



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

USING DIGITAL TOOLS TO SUPPORT GHANA'S SMALLHOLDER FARMERS:

A Case Study of ADVANCE II



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ADVANCE II CASE STUDY

GLOSSARY

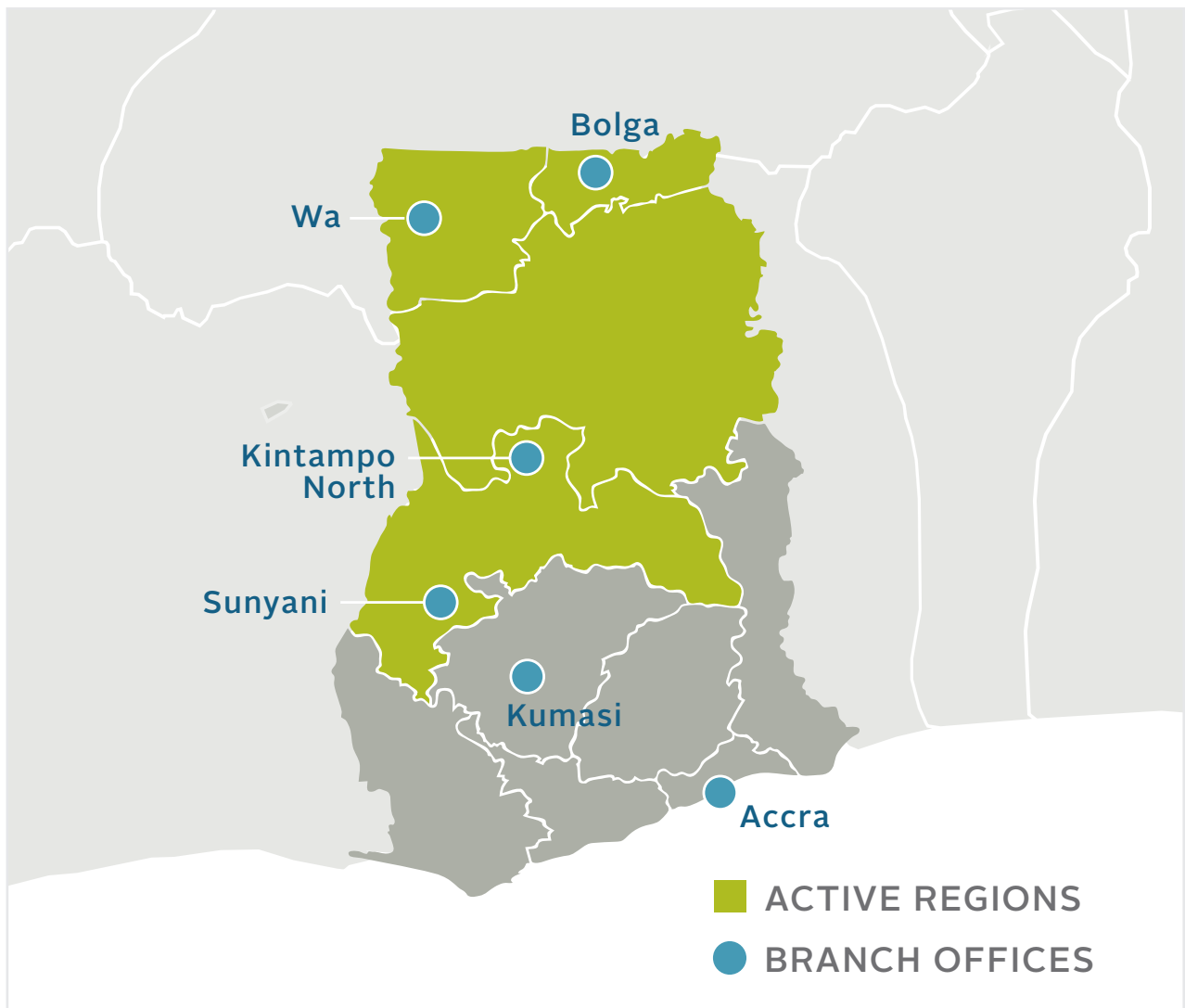
ADVANCE II	Agricultural Development and Value Chain Enhancement II
VSLA	Village Savings and Loan Associations
DFS	Digital Financial Services
ICT	Information and Communications Technology
IVR	Interactive Voice Response
GIS	Geographic Information System
NF	Nucleus Farmer
OB	Outgrower Business
OG	Outgrower
SMS	Short Message Service, a service for sending short messages of up to 160 characters, commonly referred to as “text messaging”




Digital Development for Feed the Future is a collaboration between USAID's Global Development Lab and Bureau for Food Security and is focused on integrating a suite of coordinated digital tools and technologies into Feed the Future activities to accelerate agriculture-led economic growth and improved nutrition.

Feed the Future is the U.S. Government's Global Hunger and Food Security Initiative

ADVANCE II'S REGIONS OF OPERATION IN GHANA





This case study is part of a series highlighting the integration of digital technologies into agricultural programs. Over the past ten years, and particularly over the past five, the use of mobile phones and Internet-based, digital tools in farming activities has sky-rocketed. This is largely due to the widespread adoption of mobile phones in developing and emerging markets, coupled with the increased spread of 3G and 4G connectivity. What has emerged is a broad set of digitally-based applications that have driven greater financial inclusion, more precision in agriculture, better data collection and analytics and more effective information dissemination. Agricultural organizations and programs are increasingly embracing these tools to advance their goals. Each case study in this series looks at different approaches to adoption and how the tools are impacting organizational culture, operations, and programming.

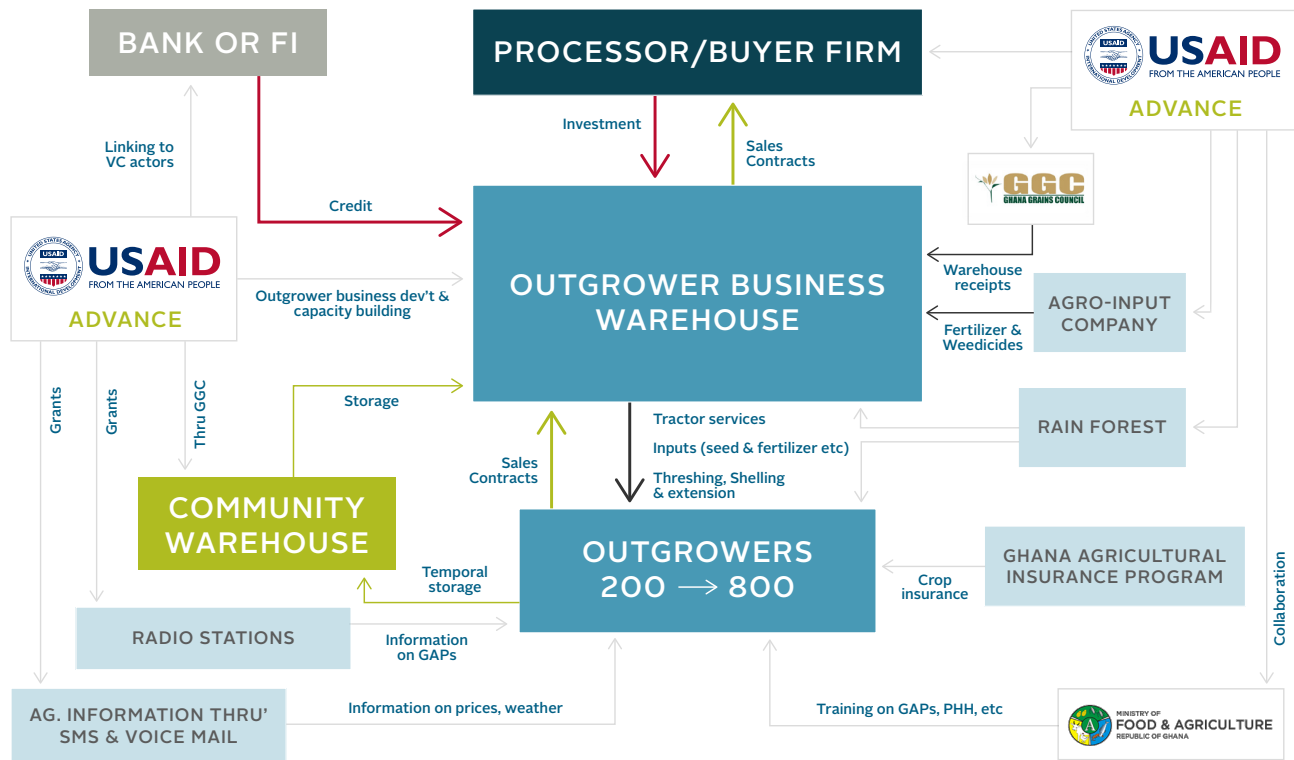
BACKGROUND

Globally, digital technologies such as digital financial services and information and communication technology (ICT)-enabled extension services have demonstrated an ability to transform agricultural markets. These technologies improve information delivery, streamline and reduce the cost of cash transactions between smallholder farmers and other value chain actors, and open up markets previously inaccessible to certain demographics, such as women.

Ghana is a target country under Feed the Future, The U.S. Government's Global Hunger and Food Security Initiative. As the main value chain project of USAID/ Ghana's Feed the Future program, the Agricultural Development and Value Chain Enhancement II (ADVANCE II) Project aims to improve the livelihoods of 113,000 smallholder farmers by boosting the productivity of rice, maize, and soy value chains. The project is implemented by ACDI/VOCA and three consortium partners (Technoserve, ACDEP, and PAB Consult), for a duration of four years (2014-2018). Building on pilots initiated under ADVANCE I, its predecessor program, ADVANCE II has integrated a full suite of digital tools into its programming. In doing so, the project aims to increase the earnings and security of the smallholder farmers it supports throughout Ghana.

In Ghana, agriculture contributes nearly 30 percent of GDP. Agriculture serves as the largest source of employment for Ghanaians, employing more than half of the total labor force. Eighty percent of agriculture in Ghana is conducted by smallholder farmers producing food and cash crops on an average of 1.2 hectares. While Ghana has recently been re-classified as a middle-income country, due in part to agricultural growth, economic development has been widely unequal. Despite an overall reduction in the poverty rate from 52 percent to 28 percent over the past 10 years, the northern regions have poverty rates nearly twice that of the south (USAID 2014). Similarly, the World Bank reports that while the number of the poor in southern Ghana declined by 2.5 million, it increased by nearly 1 million in northern Ghana (USAID 2014). For these reasons, Feed the Future in Ghana is specifically targeting its investments in the three northernmost regions of Ghana, including Upper West, Upper East, and Northern. Some activities also take place in the Brong Ahafo Region that lies above the 8th degree parallel, as this is where the majority of traders, aggregators processors, and buyers are located.

ADVANCE II OUTGROWER BUSINESS MODEL



ADVANCE II operates via the Outgrower Business (OB) model, adapted from ADVANCE I (see figure above). This model promotes commercially-focused linkages between actors on the input and output side of smallholders and the smallholders themselves (ACDI/VOCA 2016). Many of these relationships already exist, with OBs connecting smallholder farmers to service providers or functioning as service providers themselves, offering tractor services, short-term financing for inputs, post-harvest shelling or processing, and/or basic extension services. ADVANCE II seeks to enhance and build upon them to help smallholder farmers increase their yields, to help OBs and service providers increase their profits, and, ultimately, to promote farming as a business. In addition to supporting linkages, ADVANCE II provides trainings to

OBs on topics such as business management, decision-making, and record-keeping, and to smallholder farmers, on topics such as good agricultural practices and numeracy. Digital tools and approaches play an important role in facilitating and extending the reach of these trainings, as well as building deeper connections between the various value chain actors.

II. GHANA'S DIGITAL LANDSCAPE

According to GSMA Intelligence, the number of unique mobile subscribers -- meaning, one person subscribed to one SIM card -- is just under 67 percent. Mobile network coverage across Ghana is relatively high, with 85 percent of the country covered by 3G and 46.10 percent covered by 4G (GSMA Intelligence). GSMA Intelligence classifies Ghana as a "Discoverer," or

emerging market, with nine mobile network operators, lead by MTN, Vodafone, Tigo, and Airtel. Mobile money was first introduced in 2009, with the launch of MTN Mobile Money, followed by Tigo Cash in 2011. With 74 percent of Ghanaian adults having sent or received text messages, 95 percent having basic numeracy, and generally high mobile subscribership, the service has spread quickly (see table, below).

Yet in regions where ADVANCE II works, these numbers are strikingly different. Among ADVANCE II beneficiaries within the Northern, Upper West, Upper East, and Brong-Ahafo regions, mobile phone ownership is at 33.12% overall (48.67% for men, 18.67% for women). The difference between the northern and southern parts of the country is also notable. In ADVANCE II's three northern regions (Northern, Upper West, Upper East), mobile phone ownership lies at only 25.21%. This compares to 74.79% in the southern region (Brong-Ahafo). Though ADVANCE II does not have access to maps of network coverage within the regions where the project works (as this information can only be provided by the

phone service providers, or "telcos", themselves, and is often confidential), field staff and project beneficiaries report much lower network coverage in these areas.

A baseline study conducted in 2017 by the digital service provider Esoko, based on interviews of 314 farmers across two of the regions where ADVANCE II operates, Northern and Brong-Ahafo, and a third region, Volta, provides additional insight into the mobile phone usage of Ghana's smallholder farmers. Amongst those surveyed, of which 89.5 percent owned a personal mobile phone, about 52.9 percent were literate, with 37.6 percent discarding SMS (text) messages due to literacy challenges. With regards to Interactive Voice Response (IVR), 58.6 percent had received at least one voice message on their phone; of this number, only 38.9 percent listen to those messages (with the main reason of discarding messages being that they were not in their local language (Esoko 2017)). Though these results are not statistically significant, they suggest the importance of viewing Ghana's digital and mobile ecosystem as nuanced and varied across regions and communities.

MOBILE MONEY USAGE IN GHANA, 2015

Percent of Ghanaians who have used a mobile money account at least once	29%
Percent of Ghanaian adults with a mobile money account	20%
Percent of Ghanaian adults with an active mobile money account	17%

Source: CGAP 2015



III. ADVANCE II'S APPROACH TO DIGITAL INTEGRATION

ADVANCE II, and its predecessor project, ADVANCE I, have both taken a common approach to the use of digital tools, which emphasizes flexibility, experimentation, the transformational impact of simple technologies, and the critical role of ICT champions throughout the organization.

ADVANCE I conducted small-scale pilots of many of the tools that ADVANCE II uses today. These included SMS-messages to farmers, digital financial services, radio agricultural programs, and geospatial analysis. Each of these tools and approaches were enhanced and scaled up during ADVANCE II, with the addition of mobile data collection and a partnership with Grameen Foundation on tablet-enabled extension services, which was funded by USAID via the New Alliance ICT Extension Challenge Fund.

Building on the learnings from ADVANCE I, ADVANCE II's use of digital tools and approaches was laid out as a clear expectation from the USAID/ Ghana Mission as the project was designed. Once the

project was awarded, it was left up to ACIDI/VOCA to determine which tools to use in order to most effectively accelerate their results based on their key indicators. To do so, ACIDI/VOCA began by assessing tools available on the local market, conducting small pilots, and then scaling up the tools that prove to be successful, either project-wide or in particular regions. This approach is based on an understanding that there is no "one size fits all" solution, particularly in Ghana, which has pronounced differences between and within communities. It also reflects a digital economy that is still evolving, with new digital services being launched and an ever-changing landscape of connectivity and mobile phone access.

Senior staff who have been involved in both ADVANCE I and ADVANCE II note that both projects have shared a common culture of experimentation, and a desire to be on the cutting edge of testing and piloting new technologies. ADVANCE II's use of SmartCards is one example of a cutting edge technology for monitoring and evaluation that had previously been used in the Ghanaian private sector;



but not yet in the local development community. The shift from SMS (text) messages to Voice Messaging Service (VM) messages for the mobile-based information delivery activities is another example. When ADVANCE I designed its information delivery activities, Voice Messaging service was not yet widely understood or utilized in Ghana. Yet once VM became more locally available and accepted, ADVANCE II sought to utilize this voice-enabled tool to enhance its information delivery capacity in the local dialects, particularly for illiterate or non-English speaking beneficiaries.

The project also believes that fairly simple technologies can have transformative impacts. For example, ADVANCE II provided a number of outgrower businesses with laptops, printers, and related training to use these tools to better manage their agricultural businesses. The project has found that these relatively simple tools have been incredibly impactful, helping to increase the confidence of OBs and allowing them to better manage their outgrowers, track sales and credit, and store and share information.

To manage its large portfolio of digital tools and approaches, ADVANCE II has employed an ICT Specialist, whose job involves: identifying tools and partners, embedding them into ADVANCE II's operations, and ensuring that the project is using the appropriate tools and using them well. ADVANCE II has also employed a GIS specialist, who focuses on mapping and visualization of project data. The Deputy Chief of Party for Monitoring and Evaluation leads on the project's mobile data collection efforts. Notably, all four staff members are women, reflective of the project's prioritization of women, both within its staff as well as in specifically targeting women farmers to receive support.

In addition, there are "digital champions" embedded throughout the various field offices -- staff members whose roles may not be explicitly tied to digital technologies, but who are excited about the potential of digital approaches. This includes at least one person in each office who provides some support on implementing and assessing digital technology approaches. Yet all technical staff, regardless of their

other responsibilities, are expected to use, promote, and help manage digital tools, while deferring to and collaborating with the ICT specialist in coordinating with partners, providing structure, and conducting overall monitoring.

IV. ADVANCE II'S USE OF DIGITAL TOOLS

ADVANCE II is integrating a suite of digital tools and approaches into its work to increase efficiency, extend reach, and ensure cost-effectiveness. The digital tools that ADVANCE II uses can be broken down into three broad categories. The first category includes

tools for **operational use** - those digital tools used to support the program's day-to-day operations, improve operational efficiency, and support analytical ability. This includes mobile data collection tools, the use of SmartCards for beneficiary tracking, and geospatial analysis. The second and third categories - **extension and information delivery**, and **financial inclusion** - are both "farmer-facing," in that they are intended to support the needs of ADVANCE II's smallholder farmer beneficiaries. An in-depth analysis of each of these categories is included in the following pages.

CATEGORY	DIGITAL TOOL	DESCRIPTION/PURPOSE
Operational use	Mobile data collection and analysis	Use of Magpi, and later, Datawinners, to collect data for annual surveys via tablets
	Smart Cards	Smart Cards assigned to farmer beneficiaries to easier track attendance at trainings
	Geospatial Analysis	Geographic information systems (GIS) used to visualize and analyze project data; helps with understanding of data, decision-making
Extension and information delivery	Text and voice-based information delivery to farmers	Through a number of partnerships (Ignitia, Esoko, VOTO Mobile, Farmerline), a subset of farmers receive daily messages, including agricultural tips (GAPs), market prices, nutritional messages, pest outbreak/control, and weather; initially through SMS but recently transitioned fully to voice messages (VM)
	Smartex Application – integrated ICT solution for extension provision	Grameen Foundation designed "Smartex," a tablet-based application that enables Outgrower Businesses (OBs) and their agents to provide interactive and tailed extension services to outgrowers (OGs)
	Interactive agricultural radio programming and listenership groups	ADVANCE has provided 1000+ listenership groups with solar powered radios and is partnering with various radio stations across the country to launch or enhance interactive agricultural radio programs; farmers are able to call in during radio programs to ask questions (and for some programs, can call in to record questions in advance)
Financial inclusion	Digital financial services	Supporting growth of agent networks by identifying nucleus farmers to serve as agents; onboarding farmers to mobile money and supporting Village Savings and Loans (VSLAs) in developing savings practices

I. Digital tools for operational use


Challenge: ADVANCE II conducts a large survey of 2,000-3,000 farmer beneficiaries each year. The surveys were initially paper-based, requiring a large team of hired enumerators, and a huge volume of paperwork and manual calculations and data-entry. At the same time, the project struggled to keep track of its farmers, particularly those attending trainings and events, as it moved towards its target of reaching 113,000 farmers. Taking attendance by hand at each training could take up to an hour (out of a three or four hour training), requiring additional time afterwards to enter names into the computer. Farmers with similar or identical names lead to additional challenges in tracking beneficiaries. Finally, the combination of annual surveys and ongoing monitoring data led to a tremendous amount of data that the project is collecting, processing, and analyzing on a consistent basis, leading the project to explore new, digitally-enabled techniques for more effectively analyzing the data that it collects.

Solution: Initiated by a tech-savvy Deputy Chief of Party for Monitoring & Evaluation, ADVANCE II

transitioned from paper-based to mobile-based data collection in 2015. ADVANCE II first selected the free, open-source data collection tool Magpi. While Magpi worked quite well, the free version expired after 500 surveys and began to charge a set fee per upload. As the project's mobile data collection efforts expanded, so did the cost, leading the project to select a more cost-effective tool, DataWinners, which charges a flat rate every month.

To solve the challenge of tracking beneficiaries, the project developed an innovative SmartCard system. The project initially explored off-the-shelf tools, but ultimately decided to design a system from scratch with the support of a local consultant, who had experience developing similar systems in the Ghanaian private sector. The new SmartCard system worked by assigning each farmer a unique identifier and a physical identification card, equipped with an internal chip holding his or her identification information. The project's technical officers were each given a small card reader that connects to their laptops (and works offline), allowing each farmer to simply swipe their card





upon arriving to a training. With this system, technical officers no longer needed to take attendance by hand.

Impact: ADVANCE II realized immediate benefits in time, efficiency, and cost savings in transitioning from paper-based to mobile data collection. Whereas the project initially contracted a team of 18 enumerators and 3 data entry consultants to provide support on the paper-based surveys, after switching to mobile data collection, the project only needed to contract 8 enumerators. With the new SmartCard system, capturing attendance at training now takes staff only 5-10 minutes, and is much more accurate and efficient. Additionally, the project is now able to conduct higher levels of analysis about activities and impact. For example, by adding unique identifiers into their tracking system, the project is better able to assess how many - and which - farmers are attending more than one training, and conduct targeted outreach to those who may have only attended a single training (ACDI/VOCA 2016).

Lessons Learned: Setting up the new systems required initial time and financial investments. This included purchasing tablets and equipment, onboarding consultants, building technology systems, and training staff and beneficiaries. For such a large project, these costs can add up quickly. For example, though the SmartCards are only \$0.60 each, this adds up to over \$60,000 - for the cards alone - with over 100,000 in circulation. Yet the project feels that these costs quickly pay for themselves through cost-savings and gains in efficiency.

The project also recognizes that capturing data is just the first step. Of equal or greater importance is the ability to use, apply, and analyze the data for decision-making and operational management. One

way ADVANCE II does this is by leveraging geospatial analysis as a complement to the project's mobile data collection efforts. The project employs a GIS specialist who works full-time in the main office in Accra. The GIS specialist works closely with the M&E team to layer and present data in a way that is visually appealing and easy to understand. In addition to creating maps depicting results from the project's large annual surveys, each week, the GIS specialist reviews the project's weekly reports and determines what data will be helpful to be mapped. She also creates maps based on staff demand. In Fiscal Year (FY) 16, over 70 different maps were created, including maps of beneficiary reach and where demonstration sites are located. Ultimately, the maps that the GIS specialist creates are utilized by ADVANCE II's broader staff for decision-making and programmatic adaptations, and to address unique challenges. One particularly impactful example of how geospatial analysis is applied is the fall armyworm outbreak, currently spreading throughout Ghana and all of Africa. To address the outbreak, ADVANCE II has set up three hotlines, allowing farmers to share information on the pest's spread. The GIS specialist has then created a map, which is updated on a weekly basis, allowing the field team to be proactive in targeting communities where the pest had spread or is likely to spread in the near future.

I. Extension and Information Delivery

Challenge: ADVANCE II prides itself on delivering excellent training and support to farmers and value chain actors, working towards a goal of reaching 113,000 smallholder farmers by the fall of 2018. Yet conducting trainings is time- and labor-intensive, both for training staff and for farmers. With the end date of the project rapidly approaching, ADVANCE II hopes



to promote sustainable avenues for farmers to receive agricultural information, even after the project ends.

Solution: To maximize its impact, the project bundles services, training, and information, recognizing that hearing information multiple times and through multiple channels, heightens understanding and adoption. This includes three unique components, including:

- **Text- and voice-based information delivery to farmers:** Information delivered includes agricultural tips, market prices, and weather forecasts to farmers' mobile phones. Each year, a sub-set of farmers (10,000 for weather forecasts and 20,000 for agricultural tips and market prices) receive these messages. To promote sustainability, after one year, respondents are encouraged to transition to a self-subscription service, and a new subset of farmers is selected. This information is provided through a number of partnerships with technology service providers, which, importantly, were all either founded or launched in Ghana, including Esoko, VOTO Mobile, Farmerline, and Ignitia (which is also recognized and supported by USAID's Securing Water for Food Grand Challenge).
- **Tablet-based extension service:** Implemented in partnership with the Grameen Foundation and a tablet application called Smartex, the tablet-based extension service was initially piloted with 36 agents in the Brong-Ahafo region, and then expanded to include an additional 118 agents in the project's three northern regions (Northern, Upper East, and Upper West). Agents are provided with a tablet, pre-loaded with the Smartex application that includes videos, pictures, and written content in preset, interactive training protocols, as well as a mobile-based registration tool for enrolling farmers into the training program and tracking their progress. Agents are also provided with a portable Pico projector, an SD card and a Bluetooth Speaker. All components are accessible offline, though tablets must be connected periodically to sync new farmer profiles. Agents are paired directly with an outgrower business, intended to be that OBs key intermediary with his or her outgrowers. Agents are not paid, but outgrower businesses are encouraged to, at minimum, reimburse agents for travel and data costs. At the end of the season, farmers are also encouraged to repay the services with half a

bag of grain. Outgrower businesses and agents are encouraged to modify this business and funding model as they see fit. For example, outgrower businesses might prefer to compensate their agent by providing them with inputs (such as seed or fertilizer) or services (such as plowing) for their farms.

- **Interactive radio programming:** ADVANCE II has provided training to 25 radio stations in developing and broadcasting interactive agricultural radio programs. The radio shows broadcast once or twice a week, in both English and in local languages, with a combination of local and regional reach. Each radio program incorporates question and answer periods where farmers can call-in, and some provide hotlines where farmers can call anytime during the week to ask questions to be answered on the next week's show. To complement this effort, ADVANCE II has also established nearly 1,000 radio listenership groups, providing a low-cost radio set for many of them, and encouraging them to convene once or twice weekly to listen to the shows, call in with questions, and discuss amongst themselves.

Impact:

- **Text and voice-based information delivery to farmers:** The text and voice-based messages have been very well received. A survey conducted by Voto Mobile of 2,681 farmers in Kintampo North and South in FY17 Q2 indicated 81 percent satisfaction, with 94 percent indicating willingness to pay for receiving the messages. Based on in-depth conversations with a number of ADVANCE II farmer recipients, these messages are most appreciated for their specificity, accuracy, and appropriateness of timing. Weather forecasts are seen as much more accurate and specific than other sources of weather information, such as weather provided on the radio. With agricultural tips, farmers note that the content

is helpful and well-timed with their crop cycles, providing them with the information that they need, at the time that they need it. The thrice weekly market price updates are appreciated for providing accurate, and up to date information, helping farmers to negotiate better deals with their buyers and to discover new markets where prices for their crops are higher. The farmers interviewed noted that before receiving the market price information, their only alternative would have been to try to determine market prices on their own, through their Nucleus Farmer, Outgrower Business, or agricultural buyers within their networks. It could be difficult to get in touch with these individuals, or use up costly amounts of airtime, and the information may not be reliable.

“Thanks to the agricultural tips, I now know to purchase certified seeds, plant them in rows, and how and when to apply fertilizer. My maize yield has increased from two bags last year to eight bags this year, on the same plot of land.”

Farmer in Kintampo South, recipient of agricultural tips and voice messages piloted by Voto Mobile in 2016

- **Tablet-based extension service:** As of July 2017, 7,390 farmers have been registered by 154 agents. This is an excellent start, but with an average of 48 farmers registered per agent, this falls short of ADVANCE II's target of at least 150 farmers registered per agent. ADVANCE II and Grameen Foundation have invested a large amount of time to create the necessary conditions for the success of this initiative, including training each agent up to five times for agents in the South, and up to three times for agents in the North, creating a WhatsApp group to allow agents to communicate with one



SPOTLIGHT: IMPACT OF IGNITIA WEATHER FORECASTS

ADVANCE II's first partner in weather forecasting, Ignitia, cites an ability to predict weather down to a specificity of 3km x 3km, compared to global models that tend to predict weather on a +50km square grid. Farmers also appreciate the convenience of weather forecasts being delivered directly to their phones, as the messages are sent daily but can be read at any time, and wherever the farmer may be (whether at their home or in their field).

These impacts were underscored by a Securing Water for Food Grand Challenge for Development site visit to Ghana in February 2017. In this visit, 90 percent of the 31 farmers interviewed, from multiple regions of the country, noted at least one benefit using the weather information provided by Ignitia, with 80 percent naming multiple benefits. More than 90 percent of farmers interviewed also noted a significant increase in crop yield, as compared to before receiving the weather forecasts. While these are not statistically significant insights, they are very promising and align with insights gathered from interviews for this case study.

another and with ADVANCE II and Grameen staff, and linking some of the less successful agents with more successful ones for mentorship and support. It is clear to both partners that there is potential for great impact, in facilitating the project to reach further than currently possible and provide continuing support for farmers, that will last beyond the life of the ADVANCE II project. Yet results have been uneven, with some agents thriving in the roles, and others that seem hesitant to even start.

- **Interactive radio programming:** ADVANCE II promotes interactive radio programming and listenership groups as a way to enhance the project's overall impact. Through ADVANCE II's guidance, the content provided in radio agricultural programs aligns with the content provided in ADVANCE II's in-person trainings. The question and answer components of each show enables two-way communication between the radio programs and

farmers, encouraging farmers to call in via their mobile phones and interact directly with the content being shared. ADVANCE II further promotes interactivity through the radio listenership groups the project has developed, in which even farmers who do not have their own phones can participate in by interacting with one another or using a single farmer's phone to call in a question as a group. While ADVANCE II has not directly measured the impact of radio programming on its farmers retention and application of agricultural knowledge, an independent survey conducted in Ghana by the mobile survey platform Geopoll and interactive agricultural radio non-profit Farm Radio International found a strong correlation between radio listenership and quality farming practices (Geopoll 2017). As with the other extension activities, ADVANCE II intends for radio agricultural programs and listenership groups to serve as a continued form of support for farmers after the project ends.

Lessons Learned:

- **Text- and voice-based information delivery to farmers:** ADVANCE II has adapted their approach to phone-based information delivery in response to farmer feedback. Initially, the majority of messages delivered to farmers were through text messages, which was much cheaper than doing so by voice (and voice messaging technology was not readily available when the activity was designed). However, through one of ADVANCE's quarterly phone surveys of farmer recipients, focused on assessing impact and satisfaction with the messages, ADVANCE II discovered that literacy levels amongst recipients were quite low, leading them to shift from SMS-based messages to voice-based messages. The shift to voice message additionally allows ADVANCE II to reach farmers directly in their local languages, rather than sending messages only in English. Interviews with farmers revealed how the reach of these messages may be even greater than text. One challenge, however, is that the project has not yet been able to track how many recipients of the messages have transitioned to a subscription-based service in their second year. This is something that they hope to start tracking this year.

- **Tablet-based extension service:** Throughout piloting and implementation, ADVANCE II and Grameen Foundation have worked to determine what elements are necessary for agents to be successful. Overall, the most successful agents are those who are well-supported by their outgrower businesses. This means that the outgrower business provides adequate pre-financing for the agent, has explained to his or her farmers that they will be expected to repay the services at the end of the season, and serves as an enabler, not a barrier, to the agent's success. Unfortunately, despite the project's best efforts, not all outgrower businesses have been willing to provide this kind of support to their agents. One reason for outgrower businesses' hesitation may be that the agents' intended impact on farmers - ideally, higher yields for farmers receiving the extension service - has a long lag time, and will not be apparent until the end of the season. Because of this, it may simply take a number of seasons for outgrower businesses to recognize the agent's impact. However, as agents cannot be successful without the outgrower businesses support, ADVANCE II is working hard with outgrower businesses to encourage their support early on.



ADVANCE II has also seen some challenges on the technology side, specifically, that it can take more time for the less technologically-savvy agents to get up to speed on using the tablet, as well as for some farmers, particularly those in the northern regions, to feel comfortable with the technologically-enabled system.

- **Interactive radio programming:** One concern expressed by various radio group members is the lack of agricultural programs in local languages, particularly in some of the more rural areas. One group interviewed shared that while they aren't able to access a show in their local language, they are usually - but not always - able to find someone who is able to translate. When they are not able to find a translator, they may still choose to meet, but aren't able to understand the show. Another group interviewed shared that while the radio group is helpful, it is usually only attended by those who do

not have a radio set at home. Yet ADVANCE II staff is seeing this challenge as an opportunity, encouraging radio listenership groups to think of their groups as being focused on more than just the radio. While individuals can certainly listen at home, the project hopes that by joining the listenership group, the farmers will feel more comfortable calling in with questions as well as discussing amongst themselves.

(GSMA 2016). Mobile money too has demonstrated unequal growth, with much higher levels of growth in the country's southern regions than the northern regions, where the majority of ADVANCE II beneficiaries are located. Smallholder farmers in particular face a number of roadblocks in managing their farms as a business -- a core focus on ADVANCE II -- from purchasing inputs, to accessing financial services, to storing and selling produce. Digital financial services present an opportunity to address some of these pressing needs.

GRAMEEN SMARTEX AGENT PROFILE



Pictured here at left is Sule, the highest-performing agent in Upper East. He has registered over 230 farmers. His goal, he said, is to register another 1000 farmers this season (while this may be unrealistic, his drive is incredible). Sule and his nucleus farmer, Alhaji (right), have a strong working relationship. Alhaji funds Sule's transportation and data for the tablet. He is grateful to Sule for helping increase his outgrowers' yields while also helping him to maintain his records and track and monitor what inputs and services he's provided to his farmers. He hopes Sule will take over his business when he dies.

Sule's success is not only thanks to the support of Alhaji. He is also highly self-motivated. Sule works with his own agents in each village. These agents are lead farmers who are already connected with the outgrowers in that community, and help Sule coordinate and plan when he will arrive for trainings. The outgrowers arrive to his training with enthusiasm and excitement to see the videos that Sule will project using the Pico projector. Sule also proactively communicates with other agents, as well as with Grameen and ADVANCE II staff, via Whatsapp. If he has a question about something that he sees in the field, Sule will just snap a picture, send it through the Whatsapp group, and get a quick response.


Solution: To address these challenges, ADVANCE II's work in digital financial services has focused on three areas: digitizing payments from nucleus farmers to outgrowers, strengthening agent networks by onboarding outgrower business, nucleus farmers, and input dealers as mobile money agents, and promoting savings among farmers through VSLAs, which allow farmers to save a set amount per week and take loans, if needed, from the savings for their farming and other activities. ADVANCE II is undertaking this work in partnership with MTN, Tigo, and First Allied Savings with support from the Alliance for a Green Revolution in Africa (AGRA).

Impact: The project's drive to digitize payments between nucleus farmers (NF) and outgrower businesses with their outgrowers and support the growth of agent networks has had relatively high levels of success. At the end of FY16, 65 merchants (nucleus farmers or outgrower businesses) have been on-boarded as mobile money agents, and 5,207 farmers have been subscribed to mobile money services. On an ongoing basis the project continues to encourage outgrower businesses, and their outgrowers, as well as

service providers, to subscribe to mobile money for savings and transactions. Those NFs, OB, outgrowers, and service providers that have begun to use mobile money through the support of ADVANCE II recognize a number of benefits, including cost savings, increased security, and efficiency. Many, particularly women, are also grateful for the social benefits of mobile money -- such as the ability for women to manage their savings privately, without the influence of their husbands. The project ultimately aims to encourage a more cashless ecosystem by encouraging farmers and value chain actors to intensify their use of mobile money. For example, while there has been an increase in OBs and NFs purchasing crops from their outgrowers via mobile money, the outgrowers will typically cash out these payments immediately. Rather than cashing out, the project is encouraging outgrowers to use their mobile wallet to purchase inputs, make another digital transaction, or simply use it as a savings platform.

Connecting Village Savings & Loan Associations (VSLA) to digital payments has been more challenging. ADVANCE II has set up 826 VSLAs, about 60 percent of which are made up of women. These VSLAs are very





effective in promoting a culture of savings, an important first step in the process of transitioning smallholders to utilizing mobile money and a mobile savings platform. Of these 826 groups, 55 of them have thus far been connected with formal financial institutions, typically GN Bank, who will send a representative to the group every two weeks to collect the savings. While the project initially hoped that these groups could then be transitioned to the mobile savings platform, this may not be possible until later down the road, with the continued focus on promoting savings, and where possible connecting groups with banks.

Lessons Learned: The greatest challenge ADVANCE II has dealt with, in regards to digital financial services, has been the lack of mobile connectivity and phone access in many of the communities where the project

works, compounded by high levels of illiteracy and innumeracy. As noted earlier, the mobile phone ownership rate for ADVANCE II farmers in the Northern, Upper East, and Upper West regions is just over 31 percent -- leaving the vast majority without phone access. ADVANCE II is seeking to address this by working directly with telcos to sell low-cost phones in the communities with the lowest levels of phone access. The project has sold around 150 phones so far, and is encouraged by high levels of interest among farmers. However, progress can be somewhat slow, as sales are limited to harvest times, when farmers have a bit of extra income to make such purchases. The project also liaises directly with the telcos and mobile money operators in other ways, working to promote the value addition of expanding network coverage into rural areas and onboarding farmers to mobile money.

VSLA PROFILE: “UNITY IS STRENGTH”

The “Unity is Strength” group, located near Tamale in the Northern Region, was one of ADVANCE II’s first VSLAs, made up of 23 women and 2 men. Most group members have mobile phones, and many have mobile money accounts. Many group members, however, are illiterate, making mobile money transactions challenging.

To set up the VSLA, ADVANCE II provided a savings box along with a calculator and pens, and providing training on how to manage the group, hold meetings, and collect and share out money. Group members use the VSLA to save for farm inputs. On share out days (when members receive the full amount of money that they have saved), ADVANCE II comes to their community along with an input dealer, so they can purchase inputs directly. Prior to the VSLA, group members generally did not save. Rather, members would keep some produce in a safe place to sell it at the time required to buy inputs. However, produce would sometimes be hard to sell, requiring group members to “eat what they would have sold.”

Recently, ADVANCE II connected the group with GN Bank. Now, a GN Bank agent visits the group every two weeks to collect their savings and deposit it. The group is happy with this arrangement as money stored in the box would sometimes get wet or “spoiled.”




V. COMBINED IMPACT AND INTEGRATION OF DIGITAL TOOLS

It is important to note that not all farmer beneficiaries of the project are supported by all of these digital tools, just as not all farmers are reached by the same sequence or combination of ADVANCE II trainings. Nonetheless, the various tools bolster one another, while simultaneously supporting progress towards ADVANCE II's agricultural goals and outcomes. The extension and information delivery tools, including text- and voice-based information delivery, the tablet-based extension service, and interactive agricultural radio programming, all share a common goal: improving and enhancing the project's ability to share information with farmers, through multiple outlets and varied techniques. In considering which farmers and communities to focus on with these digital information-delivery approaches, ADVANCE II specifically targets farmers who may have not had the opportunity to attend a large number of in-person trainings, or any trainings at all, often because they may live in a particularly remote location. Yet there are many farmers who have both attended in-person trainings and received information via one

of the three technology-enabled information-delivery processes. For example, those who have received agricultural tips and market price information on their phones and are also a member of a radio listenership group, or farmers who are receiving training by a Grameen agent and also receive weather forecasts on their phones. For these farmers, by layering multiple information delivery methods on top of one another, and combining digital-enabled information delivery with in-person information delivery, ADVANCE II maximizes the potential for information retention and application, who might need to hear a suggestion or learn about a new farming practice a few times before taking action to follow up, or hear the same information in a couple of different ways.

Applying digital tools in this way further allows ADVANCE II to capitalize on the natural tendency of farmers to share information with one another, thus extending the information's reach beyond the actual or intended recipients. For example, one farmer interviewed noted that he meets every morning with a group of farmers from his community for tea. Each



morning, he will share the weather forecasts, market price information, and agricultural tips that he has received on his phone with the others farmers in his group. In other cases, nucleus farmers or outgrower business will share this information with their outgrowers. These practices enable the information shared to extend even further than ADVANCE II had anticipated, not only to those farmers outside of the reach of the project, but more importantly, even to those who do not have their own phones or who are not literate.

Financial inclusion, promoted via digital financial services, also directly underpins ADVANCE II's efforts to improve the livelihoods of the project's smallholder farmers. Once again, the digital component of this work is not the end-goal itself; rather, it is intended to facilitate more cost-effective, efficient, and safe access to financial services to farmers, so they can better and more successfully manage and operate their farms, and better utilize the information on good agricultural practices that is also being shared by the project. For those farmers that have already embraced mobile money -- as well as those moving along the pathway towards digital financial services -- this digital tool serves as another enabler, supporting the many others that are provided by the ADVANCE II project.

Finally, mobile data collection, Smart Cards, and the use of geospatial analysis provide an important operational backbone to ADVANCE II in better tracking, managing, and reporting on the work of the project. These tools help project staff focus their efforts on the interventions that have proven to be successful, to shift gears when necessary, and to respond more quickly to changing conditions and contexts, such as addressing the fall armyworm outbreak through geospatial analysis, or better understanding the extent of the project's

reach. They also underpin important feedback loops whereby the data collected over digital channels informs the projects of how best to pivot in response to farmers' needs.

VI. LESSONS LEARNED

This section outlines lessons learned from the experience of ADVANCE II in integrating digital tools and approaches into their operations. It is organized around the Principles for Digital Development, a set of principles developed by international development donors and their implementing partners that seek to institutionalize lessons learned in the use of information and communication technologies in development projects. The discussion below highlights the most significant and relevant applications of the Digital Principles to ADVANCE II's work, focusing on three of the nine principles. It is intended to be an illustrative, rather than comprehensive, portrayal of how the Digital Principles apply in practice.



PRINCIPLE FOUR: BUILD FOR SUSTAINABILITY

Like many USAID and Feed the Future activities, ADVANCE II has a finite term and will not continue indefinitely. ADVANCE II's digital tools serve as an important component to the project's sustainability strategy, with the intent that these tools, and the information shared through them, will continue to provide support to farmers even after the project ends in September 2018. To do so, the project promotes private sector-enabled solutions. For example, while the project pays for a subset of farmer beneficiaries to receive agricultural tips, market prices, and weather forecasts for a period of one year; after the year elapses, beneficiaries are expected to pay for these services on their own. The intention is for farmers to



see the value of the service after a year of receiving it for free, allowing the project to select a new subset of farmers in the next year to expand its reach. At the end of the subscription year, both ADVANCE and the service provider send a message to all beneficiaries letting them know that their subscription is over and they can continue with the messages by paying a small fee - around 50 cents per month - if they choose. ADVANCE II's initial vendor for this service, Esoko, estimates that around 70 percent of farmers do choose to continue with the messages.

"For ADVANCE II, Monitoring and Evaluation is a lot more than just generating numbers. It's more about making informed decisions, performing higher analyses, and linking data together to analyze it relationally, not just independently"

-ADVANCE II M&E Coordinator

The Smartex Application and partnership with Grameen Foundation also demonstrate ADVANCE II's

drive for sustainability. First and foremost, this activity was initially envisioned as a way to extend the project's reach. While farmers will no longer be able to attend trainings or contact ADVANCE II staff for support after the project ends, they will still be able to contact their Grameen Foundation agent, who will continue to use the tablet and Smartex application that is already pre-loaded with agricultural content. ADVANCE II has also been in early conversations with the Grameen Foundation about other ways to commercialize and/or formalize the Smartex Application. This could involve a number of business models, including partnering with the government extension service or offering the application as a service that OBs or other value chain actors could pay for themselves.

Finally, ADVANCE II's support of Village Savings and Loan Associations (VSLAs) as an "on ramp" to savings cultures and eventually, digital financial services, demonstrates an important recognition of sustainability. As explained earlier, ADVANCE II recognizes that transitioning beneficiaries to feeling comfortable with digital financial services is a long process, with

promoting a culture of savings through VSLAs being the first step. The project has invested a huge amount of time and effort in setting up and supporting VSLAs, and has done so from the beginning with an eye towards the future. Though conversations are still in early stages, the project hopes to be able to turn over many, if not all, of the VSLAs to an external consultant, already active in the financial inclusion space in Ghana, who can continue to monitor and support the groups, facilitate connections between the groups and formal financial institutions, and eventually support them in getting comfortable in using digital financial services.



PRINCIPLE FIVE: BE DATA DRIVEN

Principle five focuses on the use of real-time information, data for decision-making, and ongoing learning and evaluation. Data is collected constantly, including both quantitative and qualitative, and reviewed on a weekly and quarterly basis by regional teams as well as in headquarters. The use of geospatial analysis for the visualization of data allows the project to layer different datasets, and to compare and contrast across

regions or even communities. ADVANCE II M&E staff note that while most of the data that is collected is done so for USAID reporting, beyond using it to fulfill a requirement, the team uses it to get real-time feedback to guide technical officers, letting them know what to emphasize at any given point and to inform planning and future activities.

The project also exhibits a willingness to shift gears mid stream when it becomes clear that this might lead to greater impact, and constantly solicits feedback from its farmers in order to do so. One example is the recent shift from SMS-based messages to voice messages. SMS messages were selected initially based on cheaper cost and availability, as well as higher levels of comfort (and exposure) of project beneficiaries to text-based rather than voice-based messages. Yet when a quarterly survey indicated that many recipients of the text-based messages were not able to understand them due to illiteracy, or an inability to understand English, ADVANCE II decided to make a shift. When the sub-contract for mobile-delivered messages was recompleted, ADVANCE II selected a new vendor, VOTO Mobile, and determined to switch all messages



with the exception of Market Price Information to voice from that point forward.

The project's persistence and willingness to adapt with regards to the Smartex Application is also notable. When initial results from Grameen Foundation agents were not as positive as the project had hoped, the team began to think how it could shift gears and find other ways to motivate and support agents. This included not only conducting refresher trainings, but also creating a WhatsApp group for agents to share information with one another and encouraging more successful agents to support and mentor the less successful ones. The team is also closely monitoring agents' progress, and when agents are not meeting targets, despite this additional support, tablets are pulled and redistributed to new agents.



PRINCIPLE NINE: BE COLLABORATIVE

ADVANCE II leadership express an understanding that when it comes to implementing digital tools and approaches, the project will not be able to do everything on its own, nor does it have a comparative advantage in doing so. ADVANCE II brings a wealth of expertise in agriculture and a nuanced understanding of Ghana's local context, but depends on a vast group of external partners, including Ghanaian telecommunications companies and mobile money operators (MTN, Fidelity Bank, Tigo) and a whole of host of digital service providers (Esoko, Voto, Ignitia, Farmerline). These partners bring their own expertise in technology design and implementation that make ADVANCE II's technology-based activities possible. However, these relationships are certainly not one-sided. In an interview about the Smartex Application,

Grameen Foundation expressed excitement to being able to implement and test their application through a partnership with ADVANCE II, tapping into ADVANCE II's outgrower business model and existing relationships with outgrower businesses, outgrowers, and other actors along Ghana's agricultural value chain. Voto Mobile expressed similar excitement at collaborating with ADVANCE II, as their platform facilitates the widespread dissemination of information through mobile means, but depends on the agricultural content provided by ADVANCE II.

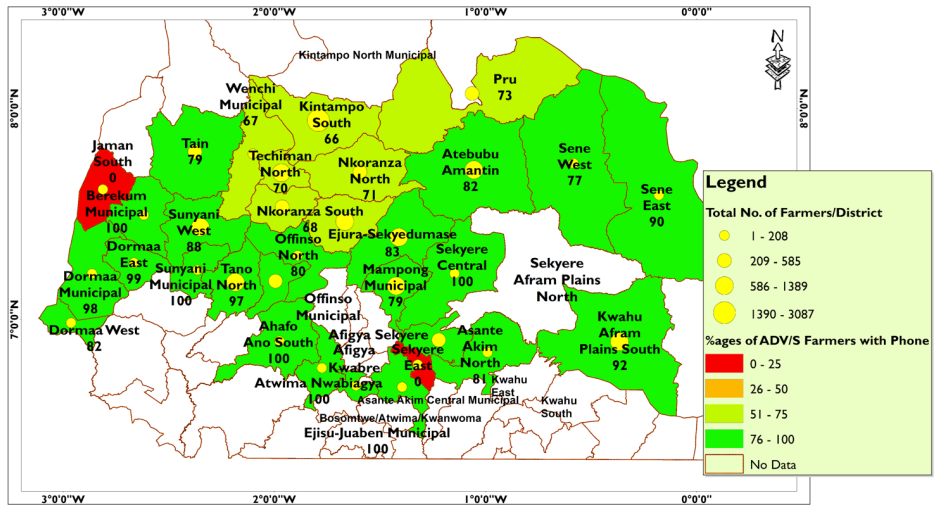
VI. CONCLUSION

Ghana's digital economy has witnessed an impressive transformation in the past decade. ADVANCE II has sought to take advantage of the new digital economy in Ghana, building on learnings from its predecessor project and leveraging digital tools as a key enabler towards meeting its agricultural goals of improving the livelihoods of 113,000 smallholder farmers throughout Ghana. Through the outgrower business model, ADVANCE II seeks to enhance connections between smallholder farmers, outgrower businesses, and agricultural service providers, and digital tools serve as a way to deepen these connections further, in lasting ways that will continue even after the project ends. Digital tools also facilitate ADVANCE II's work towards knowledge sharing and dissemination, providing farmers with the information that they need to conduct their agricultural activities more effectively, efficiently, and ultimately, more productively.

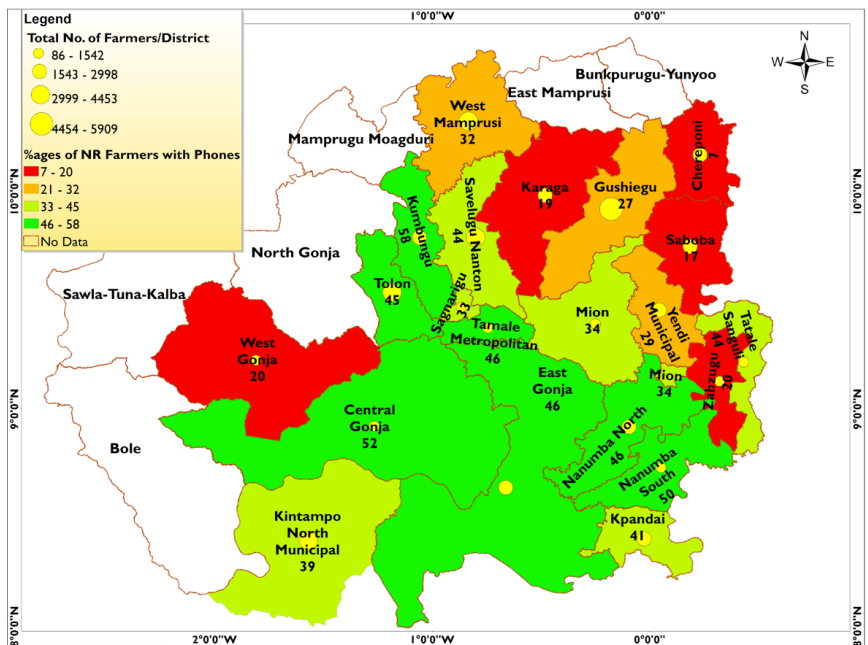


ANNEX I: PERCENTAGE OF ADVANCE II FARMERS WITH CONTACT PHONE NUMBERS (BY REGIONAL SUB-OFFICES)

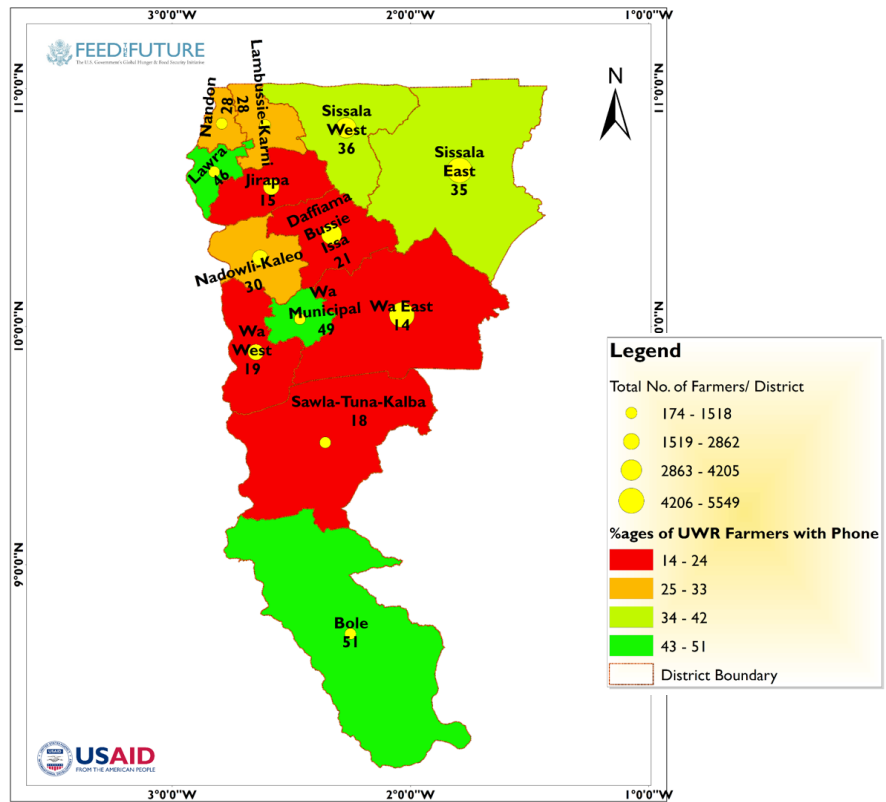
Percentage of ADVANCE II farmers (profiled & beneficiary) with contact phone numbers – ADVANCE South Sub-Office



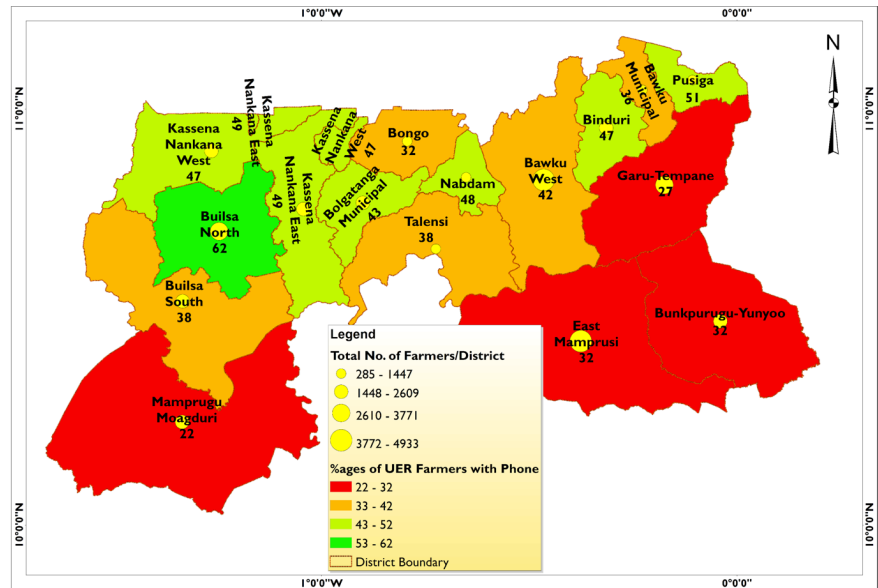
Percentage of ADVANCE II farmers (profiled & beneficiary) with contact phone numbers – North Regional Sub-Office



Percentage of ADVANCE II farmers (profiled & beneficiary) with contact phone numbers – Upper West Regional Sub-Office



Percentage of ADVANCE II farmers (profiled & beneficiary) with contact phone numbers – Upper East Regional Sub-Office



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