

A Private Sector-led Business model for meeting changing needs of agribusiness value chains actors in Ghana based on Mobile-based ICT- enabled field agents.

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Abstract

The role of the private sector in the provision of ICT- enabled agricultural advisory services is gaining prominence due to challenges limiting effective delivery of public agricultural extension services. Grameen Foundation piloted the AgroTech SmartEx Model which provides quality advisory services to agricultural value chain actors in some selected regions in Ghana. This paper sought to develop a business model for scaling up the Agro-Tech SmartEx on commercial and more sustainable basis. In addition to interviewing 103 farmers in the Brong Ahafo and Volta Regions of Ghana, other actors along the agricultural value chain were interacted with to identify their challenges that could be turned into business opportunities. The study found out that agricultural advisory services were needed not just by farmers but also by other players including inputs and financial service providers as well as other agri-distributors. Based on the gaps identified, a proposal is made for an Integrated Business Services Delivery Model which is national in character with a three-tier structure consisting of a Master Platform, Digital Solution Providers (DSPs) and the Agribusiness Service Providers. In addition to production based support services to farmers, the model proposes provision of farmer data to financial institutions and input suppliers for a fee as well as engagement with large buyers and processing units to secure market for produce of registered farmers.

1. Introduction

It is a well-known that the performance of public agricultural extension systems is inadequate for the provision of agricultural advisory services needs of today's farmers and other actors along the agricultural value chain (Elias 2016, Caggiano, 2014, Celik 2013, Sulaiman *et al* 2012 and Kristin 2008). There are several reasons why public agricultural extension system alone will not be adequate in meeting the agricultural advisory services needs of actors. These include the dwindling central Governments funding globalization and increasing trends of market-oriented economies, which require smallholders to adapt to new markets, inputs and standards and the general decline in subsistence as a viable livelihood. In Ghana, the public extension system limits its activities to technology transfer and education through training, demonstrations and visits. Other services such as inputs and machinery services are provided

by the private sector. Thus there is hardly any relation or synchrony between provision of “software” by the public system and “hardware” by the private sector.

The notion of “*agricultural extension services*” has transformed through “*agricultural advisory services*”, “*rural advisory services*” and now increasingly considered as “rural business development services”. This is in recognition that the rural population, remaining agrarian, has to deal with the effects of globalization and market-oriented economies. Provision of rural business development services therefore include a very broad range of services, which can include advocacy and farmer organization development (UNDP, 2004) in addition to the traditional support in production, post-harvest and marketing. Over the years, there have been efforts to provide smallholders and other rural enterprises with combined or embedded services or “one stop shops” to enhance the delivery of services. In many cases this has been under donor-funded projects. Under these project, government contracts consultants or companies to provide both inputs, services and training to support smallholders. Other projects have taken a “value chain approach” so as to bring services providers to relate more to smallholder farmers. With the foregoing, it important, and about time, that these efforts are institutionalised in a sustainable manner. The proliferation of internet, mobile telephony has provided opportunity to improve the delivery of agribusiness services by digitizing and formalizing processes, procedures more new opportunities for engaging with smallholders within agricultural value chains. It is against this background that Grameen Foundation has developed a mobile software application called ‘AgroTech SmartEx’. The application helps in delivery of agricultural extension and advisory services in more effective manner. Under the New Alliance ICT Extension Challenge Fund project in Ghana, Grameen Foundation piloted the AgroTech SmartEx - technology and the extension service model. The software is currently deployed in 6 regions of Ghana among 200 field agents and with over 5,000 farmers. The project is being implemented in collaboration with other partners such as Agricultural Development and Value Chain Enhancement (ACDI/VOCA ADVANCE).

Having established the effectiveness of the Agro-Tech SmartEx at the pilot stage (Quaye et al 2017 unpublished), there is the need to scale-up and commercialize the use of the Agro-Tech SmartEx Model to enable the establishment of a more sustainable solution to bridging the gaps in the extension and advisory needs of actors along the agricultural value chain in Ghana.

This study was conducted to conceptualize a sustainable private sector-led demand-driven ICT-based extension and agribusiness services business model. The concept development was based on understanding the background, operations, business processes and needs of value chain actors in the food crop sector.

2. Methodology

The methodology used for this study, involved secondary research followed by a primary research in Ghana. The primary research included Focused Group Discussions (FGDs) and questionnaire-based survey with 103 farmers in two regions of Ghana including Volta and Brong Ahafo.

In Brong Ahafo region, a total of 61 farmers were interviewed. In addition to the farmers, 10 Outgrower Business Owners (OBs), 4 financial institutions of different legal forms, 3 agents, farmer federation, 2 market associations, 2 agri-input dealers and 2 potential business entities that could potentially take up AgroTech SmartEx as a business were interviewed.

In Volta region, a total of 42 farmers were interviewed. In addition to the farmers, 4 agents, 1 financial institution, 1 farmer federation, 2 market associations, 2 agri-input dealers and 1 potential business entity that could potentially take up AgroTech SmartEx as a business were interviewed as shown in Table 1.

Table 1 Stakeholder interviewed in Brong Ahafo and Volta Regions of Ghana

Stakeholders covered	Brong Ahafo	Volta	Total
Questionnaire survey with farmers	61	42	103
FGDs with farmers	2	3	5
Agri-input dealers	3	2	5
Outgrower Businesses (OBs)	10		10
Agents	4	4	8
Farmer federation	1	1	2
Maize Market Association	2		2
NBFIs, MFIs and banks	4	1	5
Credit Cooperatives	1	1	2
Processing units		1	1
Potential Businesses	2	1	3

Primary survey with farmers was done with a mix of respondents who had earlier participated in AgroTech SmartEx pilot and those who did not know of AgroTech SmartEx.

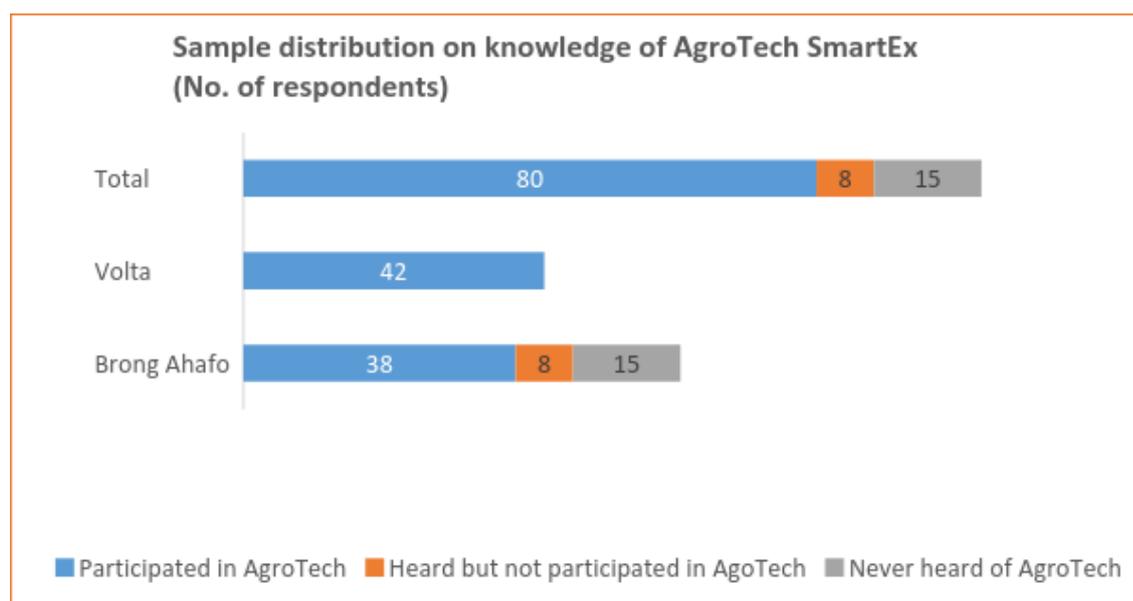


Figure 1. Distribution of farmers interviewed by Region

Semi-structured interviews were conducted with the representatives of the institutions listed in Table 2.

Table 2 Institutions interacted with in the study area

Type of Institution	Name of the institution
Agri-input dealers	<ul style="list-style-type: none"> ● Northgate ● Waaf Agri ● Agyaaku Farms & Trading Ltd ● Sweet Jesus ● Green Shield
Farmer federation	<ul style="list-style-type: none"> ● Wenchi Farmer Federation ● Tapaman Farmer Association
Maize Market Association	<ul style="list-style-type: none"> ● Maize Market Association ● Wenchi Maize Market Association
Financial Inst. - NBFIs/MFIs/Banks	<ul style="list-style-type: none"> ● Express Savings and Loan ● Opportunity International ● Sinapi Aba Savings and Loan ● FBN Bank ● Asubonten Rural Bank
Financial Inst. - Credit Coop	<ul style="list-style-type: none"> ● BACCSOD Credit Union ● Paradise Credit Cooperative Union
Processing unit	<ul style="list-style-type: none"> ● Worawora Rice Processing Mill (GN Foods)
Potential Business houses for scaling-up AgroTech SmartEx	<ul style="list-style-type: none"> ● Agri Impact ● Agri Consult ● Cocoa Abrabopa

3. Findings

3.1 Description of Food Crop Value chain

Figure 3 below shows the relationship between the different stakeholders with regard to the movement of produce and finance.

Farmers are the producers. Farmers may exist as individuals or could be part of Farmer federations or other smaller groups. Farmer federations or FBOs are associations of farmers to improve their bargaining power and to leverage strength as a collective. In general the bulk of

production is financed by smallholder farmers. They bear the cost of land, land preparation and most of labour costs:-

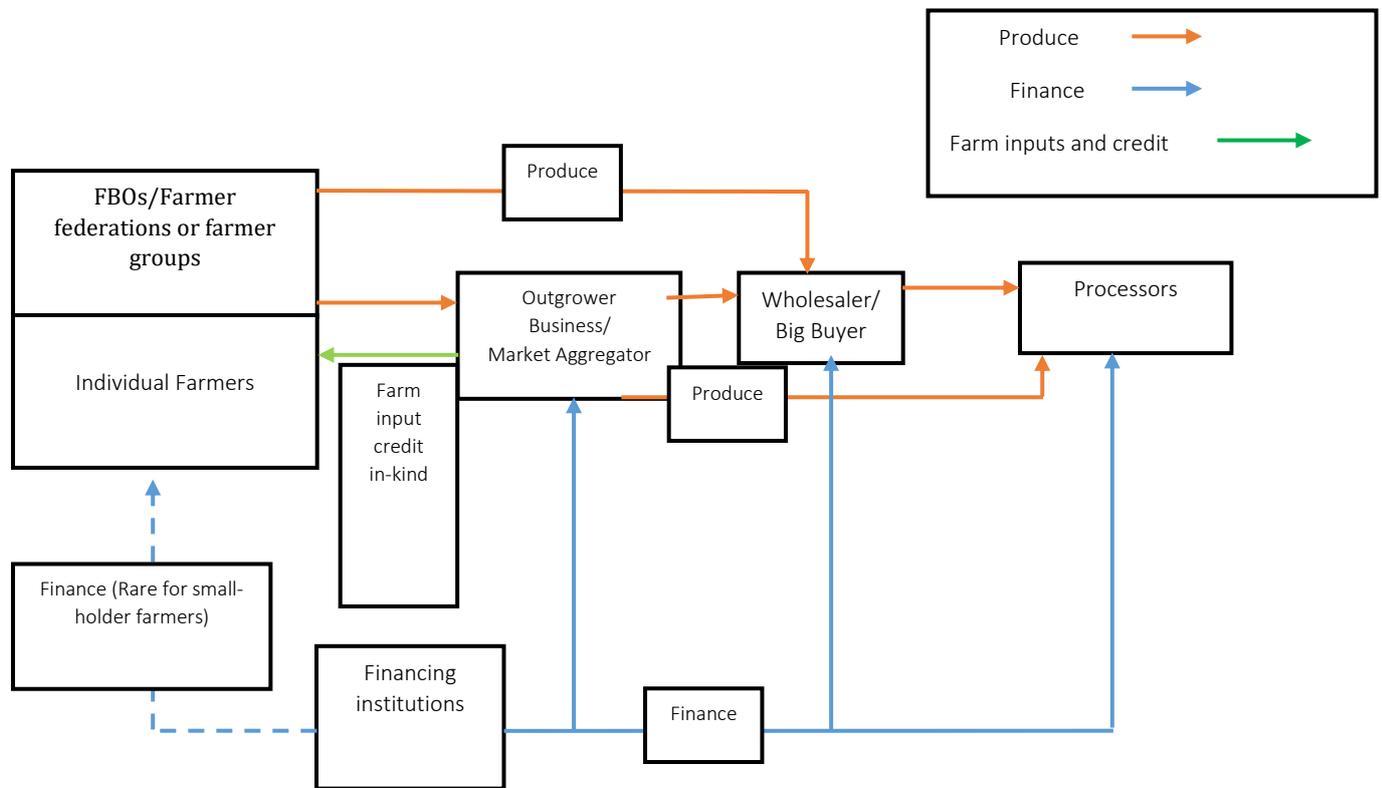


Figure 3 Agricultural Value Chain in Ghana

Outgrower Business (OBs) Owners are intermediaries between the market and the farmers. They may themselves be farmers or may just be operating as intermediaries. The biggest value addition that OBs bring is the provision of agricultural inputs on credit. OBs provide farm inputs on credit to individual farmers and then at the end of the season they generally procure the produce and take their share of interest on credit provided. Generally, the principal as well as interest is all collected in the form of produce. Increasingly, OBs provide financing for cost of purchased inputs and processing costs. Earnings come from margins on the inputs (procured at wholesale prices) and/or interest charges. Mostly, the terms of credit are clearly defined but not documented. Generally, the principal as well as interest is all collected in the form of produce at the end of the season. This is what makes the arrangement a popular practice among farming communities. The OBs sometimes obtain the credit from financial institutions for on-lending. The seemingly dominant operations of the OBs reflect sub-optimal performance of financial institutions. But for now, OBs are an integral part of value chain and are well entrenched in the value chain.

Processing units may be factories or smaller units which procure produce from Aggregators or in some cases from OB. The processors also offer credit to farmers and accept produce as repayment. Primary processing, especially machine threshing, winnowing and bagging has become an important activity within the chain.

Financial institutions provide finance. In most cases, financial institutions refrain from lending to small-holder farmers. Most financial institutions lend to large farmers, processing units, OBs and Aggregators. Finance is a problem throughout the value chain, especially for small scale operators; be it farmers, OB or Aggregators. The main reason why agri-financing is lacking is because of the high level of risk associated with farming activities.

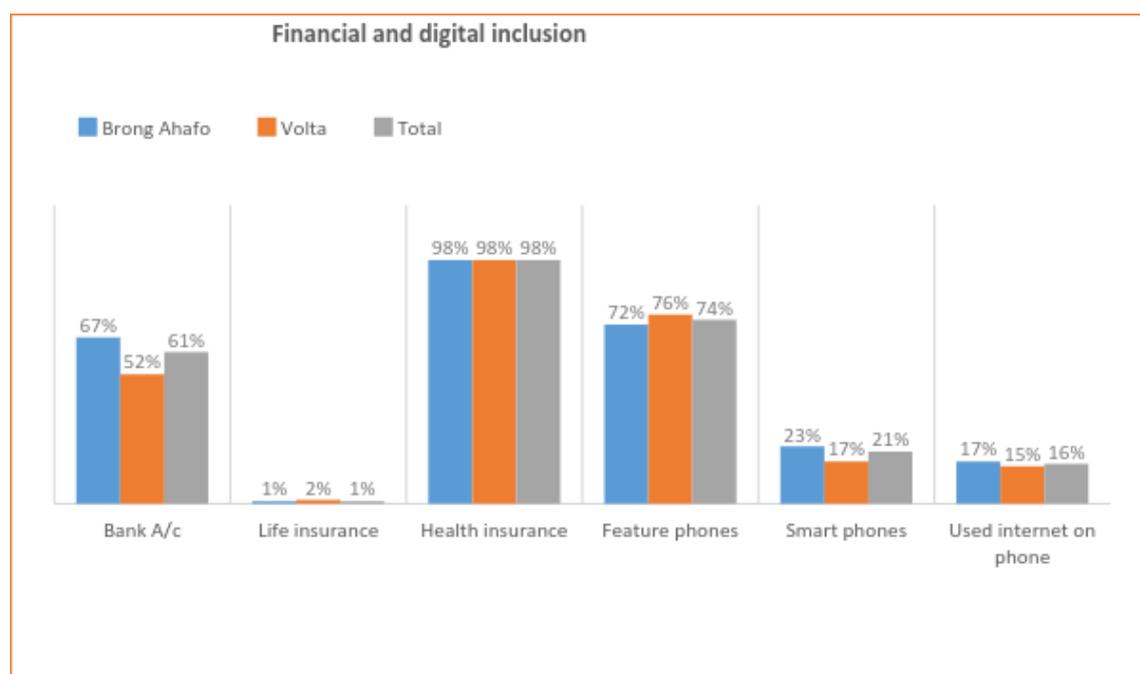


Figure 4. Distribution of Digital and Financial Inclusion farmers interviewed by Region

3.2. Identification of Service and Information needs within value chains

The survey inquired from farmers, their primary sources of various types of information required for production enterprises. Initial enquiries were on general challenges they faced that continue to inhibit their progress. As expected, farmers indicated that they face a wide range of challenges. Table 3 shows the challenges facing farmers interviewed in Brong Ahafo and Volta Regions of Ghana.

Table 3 Challenges facing farmers in the agricultural value chain

What are the biggest challenges for you in agriculture?	Brong Ahafo (n=61)	Volta (n=43)	Total (n=103)
Agri-input availability	59%	45%	53%
Input cost	20%	38%	27%

Farming technique	48%	36%	43%
Market and price uncertainty	79%	74%	77%
Rainfall/Irrigation	84%	55%	72%
Soil quality	11%	7%	10%
Others	3%	26%	13%

Source: Primary research

3.2.1 Information and service needs of smallholder farmers

Figure 5 shows Ministry of Food and Agriculture (MoFA) as the most common source of information followed by TV and Radio. Most farmers mentioned that their main source for technical advice was from MoFA Agricultural Extension Agents (AEAs) or radio and television broadcast. The results of the survey also confirmed that MOFA agents were not able to adequately cover all farmers in their “operational zones” or were they able to provide adequate support to any section of farmers. For the mass media, although popular, less than half of those interviewed regularly listened to radio and only about 10% watched agricultural extension programs (figure 6 and 7).

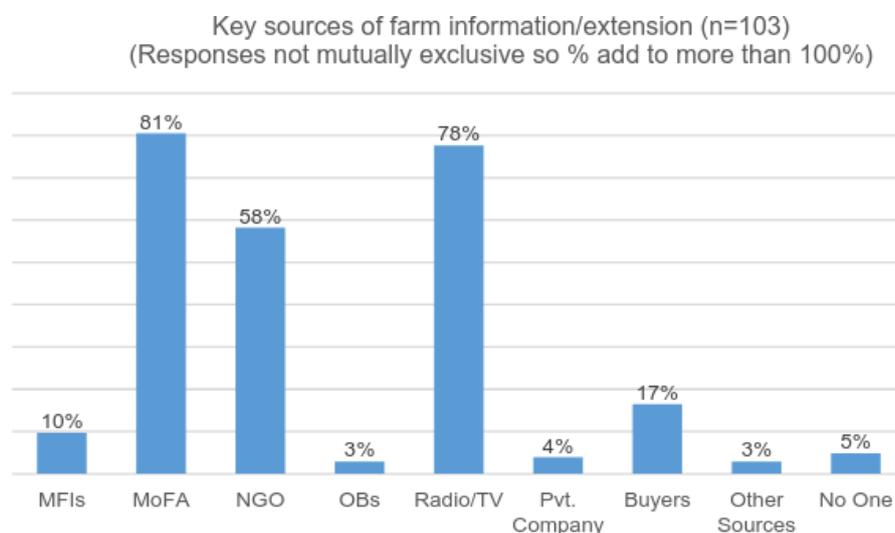


Figure 5 information sources used by farmers.

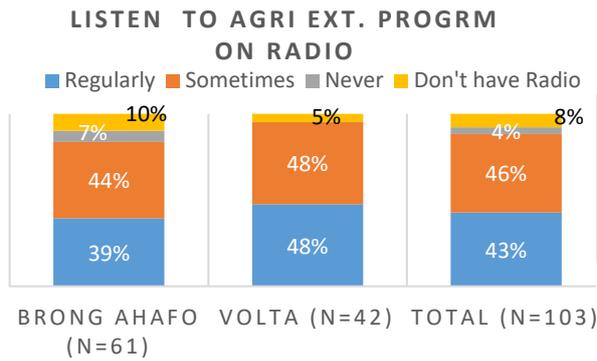


Figure 6. Frequency of listening to agricultural extension programs on radio.

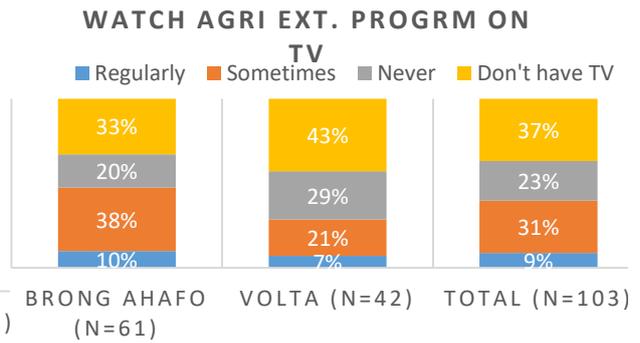


Figure 7. Frequency of watching agricultural extension programs on television.

The type of information discussed in which farmers were interested in but having inadequate access to include the following:

- New farming practices and knowledge;
- Reliable weather forecast in relation to key activities;
- Reliable information on produce marketing, including price movements and general forecast on supply and demand; and
- Availability of credit and conditions for lending.

Most of the farmers had learned farming from their ancestors. They felt that the knowledge handed-over to them was outdated. An overwhelming - 94% respondents thought that they did not know modern farming techniques and needed to upgrade their knowledge. Farmers mentioned that they lacked information on quality of seeds, techniques of sowing, applying fertilizers etc. Incorrect ways of farming had significant impact on overall productivity.

While, the farmers mentioned that they need extension services they also made it clear that information and training alone is not adequate for production for current markets. Farmers expressed need for various support services including credit/finance, information on markets, prices and weather, input supply services and keeping of farm records. There was adequate evidence (data not shown) that farmers need these services, will benefit from their provision but are not receiving them on a consistent basis as designed and operated under the AgroTech model.

3.2.2. Information and Services Needs of Value Chain Service Providers

A number of financial institutions (credit cooperatives/credit unions, banks and Micro-Finance Institutions (MFIs), agriculture input distributors, market federations, farmer federations and individual farmers were interviewed to understand their information needs that will enable them improve their services to smallholder farmers. Firstly, the business entities indicated the need to know and understand the livelihoods of small holder farmers. Secondly, they needed to build a relationship of trust with the farmers. Each entity was given the opportunity to go through a list of data points and indicate the importance and relevance for their businesses.

Some of the key data points of relevance include demographic information, livelihood issues and information related to market intelligence.

- Demographic –
 - Personal details,
 - family details,
 - location and
 - assets holding
- Livelihood –
 - land-holding,
 - past credit history,
 - farm history,
 - crop details,
 - yield,
 - cost
 - revenues and
 - profits
- Other information (aggregated) related to market intelligence
 - Crops grown
 - Farm inputs used; type, brands
 - Farm input use

Value chain service providers needed information and services that could be firm-delivered or outsourced including how to identify potential farmer clients needing farm services, support in dissemination of correct information on agri-inputs, Support in dissemination of product details and its method application – particularly when a new product is launched, identification of credit-worthy clients, credit appraisal and managing borrowers (reducing number of bad loans). Others are effective advertising, customer service and records management.

3.3. Elements of an Integrated Business Services Delivery Platform at Scale

Based on the interactions under the study, it was found that there exists a business opportunity for a platform which could address the information asymmetry among various players in the agricultural value chain. This lack of information or gaps eventually throttle the agriculture sector. It was found that support services were needed not just by farmers but also by these other players. Further, the agri-input dealers and even financial service providers showed great interest in exploring commercial relationships and willingness to pay for such a service provider that could provide them with the above-mentioned services. Agricultural input dealers indicated that they were already spending money in advertising and in extension services to spread information about their products and use of fertilizers, hybrid seeds etc. In effect, service providers require information and services in order to deliver effective targeted and customised services which smallholders need. A platform that captures and share data and information for all stakeholders will improve the functioning and productivity of the value chain.

There are several organizations in Ghana that are operating technology platforms solutions that can benefit farmers in different ways. Many, just like AgroTech, are primarily donor funded,

while others are grant-funded with very few operating commercially at scale. The analysis and development of elements for full scaled-up business model for the AgroTech platform, takes into consideration the operations of these technology platform to harness the opportunities for digitization to serve the national good. Thus this analysis is directed at developing a national system that harnesses digital platform to serve agribusiness value chains.

The business model proposed in this study is based on the following key findings in the study:

- Farmers need not just extension services but integrated bundle of support services;
- Other value chain players – namely financial institutions and agri-input dealers also need information about farmers and a range of services to enhance their service delivery;
- Farmers, financial institutions as well as agri-input dealers are willing to pay for the services, but farmers will prefer to pay when cost of service delivery is embedded, payment is accepted in kind (by produce) at the end of the season;
- Farmers need an easily accessible and a trust-worthy service provider preferably local and since monetization of farmers payments is required, an OB/NF or market aggregator is a worthy value chain player; and
- The proliferation of digital platforms in the industry requires a regulator and framework to ensure standards, ethics, and sustainability.

With the above considerations, a National Agribusiness Advisory and Services Delivery model with a three -tier structure is being proposed. Under the three-tier structure, there will be a top-level umbrella platform (The Master Platform), Digital Solution Providers (DSPs) (that includes AgroTech and others) and the Agribusiness Service Providers (Agribusiness owners such as OBs/NFs).

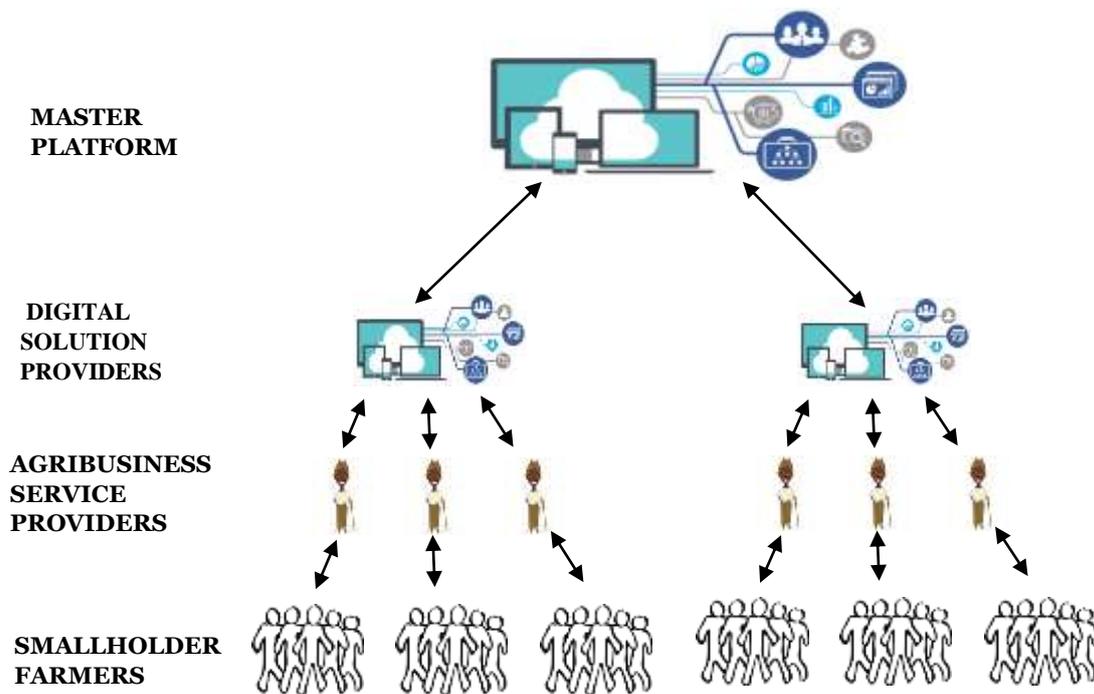


Figure 8 Integrated Business Services Delivery Model

3.3.1. The Master or Regulatory Platform

Government's interest in agriculture and farming communities is strategic, and as occurs in the health Sector, Government must ensure that citizens receive the best service, whether provided by a Government agency or private Sector. Government is also interested in the data on farmers and their operations for national planning. A Master Agribusiness Digital Platform (MADP) will ensure that these interests are harnessed. The functions of the Platform will include the following:

- Housing generic agricultural content, including research-based recommended technologies and practices as well as government policies that can be accessed by Agribusiness Digital Platform Providers (DPPs);
- Interfacing with all registered ADPSPs to exchange platform who will provide Government with minimum required data for planning and evaluation;
- Creating standards and fair practice codes for ADPSPs;
- Keeping a register of ADPSPs;
- Keeping a register of Agribusiness Service Providers (ASPs) or Private Extension Providers;

- Undertake data management services for use by government, other value chain stakeholders (including researchers) and new investors;
- Promoting the activities of the Master Platform and support in its expansion;
- To create new generic technical material on agriculture;
- To collect periodic feedback from partner channels and improve services and software; manage and upgrade AgroTech SmartEx application
- To conduct training of trainers (existing channels can act as trainers for new PEPs); and
- To promote best practices, learning sharing, publications; recognizing and awarding good practices and achievements of channel partners.

The Master Platform should be owned by the Ministry of Food and Agriculture (MOFA) and preferably operated by a private entity on their behalf, although well-trained public officials could handle a prioritised and well-funded platform.

3.3.2. Digital Platforms

This Platform includes competing digital solutions including AgroTech, mFarms, Esoko and others. Thus Direct-to-Farmer (D2F) services via Short Message Service (SMS) text, Interactive Voice Response (IVR), radio and similar media may operate at this level. They will compete to provide information to agribusinesses, banks and other stakeholders who have smallholder farmers as clients. Content, including locally relevant and applicable knowledge and the services provided by the application will be key to increased subscription by the service providers. The geographical operational area will also be important in positioning a Digital Solution Provider in the competition.

3.3.3. Agribusiness Service Provider (ASPs)

This Platform is for delivering agricultural services, including extension and information to smallholder farmers in a way that ensures that they make advances in yields and general productivity. Platform members will be registered by the Master platform and they have the option to work with any registered Digital Solution Provider. They will have one or more field agents working with the digital solution provided by the Digital Solution Provider. They will provide services directly (from their own resources) or connect farmers to service providers. Services may be provided on cash or credit basis depending on arrangements agreed with farmers. Key services that can be provided are shown in figure 9. This arrangement curtails a situation where the smallholder, with limited capacity to engage, has to deal with a multiplicity of value chain actors

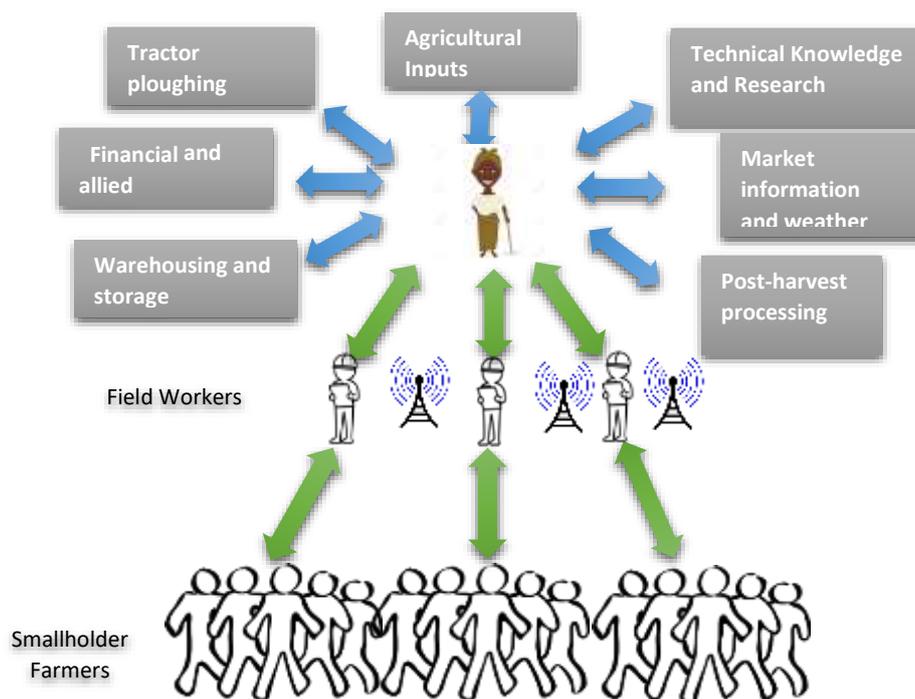


Figure 9 Services by Agribusiness Service Providers

4.0 Discussions and conclusion

4.1 Discussions

Grameen Foundation has so far piloted the SmartEx solution only with Outgrower Business (OBs) and with staff of Ministry of Food and Agriculture (MoFA) and Agricultural Development and Value Chain Enhancement (ADVANCE) project, acting as Agents. While testing the SmartEx with these entities was important, limitation is that these delivery channels are able to work only in very limited geographies and on very small scales. An OB in most cases is not able to provide services to more than 300-500 farmers. For scaling-up the business model, it will be important that AgroTech SmartEx services are also delivered by larger businesses that can run it on a bigger scale as full-fledged business verticals. At the same time, there should be freelance individuals who can easily proliferate and provide services locally. With larger private institutions, Grameen Foundation needs to pitch the product to them and make them interested in the business.

It would therefore be necessary that Grameen Foundation involves these entities in the proposed financial viability pilot and absorbs some initial costs during the pilot to demonstrate the cost effectiveness and financial viability of the model. This is important that at this stage, since it would not be practical to expect that private institutions will take up the AgroTech SmartEx model and would be willing to make all the required investments needed for scaling-up on their own. Therefore, Grameen Foundation will need to partner with these private

institutions and should be willing to share some initial costs and hence part of the business risk as a market making effort. The exact nature of support needed and costs to be shared will be clear once these entities are engaged in the discussions for such a pilot. But GFUSA must budget funds for such market making exercise under the scale-up pilot.

The literature supports a more complementary role for private-sector led agricultural extension with ICT-Enabled Models (Mittal and Tripathi 2009, Gichamba and Lukundu 2012 and Chowdhury and Odame 2013). ICTs applications program have been used elsewhere to ensure timely availability of agricultural information to farmers (Tahir *et al* 2017; Butt *et al* 2017). Sulaiman *et al* (2012) has critique the role of ICT-enabled agricultural extension services as necessary but not being sufficient enough in transferring improved technologies to farmers.

The Agro-Tech SmartEx model has been proven to be technically viable, the acceptability of the extension services using ICT among farmers; the effectiveness of using Agents for extension services and the impact of services in improving farm yield have also been tested. However, the proof of the above business model proposal still does not provide the necessary conditions that may be needed for commercially scaling-up the technology. Currently, the three most critical challenges that need to be addressed in scaling – up are (i) the viability of Agribusiness Services Providers and Private Institutions to act as effective delivery channels (ii) feasibility of engaging with the delivery channels to test and demonstrate their effectiveness and capacity to deliver services and (iii) willingness of clients (farmers as well as other institutions) to pay for these services. If the business model and the scalability potential is proven, private entities (delivery channels) will be interested to take up the model and to make necessary investments.

From the literature, willingness and capacity of farmers to pay for agricultural advisory services have always been problematic (Falola et al 2012). The primary clientele for AgroTech SmartEx solution are farmers. Hence, it is the farmers that should be paying for the services. Under the proposed business model, farmers have been assumed to be the first and the main source of revenue. While the proposed business model also envisions institutions such as banks, MFIs, Agri-distributors to be the potential clients and thus potential sources of revenues, they will come on board once the model demonstrates success and significant outreach with farmers. During this study, a significant need for such services and willingness of farmers to pay for such services was found. Discussions with other actors in value chain also showed interest of these institutions in AgroTech SmartEx services and even their willingness to pay.

4.2 Conclusion

This study has proposed an Integrated Business Services Delivery Model that provides a comprehensive range of advisory and support services in the agricultural value chain in Ghana rather than just extension services to farmers. In addition to production based support services to farmers, the model proposes provision of farmer data to financial institutions and input suppliers for a fee as well as engagement with large buyers and processing units to secure market for produce of registered farmers. With this proposed business model of advisory and support services delivery, it is necessary that AgroTech SmartEx partners with different stakeholders and other ICT-Enabled extension service providers. Grameen Foundation already has partnerships with Farm Radio and with ACDI/VOCA's ADVANCE project as well as Ministry of Food and Agriculture in Ghana. There are potential to build on these existing

relationships as well as to explore some common areas that AgroTech SmartEx can partner with other ICT Platforms.

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