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

Agricultural Development and Value Chain Enhancement Feed the Future Activity (ADVANCE)

A USAID FEED THE FUTURE INITIATIVE

FINAL REPORT



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ACRONYMS

ACDEP	Association of Church-based Development NGOs
ADVANCE	Agricultural Development and Value Chain Enhancement
ASWG	Agriculture Sector Working Group
CAADP	Comprehensive Africa Agriculture Development Program
CERGIS	Centre for Remote Sensing and Geographic Information Systems Program
DCA	Development Credit Authority
EPA	Environmental Protection Agency
FASDEP II	Food and Agriculture Sector Development Policy II
FBO	Farmer Based Organization
FTF	Feed the Future
GAIP	Ghana Agricultural Insurance Program
GGC	Ghana Grains Council
GIS	Geographic Information System
GIZ	German Development Cooperation
GSA	Ghana Standards Authority
Ha	Hectare
IFAD	International Fund for Agricultural Development
IFDC	International Fertilizer Development Center
IITA	International Institute of Tropical Agriculture
MCC	Millennium Challenge Corporation
METASIP	Medium Term Agriculture Sector Investment Plan
MoFA	Ministry Of Food And Agriculture
MSME	Micro, Small And Medium Enterprise
MT	Metric Ton
NF	Nucleus Farmer
NGRP	Northern Rural Growth Program
PERSUAP	Pesticide Evaluation Report and Safe Use Action Plan
PPRSD	Plant Protection and Regulatory Services Directorate
RaFIP	Rural and Agricultural Finance Program
SARI	Savanna Agricultural Research Institute
SASL	Sinapi Aba Savings and Loans
SEG	Small Equipment Grant
SSP	Spraying Service Provider
USAID	United States Agency for International Development

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EXECUTIVE SUMMARY

The Ghana Agricultural Development and Value Chain Enhancement (ADVANCE) project was funded by USAID's Ghana Mission under the global Feed the Future (FTF) program. The project was awarded through the Farmer-to-Farmer (F2F) Leader with Associates Award under an Associate Cooperative Agreement and implemented by ACDI/VOCA in partnership with TechnoServe, Winrock International, the Association of Church-based Development NGOs (ACDEP) and PAB Consult. The agreement was signed on 14th July 2009 and implementation was completed on 13th March 2014. In September 2011, in close coordination with USAID/Ghana, ADVANCE moved all operations to focus on beneficiaries north of the 8th parallel, in order to align the project's strategy and focus with the then-newly approved Feed the Future multi-year country strategy.

The overall goal of the FTF program was to sustainably reduce global poverty and hunger. ADVANCE contributed specifically to the strategic objectives of improved nutritional status, especially of women and children; and inclusive agriculture sector growth.

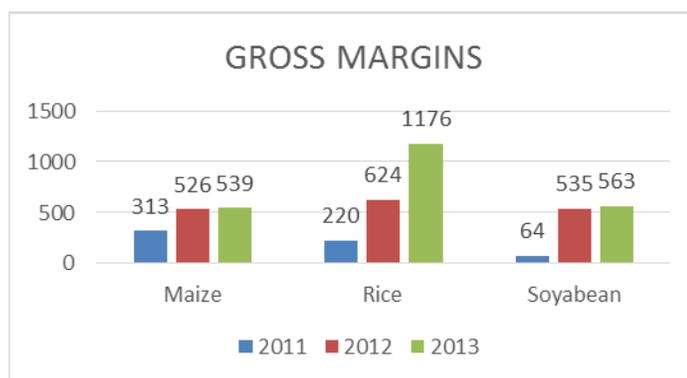


Figure 1: Gross Margins for Maize, Rice and Soybean, 2011-2013

ADVANCE adopted a long-term sustainable and comprehensive value chain approach by working through commercial actors as conduits for reaching out to large numbers of smallholders, ensuring that improved practices remain in the market system after the end of the project. Key results achieved and some lessons learned over the life of the project are presented in this report.

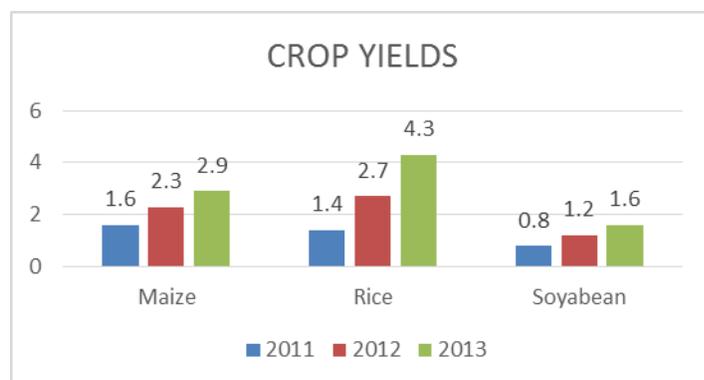


Figure 2: Crop Yields for Maize, Rice and Soybean, 2011-2013

The project reached over 31,706 rural households directly impacting 34,121 producers (38 percent female). Over 27,979 beneficiaries (32 percent women) were trained to acquire new skills and knowledge in production technologies, management practices, 'farming as a business', and numeracy

skills, all of which enabled them to operate their farms in a more business-like manner.

For the purposes of technical training of smallholder farmers and to showcase good agricultural practices in maize, rice and soybean, the project set up 326 demonstration sites in collaboration

with private sector firms. Over 84 percent of project beneficiaries in northern Ghana applied at least one new technology or management practice, contributing to substantial yield increases and improved gross margins.

ADVANCE was implemented with a deliberate effort to reach as many women as possible, with substantial success. The project ensured that women beneficiaries received agricultural productivity, numeracy training and nutritional education, and had equal access to the project's grants program. As a result their yields and gross margins were comparable, and sometimes better, than those attained by their male counterparts.

Regarding trade and markets, smallholder beneficiaries produced and sold approximately 155,626 metric tons (mt) of maize, rice and soybean worth \$4.2 million between the start of the FTF program in 2011 and close of the project in March 2014.

Key trade and market results under FTF	
Volume of sales from smallholders (mt)	155,626
Total value of sales from smallholders	\$41.9m
Loans/ investments in agri-businesses	\$3.9m
Number of rural households reached	31,706

Various categories of project beneficiaries received loans worth \$3.9 million from financial institutions to invest in their businesses in addition to \$2.9 million provided as grants by the project for equipment such as farm machinery, weighing scales, warehouses, rice mills and others. Through various forms of capacity building the project supported 822 Micro, Small and Medium Enterprises (MSME) to improve their business services to their clients, especially smallholders. They included:

- 122 aggregator/buyers,
- 12 processors,
- 77 input firms,
- 255 mechanized service providers,
- 27 financial institutions,
- 17 radio stations) and
- 312 farmer-based organizations (FBO)

The project had a volunteer support component that helped to increase participating value chain actors' incomes and agribusiness profits by supporting them to improve their productivity, product quality, market access, information services and organizational management. Volunteers worked with 88 host organizations including banks, processing companies, FBOs and other agribusiness firms. ADVANCE fielded 87 volunteers for 127 assignments for both long-term and short-term assignments to assist in the project's technical delivery. Volunteer consultants from the U.S., Ghana and other countries provided a total of 5,648 days of technical expertise through 14 long term (over 100 days) and 73 short term assignments (average of 21 days)

throughout the project life. Of those, Winrock International provided six long-term volunteers and three shorter term volunteers for a total of 1,178 days, and TechnoServe provided 17 medium and long-term volunteers for a total of 2,321 days. The two partners contributed more than 60 percent of the volunteer time and value.

The total estimated value of the volunteers' time was \$2,645,160. Ghanaian hosts also personally contributed about \$10,000 to logistical support of the volunteers.

In addition to ensuring the highest standard of compliance with USAID environmental regulations through the preparation and implementation of a Pesticide Evaluation Review and Safe Use Action Plan (PERSUAP), an environmental management plan and promoting the setting up of spray service providers, the project also promoted climate smart strategies including rainfall prediction, drought index insurance and introduction of drought tolerant maize varieties to reduce the impact of climate change on crop production and improve adaptation.

ADVANCE had a grants component under which the project disbursed \$2,925,648 in grants. The grant mechanism was used to introduce beneficiaries to types of equipment that are necessary to upgrade quality and productivity of the three commodities but which most beneficiaries had never used or had difficulty accessing. The grants helped the beneficiaries appreciate the usefulness of land preparation equipment as well as post-harvest services such as shelling and threshing, all of which improve product quality. The grantees provided leverage of \$734,835 (of which \$463,246 was cash and the remaining in kind), which allowed the grants program to serve as a "bridge" to a fully commercial equipment market. This benefitted 3,074 individuals directly and 92,360 indirectly.

The project, in partnership with the Centre for Remote Sensing and Geographic Information Systems (CERGIS), launched an online agricultural database system with GIS information, making data collected by the project as well as CERGIS' own data collected over the years available to the general public. This information will be useful to businesses, projects and researchers¹.

¹ see www.gis4ghagric.net

INTRODUCTION

The agricultural sector in Ghana is characterized by rain fed crop production carried out primarily by smallholders using hand implements. Over 90 percent of farms are less than 2 hectares. This results in very low yields and subsequently, incomes. The situation is worsened by inadequate infrastructure, including road networks and storage facilities, which create further inefficiencies in the market and affect the competitiveness of products in urban markets. Most of the staple crops produced (including maize and rice) are consumed by household members. Food crop farmers are said to be among the poorest in the country while Ghana continues to import staple foods. In 2008 for example, Ghana imported about 290,000 mt of rice and 250,000 mt of maize².

As part of its ongoing support to Ghana's agricultural sector, USAID awarded the Agricultural Development and Value Chain Enhancement (ADVANCE) project to ACDI/VOCA in July 2009 through the Farmer-to-Farmer Leader with Associates Award under Associate Cooperative Agreement No. 641-A-00-09-00026-00. The project was implemented by ACDI/VOCA and four partners: two international organizations (TechnoServe and Winrock International) and two local organizations (ACDEP and PAB Consult).

ADVANCE contributed to the intermediate results of USAID's FTF Strategic Objective 3, improved nutritional status, especially of women and children, and Strategic Objective 4, inclusive agriculture sector growth. The project was extended for eight months at no cost from July 14, 2013 to March 13, 2014, allowing for a full production cycle to take place in the last year. The extension also provided the opportunity to assist new FTF projects with information as they came on line; the Agricultural Technology Transfer (ATT) project under the International Fertilizer Development Center (IFDC), the Financing Ghanaian Agriculture (FinGAP) project implemented by CARANA, and the Agriculture Policy Support (APS) project implemented by Chemonics were all assisted by the ADVANCE team as they began their start up process during 2013 and early 2014.

This final report is prepared in accordance with the terms of the cooperative agreement. ACDI/VOCA has also submitted four semi-annual and four annual reports to USAID since project inception.

² MOTI

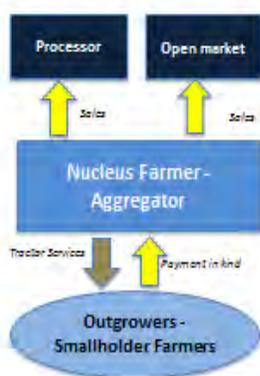
PROJECT STRATEGY

For agricultural transformation to occur, it is necessary to adopt a commercial and competitive approach which requires that the project work with actors along the value chains that have commitments and incentives to invest in the transformation process. Rather than provide services directly, ADVANCE's approach focused on facilitation and strengthening private sector capacity to deliver the services along the value chains that are needed to sustain inclusive growth and improved competitiveness.

The project adopted an implementation model through which nucleus farmers (NFs) and aggregators were trained and mentored to provide agricultural services (tractor services, improved seed, fertilizer, post-harvest services like shelling, and credit) to smallholder farmers (out growers) in turn providing a market channel for smallholders to directly access growing markets, including large food processors and buyers in the South. The project selected these NFs and aggregators carefully by assessing their willingness to invest and provide the services mentioned above, and then supported them through training, providing matching grants, and technical advice to enable them to manage their outgrower schemes effectively and efficiently.

Figure 3 illustrates the limited vertical relationships experienced by most NFs when they were identified by the project and how this changed to include other service providers and additional services by the NFs by the end of the project. The level of involvement of other service providers, all on a commercial basis, was critical for the success of the ADVANCE value chain implementation model, leaving behind strong market relationships.

The starting point with most NFs



Most NFs reached this point or close to it

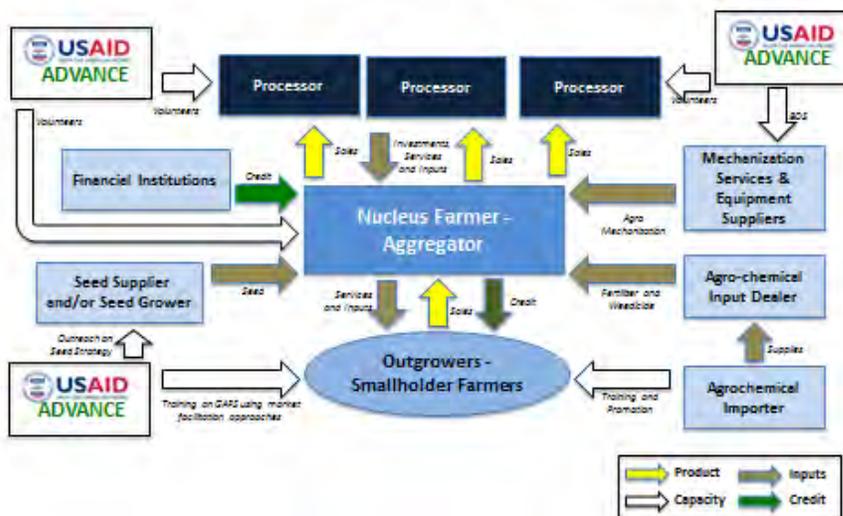


Figure 3: The ADVANCE Model, Before and After

SUSTAINABILITY AS A KEY THEME

The project adopted an approach through which beneficiaries were introduced to market opportunities and encouraged to take advantage of them and to improve efficiency at all levels of the chain. An important principle of this approach was to ensure sustainability in several ways: (i) by not providing services directly, the project did not leave any service gaps post-project; (ii) the relationships between all the actors were driven by aligned business interests as opposed to access to grants and subsidies) and should continue as long as it remains profitable to all parties.

ALIGNMENT WITH THE MINISTRY OF FOOD AND AGRICULTURE

Throughout implementation of ADVANCE, project staff engaged the Ministry of Food and Agriculture (MoFA) at all levels and ensured that project activities were aligned with the objectives set out in the Food and Agriculture Sector Development Policy II (FASDEP II). ADVANCE senior management also participated actively in the Agricultural Sector Working Group (ASWG) activities and contributed to the Comprehensive Africa Agriculture Development Program (CAADP) and the Medium Term Agriculture Sector Investment Plan (METASIP) as members of the working groups. At the field level, MoFA staff were actively involved in demonstration sites and moderating at field days as well as other training programs organized for smallholder farmers.

PARTNERING WITH OTHER DEVELOPMENT PROJECTS

As a policy, ADVANCE made deliberate efforts to link project activities with those of other donor projects and programs operating in the same geographic and/or commodity areas. The project worked with several public and civil society organizations, including the Northern Rural Growth Project (NRGP) managed by MOFA and funded by the International Fund for Agricultural Development (IFAD), Savannah Agricultural Research Institute (SARI), International Institute for Tropical Agriculture (IITA), Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ), the Ghana Agricultural Insurance Pool (GAIP), the Rural and Agricultural Finance Program (RaFIP) among others.

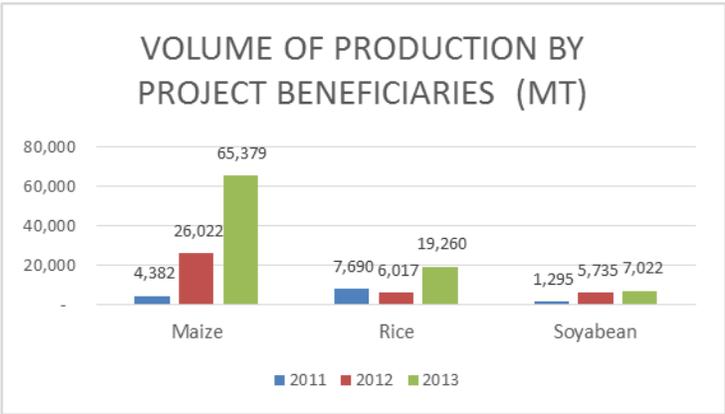


Figure 4: Production volume for maize, rice and soy by project beneficiaries (source: Project primary data)

THREE COMMODITY VALUE CHAINS

In alignment with the FTF initiative in Ghana, the project focused on the maize, rice and soybean value chains. Interventions related to production were limited geographically to

northern Ghana, specifically areas above the 8th parallel; however, there was no limit to market locations as well as sources of inputs and finance. With project support, the value chain actors invested \$3.9 million in farm machinery and other agro inputs towards increased productivity and quality. These resulted in significant increases in yield, gross margins, production levels and value of sales of all three commodities during project implementation (Figures 4 and 5).

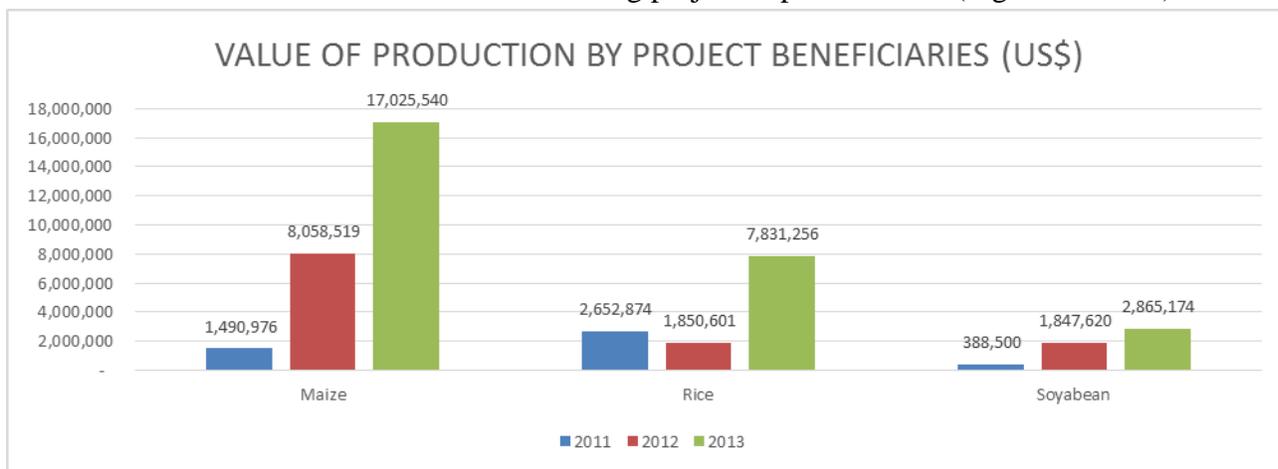


Figure 5: Value of maize, rice and soybean produced by project beneficiaries (source: Project primary data)

MAIZE

Maize is a staple across Ghana and has a ready domestic market. Human consumption is estimated at 1.1 million mt while the livestock/poultry and food/beverage sectors consume 225,000 mt and 104,000 mt respectively. Cross border trading within the West Africa sub-region is fueled by seasonal supply imbalances, especially between Ghana and Burkina Faso, though there are no reliable statistics on trade volumes. The major constraint in Ghana remains low productivity and quality. Average national yields as of 2013 were 1.8mt/ha while poor post-harvest handling and inadequate storage reduce this yield to an estimated 1.3 mt/ha, a loss of almost 30 percent.

INVESTMENTS TO IMPROVE PRODUCTIVITY AND QUALITY

The project set out to support upgrading investments that would lead to improved productivity, quality and efficient marketing of the commodity. Project activities were therefore designed to ensure access to production inputs, technical knowledge, management practices, and finance and also take advantage of all market opportunities.

While impact and attribution studies have not been carried out, ADVANCE's support to beneficiaries did correlate with the desired outcome of greatly increasing maize production among these same beneficiaries in the intervention regions. ADVANCE project beneficiaries increased their average yields by over 80 percent from 1.6 to 2.9 mt/ha between 2011 and 2013 and gross margins by over 70 percent from \$313 to \$539 over the same period. These achievements were realized through collaboration with private sector stakeholders who were

motivated to invest in training and the adoption of better agricultural production techniques as well as by participating in activities leading to the strengthening of relationships in their supply chains.

Following the project's NF/outgrower model, ADVANCE engaged 69 maize nucleus farmers in the four northern regions of Ghana, working with a total of 23,402 outgrowers, 35 percent of whom were women. Through the linkages approach, 38 new markets were created leading to increased market access. In collaboration with input companies, the project set up 177 maize demonstration sites to show farmers how to achieve higher productivity through good agronomic practices and post-harvest handling practices. As a result, 17,861 of the smallholder farmers adopted new technologies and/or management practices resulting in the increases in average



"I have now moved to farming as a business. Knowing the importance of using improved seeds, I am prepared to even sell my KIA truck to buy more improved seeds," says Malik Nabie, a nucleus farmer.

Through the small equipment grants program and trainings in record keeping, farming as a business and outgrower management, Malik increased yields of his farm from 1.92 in 2011 to 4.08 mt in 2013. The yields of Malik's outgrowers also increased from an average of 1.44 to 3.6 mt during the same period. From an average supply of 15 mt to the open market before project intervention, Malik supplied 233 mt of maize to his end markets after just 16 months of working with the project.

yields and gross margins per hectare between 2011 and 2013 stated above. In that same period, 95,783 mt of maize worth \$26,575,035 million was produced and sold or consumed by project beneficiaries in northern Ghana thereby contributing to food security. Several NFs became inputs suppliers' commission-based agents, assuring sustainability.

WAREHOUSE RECEIPT SYSTEM

Trade in grains in Ghana is dominated by small to medium wholesalers and retailers in a market that is poorly regulated and lacks standards. This situation makes it difficult for industrial and high end food processing companies to source grains locally. To improve the trade environment and upgrade the operations of the sector, ADVANCE supported the establishment of the Ghana Grains Council (GGC) to develop and operate the first warehouse receipt system in Ghana. The GGC is an independent private sector corporate body, limited by guarantee, and has a membership of 60 made up of key agricultural input suppliers, grain producers,

traders/aggregators, warehouse operators, grain processors, financial institutions and other service providers.

Achievements under the warehouse receipts system to date include the certification of eight warehouses with total storage capacity of 36,600 mt and 18 community warehouses in the three northern regions with a total capacity of 1,560 mt to serve as aggregation points for various end markets. GGC also licensed seven warehouse operators who issued 96 warehouse receipts for 29,372.71 mt valued at over \$5 million. Some of this grain (6,920 mt) was used as collateral to access \$1.4 million in credit from GGC member financial institutions. Also, the GGC collaborated with the Ghana Standards Authority (GSA) to develop guidelines for good storage and warehousing practices for grains (cereals and pulses), to promote the use of maize standards, weights and measures and to develop soya standards.

We believe that the right foundation has been laid down through GGC's warehouse receipt program and any future expansion into a commodity exchange should build on this.

RICE

Rice consumption in Ghana increased by 25 percent between 2004 and 2011. In 2010, MoFA estimated paddy production to be 491,603 mt (294,962 mt milled rice) with northern Ghana producing 67 percent of the total. Until recently, preference for either local or imported rice depended on geographic location of consumers and availability. Consumers in southern Ghana, especially urban consumers, prefer imported aromatic rice varieties while most rice produced and sold in the north is parboiled. In 2011, 370,000 mt of rice valued at about \$600 million was imported, 40 percent of which was an aromatic variety. Only about five percent of the rice produced and parboiled in the north is traded outside of the north. From recent trends it is expected that demand for rice in Ghana will continue to grow as per capita consumption is expected to rise from 38 kg to 50 kg by 2015.



With project support, approximately 900 smallholder rice farmers benefitted from using weighing scales and moisture meters provided, as shown in the photo. This equipment helped farmers ensure accurate and transparent weight measurement during trading.

Over the years, the rice sector has faced many challenges at all levels of the value chain. These include low yields due to unavailability of certified seed for high yielding and aromatic varieties. Irrigation facilities are very limited and equipment for land preparation is scarce. Milling equipment is generally obsolete, with low capacity, and lacks the requisite components such as de-stoners to ensure quality. Threshing is generally done manually resulting in high post-harvest

losses and loss of quality. Average paddy yields across the country are 1 mt/ha, 2.4 mt/ha and 4.5 mt/ha for upland rain-fed, low land rain-fed and irrigated fields respectively. Most rice is produced on a small scale with average farm size of 0.8 ha.

For the rice sector in Ghana to become a competitive industry, significant investments were required to upgrade at all levels of the value chain. This is the task that ADVANCE took on from the start of the project. The project reached out to 17 NFs/aggregators working with 5,209 outgrowers with interventions that increased their productivity and improved food security and household incomes. The farmers were trained in agronomic and post-harvest handling practices, linked to markets, and accessed inputs, mechanization services, equipment grants, information and credit. Most training on GAPs was conducted in collaboration with input firms who provided the necessary agro inputs to establish 66 demonstration sites across the country between 2011 and 2013.

Almost 5,000 of the outgrowers adopted new technologies and/or new management practices. These interventions resulted in yield and gross margin increases by project beneficiaries from 1.4 mt/ha and \$220/ha in 2011 to 4.3 mt/ha and \$1,176/ha by 2013. In the same period, 32,967 mt of paddy worth \$12,334,731 was produced and sold or consumed by project beneficiaries in the north of Ghana.

Weighing scales and moisture meters were also provided under the grants program and for the first time many rice farmers sold their paddy at agreed prices per kilo as opposed to selling by “bush weight”.



“With proper management structures in place and upgrade of my rice mill, I am looking at doubling production capacity. Formalizing the appointment of my employees has boosted their morale and they now go the extra mile in meeting daily production targets”, says Sadia Awuni, a nucleus farmer.

Sadia was trained to manage her business, work efficiently with her outgrowers and keep proper records of her business transactions. She benefitted from a grant facility from the project which enabled her to upgrade her rice mill to 1.5 mt per hour and procured a de-stoner. In 2013, she milled over 18 mt of paddy per day. Her old mill used 30 percent of its capacity per day. Project support trickled down to benefit the female smallholder farmers with whom she works, making up about 40 percent of her outgrowers.



“ADVANCE has been a real blessing to me. I have gained a lot from the trainings, linkages to market, financial institutions and other farmers. This has helped me to improve my business. I am now able to support my outgrowers and my family. I know that with the support of ADVANCE, I will be able to achieve my dream of being one of the successful farmers in Ghana”, says Yahaya.

Through the project Yahaya was linked to three major end markets, namely Vestor Oil, Royal Danemac and Yedent Ltd. He was also able to access market information through SMS alerts on his phone, received credit of \$55,000 for him and his outgrowers from Wa Credit Union, and was a recipient of small equipment grant items including tarpaulins, a weighing scale, and a multi-purpose sheller. Additionally Yahaya received training on record keeping and participated in live agricultural radio programs as a resource person. Yahaya increased the number of his outgrowers from 100 in 2012 to 300 in 2013 and his soybean supply from 75 mt to 354 mt as a result of project support.

SOYBEAN

Ghana is a net importer of soybean grains and cake. The growth market for soybeans is the poultry industry which uses the cake as a protein source in feed formulations. In Ghana, the crop is produced mainly in the three northern regions. Farm sizes generally range between 0.25 ha to 2 ha and yields are low at 1.1 mt/ha compared to 2.9 and 3.7 in the USA and Turkey respectively. Poor harvest and post-harvest management practices result in lower quality grains and cake, hence the cake sells at prices that are 35 percent lower than imported cake.

The project worked with 44 soybean nucleus farmers with 16,083 outgrowers and implemented interventions that ensured improved productivity and grain quality. The interventions included training in agronomic and post-harvest handling practices in collaboration with private sector firms; market linkages; access to inputs, mechanization, information and credit. Over 45 percent (7,264) outgrowers adopted new technologies and/or new management practices including using fertilizers, improved seed, proper plant population densities, harvesting and post-harvest handling. These practices resulted in average yields increasing from 0.8 mt /ha in 2011 to 1.6 mt/ha in 2013 and producing 14,052 mt of grain valued at \$5,101,294 and gross margins increasing from 64 \$/ha in 2011 to \$563 in 2013.

ENGAGING MARKET PLAYERS

Working with various private sector players to improve their services or design new strategies to engage the direct value chain actors was a major focus of the ADVANCE project. The project worked closely with financial institutions, agrochemical importers, wholesalers and retailers, seed dealers, research institutions, and various communication media to disseminate information and create knowledge on best practices.

FINANCIAL SERVICES

ADVANCE built the capacity of 39 financial institutions to improve access to agricultural finance in north Ghana. Project interventions included improving relationships and knowledge among value chain actors (thereby lowering risk and improving creditworthiness); training on credit analysis and use of financial tools; financing options and financial management for value chain actors; establishing trade finance among value chain actors; and facilitating loan disbursements. A total of \$3.9 million was disbursed to 22,699 beneficiaries, 40 percent of whom were women.

DEVELOPMENT CREDIT ASSISTANCE

As part of ADVANCE's partnership with the Development Credit Authority (DCA) implementing banks, the project supported Sinapi Aba Savings and Loans (SASL) and Ecobank to improve their lending to the agricultural sector. From the inception of the recent DCA program that started in 2013, Ecobank received ten loan applications totaling \$305,706, and disbursed \$139,903. Ecobank is exploring the option of financing warehouses in the near future. SASL on the other hand received 39 loan applications totaling \$518,365 and disbursed \$351,096 for agricultural production and trading.

REDUCING RISKS OF LENDING TO THE AGRICULTURAL SECTOR

A starting point in encouraging financial institutions to expand their agricultural loan portfolios was to assess the risks (both real and perceived) and identify opportunities to reduce those risks and improve the comfort levels of banks to enter the agribusiness sector. Consequently, the project developed a credit risk scoring tool and rolled it out to nine rural banks in the Upper East and West Regions to assist with the assessment of agricultural loans.

Also, an Excel-based cash flow tool called Profit Planner was developed for seven branches of Sinapi Aba Trust, the Wa Credit Union and the Yabra Rural Bank. The cash flow tool has embedded crop budgets for maize, rice and soya and allows for a systematic process of



“Relationships are vital in this business. Other aggregators have entered the market but are not paying the farmers on time. I want to keep my word to the smallholder farmers. This financing arrangement helps me to continue to do just that,” said Grace Manu.

Based on relationships facilitated by ADVANCE between the financial institutions and actors, Grace Manu, a maize aggregator in Kwame Danso, a rural community in the Brong Ahafo Region, received a loan of \$7,386 from Yabra Rural Bank to pilot the reverse factoring model. With this financing mechanism the bank pays smallholder farmers on behalf of Grace Manu within two weeks of delivery of produce to her. Grace found the arrangement useful because she was able to pay her suppliers on time and maintained the trust and good business relationship she had with them.

The Reverse Factoring Model

In reverse factoring:

1. The factor (bank), suppliers (smallholder farmers) and buyer (the aggregator) come to an agreement in which the Buyer will send all accounts payable of the suppliers to the bank.
2. The bank immediately pays up to 100 percent to the supplier depending on the terms of agreement.
3. When the buyer is ready to make payments to the suppliers, the buyer pays the bank the full amount plus interest and fees depending on the details of the agreement.

With this arrangement, the banks are able to develop relationships with smallholder farmers without taking on additional risk. This also provides cross-selling opportunities where the banks build a credit history on the small holder farmers that sometimes lead to additional lending.

In 2012 and 2013, a total credit of \$18,000 was disbursed by two rural banks (Yapra Rural Bank and Kintampo Rural Bank) through this model and 55 mt of maize was purchased from 42 small holder farmers during the period.

The rural banks have identified the cross-selling opportunities and are working with aggregators to pilot input credit arrangements with the small holder farmers through lending by the referral system. This would improve farmers' access to inputs and improve their productivity.

evaluating financing requests based on crop, required inputs and acreage, timing, price and yield sensitivities. The objective was to help the financial institutions establish a benchmark for analyzing crop budgets submitted by loan applicants and create confidence for the managers in conducting cash flow-based loan analysis. The tool proved critical for helping partner financial institutions make the shift from the traditional collateral-based lending that has long dominated the Ghanaian financial sector.

LENDING THROUGH NFS AND AGGREGATORS

The dominant ADVANCE-facilitated smallholder finance model was outgrower credit through the NF/outgrower model, under which tractor services and production inputs were provided to outgrowers on credit. Payments for the inputs and tractor services were made in-kind at harvest and there was no collateral involved except trust between the NF and the outgrower. This worked very well with average repayment rates well over 90 percent. In case of crop failure due to

climatic conditions such as drought, in-kind payments were deferred to the next season.

For the aggregators, the project developed and piloted the reverse factoring model (see text box) with great success, albeit on a relatively small scale. Structured mechanisms like the reverse factoring model are helpful to cover credit risk of the lender, and there is increasing interest among financial institutions to adopt such models.

INPUTS AND EQUIPMENT

Both agricultural mechanization services and production inputs are critical to increasing productivity and making the three commodities competitive. The project therefore placed emphasis on how to link project beneficiaries to these sources of inputs and mechanized services.

COLLABORATING WITH PRIVATE SECTOR FIRMS TO SET UP DEMONSTRATIONS

To ensure access to production inputs and proper application as a means of improving crop yields, the project collaborated with over 77 input companies and established 326 demonstration sites at which all inputs were donated by the input companies. The sites were used as practical training centers for farmers, and during field days, the companies trained farmers on the proper application methods of various agro-inputs. When convinced, many smallholder farmers bought the inputs and applied them on their farms in the same season.

“Since I started farming, I have never gotten 0.4 mt/acre from my maize farm but through learning from the demonstration plot I was able to harvest 1.5 mt/acre last season”. -Mary Vanure, an outgrower for John Mulnye (a nucleus farmer) from Gindabor, Upper West Region.

Others waited to see the results at the end of the demonstration and, upon seeing favorable results bought the inputs in the subsequent crop seasons. The input companies felt that their investment paid off and continued with the collaboration through the end of the project.

“This collaboration has been very useful and makes business sense, we will do it again with you” Boaz Yagel, Sales Manager, Agriculture Division of Dizengoff Ghana Ltd, a leading importer and distributor of agro inputs in Ghana.

“The collaboration with the ADVANCE project in setting up the demonstrations has had great impact on my business through increased sales of weedicides; a total of 15 mt of weedicides valued at US\$25,000.00 and 40 mt of soybean and maize hybrid seeds valued at about US\$67,000, and I am still selling as a result of this.” -ANTIKA, an input dealer in Wa, Upper West Region of Ghana.

The impact of this approach has been twofold; farmers learned practically how to apply the inputs properly and saw the results, and the input companies were brought closer to the farmers and expanded their market base. In many instances, proper application and the use of the right dosage reduced the quantity applied and hence subsequently reflected in the production cost per unit of produce.



The project assisted NFs, aggregators and tractor mechanization service providers to upgrade their equipment and offer services to smallholder farmers.

In the photo above, the operator is demonstrating how to use a power tiller to prepare a rice field before transplanting. Proper land preparation contributed significantly to increases in rice yields of project beneficiaries.

The input dealers also took advantage of this new relationship with smallholder farmers and made trade arrangements with some NFs who acted as agents on their behalf, receiving inputs and selling to their outgrowers for a commission. Previously these NFs would have provided only tractor services to their outgrowers, which would have led to marginal increases in yield. With the addition of seed and fertilizer, yields improved significantly. Another strategy adopted by the input companies was to expand and reach out to stakeholders by opening new outlets and establishing community agencies.

BOOSTING LOCAL MANUFACTURING AND DISTRIBUTIONS OF SMALL AGRICULTURAL EQUIPMENT

As part of the project's small equipment grant (SEG) program, NFs, FBO members and outgrowers across northern Ghana were encouraged to take advantage of the matching grant and purchase equipment that is critical for improving productivity and product quality up to the value of \$5,000. Forty-one shellers and threshers for maize, soybean and rice were procured through the SEG program for 41 mechanization service providers and NFs offering post-harvesting services to their outgrowers.

The approach adopted by the project in providing small equipment grants was to link beneficiaries to equipment dealers using the grants as leverage. Beneficiaries paid their portion of 30 percent of the cost of the equipment directly to the vendor and the project paid the balance to the vendor after delivery of the equipment to the beneficiary. This had a positive impact on equipment sales by vendors and promoted opportunities for them to reach out to farmers. For example MaxBaff General Works, a small local equipment manufacturer located in Nkoranza, increased their sales by approximately 100 percent (\$21,762 to \$45,337) within six months after the company was first introduced to farmers in the project area through the SEG program.

PRE-SEASON AND PRE-HARVEST EVENTS

To enhance cooperation, effective networking and healthy working relationships among actors in the maize, rice and soybean value chains, ADVANCE, in collaboration with IFDC, and other development partners, organized pre-season events in March and pre-harvest events in October at which the project brings together various actors in the agricultural sector.

The purpose of the pre-season events was to bring service providers to meet with producers and make deals on inputs and equipment necessary for a successful production season, and plant the seeds of purely commercial relationships so as to avoid post-project gaps. Over 500 farmers and private sector companies participated in each of these fora held annually from 2011 to 2013. Generally, the pre-season events were attended by input companies, equipment manufacturers and distributors who either had new products to promote or took advantage of the gathering to market their existing products. Typically, equipment for land preparation, varieties of high yielding seed, pesticides and fertilizers were exhibited and marketed. Also prominent in these fora were financial institutions, ICT firms with various messaging products and agricultural

insurance firms. To a lesser extent, processors and major buyers also attended and made advance arrangements for produce or negotiated contracts through which they sponsored the farmers to produce and sell the produce to them at harvest.

The pre-harvest events were attended mainly by producers and buyers of the three main commodities promoted by the project. These pre-harvest events were characterized by price and contract negotiations between producers and buyers/processors. Other service providers including banks, harvest and post-harvest equipment suppliers and ICT firms actively participated.

OUTREACH

Throughout project implementation, various information and communication tools were used for the efficient dissemination of information directly by the project or by assisting value chain actors to adopt such tools. Radio, SMS messaging and mobile money transfers, voice messaging and mobile money payments are examples of ICT tools adopted or promoted by the project.

RADIO

ADVANCE worked through 17 radio stations with an estimated listenership of 200,000. Some of these radio stations either did not have regular agricultural programs or had poor programs presented because they could not attract sponsorship for such programs and also had little experience with agricultural broadcasting. The project therefore supported the radio stations with grants to disseminate agricultural information and to learn how best to attract sponsorship for agricultural programs. Eight of the radio stations formed 120 listenership clubs made up of 80 percent women. The listenership clubs served as a medium for technology transfer and feedback experience sharing out of which partnerships with private sector input firms were formed resulting in sponsorship of almost \$40,000 to broadcast agricultural programs.

VOICE MESSAGING

Two firms, Hekimax Solutions Ghana Ltd and Farmerline Ltd were contracted to pilot voice messaging to smallholder farmers. This form of communication was very attractive, especially for those who are illiterate and would not be able to read a regular SMS message. With the voice messaging from Hekimax, the NF recorded the message he wanted to send to his outgrowers and

Direct Involvement of Radio Stations in Technology Dissemination

As a result of project intervention, Radio Upper West, in partnership with Marktshim, ANTIKA, and the Ambambaah Listenership Club, set up a one-acre maize demonstration field in Busa to demonstrate the zero tillage technology on soya. The demonstration plot was used to train local women to put into practice the messages they receive on GAPs from the radio station's agricultural program, and to encourage group and individual application of the methods. The demonstration also served to improve relationships between listeners, the radio station and sponsors.

ANTIKA also signed a promotion contract in the amount of \$825 with Radio Progress and Upper West Radio to promote the use of improved soya seed.

this message was broadcast to them. They received and listened to the messages in their own language.



Memunatu Alhassan (pictured above) is one of over 1,000 smallholder farmers, 200 of them women, whom the project reached with voicemail messages in their local language on subjects such as farm maintenance, plant population, spraying services, and dates for organizing field days.

The voice messaging helped improve the efficiency and communication channels between NFs and their outgrowers.

Hekimax and Farmerline trained some NFs and a bank to develop their own voice messages which were pre-recorded and delivered in their local languages.

Messages included tips on weeding, planting, spraying, fertilizer sales and proper application. Some financial institutions used the system to send out messages on loan repayment and loan utilization to smallholders.

SMS

Over 20,900 farmers received SMS on market prices, agronomic practices and weather information on a weekly basis in 2012 and 2013. For example, through Esoko (a private ICT company that specializes in information delivery systems), the project reached over 2,000 farmers weekly with information on market prices, agronomic practices and weather information during a pilot program that started in October 2012 and ended in October 2013. A phone monitoring report on the pilot program in July 2013 which included 40

respondents randomly selected from the project intervention area indicated that 92 percent of respondents found the information they received useful. The eight percent who said they did not find the information useful indicated that they could not read the messages received. This suggests that in areas with high illiteracy rates, voice messaging can have better impact on rural farmers than text messaging and should be explored in future projects. The information that respondents found most useful was market price information which enabled them to decide where to sell their produce, and agricultural production tips that helped them apply good agricultural practices on their farms. In order to reach more farmers with the information from Esoko, 16 radio stations rebroadcasted the market and weather information to their listeners throughout the three northern regions. “Through the ESOKO alert, I am able to make informed decisions and to negotiate for better prices when I am about to sell my soy and maize; a situation which I did not have previously”; Big Ajar, NF, Busa.

SMS improved bank's loan recovery

The Sissala Rural Bank has reduced its communications costs as a result of the use of SMS technology to send messages to clients. The bank now spends \$52 per month instead of spending between \$103 and \$155 on sending messages to clients on loans, board meetings, salaries and others, helping to improve relationships with clients.

“Loan recovery has improved because when the FBO leaders get the information on loans they meet their groups quickly and act on the information.” Mr. Alhassan, Sissala RB’s Loans department.

MOBILE MONEY PILOT

Over 2,540 nucleus farmers, input retailers, aggregators and outgrowers signed up for the MTN Mobile Money pilot and used it for standard business transactions including payment for tractor parts, inputs, aggregation, plowing costs, and produce. With the level of enthusiasm shown during the pilot, with some smallholders like members of the Kukunasor Womens' group in the Northern Region having started weekly savings on their mobile wallets from the sale of their produce and using mobile money to purchase items including medications at the local pharmacy and remitting their children who are schooling in Accra and Kumasi. Therefore, we can conclude that the use of electronic payments has great potential in the near future.

Women adopt mobile payments

Two Tigo Mobile Money agents were set up in Wenchiki and Mayama in the Chereponi District of the Northern Region to provide services to 1,000 women farmers belonging to the Kukunasor Women's Association. This was facilitated by the project to promote easy payment for various transactions and to encourage savings after selling produce.

Hakeem, an input retailer of Antika Enterprise and a mobile money merchant said, "People come to me to collect money for one thing or the other. It is a new business I have discovered thanks to ADVANCE and MTN; I can now bring relief to my people through mobile money".

ADDITIONAL DIRECT TECHNICAL AND FINANCIAL SUPPORT TO BENEFICIARIES

VOLUNTEERS AS AN IMPORTANT RESOURCE

The volunteer support program was an integral and important part of ADVANCE which helped to increase participating value chain actors' incomes and agribusiness profits by improving productivity, product quality, market access, information services and organizational management.

To assist in the project's technical delivery ADVANCE fielded 87 volunteers for 127 assignments from January 2010 to March 2013, an average of 30 volunteer consultants each year for both long-term and short-term assignments. Volunteer consultants from the U.S., Ghana and other countries provided a total of 5,628 days of technical expertise through 14 long term (over 100 days) and 73

Improved Business Operations Assistance

Sadawin Milling Enterprise in Kumasi, owned by Sadia Alimatu Awuni, is engaged in rice aggregation, processing and the sale of processed rice. Although the business had been in operation for more than 20 years, it had no long-term strategic plan to guide its activities and was using just 30 percent of its capacity per day. As part of an integrated support strategy, volunteer John Wallbrown trained Sadia on record keeping and inventory management practices. This has enabled her to keep track of business transactions and prepare budgets as overall project support helps to grow her business.



short term assignments (average 21 days) throughout the project life in the following areas:

- Improved production technologies
- Value-addition technologies
- Association and cooperative development and management
- Marketing and linkages to buyers
- Training of farmers, agro-dealers, etc.
- Gender mainstreaming
- Integrated pest management
- Training in environmental and natural resources management

During the 39-month project period, 24 female and 63 male volunteers, several of them returning for a second and third visit, carried out 127 volunteer assignments that supported 88 host organizations.

The total estimated value of the volunteers' time was \$2,645,160 Ghanaian hosts also personally contributed almost \$10,000 to the logistics support of the volunteers. Twelve volunteers were placed directly with the ADVANCE project to work with and train staff and actors in support of the technical program.

Of the 88 host organizations supported, 30 were individual private farmers, one was a public/private educational institution, one was a non-profit public interest organization, 12 were cooperatives or associations, two were public sector technical agencies, 28 were other private enterprises and 14 were rural financial institutions. Together the hosts had 4,918 member/owners, 1,201 employees, and 97,000 business clients; all of them directly or indirectly benefiting from the volunteers' assistance.

ADVANCE implementing partners contributed significantly to the volunteer program. Winrock International provided seven of the long-term volunteers and two of the shorter term volunteers for a total of 1,178 days, and TechnoServe provided 17 of the long-term volunteers for a total of 2,321 days. The two partners contributed more than 60 percent of the volunteer time and value.

GRANTS

The ADVANCE project disbursed \$2,925,648 through grants and grantees provided leverage of \$734,835, of which \$463,246 was cash and the remaining in-kind. This benefitted 3,074 directly and 92,360 indirectly.

With the high poverty levels in northern Ghana, limited access to capital and high interest rates, capital investments by farmers in particular have been slow and inadequate. In order for NFs to upgrade and have the capacity to provide services to their outgrowers in line with the

ADVANCE project model, grants became a great source of motivation and incentive for them to invest in the much needed equipment required for upgrading. The project provided grants for the purchase of various farm equipment including tractors, power tillers, harvesters, threshers, rice mills, planters, dibblers, and donkey carts among other small equipment. The beneficiaries paid 30 percent of the cost of the equipment directly to shortlisted vendors and ADVANCE then paid the remaining 70 percent after the equipment had been supplied to the grantee. With these substantial contributions, some up to \$10,000, the beneficiaries had the incentives to manage, maintain, and use the equipment diligently – and the groundwork was laid for the commercial equipment market post-project.

Upgrading to improve product quality

Taken together, equipment purchased with partial grants from ADVANCE was necessary to allow farmers to get product volumes, quantities and qualities up to the amounts and standards end-users required; mechanical threshing kept grain out of contact with the ground and reduced breakage of kernels or beans through flailing.

Like all other project interventions, project management ensured that women benefited from these equipment grants, especially labor saving but inexpensive equipment such as dibblers, which ensured proper plant spacing and plant population density required for optimum yield, as well as machinery for rice-harvesting and post-harvest processing (rice threshing and maize shelling), which are activities undertaken mostly by women. These equipment grants were designed to improve product quality and reduce post-harvest losses.

Another significant investment the project made with grant funds is the construction of warehouses. To kick start the warehouse receipt program, there was the need to have standardized and certified warehouses, which did not exist at the time the project started. ADVANCE therefore built one 500 mt warehouse in Tamale to pilot the program. Subsequently, three 1000 mt warehouses built under the Millennium Challenge Corporation (MCC) program and an 18,000 mt one belonging to WIENCO have been certified and used in the warehouse receipt program. Therefore building the 500 mt warehouse was a good catalyst to stimulating the take-off of the warehouse receipt system. In addition, the project collaborated with the AGRA-funded Azarkimu project by providing 50 percent of the cost of constructing 18 community warehouses to serve as primary holding storage for grain before transfer to the certified warehouses.

All these grants contributed significantly to speeding up land preparation and expanding the area under cultivation in the three value chains and contributed to improved yield while the harvest/postharvest equipment reduced losses and assured higher quality products.

ENVIRONMENTAL COMPLIANCE AND CLIMATE SMART STRATEGIES

Throughout project implementation, management ensured general compliance with title 22 of the code of federal regulations section 216 (22CFR216), promoted safe use of pesticides, and explored strategies to improve adaptation and resilience to climate change.

PROMOTING SAFE USE OF PESTICIDES

The project recognized the risks associated with pesticide use to both human health and the environment, and therefore designed a pesticide management strategy to minimize these risks. In collaboration with the private sector, the project trained participating smallholder farmers to adopt the best practices required for safe pesticide use, but also acknowledged that it is not economically feasible, given the small scale operations of most smallholders to invest their resources in knapsack sprayers and the required protective clothing.

Collaboration with service providers to disseminate information

The project collaborated with several local radio stations, agro-input importers, retailers and the EPA who served as a technical resource on radio programs that were organized to educate farmers on proper practices and safe handling of agro-chemicals. This ensured widespread awareness of the hazards of using agrochemicals and the fact that anyone could be exposed unintentionally after application. It also served as a medium to market the services of the SSPs.

The project strategy was to facilitate the formation of 26 Spraying Service Providers (SSPs) in 19 districts. This strategy ensured that the three-fold objectives of the ADVANCE

pesticide management program was met, namely to: (i) ensure compliance with title 22 of the code of federal regulations section 216, (ii) promote safe use of agrochemicals and (iii) prevent environmental pollution as a result of improper pesticide applications and disposal. The SSP concept has the potential to maximize safe application and minimize the number of untrained people that are exposed to pesticides.

Members of the SSPs were identified by NFs and input dealers and trained by resource persons from the Ghana Environmental Protection Agency (EPA) with support from the Plant Protection and Regulatory Services Directorate (PPRSD) of MoFA, and in collaboration with major input dealers. Over 2,100 smallholders who are linked to 11 nucleus farmers and four aggregators used the services of the SSPs in the last year of the project. The more widespread and popular SSPs become, the less likely it will be for untrained smallholder farmers to apply agro-chemicals themselves, reducing the likelihood that women and children will come in direct contact with agro-chemicals.

CLIMATE SMART STRATEGIES

The project pursued two interventions to reduce the effects of climate change. The project collaborated with GAIP to promote drought index insurance. GAIP provides drought index insurance for smallholder farmers, as well as commercial farmers for maize and soybean farms. About 460 farmers bought insurance premiums worth \$5,000 to cover 484 ha in the 2012 and

2013 crop seasons and 109 received payouts worth \$2,000 in respect to 55 ha in the two crop seasons. Payments are normally triggered by a dry spell of at least 20 days during the crop season. Banks and input dealers can also insure against their services to farmers to reduce the risks of default in payments. This pilot should be expanded under any future agricultural program that aims at improving farmer productivity under rain-fed conditions.

ADVANCE also worked closely with Ignitia Ltd. on a pilot program to broadcast rainfall forecasting messages through SMS. Through this program messages were sent to 340 farmers, input dealers, MoFA agricultural extension agents, banks and ADVANCE staff on a pilot basis during 2013. The text message indicates what the weather, in terms of rainfall, is likely to be on the day of the text message and the next day. Based on the forecasts, the farmers and other recipients planned their farming activities such as application of fertilizer and other agrochemicals appropriately.

EQUAL OPPORTUNITIES FOR ALL GENDERS

At the start of the ADVANCE project, a gender study was conducted to identify and analyze gender constraints and develop strategies that would ensure that women and men benefit from the project without any form of discrimination or disadvantage. In some cases, however, project management made a conscious effort to ensure women benefitted in instances in which they

were too disadvantaged to compete with the men. Some examples include the training on numeracy which targeted mostly women; 4,145 women (99 percent of total trained) were trained in numeracy skills. This was necessary because their general lack of numeracy skills made them less capable of keeping any form of records or recollecting accurately how much they had spent on the

farm vis-à-vis the revenue to determine profits. This placed them at a disadvantage when applying for any form of financial services or credit as this basic information is generally a requirement. Another example where women received preferential treatment was under the grants program where they were given donkey carts and bullock ploughs if they had either donkeys or bullocks respectively without having to provide additional leverage.

At the beginning of 2013, the management team of the project commissioned an assessment to evaluate the project's performance in reaching women and to identify both impact and challenges that needed to be addressed as the project entered its final year. The assessment showed that project activities had helped women participate fully in economic activities,

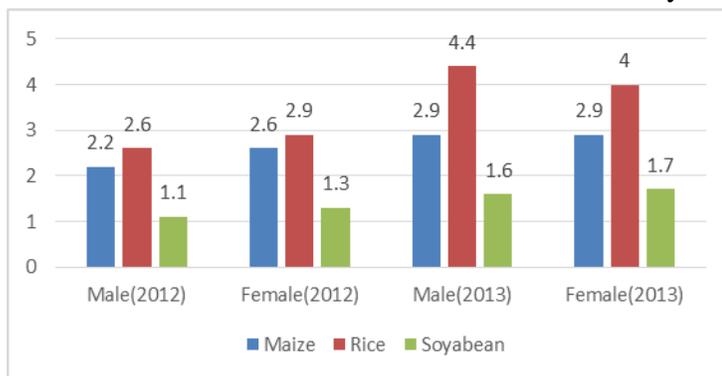


Figure 6: Comparison of crop yield of men and women beneficiaries

contributed to improved food security and decreased household level conflict. Some of the key findings were that interventions that were tailored specifically to benefit women, such as the numeracy training, listenership clubs and leverage relief in the grants program, enabled the project to reach and positively impact more women. Also, the assessment showed that women are more likely to apply recommended technologies, and as a result their yields sometimes increased more than the men's (Figure 6). Gross margin data analysis followed the same trend when comparing men and women; the women smallholder maize and soybean farmers generally had higher gross margins than the men.

Other important observations from the gender assessment were:

- With increased production, women who previously had little to sell were realizing new marketing opportunities and require additional support on when to sell their produce and how to develop relationships with buyers and enhance their negotiating skills.
- Both financial institutions and other sources of credit such as aggregators and nucleus farmers have learned that women's repayment rates tend to be higher than men's, and are becoming less reluctant to work with them despite their lack of collateral.
- Women report that increased economic security enables them to contributing significantly to educate their children and feed their families, and also reduces conflicts between spouses.



Women Receiving Numeracy Training

LESSONS LEARNED

In recent years, many projects funded by USAID and other donors profess to adopt a value chain approach. However, no two project approaches are the same making it is difficult to define a standard value chain approach to project implementation. The ADVANCE project team learned many lessons during project implementation, with key examples below:

The nucleus farmer model

At the start of the project the overall strategy was to identify lead firms to drive the value chains. It was expected that large agro input importers and wholesalers as well as major buyers and producers would have incentives to promote their inputs or to buy raw material (i.e. farmers' produce) and therefore invest downstream. During the first year of the project, it became apparent that these firms were not ready to take that lead role, either because of previous experiences where they had tried but failed, or their perceived high risk. Also, there was a relative scarcity of large, representative producer associations with capacity to step into the role of aggregator and service provider at any appreciable scale. Therefore, the ADVANCE value

chain approach placed the NF at the center of the chain because of the ease with which they could be linked to markets upstream and to smallholder producers downstream at the same time, making it easier to work with banks and input companies. They also proved to be willing to make at least modest investments in producers within their communities.

The most important factor is that the NFs were selected because they owned tractors (a critical piece of machinery for land preparation in the north) and already provided tractor services to smallholders often on credit. They had existing relationships but lacked clear and reliable markets, access to finance and the ability to provide additional services. Even with support from ADVANCE, not all NFs were willing to provide additional services beyond plowing. In those cases, their outgrowers' productivity did not improve significantly, except in cases in which the outgrowers were separately linked to sources of inputs and/or finance.

The ADVANCE team believes that the NF model can be pursued as another value chain approach beside the lead firm and producer organizations where conditions lend themselves to its adoption. It is very important to note that success with the ADVANCE model hinges not only on the NF. The best results were achieved when the NF effectively collaborated with input dealers, financial institutions and buyers. Finally, it is important to note that not every commercial farmer can become a good NF. Reaching out to smallholder farmers through good and credible community leaders, understanding the role of NFs, and staying in or close to the commodity or outgrowers are all important factors in success.

Private sector response to the ADVANCE model once it got off the ground

In the first two years of the project, most private sector firms were either totally disinterested in working closely with the project or preferred to watch from a distance. At best, they bought produce and paid for it after delivery. By the third year of the project, this began to change and firms such as Premium Foods Ltd. and aggregators including Sadia, Agnes Yankey, and Rebecca Dowokpor began investing significantly in smallholder farmers, especially for rice and maize. There was a clear 'wait and see' attitude before they realized the potential gains and became motivated to invest down the chain. The project proposed and supported these firms to adopt strategies that reduced risks to their investments, which partially accounts for their decisions and willingness to invest.

The relationship between the buyers and the producers was further strengthened when each party adhered to the terms of the agreements made. For example, the speed with which some farmers paid off loans advanced to them by Premium Foods Ltd. to pay their 30 percent leverage, which then enabled them to purchase tractors under the grants program.

It is also of note that private sector firms, especially input companies, responded positively and financed all the demo sites as a means of promoting their products because they realized a win-win opportunity.

Overcoming real and perceived risks of agricultural lending

There was found to be an increased comfort level in the assessment of the risk of farmers where training was directly provided to the bank's loan officers, resulting in increased lending.

Additionally, there is a learning process for both the financial institutions, which have had limited experience lending in the agricultural sector, and value chain actors who have had limited experience accessing credit. Both now have a better understanding of the costs involved, the scheduling and impact of repayments on business' cash-flow projections, and appropriate loan sizes.

Differential rates of adoption and willingness to change

While there is no empirical data to support this assumption, the project team observed a certain level of donor dependence in the larger towns of the northern region at the beginning of the project which was a hindrance to private sector investment. A good example is the challenge faced by Premium Foods Ltd. in investing in Botanga, where after providing tractor services, seed and fertilizer, the farmers refused to repay in-kind as agreed. These farmers side-sold all harvested rice, refusing to pay back the cash. However, the same company later invested in rice farmers in the Upper East region and maize farmers in the Upper West region and had little trouble getting repayments, which led to further investments the following year.

Also, adoption of GAPs is generally better in the Upper East and Upper West regions than the Northern Region because of better incentives for private sector firms, including financial institutions, to invest there. Field staff observed that in the Upper West region farmers were more actively involved in project activities compared to the Northern Region. Examples include participation during field days and the gross margin data collection exercise.