

Digital Platforms for Agro-advisory and Business service Delivery: Lessons from Scaling-up of AgroTech in Ghana.

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Executive Summary

Grameen Foundation, Farm Radio International and other partners implemented the project “Achieving Impact at Scale” from 2015 to 2018. The project was implemented through the ADVANCE II project implemented by ACDI VOCA. The Objective of the project is to test the scale up of AgroTech, an ICT platform, in the delivery of agricultural extension and agribusiness advisory services to smallholders, through private sector value chain players. AgroTech combines interactive radio broadcast and customized field coaching by an agent, bring together information, inputs and markets through private businesses. The goal of the project is to contribute to policy reform of the agricultural extension system with the view of improving responsiveness, accountability and operational sustainability. The project has been implemented through six community radio stations and 260 individuals and entities, including market aggregators, nucleus farmers, individually owned outgrower businesses, small-scale enterprises, credit cooperatives and farmer-based organizations/association. Geographically six regions were covered, involving some 83 districts. Interactive radio broadcast reached and estimated 300,000 smallholders, majority of whom implemented what they heard and gained yield increase more than those not exposed to interactive radio. The agent component enrolled over 14,000 smallholders who also gained in a similar way. Our experience indicate that digital platforms in agricultural extension and agribusiness services delivery can be successful at scale, but requires policy change and support. We recommend that MOFA should be supported to complete the ongoing reform that includes increasing private sector participation and regulating the service delivery and standard. We also recommend that the current e-agriculture platform be oriented as a “master platform” where private sector digital platforms plug in to ensure accountability and harmonization of data collected on agriculture and smallholders.

Introduction

Ghana’s agricultural extension system has undergone several reviews and reforms over the last two decades. The most notable was the decentralization of operations and unification of services, which created the District and Municipal Agricultural Development Units (DADU, MADU) at the various district and municipal capitals, as well as Regional Agricultural Development Units (RADUs). These units did not replicate the eight (8) technical directorates that exist at the National level. Since 2014, the decentralized units operate under the District Assemblies, which is the decentralized/administrative organ of Government, under the Ministry of Local Government and Rural Development. This is to complete the decentralization process by ensuring financial decentralization. It is expected that the Directorate of Agricultural Extension Services (DAES), hitherto tasked with providing public extension and advisory services will now work with the



Directorate of Policy, Planning, Monitoring, and Evaluation (PPMED) and others to develop extension policy.

These changes have not been reflected in documented policy, which dates back to 2002. There is a clear need for policy reform, and rightly so, MOFA has launched a new policy review initiative, and circulated a draft document including a new regulatory framework. The regulatory framework affirms the pluralistic, participatory **and** demand-driven aspects of an agricultural advisory system. Importantly, the draft framework recognizes the role of the private sector in the delivery of advisory services, although it suggests MOFA DAES will still play a dominant role. This paper contributes to the review and reform process by sharing details of the setup and deployment of an ICT-based business model for the delivery of agricultural advisory services to smallholders.

Apart from skill training **and** provision of advisory services, smallholder farmers require very good access to output market and inputs. Buyers, aggregators, outgrower businesses and nucleus farmers offer these services to farmers, mostly under informal transactions, although the training and advisory services are not at the optimum. However, there are many examples from high value and export crops that indicate that an outgrower arrangement has the best potential to improve productivity of smallholders. In such an arrangement, there are enough incentives and motivation for both smallholders and the agribusiness to keep this relationship operationally and financially sustainable, unlike in the public system. However, these agribusinesses face two key constraints;

1. Low credit recovery from outgrowers/smallholder farmers.
2. Limited access to credit for on-lending from financial institutions.

Key among the factors contributing to the constraints are;

- Sub-optimal field guidance and supervision of smallholders leading to unprofitable production, credit repayment default and side selling. Smallholders face many decision-making crossroads that formal training or prior provision of technical information may not be useful except an interaction with a colleague farmer, field agent or expert takes place.
- Poor business, managerial and financial literacy skills on part of OBs and smallholders farmers to handle their economic activities as a commercially entity.
- Inadequate data and records on their own business processes as well as on smallholders who they provide credit. Availability and use of data records improve transparency and trust relations within the value chain. It can greatly enhance sustainable value chain financing by financial institutions and others.

Grameen Foundation, Farm Radio International, MOFA, ACDI/VOCA and other partners developed, piloted and tested at scale, the AgroTech SmartEx application under two donor funded projects. The purpose of these projects was to support agribusinesses overcome the two causal factors that inhibit agricultural productivity and business expansion. The basic

functions of the mobile application provides the field agent or extension officer a tool to easily access information and also to collect information. The field agent can access multimedia information on crop enterprises (from planning to marketing) and contact information on service providers. It also allow him/her to collect information on farmers and their field performances. However the mobile application is used in a business model that requires close attention to each farmer and provision of customized services according to the needs of the farmer and the buyer.

Components of AgroTech

The AgroTech Delivery Model is made up of two components

1. AgroTech Radio - Interactive radio programing (Direct to Farmer)
2. AgroTech SmartEx - Agent mediated services

The two components are complementary. The D2F provides mass broadcasts of agricultural content based on key principles and general information, whilst the agent-mediated services provides customized support, including local content and linkages to other services.

AgroTech Radio

AgroTech Radio is interactive radio series aimed at an audience of farmers. It combines a participatory radio campaign with **ULIZA**[®], a tool created by FRI for gathering and analyzing feedback and questions from audience members.

Participatory Radio Campaign: a specialized interactive Broadcast

This set of broadcasts is focused on the uptake of one or a small set of related agricultural practices. This specialized radio broadcast consist of activity calendar-timed programs that are broadcast over a period of 12-16 weeks. A key objective of the format is to get smallholders to transition from listening, through decision making, taking action and sharing experience. It is preceded by;

1. Pre-production audience research
2. Design of programs
3. Training of presenters
4. Management of the ICT platform.
5. Marketing of the radio program

ULIZA:

ULIZA is built on an interactive voice response (IVR) system which enables listeners to vote on poll questions, leave messages and request the delivery of specific information on crop production. ULIZA enables listeners to communicate with their radio station through phone calls and SMS to request information, send their feedback through interactive polls, and contribute comments and questions as audio recordings. In this way, ULIZA ensures a short and rapid feedback loop and contributes significantly to dialogue, learning, and positive behavior change. It also provides a means for both

quantitative and qualitative monitoring, and helps stations develop and track a comprehensive database of listeners.

Specific ULIZA tools include:

- **Beep2Vote**, a toll-free technique which enables listeners to “vote” on a radio poll simply by beeping a number (also known as flashing or sending a missed call), prompting a callback from ULIZA.
- **SMS tune-in reminders**: provide a channel to remind subscribed listeners of a radio program about the timing and content of the broadcasts.
- **Beep4Contacts**: another toll-free technique for listeners to request phone contacts for key people in their area, such as seed distributors, marketers, or other key actors in a value chain.
- **VoxBox**: This centralizes incoming/outgoing calls and SMS in one place. Recording calls for archive/playback, conducting live conference calls, maintaining a listener database and an interface available through any web browser are some of the VoxBox’s main features.

AgroTech SmartEx

AgroTech SmartEx is in two parts,

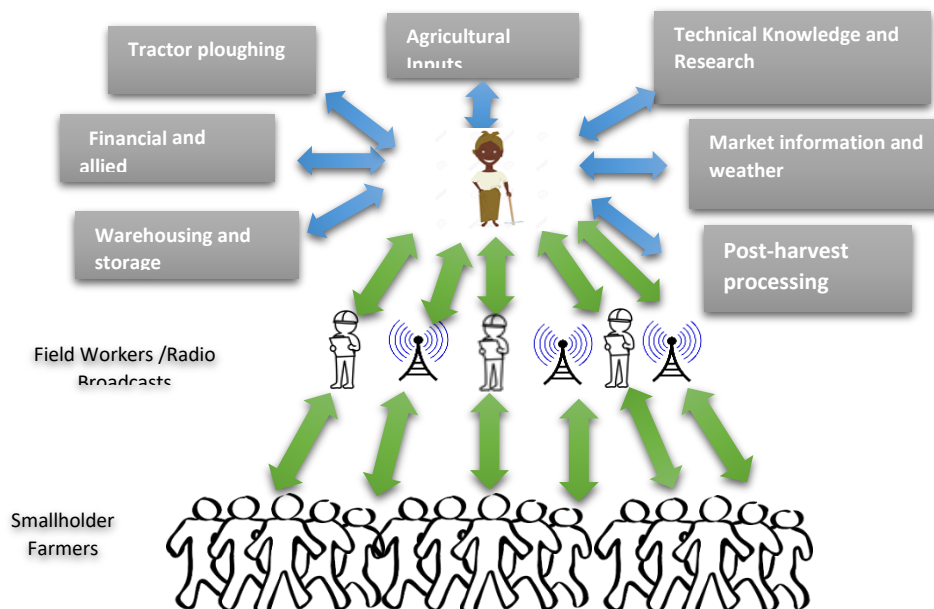
1. Android mobile application
2. Business Dashboard (BD).

The android mobile application enables a field agent to collect data and also provide essential information and advisory services to the farmer. The BD enables agribusiness owner to receive and visualize real-time data in a form that allow the tracking and monitoring of key performance indicators as well as for business planning. Both parts of the application can be customized to meet the needs of the business owner.

Mobile Application

The mobile application gives the field agent access to tools for engaging the farmers and to view the data collected on individual farmers and groups/clusters. The following are key components

1. Technical Content/Knowledge depository
2. Farmer enrollment and clustering
3. Farmer and farm records management tools
 - a. Agent meeting scheduling
 - b. Farm planning, budgeting and update
 - c. Farm area measurement
 - d. Field Crop Assessment
4. Business directory



Business Dashboard

The Business intelligence Dashboard is customized to the OB or NF's preference of indicators. However some of the basic information provided include summaries of

1. Production and Post-harvest information and performance indices
2. Credit provision and payback status
3. Agent performance

Delivery Model

The Agents or Outgrower Business Owners (OB) sponsors interactive programing and participates in live radio programs. The OB also reaches prospective smallholder clients through advertising of services rendered on radio. Thus the cost of interactive programing is provided by OBs. The OB serves as one-stop-shop for services requested by smallholder farmers (Figure 1).

This model promotes the building of trust between OB and smallholder clients (through multiple mutually beneficial transactions) and reduced complexity and overhead costs for smallholder farmers (in having to deal with multiple service providers). The OB may provide the services requested through own resources or contract/link farmers to service providers. The OB, through a field agent provides information, Knowledge and support services to farmers, and collect relevant farm business records through AgroTech SmartEx.

In the delivery model, OBs compete for clients through performance and fulfilment of value propositions (see section on business model). Thus technical information disseminated through radio will be specific to individual OBs and intended to attract smallholder clients. The OB provides customized services for individuals that opt to register with the particular OB. Theoretically, each full

Figure 1. Delivery model for AgroTech

time field agent will be optimally efficient by handling not more than 100 smallholder farmers. This will enable him/her visit each farmer once a month (four farmer visits a day). This is in addition to multimedia (group) meetings during which live radio program listening or video viewing takes place.

AgroTech Business Model and Sustainability

AgroTech Radio business model

The higher interactivity of the specialized radio broadcast provides enhanced opportunities for commercialization, through a radio-led business model. Table 1 shows the business relationship between actors that constitute the Radio model

AgroTech SmartEx business model

The business model relies on a commercial relation between the smallholder and OB, and the multiple relations between OB and other value chain service providers. Smallholder farmers find it easier to pay for credit with farm produce, and since the OB can easily monetize such produce, this relation forms the foundation of the business relation between the farmers and the OB. This relation, as stated, already exists at rudimentary levels. By supporting the smallholders to improve, the smallholder farmer gains increased productivity and profitability through credit, technical information and guidance in decision making. The OB gains through

- high credit recovery levels
- Increased profitability from input sales
- Reduced side selling
- Increased trust relations with creditors

The OB relies on radio as a channel to build customer relations, by providing information on services rendered and other details that will build customer loyalty. This relation sustains the interactive radio programming as much as the OB business model. Table 2 describes the operations that sustains the OB or AgroTech SmartEx business delivery model.

Table 1. Business relations for sustainability of AgroTech Radio

Value Chain Actor	Finances AgroTech Radio through	Benefits from
OBs/Aggregators	Either lump sum OR fee per successful transaction via radio or radio-related ICT system	Increased quantity of quality farm product

Value Chain Actor	Finances AgroTech Radio through	Benefits from
Community Listener Groups (CLG)	Agreement to provide small in-kind contribution based on success of harvest	Preferential Farm Radio service including: <ul style="list-style-type: none"> • FRI monitoring visits • Increased interaction with radio station • Wind-up solar radio
Traditional advertisers	Lump sum payment for advertising during radio program	Increased awareness among target listeners of product/service
Market development partners	Lump sum payment based on demonstrated value	Increased market size and more potential customers (e.g. Build up demand for improved inputs)
Smallholder Farmers as members of Farm Radio +	Small membership fee either in-kind (crops) or monetary	Premium Farm Radio service including: <ul style="list-style-type: none"> • Push Agricultural tips to mobile phones, • Market information on demand • Upgraded ULIZA feedback system to radio station • Guaranteed group access to AgroTech extension agent via phone • X # of in-person visits by AgroTech or other extension agent to community

Digital Platforms

Within the AIS project, FRI and GF provide the digital platforms, technical training and ancillary functions that allow the business models to operate on modern ICT tools. FRI provides the equipment and hosting of the interactive systems and the training. GF provides the SmartEx software as a service and training of field agents. GF also hosts the data and provide support services. These functions are to be provided by private entities after the project. A schematic representation is shown if figure 2.

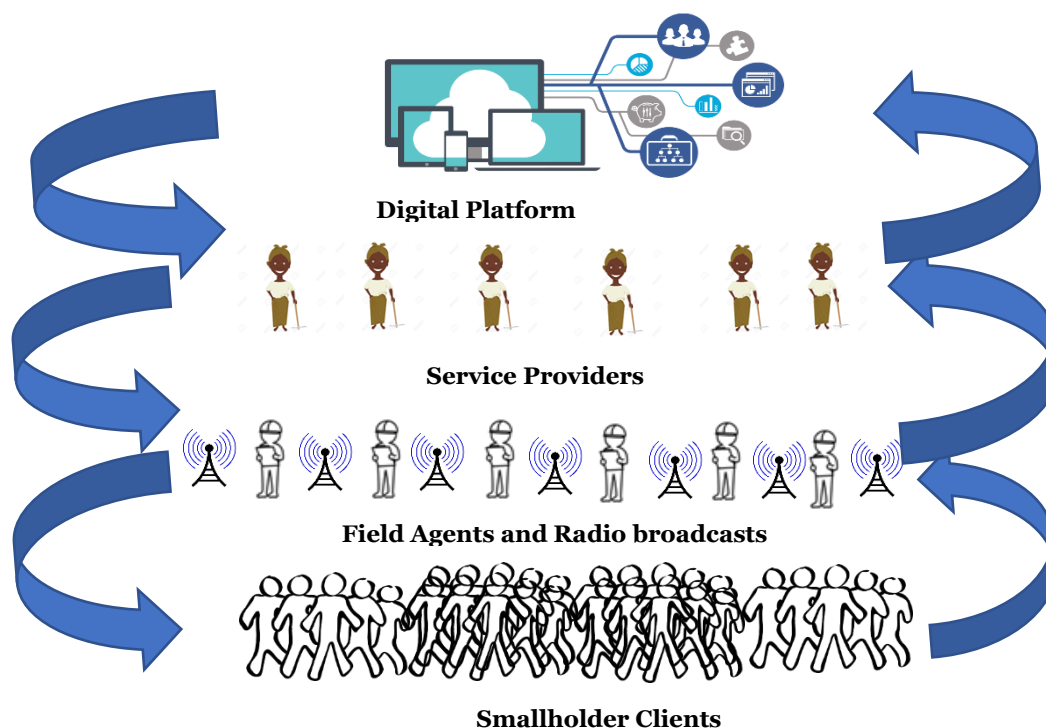


Figure 2. Schematic representation of digital framework supporting AgroTech implementation.

Field Deployment

The model has been deployed at scale since 2015. The following conditions prevailed throughout the scaling up process and had a measured influence on the results;

- FRI continued to provide support to the community radio stations in terms of training and equipment
- GF continued to provide support in terms of IT software and training
- For sustainability, OBs were not supported by the project in the deployment of agents or activities with community radio stations.
- Again for sustainability, OBs were not support financially by the project to deliver services like farm inputs, threshing and ploughing to smallholder farmers

Table 2. Business Plan Canvas to ensure sustainability of AgroTech SmartEx.

Customer Segments	Value Proposition	Key Resources	Key Activities
<u>Primary</u> <ul style="list-style-type: none"> • Smallholder farmers <u>Secondary</u> <ul style="list-style-type: none"> • Farmer-based Organizations • Input Dealers • Outgrower Businesses • Microfinance Organizations • Equipment Owners/operator 	To smallholder farmer <ul style="list-style-type: none"> • Marketing of produce • Planning and farm record keeping (including field measurement) • Credit (inputs and/or cash) • Weather information • Technical Information • Market information • Ploughing on credit • Labor contracting • Field technical support/training • Post-production processing and training • Farm assessment • On Call To Other Value chain SPs <ul style="list-style-type: none"> • Linkage to Smallholder farmers or contract/borrow to on-lend. 	<ul style="list-style-type: none"> • Agro inputs • Tablet for Agents • Motorbike for Agents • Computer • Pico projector 	<ul style="list-style-type: none"> • Introduce my business and value proposition to partners • Negotiate credit deals with MFIs/Input dealers • Develop/Support radio programs to attract clients and educate farmers • Develop and distribute outreach materials • Register farmers and determine their needs. • Purchase agricultural inputs • Deliver inputs to farmers • Conduct regular visits to farmers • Transport produce used for payment of goods and services or offered for sale • Organize and supervise machine operators • Liaise with MOFA and other service providers
Channels of delivery	Key Partners	Customer Relations	Revenue Streams
<ul style="list-style-type: none"> • Group visits • Individual visits • SMS text • Radio • Telephone 	<ul style="list-style-type: none"> • Input dealers • Microfinance companies • Other Outgrowers • Ministry of Food and Agriculture • Equipment Owners/Operators 	<ul style="list-style-type: none"> • Freemium for poorer households • Longer term credit (more than a season). • 	Repayment from smallholder farmers (Using produce at the end of season) <ul style="list-style-type: none"> • 15% or more for interest on credit, based cost of input provided • 1-5% service charge based on cost per area (acre)/season Payment of commission from Others (input dealers, MFIs, etc.) <ul style="list-style-type: none"> • 1-5% based on • value of inputs distributed/monitored/payments recovered • Value of cash loans monitored/recovered

Deployment of AgroTech Radio

Radio broadcasts from six community radio stations **covered** the geographical area of three administrative regions. The target is to reach 300,000 smallholder farmers with 96 programs. The radio stations have delivered 190 programs, reaching an estimated audience of 150,000. A total of 60,859 responses have been recorded including 5,577 unique respondents interacting with the radio stations using different ICT platforms. Also, 2,317 responses were recorded under other services

such as weather and market information, aggregators and input dealers. The radio stations, with the support of FRI, have developed 192 CLGs in 190 communities.

A survey conducted among 1,170 respondents (including project non-beneficiaries) showed that a high percentage of respondents benefited from the radio broadcast. Figure 3 shows for each of the topics broadcasted on radio, farmers indicated they that most of the respondents.

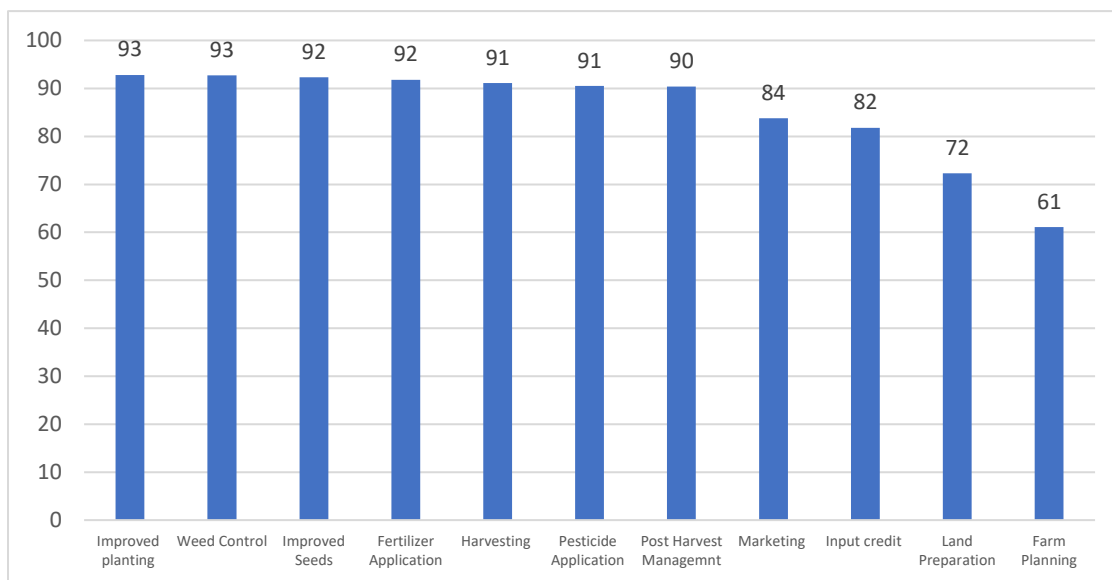


Figure 4. Percent of respondents indicating actual implementation of knowledge on practices listened to on radio

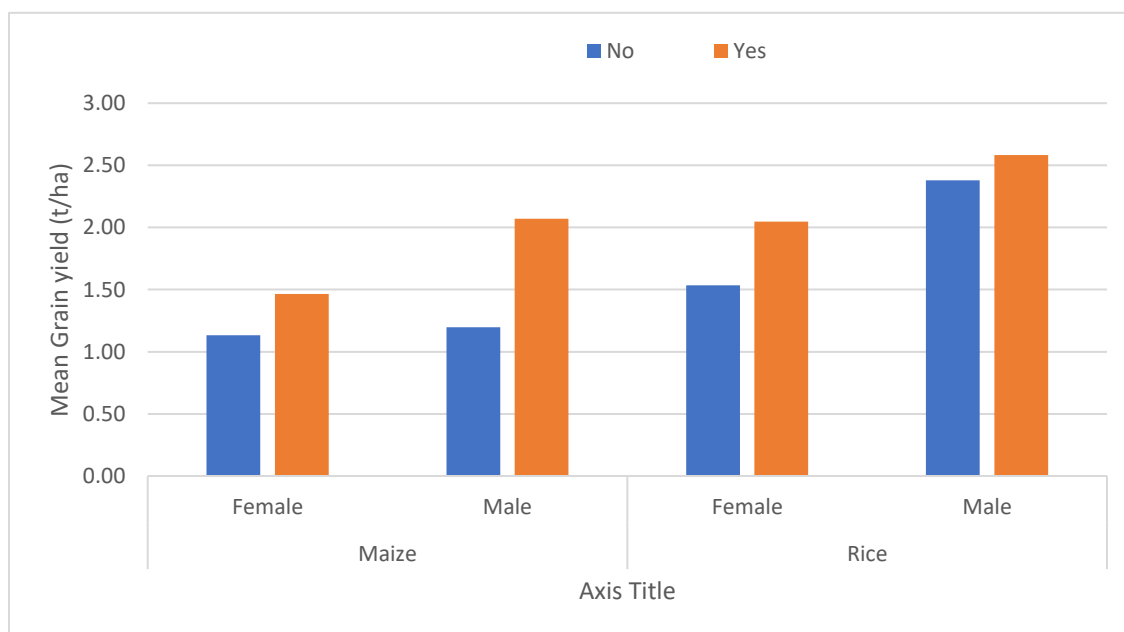


Figure 3. Mean grain yield stated by survey respondents categorized by general coaching by radio or otherwise.

Figure 4 shows that the yields stated by the smallholders who received coaching from radio as compared to those who did not. These were yields stated by respondents. There was a general tendency for males and for those who received coaching through radio (Yes) to state higher grain yields.

Deployment of AgroTech SmartEx

AgroTech Smartex have ben deployed in 64 districts in seven regions in Ghana with 260 agents working for various stakeholders. Figure 5 shows the location Obs providing services to smallholders. Majority (167) of the OBs are within ACIDI/VOCA ADVANCE II project (Table 3) which is supporting value chain actors to upgrade their operations. With the exception of a few, most businesses have one agent deployed, but there are others with 4-8 agents deployed.

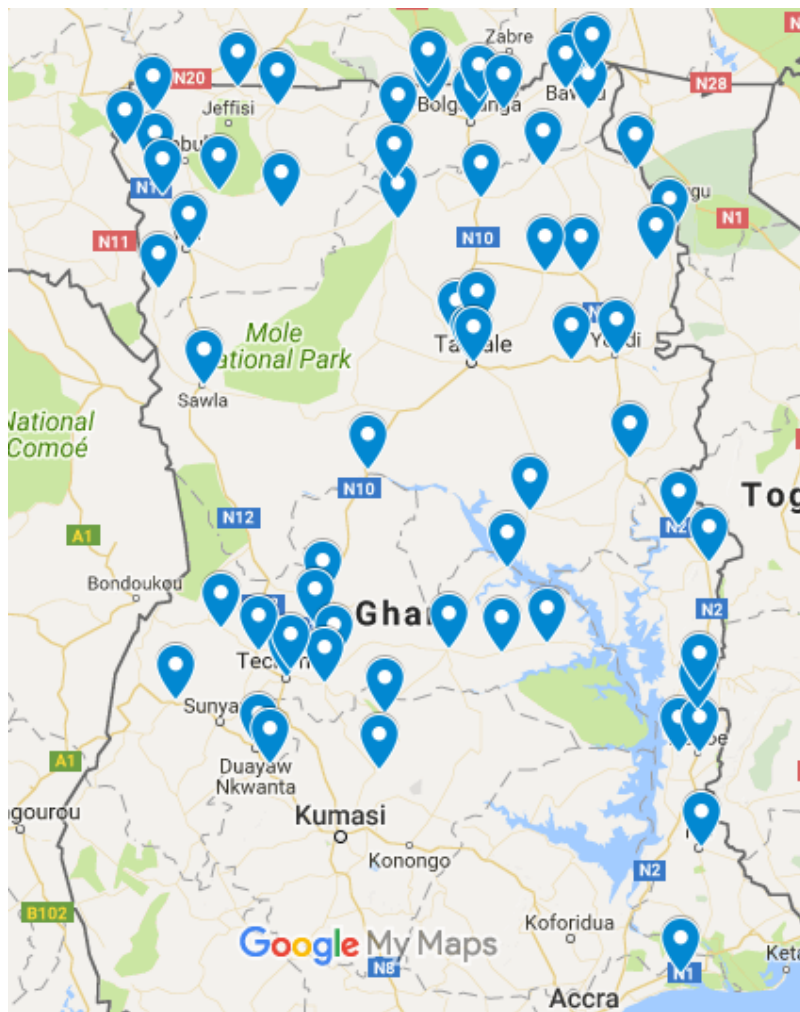


Figure 5. Location of outgrower businesses deploying AgroTech SmartEx in providing services.

Table 3. Total number of registered smallholders categorized by type of OB

	Affiliation of Outgrower Businesses	Number of Registered Agents	Number of Active Agents	Number of smallholders registered and receiving guidance
1	ADVANCE SOUTH OBs	47	25	2955
2	ADVANCE TAMALE OBs	30	15	894
3	ADVANCE YENDI OBs	30	21	1174
4	ADVANCE UPPER EAST OBs	30	27	2781
5	ADVANCE UPPER WEST OBs	30	18	1736
6	INDEPENDENT OBs	80	53	3421
7	PUBLIC (MOFA)	10	9	1294
	Grand Total	260	168	14255

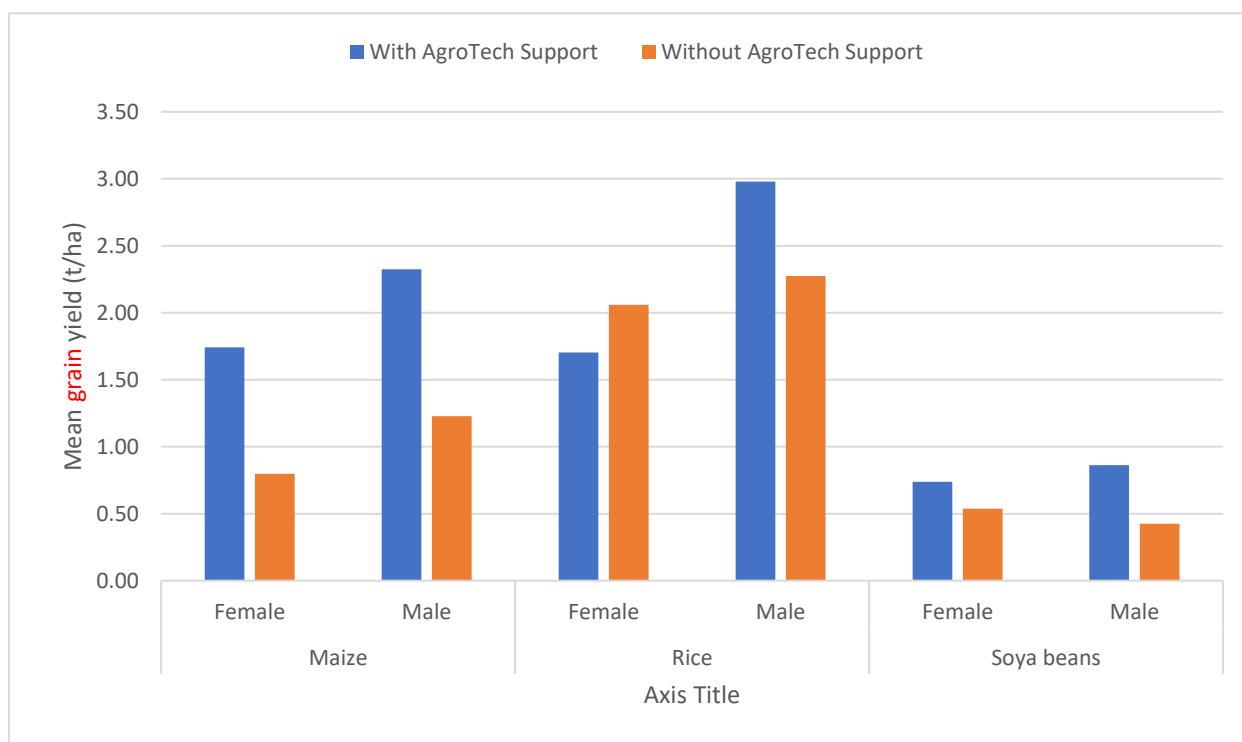


Figure 6. Grain yield as stated by respondents with and without AgroTech support.

Mean grain yield as stated by respondents were generally higher for those with AGROTECH support as shown in Figure 6. Males stated higher grain yield compared to their female counterparts. However, in relation to rice, females without AgroTech support stated higher yield than their counterparts with AgroTech support. A full analysis of plausible reasons for the differences are in a project evaluation report under preparation.

Lessons learned, policy implications and Recommendations

There have been many important lessons learned during project implementation. This paper focuses on key lessons that will support the current initiative by MOFA to reform the agricultural extension system. The current literature, and our own experience suggest there is enough evidence on the usefulness of digital platforms in improving smallholder agriculture. The question has been the financial and operational sustainability at scale. We consider our effort as “testing at scale”, with the premise that full scaling will involve the commercial private digital platform operator and the required policy environment.

The delivery model we are proposing already exist in a form as “contract farming” among food exporters and other high value crops. Our work adds to the growing evidence that contract farming, supported by digital platforms can be successful in food crop value chains. However, financial and operational sustainability is achievable if the following important policy initiatives are carried through.

1. Complete liberalization of service provision, with invitation to producer companies and others to establish a demand-driven and commercially oriented service.
2. Public sector extension service (MOFA) play more of regulatory role than a service provider
3. An appropriate digital platform to manage content and ensure accountability is established.

1. Private Sector Participation in delivery of extension and agribusiness service

MOFA is in the process of revising the 2002 Extension Policy and the abridged version of 2005. The existing policy, has nine objectives under four (4) thematic areas. It calls for promoting a demand-driven service and private sector participation. Based on the experience on the AIS project, we encourage MOFA to accelerate the process of increasing private sector players in the provision of business services. Our evidence points to the fact that a demand driven advisory service must be accompanied by business and financial services, which MOFA or the public system is not set up to deliver. The danger that the poor, disadvantaged, and others engaged in subsistence production may be further marginalized under a commercial system is an important concern. This group should be the main concern of MOFA district offices for free services and government subsidies. Thus, in a private-sector dominated environment, MOFA has a role to ensure inclusiveness.

Most smallholder farmers prefer to use produce as re-payment for credit services and therefore aggregators, bulk buyers and processors are best placed as business service providers (BSPs) because they naturally monetize crop produce. However, input dealers, financial institutions, mechanized service providers, processors and other value chain players who are set up (alone or with others) to accept produce as payment should be registered by MOFA as a BSP.

2. Role of MOFA as Service Regulator

MOFA is well suited to playing this role, which largely ensures accountability. It embodies registration of service providers, setting and maintaining service standards. Thus, we recommend an annual



accreditation process to ensure that BSPs qualify to provide services. The accreditation body should include other private stakeholders. MOFA will provide or contract training for eligible Business Service Providers (BSPs) for those who intend to engage the accreditation process. The training will cover both service regulations, and standards. Important criteria to consider for the accreditation process include:

1. Ability of the entity to plug into a centralized digital platform to enhance monitoring, learning and service accountability.
2. Setup to offer holistic bundle of services (or able to link farmers to other service providers) in addition to technical advice and skills training.

Akin to contract farming, BSPs should have a set of performance criteria or expected outputs for which a farmer signs up for the service. These and other regulatory functions are important functions that currently not in place because of under-staffing at MOFA.

MOFA will also register Digital Service Providers (see section below). They will perform Business-to-Business (B2B) services to BSPs, offering specific and localized content, including weather, market information, and technical information on their digital platforms for which BSPs will provide to farmers.

3. Digital platforms for extension and agribusiness service delivery

We recommend a two-tier digital platform

- a. Master platform
- b. Private sector Technical Service Provider platforms (e.g. Esoko-NSYT, FARMERLINE, etc.)

a. The Master Digital Platform (National Agricultural Digital Content Management System)

The proposed platform (see Figure 7) will house the National Agricultural Digital Content Management System. This will manage general multimedia content from research institutes, universities, other public institutes and MOFA for public-good activities. They will include text as well as material for radio, TV, video and mobile devices, with a friendly user interface for accessibility. This will be accessed directly by DADUs (offering free service to the disadvantaged) and others who will not opt for the second tier platform for financial reason. The Master Platform will also serve as a data center on smallholder farmers and service providers. The system can be managed by MOFA personnel or (extension multimedia department) in collaboration with a private IT company.

b. Private Sector Digital Service Provider platforms

These are entities at the operational level of AgroTech, offering OBs unique user experiences with their Software as a Service (SaaS) platforms. Their specific and localized content may dictate their operational areas, since they must respond to the relevant needs of their clients. They will plug in their IT system directly into the Master Platform when registered by MOFA to access the general content. It will be required of them to provide a minimum dataset on their operations and on the smallholders that are being serviced through their platforms. This will enhance monitoring, learning, accountability

and evidence-based decision making at all levels of government in relation to smallholder agriculture.

Master Platform



Registered Technology Service Providers



Registered Business Service Providers



Clients



Figure 7. Schematic representation of proposed framework as a digital platforms for delivery of agribusiness services.