Improving crop productivity through ICT-enabled Agricultural Extension Services Delivery: The AgroTech Approach

Background

Ghana has had a number of ICT-based extension services provided by several donor-funded and government-supported projects in the agricultural sector in recent time to improve agricultural productivity/food security. The impacts of these initiatives cannot however be underestimated. A key feature of most of the ICT-extension innovations is the focus to improve farm yield at the expense of equally important agribusiness services to beneficiaries and a sustainable business model to ensure their commercial viability. A desk assessment of these initiatives affirms their supply-driven and information overload nature making them difficult to scale up after official projects closure. The current free Government Extension Service is highly trained but underfunded for effective field operations and expensive to scale out. It is also fraught with weak linkages between farmers and service providers and/or value chain actors. Thus, large demand for good quality agent-led extension services is unmet in part because of insufficient government funding and incoherent program model/structure for extension operations.

“Achieving Impact at Scale” (AIS) is a project implemented by Grameen Foundation, USA (GFUSA) in Ghana which is jointly funded by the Canadian International Food Security Research Fund (CIFSRF), IDRC and Global Affairs Canada in partnership with Farm Radio International (FRI) to sustainably incorporate the ‘Direct to Farmer (D2F) and intermediated ICT solution’ into business services delivery in the agricultural value chains, particularly information and data services in six regions of Ghana. The D2F component is a participatory Radio Campaign (referred to as AGROTECH PRC), which is harmonized with the seasonal commodity calendar and offers a live listenership interaction and an off-air interaction platforms for comprehensive agribusiness advisory services. A mobile application, AGROTECH SMARTEX is the intermediated component utilized by agricultural extension agents (AEAs) to provide tailored services to individuals or groups of smallholder farmers across the Ashanti, Brong Ahafo, Northern, Upper East and West, and Volta regions of Ghana. Since the implementation of the project, several local and international partners and stakeholders including local/community radio stations have assisted to deploy over 200 field agents to use the AGROTECH solution to provide services directly to over 8,000 smallholders in the beneficiary regions. For the purposes of this brief, existing datasets gathered by the project were cleaned and analysed to ascertain impact of the AgroTech solution on smallholder farm productivity. This brief, and corresponding full report, provide an analysis of the unique AGROTECH options for sustained and increased crop productivity among the beneficiary smallholder farmers in Ghana and the need for a commercial scale-up.

Research Findings

The AGROTECH approach comprises a multimedia extension management platform that enables last-mile stakeholders to leverage ICT and human networks to provide agribusiness advisory services to farmers and equips farmers to address challenges encountered. The approach incorporates interactive interface and permit user engagement and progressive monitoring through the value chain linkages developed. Furthermore, the live listeners’
radio component makes it possible for non-targeted smallholders and beneficiary smallholders to interact and seek further advice from extension agents; while others receive periodic sms on specific issues on their mobile phones. Smallholder farmers were also provided with regular market and weather information for informed farm business decision-making. Membership of farmer-based organizations (FBOs) and participation in FBO activities were significantly distributed across all regions. This made it possible for the farmers’ to access credits and other support services through the independent business owners (OBs). For instance, farmers’ membership in FBOs across the six regions were significant for the Brong Ahafo, Volta and Ashanti regions but not significant for the remaining regions. Wenchi, Hohoe, Jasikan and Techiman municipal were among districts with the highest number of farmers who are registered members of FBOs whilst Bawku central, Asutifi, Asunafo South, Bolgatanga municipal, Kintampo North and Sunyani metropolis recorded fewer number of farmers who are members of FBOs. Thus, smallholder farmers from rural districts have higher tendency to be associated with FBOs as registered members than farmers from more urbanized districts (Figure 1).

Farmers’ average farm expenditure differed significantly across all six regions taking into consideration regional inflationary pressures. Rate of fertilizer application and different nitrogen-based fertilizer formulations used by farmers across the six regions evidence the level of understanding and appreciation of the role of fertilizer application by farmers in crop productivity (Figure 2).

The radio AgroTech program and video tutorials on the need for application of crop-specific fertilizers might have accounted for the adoption of this good agronomic practice (GAP). Significant number of the smallholders now owns bank account, keep records and reduced postharvest loss to about 10% (Figure 3).
Smallholder rice farmers who established bunds had their yield significantly increased. Farmers who applied organic fertilizer had significantly increased yield by 142%. Farmers adopting improved varieties had their yield improving significantly by 153% but, as farm size increased farmers tend to be less productive as increase in farm size affected yield. Potential adoption rate varied among the various smallholder segments in the study areas. The ICT-enabled package implemented have had significant bearings on the income of adopters (Figure 2).

The level of innovation of smallholder farmers have fairly improved and may be increased further by coordinated institutional support and agribusiness services delivery.

**Policy Implications**

Significant number of the smallholder farmers in the six regions are keen on adopting the ICT-enabled extension package being promoted. Some of the smallholder farmers are still challenged with barriers to technology adoption. Access to credit (mainly rising cost), limited knowledge about inputs application, organizing group marketing, integrated soil fertility management, pest and disease control and post-harvest management were among the most significant challenges farmers require more supports. Dominant institutional constraints that have the potential to smallholder farmers’ productivity include: access to credit and agricultural advisory services, and pesticides use and access to inputs (improved seeds and mineral fertilizers) for the Northern, Upper East and West regions; row spacing, storage facilities, group marketing, access to credit and agricultural advisory services, use of improved varieties for the Brong Ahafo region; access to credit, input and output market as institutional constraints for the Ashanti region; limited storage facilities, integrated soil fertility management, herbicides application for the Volta region.

The AgroTech Smart Ex. Package permits a last-mile progressive monitoring and records keeping by smallholder farmers and this must be sustained by engaging private extension institutions as this enable financial institutions and creditor providers to track the history of farmers to access credit. Private Extension players may facilitate farmers’ access to credit possibly by organizing them into groups and building their capacities to source group credit as credit institutions prefer dealing with groups than individual farmers.

We propose the AgroTech Smart Ex model for stakeholders in the agricultural sector including Policy makers, NGOs, Financial Institutions, Ministry of Food and Agriculture and Donors in Figure 4 below;
AgroTech Smart EX.

Figure 4. Unique features of AgroTech Smart EX. for policy consideration

Further Reading


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