-centred knowledge platforms.

POLICY RECOMMENDATION

1



EXPAND RURAL DIGITAL AND COMMUNICATION INFRASTRUCTURE

- ✓ Broadband connectivity
- ✓ Mobile network expansion
- ✓ Rural electrification
- ✓ Community digital access points

2



MODERNIZE AND SCALE UP AGRICULTURAL EXTENSION SERVICES

- ✓ Recruit additional extension officers
- ✓ Strengthen digital advisory services
- ✓ Promote lead-farmer networks

3



DEVELOP LOCALIZED AND FARMER-CENTERED INFORMATION SERVICES

- ✓ Provide information in Kiswahili and local languages
- ✓ Use audio, visual, and interactive formats
- ✓ Tailor to farmers' literacy levels, local production systems, and information needs

4



PROMOTE INTEGRATED DIGITAL ADVISORY PLATFORMS

- ✓ Weather forecasts
- ✓ Market information
- ✓ Pest alerts
- ✓ Financial services
- ✓ Agronomic advice via SMS, IVR, and smartphone applications

5



STRENGTHEN INCLUSION OF WOMEN, YOUTH, AND REMOTE COMMUNITIES

- ✓ Design gender-responsive and youth-focused information systems
- ✓ Expand digital literacy programs
- ✓ Support targeted outreach to address barriers faced by marginalized groups

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