Achieving Impact at Scale Through ICT-enabled extension services in Ghana (CIFSRF Phase 2)

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Final Joint Technical Narrative Report
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Executive summary

In Ghana, as in several African countries, farmers access free of charge information and knowledge largely from public extension systems funded and run by government bodies and entities. There is however abundance of publication that provide evidence that services have deteriorated over the years, in spite of several donor and government inspired reforms. The dominant public system has become unsustainable, denying millions of smallholder farmers the opportunity to improve productivity and household food security.

Locally-based private crop aggregators and buyers with the necessary capacity and incentive are providing demand driven agribusiness services to smallholder farmers who are underserved by the national extension system. 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, Farm Radio International, Digital Green and other partners implemented a successful pilot project that harnessed interactive digital platforms (radio, mobile and video) to promote the provision of actionable information and advisory services to farmers. The consortium responded to a call for proposals under the Canadian International Food Security Research Fund to test at scale enhanced ICT-enabled extension services and to test the economic viability of scaling such ICT-enabled extension services through different buyer-agent models.

The scaling up under the ‘Achieving Impact at Scale’ project resulted in 500,687 farmers reached with productivity enhancing technologies or practices (486,578 farmers reached by radio and 14,109 reached through mobile-enabled agents). 174,821 of the total farmers reached (163,562 for radio and 11,259 for field agent) used or adopted at least one promoted agricultural practice or technology. A number of iterative learnings and decisions led to the refinement of the business model for scaling ICT-enabled extension and for promoting the model to policy makers and other industry players.

The project assessed and refined both radio and mobile agent models leading to development of sustainable operational and financial models. The focus of the pilot phase was more on the B2C model, however the Achieving Impact at Scale project aimed to research and develop sustainability for both B2C and B2B models at scale. Analysis of project documents and interviews with staff indicate that the project conducted required activities towards the achievement of this aim. However not all the activities yielded the desired results or outcome, but provided useful lessons.

Overall, the project can be considered as a success, although given time and space it could have been concluded in the best way possible by transitioning the technology platform to a private operator, and supporting the Ministry of Food and Agriculture to implement the policy recommendations, some of which they had initiated during the project implementation phase.
Contents

Executive summary ............................................................................................................. 2
List of Abbreviations ........................................................................................................ 5
Project Background and the research problem ................................................................. 6
Progress towards milestones ............................................................................................ 9
  Project Scope and Targets and Achievements ................................................................. 9
  Evidence of project impacts ......................................................................................... 9
Synthesis of research results and development outcomes ............................................. 10
  What worked well (General) ........................................................................................ 10
    Smooth Delivery of AgroTech Platform ................................................................. 10
    New Learning Opportunities for Farmers and Agents .................................................. 11
    Collaboration between Stakeholders/Partnerships ....................................................... 11
    Gender integration in scaling AgroTech ................................................................. 14
Synthesis of pathway to achieving impact .................................................................... 15
  Synthesis on sustainability of the AgroTech Model ...................................................... 16
    Operational sustainability of B2B model at scale ..................................................... 18
    Conditions for success for sustainably embedding and scaling ICT-based models in developing countries- ................................................................. 20
    Positioning of AgroTech ......................................................................................... 20
  Synthesis of policy development activities around scalable, sustainable extension ...... 21
Methodology .................................................................................................................... 22
Project outputs ............................................................................................................... 22
Problems and challenges ............................................................................................... 23
Overall assessment and recommendations ..................................................................... 23
Annexes

Annex 1- Project Evaluation Report
Annex 2- Report of Project’s Gendered Value Chain Analysis
Annex 3- Gender Monitoring Tool
Annex 4- Report of Business Model Research
Annex 5- PowerPoint on Financial and Policy Implication of Scaling AgroTech
Annex 6- PowerPoint on Financial Viability of AgroTech
Annex 7- AgroTech Business Model Cash Flow
Annex 8- Farm Radio’s Formative Assessment Report
Annex 9- Minutes of Final Advisory Board Meeting
Annex 11- Policy Paper 1 (Private Sector led Business Model)
Annex 12- Policy Paper 2 (Lessons learned from scaling AgroTech)
Annex 13- Policy Paper 3 (The AgroTech Approach)
Annex 14- Policy Paper 4 (Improving Agribusiness Service Delivery)
Annex 16- Research Paper (Gendered Analysis of AgroTech)
# List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AIS</td>
<td>Achieving Impact at Scale</td>
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<tr>
<td>CLGs</td>
<td>Community Listener Groups</td>
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<td>DG</td>
<td>Digital Green</td>
</tr>
<tr>
<td>D2F</td>
<td>Direct-to-farmer</td>
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<tr>
<td>FBO</td>
<td>Farmer-Based Organizations</td>
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<td>FRI</td>
<td>Farm Radio International</td>
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<tr>
<td>ICT</td>
<td>Information and Communications Technology</td>
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<tr>
<td>IVR</td>
<td>Interactive Voice Response</td>
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<td>MOFA</td>
<td>Ministry of Food and Agriculture</td>
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<td>OBs</td>
<td>Out-grower Business-owners</td>
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<tr>
<td>SHF</td>
<td>Smallholder farmer</td>
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<tr>
<td>MADP</td>
<td>Master Agribusiness Digital Platform</td>
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<tr>
<td>ADPSPs</td>
<td>Agribusiness Digital Platform Service Providers</td>
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<tr>
<td>ASPs</td>
<td>Agribusiness Service Providers</td>
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Project Background and the research problem

Information and knowledge has always been important in improving agricultural business, particularly smallholder agriculture. Agriculture has always been an information intensive industry, whereby actors have to obtain and process various types of information including climatic, financial, technical and regulatory. In Africa, the main source of information and knowledge for smallholder farmers had been largely the public extension systems funded and run by government bodies and entities. In Ghana, as in several African countries, farmers access the service free of charge, delivered by trained and equipped field agents, in addition to the use of radio broadcasts and, to a lesser extent, television. There is abundance of publications that provide evidence that services have deteriorated over the years, in spite of several donor and government inspired reforms. Lack of responsiveness, accountability, incentives, poor performance, dwindling funding and failure to modernize has been cited as some of the key issues responsible for the decline in service coverage and quality. In effect the dominant public system has become unsustainable, denying millions of smallholder farmers the opportunity to improve their productivity and household food security.

The country has also seen the growth in private sector participation in delivery of information and other services, mainly from Non-Governmental Organizations (NGOs) and farmer peer-to-peer exchange of information. However, Government does not consider the NGO “stop-and-go” funding cycle as sustainable, and therefore their activities are not actively supported and adequately by policy. NGOs provide farmers with accompanying services, like inputs, markets and credit, sometimes as freebies or heavily subsidized.

Similarly, lead farmers, aggregators have emerged as sources of information and services for smallholder farmers seeking to improve their production, processing and marketing. These actors provide localized personalized/customized services, including personal loans and similar “quick access, no collateral” credit services. Together with Farmer-Based Organizations (FBOs), these buyers are primarily seen as aggregator models for providing market to smallholders and thereby promoting their inclusion into modern value chains.

There are good examples of successful aggregator models in Africa and Ghana, although these relate to high value export crops or commodities. Few exist for staple food crops because the trade in these crops are largely unstructured. In Ghana, the Savannah Farmers Marketing Company and the Masara N’Arsiki Farmers Association use aggregator models for staple crops in addition to other cash crops such as cashew nuts. These companies are more successful because of rolling contracts with industrial processors such as Guinness Ghana Limited and Nestle Ghana Limited. There are other locally-based individual aggregators and buyers who, provided with the necessary capacity and incentives, can provide demand driven agribusiness services to smallholders who are underserved by the national extension system.

Grameen Foundation, Farm Radio International, Digital Green and other partners implemented a pilot project that harnessed interactive digital platforms (radio, mobile and video) to promote the provision of actionable information to smallholder farmers. The project was a success, reaching out to more than 200,000 farmers through interactive radio and more than 4,000 farmers by mobile equipped agents using the AgroTech SmartEx application. The Consortium (now FRI and GF only) responded to a Call for Proposals under the Canadian International Food Security Research Fund to test the models at scale. The objective of the call, funded by Global Affairs Canada and IDRC were-
1. To scale up effective, pilot-tested innovations, and achieve meaningful impacts at scale.

2. To test and assess the effectiveness of creative and bold scaling up models, delivery mechanisms and approaches.

3. To inform decision-making and public policies, at different levels and varied contexts, using evidence-based research results.

CIFSRF is interested in scaling up those innovations that are particularly beneficial to poor rural populations, particularly women and smallholder farmers. The main motivation or rationale for the Call was to promote the scaling up of game-changing innovations that can support increased productivity and production of nutritious food by smallholders, especially women farmers. This is in recognition that innovations must reach scale to benefit the numerous smallholders who will effect the required change. In addition, the potential of women, who constitute a substantial majority in smallholder agriculture, is not fully exploited even in small pilot research programs. The Call was seeking for new and creative ways to empower women to unleash their potential for household food security and economic prosperity. Another key aspect of the Call was the harnessing of private sector ingenuity and business acumen to develop meaningful public-private partnership to support sustainable business models that delivers to the poor especially women.

The Project “Achieving Impact at Scale through ICT-Enabled Extension Services” was the response to the Call with the following key objectives:

- To scale up enhanced ICT-enabled extension services to smallholder households, resulting in adoption of productivity-enhancing technologies, specifically targeting women;
- To test the economic viability of enhanced ICT-enabled extension scaling approaches through different buyer-agent models; and
- To engage policymakers and the private sector in the promotion of proven new models to scale food security and market growth in Ghana.

The fulfilment of these objectives were generally guided by the outputs and activities as stated in the project proposal document. However, in view of the uniqueness of the project, the management was more adaptive than initially envisaged. Thus in achieving the outcomes, the valued outputs of this project is in the iterative learnings and decisions leading to the refinement and finalization of the business model and for promoting the model to policy makers and other industry players. The scaling up resulted in 300,000 more beneficiaries reached by radio and 10,000 additional smallholders through the mobile agent. During the process the project engaged 6 radio stations (up from 2). For the agent solution, the project engaged 264 buyers (up from 50) and 234 buyer agents (up from 47) in six regions (up from 3).

The project assessed and refined both radio and mobile agent models leading to development of sustainable operational and financial models. Apart from questionnaire-based surveys and subsequent feasibility analysis, full scale real-life testing of the models was assumed (for purposes of objective 2) and conducted but with severe constraints. Data from the study, and several interactions and iterations with stakeholders informed the final refined models. The stakeholders included policy-influencing personnel in both public and private sectors. Apart from the refined models, the project proposed for policy development, a national digital “Master Platform” to support the business model(s) proposed, in
recognition of the importance of digital content and data management and the ethical issues that arise from multiple and repeated data collection from smallholder farmers. The “master platform” will serve as a clearing house for agricultural content and data, whilst improving service provision and accountability.
Progress towards milestones

Project Scope and Targets and Achievements
The project had presence in 6 out of 10 administrative regions of Ghana and covered 70 out of the 254 Districts in Ghana. The radio component of the project covered only 3 of the 6 regions which had the project. The Table provides information on key project targets and outputs.

<table>
<thead>
<tr>
<th>Project milestones</th>
<th>Target</th>
<th>Achieved at Project Scale up</th>
<th>Percentage Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographical coverage</td>
<td>2 Regions</td>
<td>5 Regions; 70 Districts</td>
<td>250%</td>
</tr>
<tr>
<td>Smallholder farmers reached by field agent</td>
<td>5000 registered farmers</td>
<td>14,109 registered farmers</td>
<td>282%</td>
</tr>
<tr>
<td>Smallholder farmers reached by radio</td>
<td>295,000</td>
<td>486,578</td>
<td>165%</td>
</tr>
<tr>
<td>Total Smallholder farmers reached by the project</td>
<td>300,000</td>
<td>500,687</td>
<td>167%</td>
</tr>
<tr>
<td>Smallholder farmers who used or adopted a promoted practice</td>
<td>60,000</td>
<td>174,821</td>
<td>291%</td>
</tr>
<tr>
<td>OB/ Nucleus farmers/Buyers</td>
<td>Nucleus 50</td>
<td>264</td>
<td>528%</td>
</tr>
<tr>
<td>Buyer Agents</td>
<td>47</td>
<td>234</td>
<td>498%</td>
</tr>
<tr>
<td>Radio stations</td>
<td>2 Radio Stations</td>
<td>6 Radio Stations</td>
<td>300%</td>
</tr>
<tr>
<td>crops</td>
<td>3 crops</td>
<td>6 crops</td>
<td>200%</td>
</tr>
</tbody>
</table>

Type of Crop Promoted at Different Locations

<table>
<thead>
<tr>
<th>Region</th>
<th>Crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volta</td>
<td>Maize and Rice</td>
</tr>
<tr>
<td>Brong Ahafo</td>
<td>Maize, Cowpea, Yam</td>
</tr>
<tr>
<td>Northern, Upper East, and Upper West</td>
<td>Maize, Soya and Rice</td>
</tr>
</tbody>
</table>

Disaggregation by sex of project beneficiaries

<table>
<thead>
<tr>
<th></th>
<th>Male Project Beneficiaries</th>
<th>Female Project Beneficiaries</th>
<th>Total Farmer Beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Smallholder farmers reached by the project</td>
<td>326,448 (65.2%)</td>
<td>174,239 (34.8%)</td>
<td>500,687</td>
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</table>

Evidence of project impacts

Achieving Impact at Scale’ (AIS) provides a package of integrated agriculture extension services to farmers in six regions in Ghana; Volta, Ashanti, Brong-Ahafo, Northern, Upper East and Upper West Regions. The project contributes to addressing challenges of low agricultural production and rising food insecurity in
Ghana. There is an urgent need for increased access to agricultural extension services by smallholder farmers to help them learn and apply improved and efficient agronomic practices that contribute to increased farm productivity. This is the gap the project sought to fill.

Having tested the use of a combination of ICT and radio in providing agriculture extension services to smallholder farmers under the ICT Challenge fund, the Achieving Impact at Scale project sought to scale up the successes of the previous project to reach more farmers. The project targeted reaching 300,000 smallholder farmers using these tested approaches and converting at least 60,000 of farmers reached to adopt productivity enhancing technologies and practices.

The project used two different, yet innovative methods. Grameen used an ‘Intermediated method which used trained ‘Field Agents’ supported by an ICT platform that work directly with farmers to provide them extension and support services. Farm Radio on the other hand, used ‘Direct to Farmer’ method using interactive radio programming to provide extension services.

Data from digital platforms through which smallholder farmers were reached, and an evaluation study (Refer to Annex 1 for the project evaluation report) that surveyed 1200 respondents in five regions indicate that 14,109 beneficiaries farmers were registered and profiled by 234 mobile field agents.

Based on statistical estimation using the sampled population and the proportion of respondents who said they listened to FRI partner radio stations regularly, it is estimated that the six community radio stations together covered about 1.5 million people living in the catchment area of the FM stations. Further analysis indicates that more than 486,000 smallholder farmers listened regularly to broadcasts on improvements with radio programs. Out of this number, over 163,000 SHFs used and adopted agricultural technologies that they had previously not applied to their farms. There was a total of 575 radio programs aired over the period. The radio IVR system recorded 13,299 unique responses out of a total 74,382 responses. (See Annex 1 evaluation report page 70 for radio mapping audience coverage and reach, and map of partner radio stations)

Synthesis of research results and development outcomes
What worked well (General)

Smooth Delivery of AgroTech Platform
The registration process for all the agents was smooth and farmers who were not part of their farmer organizations were willing to register to enjoy the services of the SmartEx application.

Some of the benefits the agents derived from the services included, getting more clientele base, gaining adequate knowledge on farming and basic agronomic practices, which helped them to become good extension agents to their farmers and in managing their own farms.

Even though the system had few challenges, the ICT challenge fund project tested and refined the AgroTech platform for a smooth delivery.

The participatory nature of radio programs afforded opportunity for smallholder farmers to exchange ideas widely with other farmers and with extension and other supportive resources for improved agricultural production.
New Learning Opportunities for Farmers and Agents

What worked for the agents in the delivery of their SmartEx services was the opportunity to learn which enabled them to acquire new set of innovative farming skills and knowledge to equip them serve their farmers well so that, they can maximize yield. Some of the new innovative technologies they learned were how to measure the farm using GPS, how and when to apply fertilizers and how to keep farm records electronically. The use of the tablet to register the farmers also helped to eliminate the manual way of registering farmers and enhanced data gathering and the development of a database. The service that delighted the farmers the most was measuring their farm size so they know how much it will cost them in terms of ploughing, land preparation, farming planning, etc. The education on the use of improved seeds, planting distance or plant population, new and improved harvesting and storing techniques and the general agronomic practices given to farmers helped them to maximize yield and produce quality rice and maize grains. Also for some of the agents, their OBs facilitated their transportation to visit the various farmer groups they supervise and this contributed immensely to the success of their work. The radio broadcast also helped in facilitating their work with the farmers. This is because most of the farmers listened to the radio program and learned from it so once the agent gets to their farms to help them practically it becomes easy for them to follow their lead.

Collaboration between Stakeholders and Partnerships

One of the important drivers of success for the project was collaboration between different stakeholders, each of whom brought their specialities to the table and developed synergies that enabled them to deliver results. FRI has expertise and developing and delivering programs to farmers on a range of issues around farming and has years of proven track record of delivery in Ghana and other parts of the world. Grameen also a proven track record of delivering cutting edge solutions for social programs in different parts of the world. These two lead agencies naturally formed a winning team. Wageningen University is a centre of research and promotes research and learning the world over.

Another driver of success was the collaboration with ACDI/VOCA ADVANCE II. ADVANCE brought with it a group of farmers who were already prepared to engage with an experiment such as AgroTech. The ground was thus prepared for the project to engage with this group of farmers. ADVANCE also benefitted in the sense that AgroTech provided farmers with education and coaching on cultivating crops that were of interest to the project. This was value addition for ADVANCE. The Agricultural Development and Value Chain Enhancement project (ADVANCE) is implemented by ACDI/VOCA and its partners Technoserve, PaB and ACDEP. It is funded by USAID to increase the competitiveness of the maize, rice and soya value chains through increase of smallholders’ productivity and access to market and trade, and through building local capacities.

An example of fruitful collaboration: Grameen collaborated with USAID/ADVANCE on the implementation of the ‘Achieving Impact at Scale’ project. ADVANCE’s interest in this collaboration was motivated by its beneficiaries’ unmet needs of sustainable extension services, given the limited number of government extension agents who could take over when the project ends. ADVANCE provided the technical content of the Agrotech SmartEx Application, based on its maize and soybean standard production protocols. Both organizations monitored the project, and Grameen designed the online database that allowed both teams to track in real time the progress made by each agent. In ADVANCE’s view, the work with Grameen represented a true collaboration, in the sense that both parties complemented each other and each organization significantly contributed to the success of the activity.
**Sustainable solution within an outgrower scheme**

Integrating AgroTech SmartEx within an Outgrower Business model made the App even more powerful and impactful. Within the ADVANCE promoted OB model, the OBs provide to smallholders (their outgrowers – OGs) one or more of the following inputs and services: ploughing or ripping, seeds, fertilizers, agrochemicals, financial resources, transportation, warehousing etc. Those inputs and services are paid back by the OGs at harvest, most often in produce. To help manage the distribution, the monitoring and the recovery sides of the OB activity, OBs will employ one or several agents.

Extension services complement the package that the OBs are already providing their outgrowers. Before AgroTech, OBs provided their OGs with some form of extension to help smallholders properly use inputs, but this was done in an ad hoc way and often without any supporting materials or scientific basis. Having AgroTech allowed the OBs to make their extension service provision more professional, grounded and tailored to the need of their OGs to increase more effectively their yields, assuring a better recovery rate of their inputs credits.

Extension alone is less effective in encouraging farmers to adopt improved agricultural technologies and practices. Access to seeds, fertilizers, agrochemicals etc. is a key component, and this is what the OB model provides. The combination of knowledge generated by the extension services received and the access to those improved inputs and services makes the adoption more likely to happen and remain. Furthermore, the OB-OG relationship is business based. As long as both parties remain profitable, it will continue, making AgroTech part of a sustainable solution to increase smallholders’ yields.

**Learning collaboration**

This collaboration with ADVANCE has been not only successful but also a learning experience for both organizations. One of the main lessons learned was that adoption of new innovations, such as AgroTech, takes time. OBs and agents were not familiar with the use of tablets, speakers and projectors or the standard production protocols, promoting higher yielding technologies and practices. The use of adult learning techniques and teaching was also new to many. Moreover, for some OBs, it was the first time they had a proper employer-employee relationship with their agents who previously served as temporary aides with non-set remuneration system.

These layers of novelties made AgroTech more complex than initially thought, requiring several agricultural seasons before it started to sink in with the agents and influence farmers’ practices.

Another learning is related to the selection of the OBs. It was noted that the diffusion of AgroTech as an innovation followed a quasi “oil stain” pattern, starting with the most experiential and risk taking OBs, the ones that already adopted, or even pioneered the adoption of other innovative practices in the past, before spreading to others. Those pioneer OBs also had a habit of sharing their experiences and teaching their peers. Thus, it is important to target OBs who are early adopters for new innovations such as AgroTech during the early phase, then reach other OBs and promote AgroTech to them through experience sharing meetings by the pioneers or early adopters in a second phase.
Furthermore, the team had to revisit the data collection component of AgroTech and shorten the number of interactions between the agents and the farmer from five to three. It was noted that five interactions were too costly for the OBs as each interaction involved transportation and other related costs by their agents, in addition to the agents’ time. Grameen worked with the OBs to find the right balance between a) the frequency of data collection and field visits to ascertain the farmers’ needs and progress and b) the costs incurred by the OBs and the level of efforts required from the agents in order to reach a profitable number of farmers during the limited period of the agricultural season.

**Collaboration with the Ministry of Food and Agriculture**

The Ministry of Food and Agriculture was an implementing partner of the AIS project and deployed 20 agents in three districts of the Volta region. The government extension agents and participants received training on the use of the application. The training included use of the AgroTech SmartEx application, and video shooting and dissemination. The agents registered and worked with 1,098 farmers in 130 communities. All farmers produced lowland rice, on which the agents provided the coaching and support.

The AIS project has been beneficial to the farmers, communities and to the agents, A significant number of farmers tried new practices, key among them rice nursing and transplanting. Others applied inorganic fertilizer on rice for the first time, although a lot more indicated they would have done so if credit facility was available to them. Very few farmers were convinced enough to try a new variety, because of a possible risk with buyers. Government Agents report that farmers showed high interest in their records stored electronically on the tablet, particularly the details of their crop plans and updates. They were interested to be shown the details of their crop budgets and the estimated profits or margins. This together with the farm measuring tool was the attraction of communities, including farmers who were not participants of the project.

The agents have indicated they benefitted from the use of the SmartEx application. The application has enhanced their general knowledge and their contributions when they participate in radio discussion programs, either in the studio or when they are called by the host on telephone to contribute. They are able to make quick references and contribute on the issues. At the office the dashboard shows the activities and performance of agents which has been very useful. If the system were to be applied to all of MOFA’s field agents, monitoring and reporting will be greatly improved within the agricultural space in Ghana.

**Role of Wageningen University**

Wageningen University was involved in the research design that was integral to the design of the project. The university guided the project to ensure that it was set up to generate information that contributes to answering key policy questions on how to scale extension services that provide sustainable value to smallholder farmers. Two PhD students made research contributions to the project and participated in stakeholder and advisory board meetings. The two PhD students are conducting research related to the project objectives and the expected thesis completion date is 2019. The thesis titles are-

- ICT-based extension services: shifting institutional and knowledge paradigms towards sustainable intensification
- Enhancing farmer credit access: facilitating network collaboration through digital information systems

The project consortium explored ways to expand partnerships during project implementation. Grameen Foundation and FRI worked with AGRA and its partners, including Center for Scientific and Industrial Research and this is reflected in some of the project’s research publications.

**Gender integration in scaling AgroTech**

A number of successful practices and interventions supported gender integration in scaling AgroTech. These were based on findings from a research on a gendered value chain analysis. See Annex 2 for the gender consultancy report and Annex 16 for a gender themed paper. Key gender interventions included the following:

- Radio programs were aired at time convenient to women farmers and on meeting days of women farmer groups
- There was increased quota for women to call in during live agribusiness radio shows and all live radio programs had co-hosts. One male and the other female
- Farm Radio worked with smallholder farming households to form women-only community radio listener groups. Women farmers who participated in the project were found to be more credit worthy and they worked better in groups. Women farmers also participated effectively in markets with increased access to information.
- AgroTech used local knowledge about women’s roles in value chains in programming. Two gender experts served on the AgroTech Advisory Board.
- The percentage of women farmers to men reached with agribusiness services was 35:65, and AgroTech service package was tailored to gender roles along the food crop value chain.

In order to track radio programs and monitor male and female participation, FRI developed and used a Radio program gender monitoring tool (see Annex 3).

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**Gender outcomes with AgroTech scale-up: Project Achievements and Learnings**

- Radio programs aired at times convenient to women farmers and meeting days of women farmer groups
- Increased quota for women to call in during live agribusiness radio shows.
- All live radio programs had co-hosts. One male and the other female.
- Women farmers participated effectively in markets with increased access to information.
- Women only focus group discussions as part of project formative research and gendered value chain analysis.
- AgroTech used local knowledge about women’s role in value chains in programming.
- Two gender experts served on the AgroTech Advisory Board.
- The percentage of women farmers to men reached with agribusiness services was 34.6% (Females): 65.2% (Males).
- AgroTech service package was tailored to gender roles along the crop value chain.
Synthesis of pathway to achieving impact

Acquisition of knowledge

- Majority of respondents to the study said they have had contact session with an agent in the last 12 months.
- More than 75 percent of those interviewed said they have been in contact with an agricultural field agent. Only 24 percent said they have not been in contact with an agent in the last 12 months.
- Forty-one percent mentioned government extension agents, 24 percent, mentioned buyer/aggregator/OB while 8 percent mentioned agents from other NGO interventions.
- More than 71 percent of those who said they listened to radio also said that they listened to broadcasts on the cultivation of their major crop in the past 12 months.
- FRI partner radio stations broadcast 11 improvements to farmers on improved planting, improved seeds, weed control, fertilizer application, improved harvesting techniques, pesticide application, post-harvest management, marketing, input credit, land preparation and farm planning.
- An overwhelming majority of respondents, more than 90 percent said they listened to radio broadcasts on 7 out of 11 improvements broadcast in the last 12 months.
- AGROTECH Agents have also reached over 60 percent of all farmers interviewed on the improvements with planning.

Adoption of Promoted Practices

- An overwhelming majority of farmers indicated that they applied all improvement with land preparation, weed control and right spacing of crops being applied by 93, 87, and 81 percent of farmers respectively.
- Knowledge on the use of pesticides and improved seeds were the least applied by farmers, accounting for 54 percent each of those who the study spoke to.
- Generally, there is an equally high application of knowledge on farms by women farmers as well as their male counterparts. Three out of four women interviewed, 75 percent of women, said they applied the improvement on their farm to cultivate their major crop.

Average Yield

- The average yield for SHF in the project locations shows significant difference between those who had AgroTech support and those who did not have AgroTech support.
• The yield for maize and rice (2.1 and 0.76) is higher for AgroTech beneficiaries than for those who did not benefit from the project of (1.0 and 2.18)
• Level of yield for FRI partner radio listeners compared to yield for other farmers in the community who did no benefit from the project. Average yield for maize and rice for female FRI listeners is (2.25 compared to 0.99) for maize and (2.39 compared to 1.95) for non-FRI community member

Synthesis on Sustainability of the AgroTech Model

Operational components of the Model

AgroTech was originally piloted as a “Business to Client” or B2C model providing services to smallholder farmers. The B2C component consist of the integrated D2F and agent mediated solutions, reaching mass of farmers with important actionable information whilst providing customized services to a set of farmers “ready and willing” to produce profitably on a commercial scale. This model utilizes the services of the “TECHNOLOGY” model operating as a “Business to Business” (or B2B) model. This “sub model” is a digital services provider operating a “software as a service” (or SaaS) model. This include digital radio and SmartEx software. During the pilot phase, this component was operated by FRI and GF respectively.

Operational sustainability of model components at scale

Although the focus of the pilot phase was more on the B2C model, the project aimed to research and develop sustainability for both B2C and B2B models at scale. Analysis of project documents and interviews with staff indicate that the project conducted required activities towards the achievement of this aim. However not all the activities yielded the desired results or outcome, but provided useful lessons.

Operational sustainability of B2C model at scale

The project examined the operational and financial sustainability of the B2B model through three (3) sub-models:

1. **Sub-model A**: Individual or Individually-owned commodity buyer/Aggregator acting as an Outgrower Business Owner employing the services of a single field agent. These individuals normally own equipment or have financial capacity to deliver services as well as provide linkages services
2. **Sub-model B**: Institutional or corporate entity focused on produce aggregation and/or provision of credit, employing the services of more than one (1) field agent. These entities are normally registered, own equipment or have financial capacity to deliver services as well as provide linkages services.
3. **Sub-model C**: Individual (young and budding) entrepreneurs seeking to sign on smallholders and provide mainly linkage services to service providers for a fee. These individuals DO NOT normally own equipment or have financial capacity to directly deliver services.

The linkages services where services contracted from other service providers by the OB for “his” registered farmers was documented as a B2B within this B2C model. All three (3) sub-models utilize both AgroTech SmartEx and AgroTech radio services to reach clients.

Project reports and documents indicate that these identified models were expected to be operationally and financially sustainable based on the following value propositions for the out-grower;
• Improved knowledge of client leading to increased trust
• Improved support to, and supervision of client, leading to increased performance and satisfaction
• Improved performance and satisfaction leads to increased credit payback recovery
• Increased performance leads to increased availability of crop commodity for purchase by outgrower, lowering transport/overhead costs for aggregating.
• Improved record keeping leading to increased attractiveness to investors and financial institutions.

Built within these propositions was the assumption of the smallholder clients’ “willingness to pay” based on the value propositions made by the outgrower to the smallholder client.

Assessment of operational and financial sustainability of B2C model at scale

Enrolment

Smallholder farmer enrolment increased during the scaling up process. In general, the number of smallholder clients enrolled by AgroTech Agent increased from about 4900 to over 14,109. AgroTech Radio, from this evaluation study reached and interacted with increased number of farmers during the scale-up phase. This is evident from project database and previous reports. This was evident in all three (3) crops and geographical areas. Increases were over 30% for maize and rice. The increased enrolment was also similar for males as it was for females.

Payment for services by smallholder clients (Willingness to Pay)

The project established, early in the scale-up phase, that there needn’t be a separate charge for AgroTech coaching/mentoring or D2F services since OBs currently provide similar service as part of a bundle of services which farmers use harvested produce to payback. Thus the focus shifted to the additional costs entailed by the OB who engages an Agent, in addition to cost of AgroTech Radio through advertising or sponsorship of programs.

Profitability of the B2C model

The report of the M2i consultant (Annex 4) also indicate that the OB B2C models are profitable.

The financial model shows that the OB-based delivery model can be financially sustainable for farmer fees of at least USD 3.40 per acre per season, with a minimum of 100 farmers per field agent, but preferably 125 per field agent for sustainability.

The Consultants also indicated that the institutional sub-model has the potential to be profitable in between 2 to 3 years, but will require capital to the tune of USD 900,000 – USD 1 million before the cash flows become self-sustainable. The financial model shows that the Individual (young/budding) entrepreneur sub-model is likely to be viable, even at low client base. This is because of low overheads.

The project also undertook an in-situ case study research on financial and operational sustainability, focused on the mix of services and business practices. The results that has been included in project reports indicate that the sub-model C was not found to be sustainable because of the inexperience of the young operators in business practices and entrepreneurship. The research also found that Sub-Model B, which was a mix of large (Credit Union), medium (CARD FNGO, SKY 3 FARMS) and farmer based organizations, was profitable, particularly under the CREDIT UNION model that offered only cash credit services, with strong member guarantees as collateral. The results of the research also indicated that for the OB model
to be financially sustainable, input credit, in addition to marketing services should be a key component of the services provided.

Interviews with OBs participating in the research indicate that payback by smallholder farmers is improved and recovery of input credit costs is not a current constraint. Thus, insofar as **Outcome 2 of the project is concerned, the 30% of paying clients was achieved at this level of the model.** Willingness to pay, although did not become an issue, was shown to be positive by the results of feasibility studies and the research. See Annex 5 and 6 for PowerPoint presentation on financial implication and viability for AgroTech scale-up and Annex 7 for cash-flow for AgroTech scale-up.

**Operational sustainability of B2B model at scale**

**Components of the of the B2B model at scale**

There are two (2) sub-models of the B2B model, and these are;

I. AgroTech Radio  
II. AgroTech Agent

**AgroTech Radio**

AgroTech radio during the pilot and also at the scale up phase is produced and aired by community radio stations with support from FRI. Project documentation indicate that there have been several internal and external discussions and initiatives to develop workable integrated model and sub-models that are financially and operationally sustainable. Farm Radio International carried out a research\(^1\) (Annex 8) to ascertain the willingness of input dealers, OBs and other value chain actors to pay for AgroTech Interactive radio programming at the community level or place spot advertisements within the program time frame. The results indicated that most business organizations interviewed demonstrated an interest to support community radio stations to develop a market-based agricultural radio program. Similarly, a majority of them indicated they are likely to invest (through advertising or sponsoring segments) in such a program. The research indicated that it takes USD 113 to develop one interactive program and it concluded that this is achievable through sponsorship and placement of advertisement.

At the time of the evaluation report, the target of 30% of paying clients have not been achieved. This has been attributed to various reasons, including

- Weak business development units within the radio stations  
- Low priority given to agricultural programs as compared to other sectors like sports and politics  
- Continued branding of agriculture programs in the traditional sense rather than agribusiness activities.

**AgroTech SmartEx**

The AgroTech SmartEx sub-model requires primarily an entity to operate a Software as a Service platform. The entity will be required to also produce multimedia (video and voice). Project documentation indicate that several existing entities were approached and alternative options discussed. The entities include;

- AgroCenta  
- Viamo (Formerly VOTO Mobile)

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\(^1\) Formative Assessment Report: Business Organization and Radio Station Marketing and Sustainability (Annex 8)
Options discussed included

- Outright Sale: Sell Intellectual property (IP) and train staff to on-board
- Licensing: License the IP for the Service provider to use and train staff to on-board
- Outright Sale + extended support: Sell IP, train staff and sign maintenance contract for a specified period.

Other issues that were discussed include data protection and privacy, USAID regulations and contract specifications regarding interest/consent of original partners who helped in developing the software concept (Digital Green, FRI).

Staff interviews indicate that the discussions were not fruitful probably because it appeared to the third-party owner that the cost of on-boarding, after which they will own and operate the system, was on the high side. Since the system was built during the pilot phase, it is not surprising that existing technology companies will be reluctant to purchase a full-fledged software as they have been operating on a known platform and business model and may consider the change as unduly disruptive. Since the expected third party was not involved at design conception, onboarding without guarantees is difficult to perceive. Several documentations also suggest that GF attempted to cushion the transition and provide guarantees through a joint project under the MasterCard Fund for Rural Prosperity funding mechanism. However, this was not successful.

**Integrated Model**

Whilst the two sub-models were costed, the integrated model was discussed and conceptualized, but not costed in detail by the project. The concept of the integrated model hinges on a multimedia entity specialized in producing agricultural content for radio, video, internet and imbedded as Software as a Service. The company solicits funding for the production cycle or produce with own in-house resources. It will buy slots on community radio programs and recoup from advertisement spots within the program slot.

From the research study and assessment of the financial viability pilot with OBs and individual freelance agents, a sustainable integrated business services delivery model that provides a comprehensive range of advisory and support services in the agricultural value chain was developed. However, a third party provider of technology platform could not be found to test or own the platform. Project could not reach agreement with B2C component (Buyer agents) to actually make payments to contribute to operations of the technology provider (GF) who they considered as non-profit NGO. Many buyer agent in the scale-up were new and could not understand the project as a commercial test.

The project could not test the operational and financial feasibility of the third party technology platform provider, as suitable business candidates could not be found, neither could the project establish a new entity to test the model. **The B2C component service providers (OBs and Individual Agents) achieved more than 30% cost recovery since services (including ploughing and credit on agricultural inputs) are bundled and there is distinct charge made for additional cost due to agent activities.** Smallholders pay with harvested produce and Service Providers continue to record 100% cost recovery, except in credit default cases.
This was the most challenging component of project results and achievements. The key constraints and problems that inhibited complete success are enumerated under the relevant section below. However, the project appeared to have placed a lot more emphasis on the testing of the economic model of the B2C component, than the B2B component which is the technology platform. The B2B component involved the provision of services to the smallholder farmers at scale.

The project found it difficult to engage a third party technology platform provider, despite several attempts. The project engaged personnel from VOTO mobile (now VIAMO), Agrocenta, Agri-impact Consult, TroTro Tractor, Agri Consult Ghana, and Ghana Agribusiness Center. There were few that showed serious interest (VOTO, AGROCENTA) whilst others showed cursory interest.

The main issue was the risk of participating. The project offered no guarantees or incentives and did not have funds to even pre-finance costs of the participating service provider. As a research component, this was expected by participating entities, including buyer agents/outgrower businesses. It is the view of the project that it is much more difficult in developing economies, to get business entities to participate in research based on the value proposition of the research alone, without incentives or guarantees to possible disruptions to day-to-day operations. Together with AGROCENTA, GF applied to the MasterCard Fund for Rural Prosperity funding mechanism in an attempt to provide venture capital of a sort, but was not successful. Some analysis was done using GF staff costs and operations, simulating revenues from various scenarios based on number of paying out-grower Businesses.

Initial information during the pilot and early stages of the scale-up that farmers are put off by charges for intangible services but will pay based on tangible services received was important. The literature is awash with many “Willingness to Pay” (WTP) studies but this aspect is normally not stressed. Thus it was deemed unnecessary to inform farmers that the improved service (through increased interactivity, and customized support) would attract some charges. Thus, the project undertook several consultations and studies to ascertain how the costs (or a proportion) could be passed to the smallholder farmers. This involved analyzing the farmers operations to estimate profitability and a hypothetical amount that they are willing to pay for key services. A consultant’s output (Annex 4), in addition to other workshop outputs conducted by project staff provided good information. This exercise was important in understanding and refining the three models.

**Conditions for success for sustainably embedding and scaling ICT-based models in developing countries-Positioning of AgroTech**

In the last 5 years or so, several ICT-enabled platforms have emerged that provide various solutions to address different challenges that farmers in Ghana face.

If AgroTech extension service model is pitched just as another technology or radio solution then some of these organizations have competing products. Particularly, mFarm offers a comprehensive ICT enabled application which is also very versatile. To compete effectively and to create differentiation, ‘AgroTech extension model’ must be more than just a technology solution or a radio broadcaster of information.

Hence, one of the key aspects to be appreciated is that – instead of technology, the focus has to be on the services that can benefit farmers; technology should only be an enabler.
Business Model proposed in this report does not pitch AgroTech as a company offering a technology product. Instead, AgroTech should be an advisory platform that provides various services to farmers and other stakeholders, using ICT and interactive radio platform.

This distinction is important as this will separate AgroTech from other ICT companies/organizations that are currently operating. Furthermore, because the focus here is on providing support services to farmers, the proposed business model involves personalized mentoring, interactive radio broadcasting and hand-holding services to farmers through on-the-field Agents. The radio broadcasting will reinforce the on-field extension and support services provided by the Field Agents.

Currently, there are no companies operating at scale that are providing extension services or farmer support services on commercial basis.

Outgrower Business Owners (OBs) or large agri-distributors also provide some farm support services. These are mainly related to agricultural-input credit or extension related to use of fertilizers, seeds etc. However, the services offered are ad hoc rather than systematic or organized. Often OBs do not have clear engagement terms with farmers for these services resulting in opaque barter transactions between OBs and farmers.

There are enough opportunities for Grameen-FRI integrated AgroTech model to also collaborate with other platforms. There are various service providers that offer weather information (Ignitia), credit facilities (FASIBA of Esoko) etc. AgroTech can leverage such existing platforms for those services rather than creating competing functionalities within its ICT platform.

Synthesis of policy development activities around scalable, sustainable extension

Policy recommendations were outlined in five (5) theme papers. Key recommendation discussed, appraised and accepted by carefully selected policy stakeholders at a RoundTable Policy Event in February 2018. Refer to Annex 9 and 10 for Minutes of 6th / Final Advisory Board Meeting and Report of the Roundtable event.

The project orchestrated a number of dialogue sessions with policy makers to inform on project key take-away including:

- AgroTech model is applicable to small as well as large scale farming operations. In can be effectively increased at scale
  - Database is capable of handling large amounts of complex data
  - Database can be linked up to national and regional wide database to provide critical data for policy
- The project demonstrated how private led agriculture extension service can complement government led agriculture extension service to farmers in Ghana
- Significant efforts have been made in projects to introduce e-extension with positive results. AgroTech provided yet another test case of the capacity of e-extension to reach a multitude of smallholder farmers over vast areas at minimum cost.
- Radio has a proven record of delivering results in a number of social intervention setting as a mass communication medium. Combining radio and other ICT peripherals to deliver e-extension in this project was a potent combination that can be replicated
The project aimed to provide evidence that will lead to reform of the agricultural extension system. Key among the reforms targeted were:

1. Embracing the use of ICT platforms in a way that will make it mandatory for registered private business service providers to use ICT platforms to access public good generic content, report/account for services delivered and for the Regulator (Ghana Ministry of Food and Agriculture) to monitor and ensure standards of service delivery.
2. Official policy mechanism that will expand private sector participation and create a competitive business service delivery environment
3. Creation of enabling environment that will allow a private sector led service provision and the institutionalization of the use of ICT tools in agribusiness provision to thrive.

The main channel for simultaneous policy development and dissemination was the Advisory board meetings. At each of the meetings an aspect of the issues above was teased out and discussed to inform on the research and project work. A 14-member project steering committee was established with representation from NGOs, private sector agribusiness representatives, academia and policy makers. The committee also included several technology platform providers. Apart from core members, others were invited based on the stage of the research and project.

Methodology
The research employed case study methodology to document and analyze the operations of the business entities and individuals that were selected to participate in the research. The case study methodology was chosen because business management is a broad term for a number of different functions and outcomes, performed by people with varying degrees of skill aside other personal characteristics. Thus not a lot is achieved in business research through controlled experiments or structured designs. A review of the literature indicate that case studies are appropriate for business research of this nature, particularly when it is focused on theory-testing rather than theory- building. The financial viability study therefore focused on examining the processes involved in the set up and running of the selected Outgrower schemes using the AgroTech model to manage smallholder outgrowers.

Project outputs
The main project outputs were;

- A sustainable mobile agent-based business model for provision of advisory and business services in agribusiness value chains, especially cereals and legumes.
  - The AgroTech model identifies a buyer as an agribusiness service provider offering, as much as possible, one-stop bundle of agribusiness services on credit, using ICT tools that enables a field agent and the business to deliver customised information and services, to easily, accumulate digital records of business, track farmers and their activities, to learn from and use the digital records for the mutual good of the smallholder and the buyer. The buyer accepts repayment in the form of harvested produce. The model is a version of the USAID ADVANCE II OB Model modified to include one-stop services and ICT tools.
- Four policy papers (Refer to Annexes 11, 12, 13 and 14) with recommendations for transforming Ghana agricultural extension advisory into a modern, business oriented, demand driven and accountable business service provider led by the private sector by
Adoption of the AgroTech model or a modified version of it as the services delivery model for agribusiness and extension services

- Establishment of a national agricultural digital platform as a content and data clearing house, providing access to “public good” content and data from research institutes, universities, meteorological agency, policy institutes, and other public bodies

- To create a competitive but regulated service provision environment, with the regulatory body offering training services to ensure standards.

- Two peer-reviewed published papers (Refer to Annexes 15 and 16)

**Problems and challenges**

*Project activities were under-budgeted*

Objective 2 of the project clearly shows the research aspect of the project, but the expected outcome required an actual enterprise (or start-up), that would have 30% of its revenue from paying clients. This required more funding than was available. As a research project aimed at testing a new business model at scale, there was the need to fund a setup, reflecting the scaled-up model that guaranteed data for analysis. The businesses selected for the research did not obliged to provide the required regular data on operations and costs at their expense, but also varied operations and decisions according to their level of resources and whims. The project budget was insufficient to have in-situ observers for each case study.

*The business environment does not promote innovation*

The seemingly unregulated business environment regarding local agribusiness does not provide incentive for OBs to compete through innovation, prudent planning and good customer service. Thus, business principles are jettisoned in favor of self. For example, OBs may be tax-exempt by the nature of business, but regulation should ensure that they keep records of their business for the state to capture the value they create. Without this OBs may not appreciate investing in systems that make record keeping easier. Again the demand from end-buyers (“pull effect”) appears not to be strong enough to generate competition and innovation among Outgrower Businesses.

*Absence of a gender-focused person*

Though the right attempts was done by conducting a gendered analysis of the crop value chains and initiating other activities to promote the empowering of women farmers and their access of productive services, the presence of a gender-focused person could have led to greater gender outcomes.

**Overall assessment and recommendations**

The project can be considered as a success, although given time and space it could have been concluded in the best way possible by transitioning the technology platform to a private operator, and supporting the Ministry of Food and Agriculture to implement the policy recommendations, some of which they had initiated during the project implementation phase. A longer project with a clear phase for influencing policy may achieve more.

The project by its objectives was an “action research” with developmental targets (Objective 1 and 3) and therefore required adaptive management which is best practiced with a resident donor representative, to ensure decisions are within project agreement, at the same time supporting staff to innovate and adapt.