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THE FOOD, AGRIBUSINESS AND RURAL MARKETS (FARM) PROJECT

Final Project Report

Contract No.: EDH-1-00-05-00005-00, Task Order No. 16

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With:

ACDI/VOCA
Action Africa Help International
Risk and Security Management Consulting

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DISCLAIMER

The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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ACRONYMS

AAH-I	Action Africa Help-International
AGRA	Alliance for a Green Revolution for Africa
ASPF	Agriculture Sector Policy Framework
CAMP	Comprehensive Agriculture Master Plan
CBSD	Cassava Brown Streak Disease
CES	Central Equatoria State
CMD	Cassava Mosaic Disease
CO	Contracting Officer
COP	Chief of Party
CSERD	Country Security and Emergency Response Director
DCOP	Deputy Chief of Party
EES	Eastern Equatoria State
FaaB	Farming as a business
FAO	Food and Agriculture Organization
FARM	Food, Agribusiness and Rural Markets Project
FBO	Farmer-based organization
FPLC	Farmer Participatory Learning Center
FY	Fiscal year
GAP	Good agronomic practices
GDP	Gross domestic product
GIZ	German Society for International Cooperation
GOSS	Government of Southern Sudan
ha	Hectare
ICRAF	International Center for Research in Agroforestry
ICT	Information and communication technology
IFDC	International Fertilizer Development Center
JICA	Japan International Cooperation Agency
kg	Kilogram
M&E	Monitoring and evaluation
MAF	Ministry of Agriculture and Forestry
MAFCRD	Ministry of Agriculture, Forestry, Cooperatives, and Rural Development

MAFTARFCRD	Ministry of Agriculture, Forestry, Tourism, Animal Resources, Fisheries, Cooperatives and Rural Development
mt	Metric tons
NAFA	Nzara Agricultural Farmers' Association
NEAT	National Effort for Agricultural Transformation
NGO	Nongovernmental organization
P4P	Purchase for Progress
PERSUAP	Pesticide Evaluation Report and Safer Use Action Plan
PMP	Performance Monitoring Plan
RAISE	Raising Rural and Agricultural Incomes with a Sustainable Environment
RFP	Request for proposals
RSM	Risk and Security Management Consulting
RSS	Republic of South Sudan
S4D	Seeds for Development
SPLM	Sudan People's Liberation Movement
TOT	Training of trainers
USAID	United States Agency for International Development
WES	Western Equatoria State
WFP	World Food Programme
YAFA	Yambio Farmers' Association

EXECUTIVE SUMMARY

During its five years of operation, the USAID-funded Food, Agriculture, and Rural Markets (FARM) project established a strong foundation for agricultural development in the Greenbelt region of South Sudan, and did so in a very challenging and fragile environment. Significant gains were made in staple crop production and productivity during FARM's lifespan. At project inception, smallholder producers in the region had little knowledge of, or access to, modern farming technologies and practices. Many struggled even to achieve subsistence production levels. As the region became food secure with support from USAID, smallholder farmers began to produce at surplus levels, allowing budding markets to take hold in the Greenbelt. While these markets were beginning, FARM laid substantial groundwork for a market-driven agricultural sector, which is needed to achieve scalable and sustainable results for the country. While much more needs to be done, FARM has left a wealth of know-how, skills, and experience with thousands of smallholder farmers and agribusiness people, and the public sector that supports them.

The FARM project was at the forefront of introducing modern agricultural technology and management practices, which had not previously existed in the country. The project made a significant impact by helping smallholder farmers in 9 of the 24 counties in the three Equatoria states increase their agricultural productivity and production. It did so by introducing modern seed technology to the region, fostering widespread adoption of good agronomic practices, and guiding smallholder farmers to sustainably use their lands. FARM also created the systems, structures, and networks to reach very large numbers of farmers in difficult-to-access locations in a cost-effective manner. Noteworthy production results achieved by the project include:

- Developing a network of **666 rural community-based farming organizations,** which enabled direct project assistance to reach more than 15,600 farmers in a cost-effective and scalable manner.
- Introducing **modern seed technology**, distributing over 1 million kilograms (kg) of certified maize, sorghum, cassava, groundnut, bean, rice, millet, and sesame planting material.
- Motivating smallholder farmers to place **19,400 hectares of land under cultivation** using modern technology and agronomic practices.
- **Changing long-standing traditional farming behaviors** with modern agronomic practices for a substantial number of smallholder farmers, and training more than 5,000 lead farmers on good agronomic practices.
- Introducing **sustainable land-use practices** through trainings, pilot demonstrations, and a national awareness conference.
- Developing a team of 39 extension workers during the final years of the project, responding to an immediate need for **extension support** to implement FARM programs and expanding the project's ability to support farmers in each target payam.

Significant gains were also achieved in transitioning the Greenbelt to become a market-driven economy. FARM helped establish early markets, initiate economic activity, and create market development platforms for future growth. Farmer groups and cooperative unions were established to aggregate and bulk sell smallholder produce. Business linkages were established through national and state agriculture fairs and other forum events. The project also introduced on-farm grain processing and value-addition technology to the region for the first time. FARM worked hand-in-hand with the host government to

draft its first national policies on agriculture. Highlighted agriculture trade results achieved during the project include:

- Developing value-chain intermediaries to **aggregate smallholder surplus production for bulk sale to larger markets**, and developing seven cooperative unions that represent more than 3,600 farmers.
- Establishing or strengthening **48 agribusinesses** with project assistance.
- Working with South Sudan's government to establish the **first national and state agriculture trade fairs** by supporting South Sudan's government, including two national and six state fairs, and launching 14 farmer-trader forums.
- Introducing **mechanized grain processing technology** for on-farm processing and value-addition marketing, and training more than 1,500 farmers on cassava chip processing and 78 farmers on on-farm processing.
- Sharply increasing **commodity sales activity** through local markets, local traders, and large institutional buyers such as the World Food Programme.
- Facilitating the signature of one **enabling environment policy** for agriculture, with six more awaiting approval by the National Assembly.

FARM's active capacity building and training program supported its production and marketing components. This program was consistently well-received by counterparts and beneficiaries, thanks to its mission of developing the capacity of South Sudanese people, groups, and organizations to achieve self-reliance and long-term sustainability. FARM's capacity building activities strengthening the knowledge, skills, and organizational capacity of four main stakeholder groups: farmers and farming groups, private sector actors, extension workers, and the public sector at all levels of government. Notable results under this component include:

- Training more than **22,000** in topics related to **agricultural production**.
- Training more than **3,500 in business decision-making, market development, and business linkages**.
- Testing **one public-private partnership** in seed multiplication.
- Collaborating closely and building **capacity at all levels of government** in a broad range of areas, with 538 trained.

FARM's work incorporated several cross-cutting areas, which helped achieve the project's objective of increasing food production in the Greenbelt. Primary accomplishments in these areas include:

- Prudently awarding **over 2,000 grants,** totaling over $2.9 million.
- Using the latest **information and communications technology to develop a prototype marketing information system,** which is scheduled for implementation under the FARM II project.
- **Applying climate smart agriculture** to FARM's production programs and piloting sustainable land reclamation guidelines on 11 block farm sites.
- **Empowering women** as 38% of the project's beneficiaries were female farmers. While production activities relieved women of burdensome work in areas such as weeding and on-farm manual processing (i.e. de-cobbing maize), women were also highly engaged in FARM's market development programs, which improved their economic standing in areas such as value-addition processing and cooperative formation.

- Synergizing with **other USAID initiatives,** including the Seeds for Development program and agency support for the Government of South Sudan's National Effort for Agricultural Transformation (NEAT), and collaborating with **other donor programs**.

South Sudan is the world's newest nation, having achieved its independence from the Republic of Sudan in 2011 after decades of war and conflict. The country is currently ranked as the world's most fragile state by the Fund for Peace, a leading research institute, due to its high poverty levels, ethnic-based conflict, and political tensions. The dissolution of the government in July 2013 and the subsequent December 2013 conflict had significant ramifications for the FARM project's scope and implementation. In this ever-changing environment, FARM quickly adapted to many shifts in direction over the past five years. Highlights of the project's success in pressing forward despite the vagaries of the situation include:

- Responding to South Sudan's objective of being a food secure nation by **focusing all project activities on staple crop production** and trade and later **adapting project activities** to support the country's NEAT initiative before the December 2013 conflict. FARM also provided **rapid and intensive support** to South Sudan's first two national trade fairs.
- **Maintaining project operations during a four-month expatriate evacuation period**, including **delivering 217,500 kg of seed** throughout the region under strong leadership from South Sudanese staff supported by expatriate management from outside the country. FARM was one of the first development programs to return expatriates to South Sudan after the evacuation.
- **Incorporating a full-time Country Security and Emergency Response Director** to help project management **continue operations in a declining and unstable security environment.**

On April 16, 2015, as the FARM project was coming to an end, USAID awarded a follow-on contract (the Feed the Future South Sudan Food, Agribusiness, and Rural Markets II project) to Abt Associates. This new project enables USAID to deliver one additional year of agricultural development support in the Greenbelt. FARM II builds on the solid foundation achieved by FARM. The new project will further emphasize a "market-pull" approach to achieve scalable and sustainable results in the Greenbelt's agriculture sector. It will provide advanced support to strengthen cooperative unions, improve post-harvest handling and storage, upgrade value-addition processing, enhance market linkages and business opportunities, and decrease market barriers by disseminating market information and improving access to credit and financial services. Capacity building efforts under FARM II will promote more entrepreneurialism and public-private partnerships through grants, business development counseling services, and technical assistance. The follow-on project will also prioritize local institution building in the public and private sectors to create a foundation for long-term and sustainable support to South Sudan's vitally important agricultural sector.

1 BRIEF CONTEXTUAL REVIEW

South Sudan covers an area of approximately 640,000 square kilometers, roughly the size of Alaska, and includes stretches of tropical and equatorial forests, wetlands, savannah, and mountains. The country has six agro-ecological zones, corresponding with distinct areas of the country that have varying climatic and topological characteristics. Each zone presents different opportunities and has unique needs for agricultural development. The Greenbelt region, which includes the southern areas of the three Equatoria states, offers the greatest agricultural potential in the country with substantial rainfall, fertile and arable land, sufficient population density, and a past farming tradition.

Photo: Michael Godfrey, Abt Associates

Traditional landscape in the southern part of Central Equatoria State

With an estimated population of 10.9 million, South Sudan's population density is approximately one-tenth that of neighboring Uganda. Two-thirds of South Sudanese are under age 30 and about 83 percent live in rural areas. Approximately 27 percent of the population over the age of 15 is literate, but the literacy rate for men is about 250 percent higher than the rate for women. South Sudan also has the highest maternal mortality rate in the world (2,054 per 100,000 live births) and one of the world's highest infant mortality rates (68.14 for 1,000 births).

Southern Sudan has been war-torn since the Republic of Sudan achieved its independence in 1956. Sudan experienced two civil wars, one from 1955 to 1972 and another from 1983 to 2005, which caused significant loss of life and displacement of people. The wars led to an exodus of human talent, a disruption of economic activity, and inadequate institutional and infrastructure development. A Comprehensive Peace Agreement signed between the Sudan People's Liberation Movement (SPLM) and the Republic of Sudan on January 2005 ended the second civil war. At that point, southern Sudan remained an autonomous region of the Republic of Sudan, and was led by the Government of Southern Sudan (GOSS).

A referendum on independence took place from January 9 through 15, 2011; the vast majority of Southern Sudanese voted for independence. The Republic of South Sudan (RSS) became the world's newest independent country on July 9, 2011. One half of the land in South Sudan has high potential for agriculture, but 98 percent of the government's revenue and 60 percent of the nation's gross domestic product (GDP) come from the petroleum industry. The United Nations Food and Agriculture Organization (FAO) has reported that only 4.5 percent of South Sudan's land is cultivated for agricultural purposes. Smallholder farmers are the primary source of agricultural production in South Sudan, with farmers cultivating plots ranging from 1 to 4 feddans per family.[1]

When the Food, Agribusiness and Rural Markets (FARM) project began operations in 2010, most farmers in the Equatoria states were operating at pre-subsistence or subsistence levels, mostly using rudimentary hand-tools, low-producing planting material, and inefficient agronomic practices. Farmers were widely dispersed in remote and difficult-to-access locations and were highly risk adverse due their war experiences and extreme poverty. For several decades, little commercial agriculture existed in southern Sudan, leaving insufficient institutional or human capacity to support agribusiness development. The country also did not have much infrastructure. Roads were poor, electricity was sparse, and basic services did not exist. Inexpensive imported foods were highly prevalent in local markets and humanitarian organizations had been providing food and relief assistance to local populations for a very long time.

[1] A feddan is the commonly used measure for a plot of land in South Sudan. 1 feddan = approximately 1.038 acres.

2 INTRODUCTION

The end of the second civil war in 2005, marked by the Comprehensive Peace Agreement, provided sufficient stability to enable sustainable agricultural development programs to be established in southern Sudan. The United States Agency for International Development (USAID) created the FARM project to support the country's goals of achieving food self-sufficiency, reducing poverty, and promoting economic growth. The project was awarded to Abt Associates as the 16th task order under the Rural Agricultural Income and Sustainable Environment (RAISE) Plus indefinite quantity contract, with a total value of $54,238,973. The primary purpose of the project was to sustainably increase agriculture productivity and food production, especially among smallholder farmers, to meet the host government's food security objectives and to promote market development and increase trade. Its main components were agricultural productivity, agricultural trade, and capacity building.

Because of the Greenbelt's high potential for agriculture, USAID directed the FARM project to concentrate its efforts in that region. The project's geographic area of focus was defined as nine yet-to-be-determined counties in the Greenbelt region, which extended from Budi Country in Eastern Equatoria State (EES) through the southern tip of Tambura County in Western Equatoria State (WES). FARM's target commodities were to include staple crops, oilseeds, cash crops, livestock, and horticulture. The Ministry of Agriculture and Forestry (MAF) was selected to serve as the project's main counterpart, with responsibility for liaising with other relevant national and state ministries.

2.1 START-UP

The initial FARM team arrived in Juba to establish project operations on March 2010, one month before April elections to select the government's national assembly and president. The project was formally launched by USAID Administrator Rajiv Shah on May 17, 2010. There was significant media coverage promoting the event, which garnered support for the project among key domestic and international constituents. During this start-up period, project staff made presentations and met with key government stakeholders within GOSS, MAF, other key national ministries, and the three Equatoria state governments. Relationships were forged with organizations such as the FAO, the World Food Programme (WFP), and various international nongovernmental organizations (NGOs).

FARM established temporary state offices in Torit (in EES), Yei (in Central Equatoria State, or CES), and Yambio (in WES) during June 2010. In July, a conference was held to select the three counties in each state and the three payams in each county that would receive project support. FARM also contributed to the Southern Sudan Agriculture Consultative Conference in Nairobi on August 24-25, 2010, which was co-sponsored by MAF and USAID. The purposes of this visible event were to share the GOSS's vision for agricultural development in southern Sudan, stimulate input and involvement by policy leaders within the GOSS and the Equatoria states, and generate interest and support from the international community. By early September 2010, FARM had moved into its permanent offices in Juba and the three states and had received much of its office and computer equipment. Expatriate staff members also began to move into their long-term housing. Technical work began in areas such as land preparation, post-harvest storage, good agronomic practices (GAP), and farming as a business. And, while the project began by focusing on the maize and sorghum value chains, it also initiated work in areas such as horticulture, poultry, small ruminants, and honey.

2.2 TRANSITION TO A FOCUS ON FOOD SECURITY

Within its first year of operations, FARM's focus shifted to emphasize staple cereal crops. This was the result of changes within MAF and consultations between USAID and the ministry. The project's main counterpart, the Honorable Samson Kwaje, who had served as the Minister of Agriculture and Forestry during the initial months of the project, passed away on July 31, 2010. He was replaced by the Honorable Ann Itto. In November 2010, Minister Itto and USAID agreed that FARM should more closely align with the government's food security objectives by focusing on dramatically increasing staple crop production in the Greenbelt. Four priority value chains were selected: maize, cassava, groundnuts, and sorghum. All activities in other value chains were phased out and discontinued.

The first step was to distribute improved maize, cassava, groundnut, and sorghum seed to farmers in project-supported areas. FARM began distributing seed in March and April 2011, the first of the Greenbelt's two planting seasons. The project provided in-kind seed grants and related services to 185 community farmer-based organizations (FBOs) with 4,250 smallholder farmer-members. Seed orders were obtained from these FBOs and aggregated; the project then solicited an open competitive procurement within the East Africa region.

The project procured a total of 217,312 kilograms of planting material for the Greenbelt's two growing seasons in 2011. The distributions were challenging due to infrastructure problems, capacity constraints, and remoteness of farmers' locations. The activity required the complete engagement of all project staff for several months. Vendor trucks sometimes arrived late to their destinations. Two local transport drivers were shot and killed transporting cassava stems in Budi County in EES. Another major problem was that a Ugandan vendor supplied uncertified sorghum seed that did not meet procurement specifications, but these deficiencies could not be detected until the crop began to grow.[2] Despite all these challenges, the 2011 seed distributions were considered a success as 97 percent of the seed arrived at desired locations, improved seed technology was introduced the region, and lessons were learned from this initial distribution that improved efforts for subsequent years.

2.3 SUPPORT TO THE SEEDS FOR DEVELOPMENT PROGRAM

In 2012, USAID established a new Seeds for Development (S4D) program in South Sudan. This program introduced two new USAID-funded partners to South Sudan: the International Fertilizer Development Center (IFDC), to carry out input supply and market development activities in the Greenbelt; and the Alliance for a Green Revolution in Africa (AGRA), to implement seed research in South Sudan, increase local capacity in this area, and initiate seed multiplication activities in the country.

FARM was asked to play a coordinating role and help integrate IFDC's and AGRA's work into an overall agriculture development program for the mission. The project made its office space available to IFDC staff and both projects were co-located in the same office compound. AGRA chose to have independent space. While IFDC operated an independent input supply voucher program, FARM collaborated with the organization in a number of areas, including implementing an on-farm demonstration program. The project also made its field staff available to assist IFDC field activities and provided logistical support, such as customs assistance, on an as-needed basis. FARM's Chief of Party (COP) also served as a main point of contact with South Sudanese counterparts for the overall USAID agricultural development program.

As the S4D program began operations in South Sudan, concerns were raised about the high cost per beneficiary of the FARM project. USAID directed FARM to cut back spending in early 2012. Starting in

[2] The vendor later repaid the project for the value of the sub-standard sorghum seed.

February 2012, spending under FARM's approved work plan budget was limited to $850,000 per month. This narrowed the scope of project activities to 1) agricultural production assistance, 2) limited market development (farmer to primary trader), 3) capacity building, and 4) policy support.

FARM activities showed strong results in 2012 and the mid-term evaluation supported the reinstatement of a full complement of project activities. This led USAID to remove the project's $850,000 per month spending constraint a few months into the fiscal year (FY) 2013 work plan period, which began in October 2012. This allowed the project to scale up or introduce new activities. Additional positions were added to increase the project's operational capacity. Full-time extension workers were engaged for each of FARM's 27 payams to expand the project's reach to more Greenbelt farmers. Expatriate State Coordinators were hired to improve management and operational capacity for each state program. An Agriculture Information Officer position was introduced to enhance the project's monitoring and evaluation capabilities. FARM also expanded its role in market development, primarily focusing on developing cooperative unions. The purpose of this activity was twofold: 1) establish umbrella organizations that could begin linking FBOs and local cooperative societies to aggregate smallholders' surplus production for bulk sale to outside buyers at higher prices; and 2) create unions which, as they evolved, could provide input goods and services to their member groups.

2.4 RESULTS OF THE MID-TERM EVALUATION

USAID commissioned a mid-term performance evaluation at the mid-point of the project in 2012. The purpose of the evaluation was to assess the project's performance and make recommendations on improvements for the remaining years. The evaluation focused on seven areas: 1) achievement of targets, 2) cost efficiency, 3) contributions to USAID's intermediate results, 4) sustainability, 5) gender impact, 6) stakeholder coordination, and 7) project management. The evaluation, carried out by Social Impact, Inc., included four weeks of field work during October and November 2012 and relied primarily on qualitative data collected from key informant interviews and discussions with project beneficiaries. The report was finalized in December 2012.

The evaluation report suggested that the project's cost-per-beneficiary calculations were on the high end of similar agriculture development projects, but they were not deemed unreasonable given the challenging operating context in South Sudan and the fact that the project would begin to gain economies of scale as more farming groups were added to the project. The evaluation reported that FARM's seed distribution and GAP training had made significant contributions toward increasing farmers' productivity and yields, but that little progress had been made in increasing farmers' access to markets, primarily because surpluses were limited, roads were poor, traders were few in number, storage was inadequate, and the population's business skills were limited. The evaluation found that FARM had increased the knowledge and skills, particularly in GAP, of FBOs and their member farmers, but that continual work would be needed in this area. It also suggested that additional work would be needed to enhance the skills of extension workers. The report recommended a more deliberate focus on the project's gender effects, particularly in the areas of marketing and processing. It highlighted the importance of building agricultural information systems and linking them with other stakeholders and FBOs to strengthen the sustainability of this important function. While all levels of government responded favorably about FARM's effectiveness, the report suggested that the project make additional efforts to collaborate with other donor programs to improve sustainability and leverage resources.

While the evaluation mentioned the various management challenges experienced by the project, it also reported that FARM had largely been responsive to USAID regarding shifts in project focus and direction. The evaluation supported the project's FY 2013 work plan, which incorporated cooperative union development work aimed at helping these nascent organizations become service providers for local farmer groups and create markets for their surplus production.

2.5 SUPPORT FOR THE NATIONAL EFFORT FOR AGRICULTURE TRANSFORMATION

The Honorable Betty Agwaro became the RSS's Minister of Agriculture and Forestry in 2011, shortly after independence. FARM worked closely with Minister Agwaro on a number of initiatives, including the delivery of South Sudan's first two national Agriculture Trade Fairs in 2011 and 2012. The project also collaborated with the minister to develop guiding principles for sustainable land reclamation and introduce block farming to the region. With support from the Japan International Cooperation Agency (JICA) and USAID, through the consulting organization McKinsey and Company, Minister Agwaro engaged in a strategic planning process called the Comprehensive Agriculture Master Plan (CAMP). CAMP was designed to be a multi-year initiative to create a national agriculture development plan, using data, analysis, and strategic investment to bolster South Sudan's most promising sector for economic development. With this plan, South Sudan would be in a position to lead its own economic development and engage international donors to contribute to the execution of an overall national plan.

As CAMP was intended to be an evidence-based multi-year endeavor, Minister Agwaro, with USAID support through McKinsey and Company, also developed a National Effort for Agriculture Transformation (NEAT) plan in 2013 to generate immediate action toward achieving the country's goal of being a hunger-free nation by 2014. The NEAT initiative was designed to achieve customized short- and mid-term development results for each of South Sudan's six major agro-ecological zones, based on the distinct characteristics, needs, and opportunities of each region. USAID agreed to support the NEAT initiative by 1) providing administrative and technical leadership to a management unit that would be embedded within the ministry and be responsible for lining up and overseeing the six agro-ecological programs through a Senior Technical Advisor, who would lead the program, and a Senior Monitoring and Evaluation Specialist, who would oversee a national monitoring and evaluation (M&E) process; and 2) serving as the implementing donor of the agricultural development program for the Greenbelt agro-ecological zone through FARM.

In response to the NEAT initiative, USAID asked FARM to prepare a proposal to add the necessary project resources to support the embedded implementation unit as proposed under NEAT. In addition, the project was asked to include in the proposal programs that would scale up commercial development in the sector, based on the needs and requests of each state government. This included a more robust block farm development program in EES, introduction of entrepreneurial grants and support in CES, and cooperative union investment and support in WES. FARM nominated two strong senior candidates for the proposed positions and submitted an aggressive implementation plan for the Equatorias as requested under NEAT.

Shortly thereafter, on July 23, 2013, President Salva Kiir Mayardit dissolved his cabinet. Minister Beda Machar Deng subsequently took over what was now renamed the Ministry of Agriculture, Forestry, Cooperatives, and Rural Development (MAFCRD) and oversaw its merger with the Ministry of Wildlife Conservation and Tourism and the Ministry of Animal Resources and Fisheries. Together these agencies formed the Ministry of Agriculture, Forestry, Tourism, Animal Resources, Fisheries, Cooperatives and Rural Development (MAFTARFCRD). The NEAT program remained on hold for several months during this transition and was essentially removed from consideration once the conflict broke out between the government and opposition forces on December 15, 2013.

2.6 RESPONSE TO CONFLICT AND EVACUATION

The conflict that started in December 2013 significantly altered implementation for the remainder of the project. Upon mission orders, FARM evacuated all expatriate staff on December 19, except for the COP who remained in South Sudan through December 23 to close offices and secure project assets.

The project continued activities during the four-month evacuation period and was one of the few development programs that continued to operate during the crisis. With USAID approval, project management established a small office in a hotel in Nairobi, Kenya, during the evacuation period. From this location, the COP and the Deputy Chief of Party (DCOP) managed activities remotely by telephone, email, and courier services. All other expatriate staff remained in approved locations in the U.S. or in their countries of residence; from these remote locations, they established regular contact with supervisors and staff members by telephone, Skype, and email to manage activities. On January 10, 2014, once major roads were secured in the Equatoria states, field activities resumed. All South Sudanese staff returned to their work stations by mid-January.

Under significant time constraints and difficult conditions, the project was able to continue its seed distribution for the 2014 growing seasons during the expatriate evacuation period. The project partnered with local farming groups in a complex logistics exercise to distribute 217,500 kg of improved certified seed to 8,308 farmers and 310 FBOs by the spring planting season, which began in April. By successfully completing this distribution during a period marked by continued fighting and unrest, the project was able to ensure that crops were planted in many parts of South Sudan's agricultural heartland. This, in turn, helped avert food insecurity in the region.

At the end of the seed distribution period, the Contracting Officer (CO) authorized the expatriate project team to return to South Sudan on April 17, 2014, provided that Abt Associates deemed the situation safe enough. Abt gave the authorization for expatriates to return to post. All expatriates were back in South Sudan by early May, making FARM one of the first organizations to return its expatriate staff to South Sudan after the conflict.

Photo: Abt Associates

FARM's seed distribution activities continued in 2014 throughout the conflict period, helping avert food shortages in the Greenbelt.

Abt's security director traveled to South Sudan in May 2014 to assess the security situation. Although he determined that security threat levels in South Sudan remained quite high, he advised that project operations in the Equatorias could continue under controlled conditions and with strict adherence to sound security guidelines and adoption of tailored evacuation plans for each location. He also advised that the project should have a full-time security management professional in country at all times to handle preparedness planning, security oversight, and crisis management. Upon approval from USAID, the FARM project joined forces with Abt's USAID-funded Health Systems Strengthening Project in South Sudan to arrange for a full-time security professional through subcontractor Risk and Strategic Management Consulting (RSM) beginning in September 2014.

Due to the uncertain political and security situation in the country and the mission's evolving objectives due to uncertainty caused by the conflict, USAID/South Sudan requested that the project propose a modified work plan in late January 2014 to incorporate the mission's revised priorities of conflict mitigation, recovery and resiliency, and social cohesion. The mission asked FARM to concentrate on performing existing key activities, particularly the agricultural production and farmer group formation, rather than to ramp up new ones. The project was further advised that the mission's strategic framework would be short-term in nature. USAID requested that the project limit direct interactions with the

national government to administrative actions while continuing to working with local government counterparts, particularly at the payam and county levels.

The project's core priorities did not change during its final fiscal year. FARM continued to support smallholder farmers and pursue further gains in production, aggregation, and market development. The project maintained land preparation, certified seed, GAP training, and post-harvest storage activities. It also continued to deliver training and technical support to the seven nascent cooperative unions that had been formed in 2013 and to further collaborate with programs such as the WFP's Purchase for Progress (P4P) initiative. The project prepared for the pending 2015 seed distribution, adding 82 new FBOs to the its network and procuring 494,000 kg of seeds for distribution under the FARM II project beginning in June 2015.

2.7 PROJECT CLOSE-OUT

In addition to navigating the difficult security situation in South Sudan, FARM experienced many staffing and closeout challenges that are typical in the final year of a large project. With an understanding that USAID might request that program activities extend beyond the contract's end date, the project operated on two tracks during the final months. One track was to prepare for the full closeout of the project on February 17, 2015. The other was to position the project to work beyond this date if directed by USAID. On January 22, 2015, FARM was issued a no-cost extension for an additional two months, to continue work through April 17, 2015. On February 6, 2015, the project received a request for proposal (RFP) for a sole-source, one-year contract to further extend FARM's services. Abt Associates submitted a proposal on February 28 and the one-year follow-on contract, FARM II, was awarded to Abt on April 16, 2015. During this time, FARM continued to implement core project activities and recruit and fill open positions.

3 PROJECT MANAGEMENT

The FARM project was a five-year $54,385,000 contract awarded as task order number 16 by the United States Agency for International Development to Abt Associates under RAISE Plus, Contract Number EDH-I-0-05-00005-00. The task order was executed on February 18, 2010, with a February 17, 2015, expiration date. The contract was later extended by two months leading to an April 17, 2015 end-date.

Abt Associates served a prime contractor for the project responsible for the technical delivery, financial management, and compliance to the contract. Abt is joined by a team of three subcontractors, including Action Africa Help-International (AAH-I), a Nairobi-based NGO with significant experience operating in South Sudan in agriculture and other sectors. AAH-I's role in FARM is primarily focused on community involvement and the provision of extension services. ACDI-VOCA is also included on the team and provided support to the project's production and trade components. RSM International provided local drivers, security management, and limited logistics support to the project. Sheladia Associates, an infrastructure development consulting firm, was proposed to be included on the team. However, USAID instructed Abt that the initial infrastructure assessment work that was included in the task order would not be needed early in the implementation period.

3.1 MANAGEMENT AND STAFFING

Although humanitarian assistance programs were quite prevalent, very few development programs were active in South Sudan at the time the FARM project was awarded in 2010. To be responsive in this environment, the project placed emphasis on adapting to the country's very challenging and highly dynamic environment and to the changing needs of the program. This need for flexibility applied not only to programming decisions, but also to project staffing.

FARM was initially designed to include 31 staff members, including six expatriates and 25 locally hired staff. Positions were added, eliminated, or condensed as the project evolved over its five-year lifespan (see Table 1 on the following page). Major changes included adding and adjusting the number and types of expatriate staff. The project eventually discontinued two expatriate positions. This included the Financial Services Advisor position, since there would not be opportunities for financing until there was market demand for such services among smallholder farmers until surplus production was achieved and sold to a market. The expatriate Capacity Building Specialist position was also discontinued, replaced by a South Sudanese position as capacity building was absorbed into the project's other two technical components.

To decentralize some management decision-making and improve coordination at the state and county levels, three State Coordinators, one located in each state office, were added to the project in 2013 after funding was made available for these positions. An Agriculture Information Officer/Monitoring and Evaluation Specialist was also added in 2013 to improve the project's monitoring and evaluation capacity. A Grants Manager positon was also added later in the year to support the aggressive grant-making program included in the FY 2014 work plan.

To support the project's field-based interventions and reach a larger number of farmers and FBOs, FARM added 27 Payam Extension Workers once funding was solidified in 2013. Motorcycles were provided to all of these workers so they could reach the many farmers and farming groups in their designated service areas.

South Sudan is a danger-pay and hardship post and the emotional and health challenges are far greater than at a traditional USAID posts. In fact, South Sudan is a one-year post for U.S. Government expatriate staff. Given these conditions, recruiting and retaining expatriate staff was very challenging throughout the life of the project. While expatriate staff typically choose not to remain in South Sudan longer than two years, FARM was fortunate to have several vital expatriates stay in country for three or four years.

In addition, South Sudan saw a great deal of humanitarian assistance and donor activity, particularly before the December 2103 conflict. This meant there was a short supply of qualified local staff and surging demand, causing stiff competition for their services and leading South Sudanese workers to change jobs frequently to achieve higher salaries. In this environment, the Abt team was successful retaining South Sudanese staff while also maintaining reasonable standards for compensation.

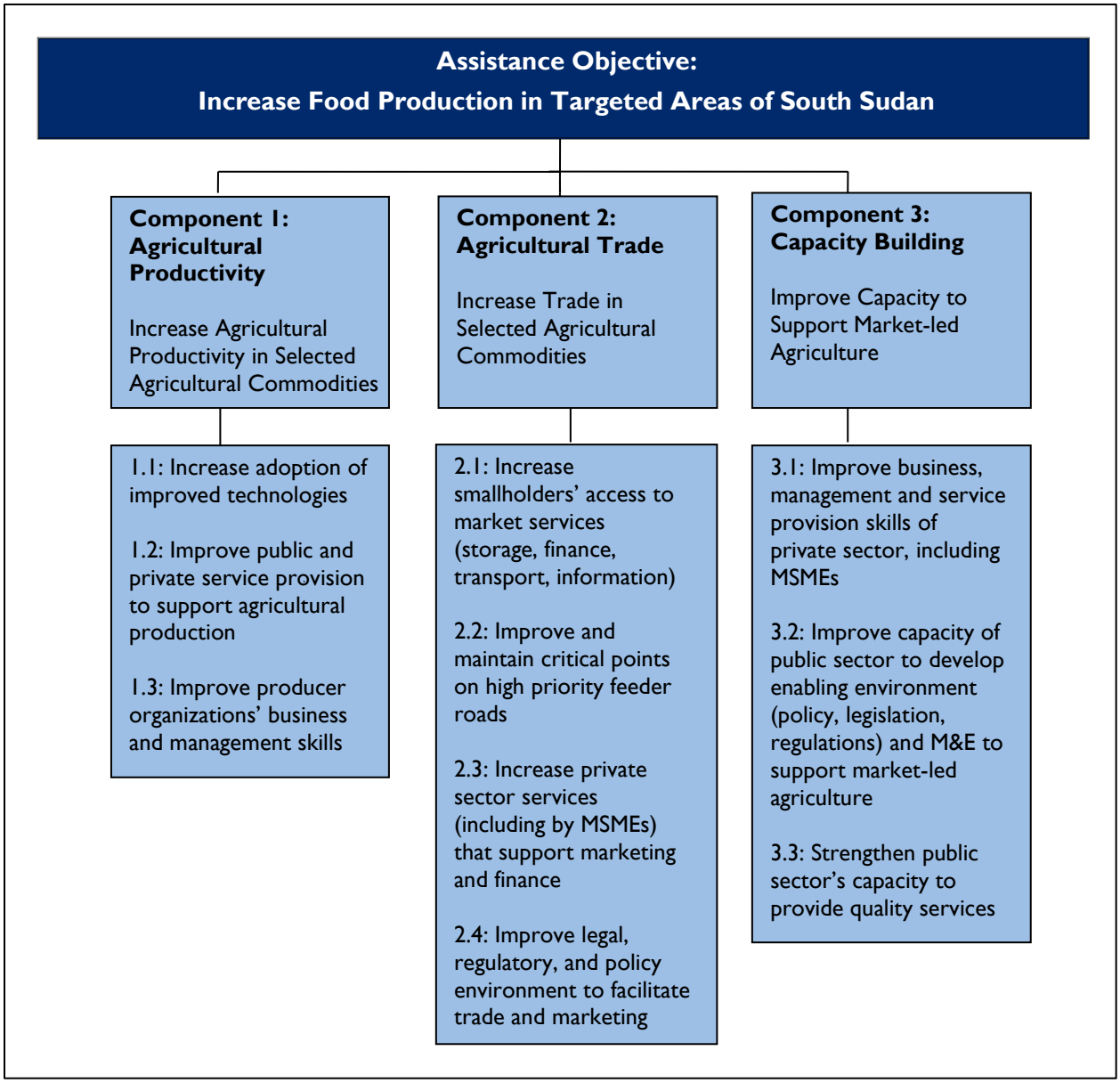
Table 1: Expatriate Positions

Expatriate Position (Turnover occurred in these positions)	Position Status	Position Period
Chief of Party	Original	Throughout contract
Deputy Chief of Party	Original	Throughout contract
Private Sector/Value Chain Specialist	Original	Throughout contract
Capacity Building Specialist	Original	Discontinued May 2012
Agriculture Policy Advisor	Original; discontinued as planned	Discontinued January 2011; followed by STTA
Financial Services Advisor	Original; discontinued	Discontinued February 2011; replaced by Agriculture Production Director position
Communications Specialist	Added; then replaced by South Sudanese position	July 2010 through July 2012
Agriculture Production Specialist	Added	May 2011 through end of contract
Agriculture Information Officer/M&E Specialist	Added	February 2013 through end of contract
EES Coordinator	Added	May 2013 through end of contract
CES Coordinator	Added	May 2013 through end of contract
WES Coordinator	Added	May 2013 through end of contract
Grants Manager	Added	November 2013 through end of contract

3.2 TECHNICAL SCOPE

As described in the introduction to this report, FARM went through numerous phases and priority changes during its life cycle. While these changes required numerous adjustments and adaptions to program activities, the scope of work in the task order, as summarized on the following page, did not change. While FARM frequently adapted to a dynamic environment and shifting priorities, it remained focused on its three core components: agricultural productivity and production, agricultural trade and market development, and capacity building, therefore not deviating fundamentally from its original design.

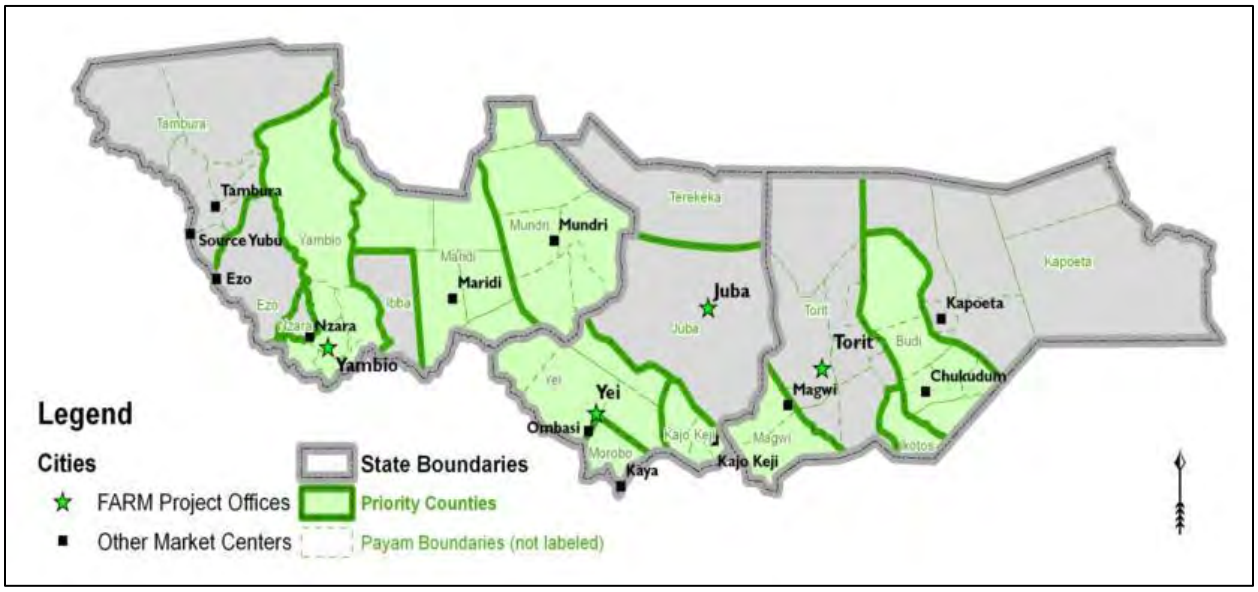
Figure 1: FARM's Scope of Work



3.3 GEOGRAPHIC SCOPE

The FARM project was designed to work in the Greenbelt region of South Sudan. This agro-ecological zone is a wide swath of land in the southern area of the three Equatoria states, bordering Uganda and the Democratic Republic of the Congo. The Greenbelt has the most promising agriculture potential in South Sudan. It has significant rainfall and fertile soils, adequate population density, and a history of agricultural production before the war years. The region is inhabited by numerous tribal and ethnic groups that are primarily agrarian in nature. The map of the Greenbelt in Figure 2 highlights FARM's operational areas.

Figure 2: Geographic Map of FARM Support Areas in Greenbelt



During its five years of operation, FARM's service area included three counties within each of the three Equatoria states. With three payams within each county, the project's service area included a total of 27 payams (see Table 2). All are traditional agricultural areas; they were selected by government counterparts, the project's leadership, and USAID. FARM's lead office in Juba, South Sudan's national capital city, was located near USAID and the country's government offices. The project also maintained a field office in each state, including in Yambio, the capital of WES, and Torit, the capital of EES. Since Juba is the capital of CES, FARM's office for this state was located in Yei, near FARM's operational areas in the southern areas in this state. Budi County in EES was initially included in the project's target list, but was replaced by Torit County in 2011 after Budi County was deemed too insecure to continue development work. FARM II will expand from 27 to 36 payams, adding one additional payam to each county program for the upcoming year.

Table 2: Geographic Summary by State, County, and Payam

State/County	FARM Payams		
Eastern Equatoria			
Torit	Lyre	Imurok	Ifwotu
Ikotos	Lomohidang N.	Ikotos Central	Katire
Magwi	Magwi	Pageri	Pajok
Central Equatoria			
Yei	Mugwo	Otogo	Lasu
Morobo	Gulumbi	Kimba	Wudabi
Kajo-Keji	Lire	Kangapo 1	Kangapo 2
Western Equatoria			
Yambio	Yambio	Ri-rangu	Bangasu
Maridi	Maridi	Mambe	Landili
Mundri West	Mundri	Kotobi	Bangallo

3.4 VALUE CHAIN SCOPE

FARM was originally designed to be a very broad agriculture and rural livelihood project that would support the local population in a wide variety of areas, including cereal crops production, horticulture, livestock, honey, and other cash-generating activities. In November 2010, MAF and USAID agreed that FARM should completely focus on staple crop value chains to support the government's food security objectives. The targeted staple crops were determined to be maize, sorghum, cassava, and groundnuts. Beans were later added as a major staple crop and sesame, finger millet, and rice were added as secondary crops. Sorghum was phased out from project support because it is not a high-priority crop in most of the region and because it was difficult to source the seed varieties preferred by the local population. Cassava was phased out, too, to minimize disease and foster a local market for cassava stem in the region. After the conflict, cassava was reintroduced into the project's portfolio as a food security crop.

3.5 SECURITY

Security remained an important issue throughout the life of the project, and was accordingly incorporated into all aspects of the project's culture and operations. Abt's subcontractor RSM provided specialist support in this important area. FARM drafted security manuals and evacuation plans. Drivers were carefully selected and trained, tracking devices were installed on all project vehicles, and satellite phones were used when necessary. The project established and enforced safety protocols and project leadership closely managed travel within the country. In addition, the project team established close relationships with state and country government counterparts to address crises when they arose.

The project was proactive during a number of events over the past five years that required high levels of security. These included the referendum voting period during January 2011, national independence during July 2011, and the conflict crises between the government and opposition, which began on December 15, 2013 requiring the evacuation of all expatriate staff for more than four months.

The project experienced a number of vehicular accident crises, including a pedestrian incident where a project driver accidently hit and killed a local citizen in Torit in 2010, a situation where two locally hired truck drivers were shot and killed by local bandits in Budi County in 2011, and a motorcycle accident in Yambio that killed a local citizen. Project management worked diligently with state and county counterparts and local authorities to address each incident in a collaborative, very responsive manner. USAID was immediately informed of each incident.

During the evacuation period, FARM was one of the few USAID programs that continued to operate. As described in Section 2.6, the project distributed planting material throughout the Greenbelt region and continued essential project activities. FARM was also one of the first donor projects to return to South Sudan and resume work after the evacuation orders were lifted.

The project added a Country Security and Emergency Response Director (CSERD) in September 2014 once the evacuation period ended and the new position was approved by USAID. The CSERD was provided by Abt subcontractor RSM, a security management company. This full-time expatriate position filled by a highly qualified international security professional who assisted project management with security planning, security management, and emergency responses. To best leverage resources, the CSERD also supported USAID's Health Systems Strengthening Project that Abt Associates was implementing in South Sudan. He oversaw the project's daily security operations, was in regular contact with staff in all implementation areas, and stayed closely tied to the professional security community in Juba so he could stay current on the country's latest security information. He also prepared a weekly

analysis that was submitted to project management in the field and in Abt's home office. The CSERD is continuing this same role under FARM II.

3.6 FINANCIAL MANAGEMENT

The overall contract budget for FARM was $54,238,983, with $52,438,356 in obligated funding. With the exception of grants, project spending was within10% of all cost line items in the contract budget as established in task order modification 6 (see Table 3). Although the final close-out has not yet been finalized, approximately $4,507,102 of the contract budget and $2,769,385 of obligated funding remains unspent.

As shown below and further explained in section 7.1, FARM spent well below its grants budget. During the first years of the project, grants were judiciously awarded to complement the technical program and avoid the prevalent practice of giving hand-outs, since this does not support South Sudan's needs for long-term sustainability of agricultural activities. All project grants made throughout the project were in-kind and focused primarily on seed distribution, land plowing and harrowing, land reclamation, and pilot programs to test production and processing equipment. A more aggressive grants program was scheduled in the project's FY 2014 work plan in response to NEAT. Most of these grants were canceled, however, due the conflict that erupted in December 2013. In addition, due to seed waiver and approval delays, almost $500,000 of in-kind grants for seed distribution were postponed under FARM and therefore will be awarded under FARM II.

Table 3: Cost Line Item Summary Analysis

Cost Line Item	Contract Budget	Incurred Costs	Remaining Balance	Percentage of Budget Spent
Direct Costs	$36,282,314	$34,929,710	$1,352,604	96%
Grants	5,000,000	2,118,.677	2,881,323	42%
Indirect Costs	9,646,299	9,310,123	336,176	96%
Total Costs	50,928,613	46,358,511	4,570,102	91%
Fixed Fee	3,310,360	3,310,360	0	100%
Total Costs Plus Fee	**$54,238,973**	**$49,668,871**	**$4,570,102**	**92%**

4 COMPONENT 1: PRODUCTION AND PRODUCTIVITY

The FARM project has made a significant impact by helping smallholder farmers in the Greenbelt increase their agriculture productivity and production over the past five years. To achieve this, the project helped organize and then worked through FBOs so that project-introduced technologies could be disseminated to large numbers of beneficiaries in a cost-effective manner. The project significantly increased farmer productivity by introducing higher-producing seed technologies for maize, sorghum, cassava, groundnuts, beans, rice, millet, and sesame and by fostering wide-spread adoption of good agronomic practices. FARM delivered over one million kilograms of planting material to more than 13,700 farmers during seed distributions from 2011 through 2014. Over 19,400 hectares of land was placed under cultivation through this support. The project trained farmers and worked through pilot sites to demonstrate approaches to reclaim previously cultivated land in an environmentally friendly and sustainable manner.

Photo: Jessica Scranton

Project-supported farmer showing his harvest.

These efforts laid the essential groundwork for future development of the agricultural sector in the Greenbelt. They helped pre-subsistence farmers become subsistence farmers and assisted progressive farmers to produce surpluses. Local smallholder farmer surpluses are now prevalent in local markets; some are even being bought and bulked by local buyers for outside markets. Approximately 38% of the farmers who received benefit from the project were women. The project helped them improve their productivity so that they could grow surpluses and get some relief from burdensome and time-consuming tasks such as weeding and manual on-farm processing.

FARM not only significantly contributed to food security in the Equatorias, but also created a foundation for a market-driven, sustainable agricultural sector in South Sudan. By linking FBOs with cooperative societies and cooperative unions, the project helped create economies of scale to enhance farmers' selling power in larger markets. Demand for inputs services in areas such as land preparation, seed multiplication, and on-farm storage is also rising due to FARM assistance. Momentum from the project's production work is also increasing market demand for food processing, bulk storage, trading services,

credit and finance, and transportation. Large institutional buyers such as the WFP's P4P program offer ready markets for Greenbelt produce even in South Sudan's current conflict-ridden environment.

4.1 COMMUNITY ORGANIZATION AND FBO FORMATION

Organizing farmer groups was a vital element of the FARM project from its inception in 2010. The project developed a network of 666 FBOs over its five year lifespan, creating a successful and cost-effective system for introducing new technologies and disseminating new information to over 15,600 smallholder farmers dispersed in remote areas of the Greenbelt. These farmers had previously had little access to modern farming information or knowledge.

FARM's approach emphasized disseminating knowledge and technology to one or two FBO members—typically the most innovative farmers in their communities. These initial farmers adopted the new technologies and practices introduced by FARM and then shared what they had learned with other members of the group. If the group was successful, larger numbers of farmers in the community would also adopt the technology, making it more prevalent. Once momentum was established, a much broader group of followers would witness the improvements and adopt the new technology as well. With their success, adoption would spread to other communities in the area.

FARM typically identified local FBOs during the fall season each year, assessing their suitability to participate in the program. The selection process prioritized FBOs that had a community structure, land available for cultivation, and access to roads and urban areas for market potential. The project also sought and prioritized women farming groups, who have special needs and require more targeted support compared to male-led groups.

While some FBOs had been previously established to work with and receive inputs from international NGOs, many groups were new and formed with assistance from FARM. These groups were generally comprised of 21-25 farmers living near each other in a village or local community. FARM helped the groups register with local county governments, develop procedures and capabilities for internal management and business planning, develop group constitutions and by-laws, select a board of directors, open bank accounts, and establish a system for record-keeping. Along with this assistance, FARM provided the FBOs with in-kind seed and land preparation grants. To complement these grants, FARM provided the recipient FBOs with GAP training, instructing them on appropriate land selection and preparation, planting, weeding, harvesting, and post-harvest handling.

Although budget limitations prevented a more robust FBO assessment, FARM carried out a condensed assessment of 55 FBOs in 2012. Three general cohort groups were identified, based on the FBO structures:

1. FBOs that largely worked as *subsistence* organizations and had been formed primarily to access inputs from the FARM project or NGOs in their areas
2. Organizations that were generally headed by a *volunteer leader,* who tended to control the activities of the FBO and allowed limited dialogue or collective decision-making within the organization
3. Organizations that had systems and governance procedures in place to allow for collective communication and decision-making, ideally allowing for *cohesive* operating partnerships within the farmer group

Table 4 shows that in 2012 approximately one-half of the assessed FBOs were led by a dominant leader, while almost one-quarter of the FBOs were cohesive, relying on governance systems and collective decision-making. While expansion and cost-per-beneficiary efficiency have been key objectives of the

project, it remains important to strengthen FBOs to optimize the value of these organizations for agricultural development in the country and further special goals in South Sudan such as the advancement of women and youth.

Table 4: 2012 Summary of Assessment of 55 FARM-Supported FBOs

FBO Type	Western Equatoria State	Central Equatoria State	Eastern Equatoria State	Total
Subsistence	10	3	3	16
Volunteer Leader	11	6	9	26
Cohesive	8	4	1	13
Total	29	13	13	55

Table 5 shows the total number of FBOs and member-farmers incorporated into the project over the past five years. All but 17 of these FBOs are located in the project's original 27-payam service area. The remaining FBOs were added in 2015 in two of the nine new payams that will be included in the FARM II project. FARM II expects to add 70 new FBOs and approximately 1,500 new farmers to its FBO network during the contract's performance period.

Table 5: Growth of FBOs and Member-Farmers during FARM's Project Life (Cumulative numbers)

	2011	2012	2013	2014	2015
FBOs	185	310	497	585	666
Farmers	4,235	6,695	10,830	13,754	15,617

4.2 SEED SELECTION AND DISTRIBUTION

Prior to the commencement of the FARM project, Greenbelt farmers were primarily using locally produced seeds that were genetically inferior and had low germination rates and poor productive capacity. One of the project's most significant contributions to smallholder farmer productivity was the introduction of improved seeds and planting material. The main feature of FARM's seed distribution program, which began in 2011, was helping smallholder farmers gain access to and adopt critical new seed technologies that had not been available in local markets in South Sudan. This seed program served as an entry point for new project-supported FBOs. It was followed by other production interventions in areas such as land preparation, GAP training, and post-harvest handling. The overall objective of this support package was to help farmers increase their productivity, expand land under cultivation, and diversify the crops they grew to improve their food security, nutrition, and resiliency. It also aimed to incorporate these farmers into a market system that would advance their livelihoods.

In November 2010, USAID and MAF agreed that FARM should be aligned to support the government's food security objectives, focusing solely on four major food security crops in South Sudan: maize, sorghum, cassava, and groundnuts. This decision led to discontinuation of all production activities in areas such as horticulture, livestock, and honey. Sorghum distribution was discontinued after the 2012 planting season, since this crop is more suited for dryer climates and the project had difficulty sourcing the sorghum varieties preferred by the local population. Cassava was phased out of the program after 2013 to minimize the spread of Cassava Brown Streak Disease (CBSD) disease from Uganda and to foster growth

in the local market for cassava stems. After the conflict erupted in 2013, and in response to the food shortage situation, cassava was introduced back into the project as a food security crop. Beans were gradually introduced to the project in 2012 and became a main project-supported crop starting in 2013. Sesame, millet, and rice were introduced in 2012 as higher-value crops with more significant market potential for Greenbelt farmers.

4.2.1 Seed Selection and Procurement

Over one million kilograms of planting material was procured and distributed through in-kind grants to 585 FBOs and 13,754 farmers during the life of the project as shown in Table 6. Due to delays obtaining seed waivers and approvals, almost 500,000 additional kilograms that had originally been planned for distribution under FARM will now be delivered to 336 FBOs and 10,500 farmers under the FARM II project.

Table 6: Volume of Seeds Procured and Distributed During Project Life (in kg)

Crop	2011	2112	2013	2014	2011-2014 Total	2015*
Maize	60,000	64,695	50,000	40,000	214,695	60,000
Sorghum	30,092	7,620			37,712	
Groundnuts	25,000	98,880	100,000	122,500	346,380	150,000
Cassava	102,220	142,840	133,100		378,160	200,000
Beans		10,185	46,000	45,000	101,185	60,000
Sesame			2,282	3,000	5,282	8,000
Millet				2,000	2,000	6,000
Rice				5,000	5,000	10,000
Total	**217,312**	**324,220**	**331,382**	**217,500**	**1,090,414**	494,000

* Due to seed waiver delays, competed under FARM but will be purchased and distributed under the FARM II project.

All planting material purchased by FARM was procured through an open and competitive procurement process. Due to the nature of seed procurement in East Africa, a rigorous selection process with vendor field visits and phytosanitary inspection was required for all seed purchases. Most of the planting material purchased by the project was sourced in Uganda through Ugandan vendors who then shipped the material to Juba or to designated collection points in each project-supported county.

4.2.2 Seed Varieties Distributed to Greenbelt Farmers

FARM took advantage of modern plant breeding methods and biotechnological advancements in East Africa's seed industry to provide highly researched and productive seed for distribution to selected smallholder farmers in the Greenbelt. The seeds purchased and distributed by FARM are described below.

Maize

Maize is an essential staple crop in East Africa, grown by most farmers in the region as a food security and income-generating crop. More land is used to cultivate maize than any other crop in East Africa. FARM successfully introduced one of East Africa's most technically advanced varities—Longe 5 maize seed—into

South Sudan from Uganda. Longe 5 is a drought-tolerant, open-pollinated variety with high-yielding attributes. It is also a quality protein maize that produces 70-100 percent more lysine and tryptophan than most modern tropical maize varieties. The introduction of Longe 5, along with adoption of GAP and good rainfall, led to significant increases in smallholder maize production in the Greenbelt. Some famers in the Greenbelt reported that their maize production increased by 300-400% after these interventions.

Groundnuts

Groundnuts are one of the most important crops in the Greenbelt. They are a good source of protein, vitamins, and vegetable oils and are used for both home consumption and as a cash crop. Groundnuts can be processed into a paste and can be mixed with other foods; they are also one of the major sources of cooking oil in East Africa. When grown in rotation with other crops, groundnuts can improve soil fertility because of their capacity to fix atmospheric nitrogen. Most locally sourced groundnut seeds in South Sudan are low-yielding and highly susceptible to disease. While most groundnut seed varieties introduced by FARM significantly increased production, the Red Beauty variety FARM first introduced to the Greenbelt was found to be vulnerable to Rosette disease. In 2013, this variety was replaced by Egola, Serenut 2, and Serenut 4, which are more resistant to this disease in South Sudan.

Sorghum

In its early years, the project distributed sorghum seed in the Greenbelt. Sorghum seed has a fairly soft exterior, making it more appropriate for use in dryer climates. While sorghum is a preferred crop in the northern states of South Sudan and some parts of Eastern Equatoria, it is not a highly preferred crop in many areas of the Equatorias, due to high levels of rainfall and humidity. Some varieties of sorghum, such as Seso, are very vulnerable to weevils and birds; most farmers in the region do not have storage technologies appropriate for controlling these pests. During its first seed distribution effort in 2011, FARM purchased 40,000 kg of certified sorghum seed from a Ugandan vendor. Unfortunately, the seeds supplied by the vendor were not pure; they were mixed with non-certified sorghum seed varieties. This yielded a non-uniform sorghum harvest that was disappointing to both the farmers and the project. A small sorghum order was successfully arranged for the 2012 planting season, but the project discontinued sorghum in 2013 since it was unable to source seed varieties suitable for the region.

Cassava

Cassava is a very important food security crop. Although low in nutritional content, it is an ideal source of calories for the South Sudanese diet. It stores well in the ground for up to 12 to 18 months and can therefore be harvested on an as-needed basis. Cassava is becoming more popular in South Sudan, particularly in EES and CES, as returnees bring knowledge of the crop from neighboring countries. In addition, cassava can be processed into added-value products for consumer use, creating food processing opportunities for local entrepreneurs. A very significant threat to cassava production in South Sudan is the Cassava Mosaic Disease (CMD), which is a single-stranded DNA virus, transmitted by white flies. CBSD, another common disease prevalent in East Africa, is already in South Sudan. In order to minimize the spread of CBSD in the country, the external procurement of TME 14 was stopped and replaced with locally sourced cassava stem for the 2012 planting season. In this year, the project imported 81,600 kg of newly released NASE 14, which is resistant to CMD and tolerant to CBSD from Uganda, and sourced 60,000 kg of TME 14 from within South Sudan. In 2013, the project distributed 122,000 kg of TME 14 sourced from South Sudan and only 11,000 kg of NASE 14 from outside the country. In 2015, FARM II will source 200,000 kg of cassava stem within South Sudan.

Beans

Beans are becoming an increasingly important crop in South Sudan for food security and household income. They are a good source for protein and vitamins and particularly benefit children, women, and the elderly. Supply is currently inadequate in South Sudan; therefore most beans are being imported from Kenya and Uganda. The WFP said that it faces challenges sourcing beans and suggested that this would be a good product for FARM-supported farmers to grow. The project has been distributing the K132 and NBVE varieties, purchased in Uganda. Due to their high yield potentials and market demand, these seed varieties are some of the most widely adopted new varieties in the region.

Millet, Rice, and Sesame

Millet, rice, and sesame were introduced by the project in 2013 and initially distributed as replacements for sorghum because of low farmer demand for the available sorghum varieties. These crops are considered to be of higher value than sorghum and to have more commercial market potential. FARM introduced upland rice as a resiliency crop for the wetter areas of CES and WES.

Photo: Jessica Scranton

Woman using traditional techniques for winnowing sesame. FARM introduced higher-yielding varieties of sesame to increase productivity. Sesame is a high-value crop that is good for female farmers.

4.3 LAND PREPARATION

4.3.1 Plowing and Harrowing

In addition to increasing small farmer productivity, it is vital to increase land under cultivation to boost agricultural production in the Greenbelt. Reports have shown that only 4 percent of South Sudan's arable land was under cultivation when the project began in 2010. Significant barriers to expanding land under cultivation include limited labor, poor access to land-preparation technologies, and scarcity of service providers in rural areas. Lack of market incentives and insufficient knowledge of market opportunities remained a challenge for smallholder expansion during the contract period.

Table 7: Cumulative Feddans Plowed and Harrowed During Life of Project

Year	Feddans Plowed
FY 2011	377
FY 2012	529
FY 2013	739
FY 2014	896

Starting in 2011, FARM supported smallholder farmers with a plowing and harrowing program. The project initiated a land preparation grants program that provided in-kind plowing services to selected farmers. The focus was on newly selected FBOs and on fallow land that had been previously cultivated. Each year, project staff visited these farms from December through February, before the planting season, to ensure that the proposed land had been reclaimed, confirm the availability of local service providers, determine which farming groups would benefit most from the program, and assess whether or not these groups were willing to contribute to the cost of the program. By the end of the project, farmers were expected to pay 20 percent of plowing and harrowing costs, which could run as high as $185 per feddan.

This activity was challenging due to the short supply of tractors in local areas. Other constraints included the skill level of local operators and the lack of maintenance capacity to keep the machines operating

during the plowing season. Despite these challenges, the project was able to increase the total number of feddans plowed and harrowed under this program each year (see Table 7).

4.3.2 Two-Wheel Tractors

Due to a shortage of four-wheel tractors in the Greenbelt and the costs associated with plowing land using this technology, FARM purchased 12 two-wheel walk-behind tractors in 2012. This pilot activity was designed to determine whether these machines could be used in areas where four-wheel tractors were not available. Each tractor unit purchased included a blade plow, disc plow, rotary tiller, trailer, and spare parts. The total cost was approximately $5,600 per set. The project trained the FBOs selected for the pilot study. The pilot study found that this technology was not successful in the South Sudanese environment. The tractors were generally too small relative to the significant biomass growth that consistently exists in Greenbelt fields. The machines broke down easily and maintenance posed a significant challenge. In addition, the training and support requirements were quite significant given the skill and capacity levels of the pilot farmers.

4.3.3 Animal Traction

Ox-plowing has not been a traditional agricultural practice in South Sudan. However, smallholder farmers, particularly in Magwi and Kajo-Keji Counties, have traveled or lived in Uganda and experienced the use of oxen for land preparation purposes. Some farmers in Mundri West County in WES have also taken up this technology. The use of ox-plowing is increasing in the Greenbelt. If available, this technology is a reliable source for plowing. FARM's market assessments show that it is 25 percent less costly than mechanized plowing.

Photo: FARM project staff

Farmers preparing land for cultivation using an ox-plow.

Ox-plowing was first introduced as a trial activity in 2012, followed by an assessment on ox-plowing training needs in Kajo-Keji County in CES. The assessment results showed a high demand for ox traction services. This was followed by an ox-plow training intervention in 2013, which included the completion of an ox-plow training manual. That same year, the project selected six FBOs in CES to receive training. The curriculum included topics such as animal care, technical use and guidance, and how to train other farmers on ox-plow technology. The project also linked farmers to animal trainers in the area.

Overall, 18 percent of total land plowed with project support was used animal traction in 2013. This increased to 37 percent in 2014. Ox-plows have proven particularly prevalent in EES—55 percent of project-supported plowing in this state was done by ox-plow in 2014. While ox-plow training and expansion was not a priority in 2014 due to interruptions caused by the conflict in South Sudan, this technology is proposed for expansion under FARM II.

4.4 ADOPTION OF GOOD AGRONOMIC PRACTICES

The project's significant and successful interventions to help smallholder farmers in the Greenbelt increase their productivity included not only introducing improved seed technology, but also encouraging adoption of good agronomic practices. Since its inception in 2010, FARM invested a great deal of staff time and resources to develop FBOs' and farmers' knowledge related to GAP and to encourage behavior change in this area. Project modalities included training-of-trainer programs, on-farm demonstrations, farmer-to-farmer field tours, demonstration plots, farmer field days, farmer exchanges, public awareness announcements, and direct support through FARM's extension service staff.

4.4.1 Good Agronomic Practice Training

Over its five-year life span, FARM directly trained over 5,000 famers on GAP. Many of them were lead farmers who shared their knowledge with other farmers in their FBOs and communities. The project's GAP curriculum included basic training customized for all target crops, including maize, sorghum, groundnuts, cassava, beans, finger millet, rice, and sesame. The purpose of these trainings was to help smallholder farmers increase their yields. The training included seven primary areas: land preparation, planting, seed sowing, weeding, pest control, harvesting, and storage.

With FARM-introduced methods unfamiliar to many farmers, adoption rates were low at the beginning. They increased significantly over time as farmers witnessed the results produced by earlier adopters. A great deal of emphasis was placed on the proper distance between planting rows, the spacing of planting holes within each row, and the number of seeds to plant within each hole. Due to the low germination rates of traditional South Sudanese seeds, farmers typically planted two or more seeds per hole hoping that at least one of the seeds would germinate and develop. This traditional practice required a high volume of seeds to plant a field and impeded crop growth, because plants growing from the same hole compete against each other for nutrients from the soil. Although it is simple in concept, the idea of planting one seed per hole was a major project intervention. With time, the practice of planting one seed per hole was increasingly adopted particularly when farmers used certified seeds.

4.4.2 On-Farm Demonstration Trials

Early yield assessments indicated that few farmers were adopting the GAP promoted during project-delivered trainings. This low adoption rate was attributed to the highly risk-adverse nature of farmers in South Sudan. Most were subsistence farmers with limited labor and had no experience growing crops in an efficient and productive manner. Additional interventions were needed to boost the GAP adoption rates among project-trained farmers.

Table 8: Yields From On-farm Demonstration Trials Using Hybrid Maize Seeds, Fertilizer, and GAP Farming Principles

Variety	Number of Samples	Average Yield (kg/ha)
KH500-22A	23	4,926
KH500-44A	17	5,725
Longe 6	21	5,038

* 2010 Baseline: 800 kg/ha

In collaboration with the IFDC and AGRA Seeds for Development program, FARM undertook 5,876 on-farm demonstration trials in 2012. Participating farmers were given a package of materials, including hybrid maize seed that had been previously tested in South Sudan, a 1-kg container of phosphate (diammonium phosphate) and nitrogen fertilizer (Urea), and a pictorial guide on how to plant and fertilize the seed. The project selected 300 motivated farmers, gave each a bicycle to deliver the packages, and assisted them in planting the seed using program-developed guidelines. Each farmer was instructed to plant the seeds on a 10 row by 10 meter plot in their field. The farmers

were expected to plant the remainder of their field using traditional seeds and planting practices. The underlying assumption was that the farmers would see and compare the much-higher yields from the demonstration plot with the yields from the remaining portion of the field. This "visual" learning about the productivity gains from the demonstration plot was expected to change the farmers' perceptions about the risks and rewards of changing their traditional agronomic practices.

The program showed first-hand that farmers can significantly increase their productivity well beyond the potential of traditional seeds and agricultural practices. Yield assessments on a sample set of 61 on-farm demonstration sites yielded the results shown in Table 8. The results from these three demonstration trials significantly exceeded the project's maize yield baseline of 800 kg/ha, which was established in 2010 using traditional seed and growing practices.

The successful 2012 demonstration program received very favorable feedback from farmers. An additional benefit was that because of their broad scope, the on-farm demonstration trials required significant collaboration with national, state, and county government counterparts who also gained significant knowledge and experience from the demonstration.

4.4.3 Demonstration Plots

FARM developed demonstration plots as a tool to visually demonstrate the benefits of improved seed varieties and GAP adoption. In 2011, the project established three state-level sites, nine county-level sites, and 25 payam-level demonstration sites. Beginning in 2012 when the IFDC's S4D program came on-stream, USAID asked FARM to focus on state- and county-level demonstration plots while IFDC took over payam-level demonstration sites.

The size of each demonstration site varied: 2 to 5 feddans for state plots, 1 to 2 feddans for county sites, and 1 feddan for each payam location. These plots were selected in close coordination with state-level and county-level agriculture departments; the departments' extension staff were trained to help develop and then manage these sites. These demonstration sites were strategically located to optimize FBO participation and were required to meet typical soil and environmental standards in their areas.

The project conducted farmer field days at these demonstration plots, using a participatory approach to create awareness in the farming communities about the technologies being showcased. The objective was for farmers to adopt accepted seed varieties and GAPs to strengthen their cropping systems. This interactive and visual approach enhanced the farmers' capacity to retain information, strengthened social organization, and provided first-hand information on the seed varieties and farming practices being demonstrated at the plots. These events also provided business linkage opportunities as various value chain actors participated and interacted during these events.

With closure of the S4D program in 2013, FARM re-established payam-level demonstration sites in 2014 in CES with intention of establishing payam demonstration sites in all states under the FARM II project in 2015. Each of the payam demonstration plots, which the project called Farmer Participatory Learning Centers (FPLCs), is 1 feddan in size and is run by a FBO in the payam. Because they are located closed to the farmers' homes, the FPLCs are much more accessible to farmers than the county and state plots. In 2014, more than 3,500 farmers participated in FPLC trainings in CES—a dramatic increase over participation in demonstration site activities in previous years. In 2015, FARM II will establish FPLCs and conduct farmer field days in all 36 payams, thus increasing farmers' access to this important project intervention.

4.5 EXTENSION SERVICES

The transition to a technology-based agricultural system requires effective extension service providers who can serve as intermediaries between farmers and improved technology, management practices, and marketing methods. Extension services need to be particularly strong in a country such as South Sudan, where use of modern technology and management practices is not widespread. Adequate resources, talented staff, and effectively managed extension organizations are essential to provide this valuable support to farmers. Public sector extension services currently provided to farmers in the Greenbelt are quite weak and the challenges of running an effective extension program South Sudan are considerable due to the overall status of the country.

There are significant disparities among the skill levels and abilities of government extension workers. Many lack the training and background to effectively support farmers. In addition, public extension providers are severely under-resourced. They struggle to compensate their staff, provide basic inputs such as transport and communications to make their workers accessible to farming clients, and fund the basic operating costs needed to run modest extension programs. The organizational capacities of these public extension providers also need significant strengthening.

FARM's initial extension support program was designed to work closely with and strengthen its public sector counterparts at the state, county, and payam levels. FARM's first extension staff structure included a senior extension officer for each of the three state programs and an extension worker for each county—a total of 12 extension staff. The plan was for these extension staff to co-locate and work closely with their state and county counterparts, thus boosting the extension services needed to deliver project-supported activities. However, due to the relative weakness of public sector extension providers, the acute gap between the support small farmers needed and the support they were receiving from public providers, and the intensity of extension support needed to change local farming practices, FARM began providing direct extension support to Greenbelt farmers early in the project as the project had discovered that without better extension support it would not be able to successfully implement its activities and reach its targeted rural farmers.

Photo: Jessica Scranton

FARM extension worker Mildie Silvana with her USAID-provided motorcycle.

To supplement its core staff of 12 extension workers, FARM temporarily hired a short-term extension worker for each payam during the 2012 planting season to assist with the year's seed distribution and GAP training program. Once its budget was secured, the project was approved in 2013 to permanently hire these payam extension workers and provide each of them with a motorcycle. This greatly enhanced FARM's access to farmers, increasing the project's ability to access much broader group of farmers. By the end of the project, through subcontractor AAH-I, FARM had developed a team of 39 extension specialists and greatly expanded its reach among smallholder farmers in the Greenbelt.

FARM recognized that having extension workers supported by the project is not a cost-effective or sustainable solution to the extension challenge in South Sudan. In the long term, sustainable extension services should be provided by functioning public sector providers or through the private sector (by cooperative unions, for example). Opportunities do exist for FARM to strengthen the skill levels of extension workers and lead farmers to create a foundation for future progress in this area. There is also an opportunity to train and develop more female extension workers in the region who have a better understanding of the specialized needs and opportunities of female farmers and can serve as role models to women and men on the key roles that women can perform in developing the agriculture sector in South Sudan.

In 2013 FARM contracted an outside extension specialist to assess the project's extension program. The assessment recommended that extension trainings be hands-on, highly participatory, and cover more than GAPs. The report recommended that the extension trainings should be intensified to help farmers and FBOs with organizational and management issues, introduce simple value chain and economic decision-making concepts, and develop business planning skills. The assessment suggested that farmer group be strengthened as soon as they are formed and that motivated farmers be trained to provide extension services to their local communities. Recommendations were made to train farmers and to involve them in the M&E process to better understand the objectives and results of their work and help them become more effective. The report suggested incorporating cross-cutting issues such as gender, youth, resiliency, civil society, environmental sustainability, and conflict when building the capacity of extension workers and lead farmers in the Greenbelt. The assessment also proposed translating extension guides and manuals into local languages to make this information more accessible to farmers.

4.6 PUBLIC AWARENESS

Most FARM activities were implemented as direct interventions to project beneficiaries through grants, trainings, and behavior change programs. These direct interventions, such as seed distribution and GAP training, are fairly expensive relative to the number of beneficiaries receiving support. Public awareness programs reach more farmers at a lower cost and can also help compensate for the fact that many farmers do not have access to extension services or helpful farming information due to the poor quality of extension services in their areas and remote locations where they live.

FARM conducted an assessment in 2011 with the objective of learning how to most effectively communicate farming messages to a broader farmer audience in the Greenbelt. The study reported that radio coverage is quite good in South Sudan and that it is the most effective way to reach farmers in rural areas. Through Sudan Radio Service (later named Eye Radio), FARM produced 28 distinct 30- and 60-second public awareness messages on agriculture in ten different dialects. The messages, created in coordination with the three state agriculture ministries in 2011 and 2012, provided basic agricultural information in a wide range of areas, including safe land clearing and preparation, weeding, row spacing, crop thinning, bird and pest control, crop drying, and storage. The intention was to broadcast the messages through government-supported radio in each state. However, FARM did not receive the expected volume of broadcasting or support from the public radio stations. While this activity was mostly dormant during the later years of the project, it will be picked up again during FARM II with the support from subcontractor BBC Media Action, a specialist in this area.

4.7 YIELD ASSESSMENT RESULTS

The two FARM interventions with the greatest impact were the introduction of improved seed technologies and the promotion of good agronomic practices. The project used substantial resources in these two areas to increase small farmers' productivity. Because it was not possible to conduct a comprehensive yield assessment for all project-supported crops in this highly challenging environment,

FARM carried out a yield assessment of maize and then used results from this crop as a "proxy" indicator to measure the overall effectiveness of the project's seed distribution and GAP training programs.

FARM first outsourced its yield assessment work to an outside South Sudanese vendor in 2011 with the support of our project staff. To increase the quality of the assessment as well as increase project and counterpart staff capacity, FARM began to conduct its yield assessment starting in 2012 through its own field and extension staff based on yield assessment protocols developed by the project in 2011. FARM's production team has complied, analyzed, and reported the results of the yield assessments for each harvest season through 2014.

FARM's maize yield assessments conducted across sample households in its nine-county service area showed an average yield of 3,300 kg per hectare (ha) and 3,866 kg/ha for the first and second harvests of 2013. An average yield assessment of 3,727 kg/ha was calculated for the first harvest in 2014. The project's baseline yield for maize in 2010 was 800 kg/ha, while the South Sudan Agricultural Sector Policy Framework 2012–2017 noted average yields of 640 kg/ha for 2009 and 750 kg/ha for 2010. Using an average of 3,631 kg/ha for the combined 2013 and 2014 seasons, the results indicate a 465 percent increase over the 2010 baseline of 800 kg/hectare.

Assessment results from Uganda and Kenya show that Longe 5 can achieve expected yields between 2,000 and 3,000 kg/ha under modern farm practices, which include fertilizer application. Results under ideal situations would obtain much higher results. However, yield results between 1,500–2,000 kg/ha are more typically achieved in the region.

As expected, the introduction of Longe 5 seed has had a significant one-time impact to smallholder farmers as they first planted this variety. Adoption of GAP at an increasing rate and repetitive GAP training interventions have also significantly contributed to yield increases. Use of fallow land, rich in nutrients, and substantial rainfall should also be recognized as contributing factors to the apparent increase in yields.

FARM II will expand, intensify, and verify FARM's yield assessment activities. This will include expanding yield assessments to all major staple crops supported by the project (i.e., maize, groundnut, beans, and cassava.) It will intensify its protocols, with the help of The Norman Borlaug Institute for International Agriculture from Texas A&M, to include control group sampling to establish a baseline for each crop. Through the oversight of Borlaug Institute, a new subcontractor, FARM II will provide third-party verification of yield results for the 2015 harvest season to improve the project's knowledge of its impact to local farming in South Sudan.

4.8 LAND RECLAMATION

A small percentage of arable land is currently under cultivation in South Sudan. As market demand for agriculture production increases, more land will be needed for farming. Increased usage of land for agricultural purposes will place great strain on the environment. Although some traditional practices exist to protect cultivated land in the Greenbelt, many current land clearing methods often used by rural farmers are harmful to the environment and long-term agricultural

Photo: Abt Associates

A parcel of land being reclaimed for agriculture using guidelines developed by FARM.

sustainability. Heavy mechanized clearing and tillage, in particular, will present future threats to the integrity and stability of South Sudan's farming system. It is therefore important that sustainable land clearing and agriculture practices are known and exercised. FARM has undertaken a number of activities focused on limiting the environmental impact as agricultural expansion occurs in the country.

4.8.1 National Land Reclamation Conference

FARM initiated and supported an MAF-sponsored national conference on sustainable land reclamation. This event, entitled Rebuilding Agricultural Productivity: A National Forum on Achieving Intensive and Sustainable Agriculture, was led by the Minister of Agriculture and held in Juba on June 19 and 20, 2012. Approximately 100 representatives from South Sudan's 10 states participated in a two-day workshop. Each state discussed its own agricultural production issues and shared its experiences on land management. The participants also learned about other countries' experiences on land reclamation. This was the first discussion of its kind in South Sudan, and helped build an organized dialogue for future policy discussions on this critical issue. FARM staff and short-term technical assistance consultants provided planning, organizational, venue, travel, and outside speaker support to the event.

4.8.2 Written Guidelines on Recommended Land Reclamation Practices

FARM prepared written recommendations on best practices for smallholder farmers in South Sudan to reclaim land. To protect virgin forest, the project recommended that land selected for agricultural use be previously cultivated parcels that have been in fallow for at least five years. It suggested that all reclaimed land be no closer than 20 meters from running water and that the land have slopes of no more than 5 degrees (or up to 10 degrees when using mitigation measures such as contour ridging or trenching) to minimize erosion. Tree cover should comprise approximately 10 percent of the land's canopy area, with a minimum of five mature trees per feddan. To minimize environmental degradation, FARM recommended that land be reclaimed with manual labor or use of light machinery.

4.8.3 Pilot Block Farm Demonstrations

In 2012, the Honorable Agriculture Minister Betty Agwaro of South Sudan requested that FARM pilot a block farming program used in other African countries as a land management practice. The FARM project developed 11 block farm demonstration sites from 2012 to 2014 to show sustainable land reclamation practices (see Table 9). The first two were established in 2012 in Obbo, EES, and Kajo-Keji, CES. In each of the 11 pilot sites, 100-feddan blocks of contiguous fallow land were reclaimed for cultivation using the project's best practice guidelines. A significant amount of preparation was required to establish each block farm. There were a dozen steps, including a feasibility study, community group and organization formation meetings, land verification, local ownership assessment, tree species documentation, land mapping, and global coordinate tracking.

Table 9: Block Farms Pilots Created With FARM Support (Demonstrating Sustainable Land Reclamation Practices)

Location	State	Year Developed
Obbo	Eastern Equatoria State	2012
Kudaji	Central Equatoria State	2012
Palwa	Eastern Equatoria State	2013
Lerwa	Eastern Equatoria State	2013
Pajok	Eastern Equatoria State	2013
Kerepi	Eastern Equatoria State	2013

Agoro-Maji	Eastern Equatoria State	2013
Lobone	Eastern Equatoria State	2014
Moli-Andru	Eastern Equatoria State	2014
Abara	Eastern Equatoria State	2014
Morsak	Central Equatoria State	2014

Each block farm provides cultivated land for 50 farming families to increase household food security or surplus production. The project awarded in-kind grants to each block farm group to cover reclamation and plowing services; local service providers were contracted to prepare the land for cultivation. The typical cost to reclaim, plow, and harrow each block farm was $30,000 to $45,000. Some block farms have achieved more success than others, depending on the leadership of the group and the leaders' business acumen.

The block farm program had high costs relative to the number of farmers who benefited, and therefore this is not a cost-effective activity that can be scaled up under FARM support. A further issue is that long-term land tenure arrangements also remain uncertain for a number of these sites. Although the block farms developed by FARM serve as models for sustainable land reclamation and agriculture in the Greenbelt, the block farm program itself will not be continued under FARM II. However, all 11 block farms will continue to be supported by FARM II as FBOs or cooperative societies.

4.9 FARM-LEVEL POST-HARVEST HANDLING AND STORAGE

Post-harvest handling and storage are critical elements of the smallholder farmer production process. Good practices in these two areas increase net production by minimizing post-harvest losses caused by pests and moisture. As much as 40 to 45 percent of a farmer's output can be lost through post-harvest losses and damaged grains; weak post-harvest practices can minimize or potentially eliminate a farmer's access to markets by lowering product quality. In addition, poorly managed harvests and inadequately stored grain crops can result in contamination by aflatoxin or other impurities, which create health risks for the farmer's family or the public. During the life of the project, FARM tested three technologies to ascertain their ability to preserve grain and to evaluate farmers' preferences.

- **Hermetically sealed bags.** These bags are made of specialized synthetic materials that create an air-tight and oxygen-free storage environment for grains after harvest. They are designed to control insect infestation and humidity, both of which can lead to changes in the crop's chemical composition, taste, and color, as well as to prevent mold buildup that causes spoilage in stored grain. This on-farm storage option removes the need to use fumigants or chemicals on stored crops. It is ultraviolet-resistant as well, protecting stored grains from light damage. The bags can be purchased for less than $3 per 50 kg unit and reused for multiple harvest seasons. They are quite effective for minimizing post-harvest losses. Once these bags become perforated, however, they can no longer be used.
- **Farmer-sized metal steel silos**. The International Maize and Wheat Improvement Center designed a simple farm-sized metal silo made of galvanized steel for use by smallholders in East Africa. These silos are designed to be manufactured by local artisans using local materials. They create a sturdy, long-lasting, air-tight, and oxygen-free storage environment for

Photo: Jessica Scranton

Project-sponsored maize silo technology.

stored grains. The silos can be as small as one- to two-metric tons—suitable for smallholders' household use. FARM contracted with a Kenyan artisan to manufacture several two-metric-ton metal silos for testing. They were found to be quite effective at minimizing post-harvest losses, but they were not strongly preferred by the test farmers. This storage option is rather expensive ($300 per unit) and currently there is minimal capacity to manufacture them locally in South Sudan.

- **Improved traditional storage cribs**. FARM built several locally improved storage units based on cribs traditionally used in the Greenbelt, and prepared a manual on how to construct them. These cribs' prime feature is that all materials—such as poles, reeds, and bamboo—can be sourced locally, making them inexpensive for local farmers or suppliers to build. The cribs incorporate rat guards and similar features to improve their functionality. While improved local cribs reduced post-harvest losses and although local farmers are familiar with this technology, this alternative was not as effective as the other two alternatives at eliminating post-harvest losses.

In FY 2014, the project conducted a study to compare the effectiveness of hermetic grain storage bags, traditional local storage cribs, and the improved storage cribs. FARM procured 150 hermetic grain storage bags (each holding 100 kg) and distributed four bags to each of the 37 farmers participating in the post-harvest storage study. The farmers filled each of the four hermetically sealed storage bags with 100 kg of grain for storage at their farms. The farmers were also requested to place maize grain in their local traditional storage cribs and in the improved cribs. The stores contained in the two demonstration cribs were to have a minimum of 50 kg of grain that could be sampled on a monthly basis.

From February to June 2014, the project monitored how effective the different storage methods were at controlling mold, dust, moisture, and—most importantly—weevils. Most farmers indicated that the hermetic bags did the best job of controlling weevils. In fact, many of the farmers requested more bags. To respond to these requests, the project procured 6,000 hermetic storage bags (each holding 50 kg) by the end of FY 2014 to give to project-supported cooperative unions for onward sale to farmers. FARM II is planning to purchase and distribute an additional 40,000 hermetic bags through cooperative unions, who will sell the bags to their member-farmers at a subsidized price of 5 SSP per bag in 2015.

4.10 SEED MULTIPLICATION

FARM recognized the need to establish a local seed production system in the country, since the project's current seed distribution program is not a sustainable option. To date, all seed distributed by FARM has been imported from Uganda, with the exception of cassava stem, which was locally sourced beginning in 2012. The seed sector's long-term viability will require establishing new seed production and distribution systems. A key challenge is that the current enabling environment is not conducive to rapid progress in this area, because seed policy, infrastructure, and standards are lacking and because of the limited experience and capacity of public- and private-sector actors in this sector.

FARM was involved in stage-setting work in this area. As described in section 0, the project in 2012 began to source cassava stem within South Sudan to reduce the spread of CMD and CBSD. In 2012, 60,000 kg of TME 14 cassava stem was sourced through a local South Sudanese vendor. In 2013, FARM sourced 133,100 kg of NASE 14 cassava stem from all three Equatoria states through two local vendors.

Photo: Abt Associates

Distribution of cassava stem in Torit in 2013.

The FARM II project intends to source an additional 200,000 kg of TME 14 and NASE 14 cassava from all three states through a South Sudanese vendor for distribution in 2015. There were many challenges encountered in sourcing cassava stem in South Sudan, including the prevalence of disease, the need to inspect cassava fields, and poor cutting quality as local farmers do not have experience producing cassava for multiplication. Due to the perishable nature of cassava stem, there were also significant logistical challenges in transporting the planting material from the fields to beneficiary farmers. For the 2015 distribution FARM II is mandated to coordinate with government counterparts who, in order to minimize the spread of CMD and CBSD, now require field inspection of cassava stem prior to purchase. The local cassava procurements were considered highly successful. They represent a big step towards empowering local farmers, developing self-sufficiency, and creating an important input market in the country.

In collaboration with the S4D program, FARM piloted a seed multiplication initiative in 2013 with farmer cooperatives in CES and Century Seeds Company, a South Sudanese vendor that was a beneficiary of the S4D program. The project facilitated collaboration between Century Seeds, the government, and local farmers to establish a functional and coordinated seed production and certification process. The pilot program primarily focused on maize multiplication, although a small groundnut and bean pilot activity was included.

FARM identified eight smallholder farmer fields from seven FBOs to pioneer seed multiplication in South Sudan. Three fields belonged to individual farmers and five were communally owned by the FBO. The participating farmers were self-selected but were supported by FARM since they had shown greater potential to understand and follow procedures involved in the seed production process. Century Seeds provided the farmers with foundational seed for each of the three crops. FARM augmented the program by providing the pilot groups with cost-share plowing grants and technical training on production standards. The farmers were expected to provide labor for clearing, weeding, harvesting, and initial drying of the seed crop before collection. The seed vendor was then expected to collect and transport the crop to processing and warehousing facilities, and then clean, sort, bulk, treat, and package the seed so that it could be channeled into a distribution network of certified agro-dealers.

The multiplied seed were eventually bought by the seed company for sale through its distribution selling points in CES. This was the first time that seed multiplication was conducted after independence. Unfortunately, the December 2013 conflict interrupted this activity and the evacuation and security situation in South Sudan required it to be discontinued in 2014. To advance seed multiplication capacity in the country, FARM II intends to pick up on this activity during 2015 through a public-private partnership initiative.

4.11 DISCONTINUED PRODUCTION PROGRAMS

During its first year of implementation in 2010 the FARM project began several production activities that were discontinued later in the year at the request of MAF and USAID so that the project could solely focus on staple crop production.

4.11.1 Small Ruminant Program

FARM initiated a small ruminant program in 2010. The pilot program was initiated in Yambio County, WES, due to the shortage of meat in that county, which placed significant pressure on the wild animal population. Locally produce goats, the primary source of domesticated meat in the state, were found to be significantly smaller and less robust in Yambio County than other parts of South Sudan. To address this problem, FARM introduced 644 higher-quality breeding goats to 58 producers in three payams in Yambio County. Each producer received management and veterinary care training. A total of 301 offspring

were reported to have been produced by the program. However, follow-up assessments found that a large number of kids born through the program died, mainly due to respiratory infections, diarrhea, and loss of appetite. Inadequate husbandry measures were determined to have been a major factor in the high mortality rate of the offspring. The program was discontinued after the first goat distribution due to FARM's shifting priorities.

4.11.2 Honey Production

Honey is an important supplementary income-generating activity for many rural farmers in the Greenbelt. WES, in particular, due to its climate and topography, offers great honey-producing potential. FARM contracted a honey expert in the region in 2010 to conduct a honey assessment in WES. As expected, the findings confirmed the project's expectation that honey could be a highly productive and profitable activity for the region's farmers. Poor management and limited processing and collection capabilities identified in this study limited the commercial development of this value chain. FARM's honey assessment report recommended a number of modest technical investments and extension activities to improve the quality, collection, and distribution of honey, which would lead to significant increases in the value and marketability of processed honey produced in WES. Although FARM discontinued its work in honey when it refocused on staple crops, it advised the German Society for International Cooperation (GIZ) of the study, since GIZ was beginning to work in the honey sector.

5 COMPONENT 2: TRADE AND MARKETING

The FARM Project made significant impact by laying the groundwork for a market-driven agricultural sector in the Equatorias. While progress has been made over the past five years, much more is needed to create scale and sustainability in the sector. Some farmers are now growing surpluses and are able to participate in and gain experience from operating in a market environment. Feeder roads have been improved in some parts of the region, allowing local produce to better access markets. Increased production is now finding its way into local markets and replacing foreign imports. Some farming groups are forming into larger organizations such as cooperative societies and unions, working together and pooling their limited capital to aggregate their production and achieve the economies of scales needed to market their produce to larger and more lucrative markets. Some brokers and traders are active in the region, buying produce from local farming groups and selling the aggregated produce in Juba, in other larger markets, or to large institutional buyers such as the WFPs P4P program. Female farmers and women groups are also becoming more active in marketing their agriculture surpluses, thus empowering their economic status in the region. As sales activity increases in the region, demand for input services is also on the rise. Demand for agricultural inputs in such areas as land preparation, certified seeds, grain storage, credit access, and processing is creating opportunities for entrepreneurs and agribusinesses.

Photo: Michael Godfrey, Abt Associates

Typical rural payam market in Morobo County in Central Equatoria State.

While there is evidence of increased market activity in the Equatorias, there are many barriers that limit the sector's development. Most growers remain subsistence farmers; they are highly risk adverse and mistrustful due to their poverty and vulnerability, their wartime-experiences, and their limited knowledge of modern technology and business practices. The literacy rate among the rural population, particularly women, remains quite low and many farmers have little or no experience participating in a commercial business, cooperating in a group environment, or conducting trade with outside parties. Measures and standards remain underdeveloped, and institutions do not exist in the region to facilitate market participation. Many farmers do not have the ability to estimate their production costs, and they lack access to the price or market information needed to make fundamental economic decisions about investment in their farming operations. Functioning intermediaries or cooperative organizations are nascent and undercapitalized and have not yet proven to be sustainable and able to support farmers in their areas.

The majority of FARM's work during the earlier years of the project focused on increasing farmers' productivity and production, to help smallholder farmers reach subsistence farming levels and help progressive farming groups begin to grow surpluses. During this time, however, FARM did lay groundwork for market development by conducting market assessments, helping prioritize feeder roads, holding farmer-trader forums, promoting on-farm processing, and delivering organizational support to South Sudan's first national and state agricultural trade shows. The project also provided significant support to the IFDC's input voucher program in 2012 and undertook substantial initiatives to improve the legal, policy, and regulatory environment that governs agricultural markets and trade in South Sudan. As surplus production became evident during the 2013 and 2014 harvest seasons, FARM intensified market development efforts, particularly in developing intermediaries and cooperative unions.

The project worked with 666 community-level farming groups that represent more than 15,600 smallholder farmers in the Greenbelt, helping many in market and business planning. It assisted a number of these groups to organize into larger organizations called cooperative societies. FARM also facilitated the startup of seven cooperative unions in six of the nine project-supported counties and provided training, technical assistance, and light processing machinery to these nascent organizations. The project laid significant groundwork for market information systems that will use smart-phone technology to collect and share data on supply, demand, and pricing. FARM supported numerous trade fairs and forums that created new market linkages between buyers and sellers and developed input supply opportunities in areas such as land preparation, seed multiplication, transportation, and post-harvest storage. There is now evidence that 2013 and 2014 surplus production is filling local markets and some produce is being bulked and sold to buyers such as WFP. More significant gains are expected under the FARM II project.

5.1 FARMING AS A BUSINESS

A fundamental project objective is to build the capacity of small farmers, producer organizations, input providers, and buyers and traders throughout agriculture value chains in South Sudan to adopt modern business practices. These practices will enable them to effectively increase their productivity and access agricultural markets in a profitable and sustainable manner. FARM developed a Farming as a Business (FaaB) training program to introduce the skills necessary to understand production costs, evaluate markets, develop budgets, maintain business records, and learn how to source financing to fund business ventures. Participants were also introduced to the group formation, governance, and leadership requirements need to effectively manage farming groups for the interest of smallholder members.

These trainings were held in all project-supported counties. They helped participants share their experiences with measuring and understanding and reducing their production costs, and actively market their products at a profit. The trainings introduced farmers to the various farm records needed to track

farm costs and revenues so that they can make effective pricing decisions, and learn to concentrate on profitable crops when increasing production.

The FaaB program included a total of 40 training-of-trainers (TOT); two-thirds of the participants were state- and county-level MAF and Ministry of Rural Development staff. The trainers who had taken part in the TOT programs then trained a total of 306 participants in FY 2011 and an additional 170 participants in FY 2012. Early participants in the FaaB program were selected by the project and included progressive farmers from lead FBOs who were most committed to increasing their production for market opportunities.

FARM learned that project beneficiaries had a particular need for basic literacy and mathematics assistance. The trainings were customized accordingly. During the final years of the project, FaaB training evolved to focus largely on developing the business management capacities of leaders and members of cooperatives.

5.2 AGRICULTURAL TRADE FAIRS

Beginning in 2011, the FARM project provided national and state agricultural ministries with a great deal of support for planning and running agriculture trade fairs. The purposes of these fairs were to promote South Sudan's agriculture, create business linkages between buyers and sellers, facilitate trade opportunities within the sector, introduce modern technologies and improved farming practices, and encourage private sector development.

5.2.1 National Trade Fairs

FARM provided intensive training, technical assistance, planning and logistical support to the MAF/MAFCRD for South Sudan's first National Agriculture Trade Fair, which was held November 9-12, 2011, at the Nyakuron Culture Center in Juba. The second National Agriculture Trade Fair was held November 27-30, 2012, at the same location.

Five months before the first fair, FARM facilitated a training workshop for 28 ministry and related staff, to help develop a vision, work plan, and organizational structure for the management unit that would be responsible for organizing the event. The project also arranged for a delegation of key ministry staff to attend Uganda's Agriculture Trade Fair in Jinja to learn how it was organized and how the trade fair had evolved over the previous 19 years. A few months later, a smaller delegation attended the National Kenya International Trade Fair held in Jamhuri Park in Nairobi to gain additional understanding on how to operate a major agriculture trade fair and how to recruit agribusinesses to participate. FARM also held trainings for selected participants in each state before they traveled to Juba to participate in fair activities.

Photo: Abt Associates

Woman showing her produce at the second National Agriculture Trade Fair in 2012.

FARM provided an agriculture trade fair consultant for five months beginning in June 2011 to work hand-in-hand with MAF/MAFCRD staff on the initial national trade fair. The project also delivered considerable communications, promotions, and logistical support for the fair and FARM staff provided intensive support during the days leading up to each fair. The project then produced a manual to guide the ministry through the steps needed to implement subsequent fairs.

Over 70 local exhibitors representing all of South Sudan's 10 states participated in the first fair, along with 40 international exhibitors. Goods on display ranged from local crops to agricultural inputs, seed and fertilizer, and agriculture machinery. A total of 2,500 participants and more than 800 students participated in the fair. FARM supported 213 beneficiary farmers from WES and EES to attend the fair. Opening day events received significant media coverage, including a front-page story in *The Citizen;* ample radio reporting by Maraya FM, Sudan Radio Service, and Bakhita FM; and television coverage by South Sudan TV. FARM directly covered the costs of many fair-related operational expenses.

The project worked to elicit more ministry involvement and responsibility for the second fair to increase its capacity to hold future national events. The ministry selected a consultant from a shortlist of candidates presented by FARM for the second fair; he remained in the county for approximately three months. The consultant worked with the ministry to formalize working groups responsible for the main components of fair management. Six ministry working groups were developed: a High Executive Steering Committee to oversee planning and implementation and the following five sub-committees: 1) executive, 2) budget and finance, 3) communications and media, 4) logistics and operations, and 5) protocol.

President Salva Kiir Mayardit opened the second fair on November 27, 2012, receiving significant media coverage. The ministry reduced its ticket price from 3 SSP to 1 SSP for the second fair, increasing attendance to 5,000 participants. A total of 113 local and international exhibitors participated in the fair and FARM supported nine farmers from each of the country's 10 states to travel to Juba to participate in the fair. While USAID provided some direct funding to MAF/MAFCRD for the second fair, significant project resources—including staff time—were needed to ensure successful implementation.

Due to the July 2013 dissolution of the government and the subsequent re-organization of the ministry, a national agriculture fair was not held in 2013. A national agriculture trade fair was not held in 2014 because of the conflict situation.

Photo: Abt Associates

The project-supported second National Agriculture Trade Fair in 2012.

5.2.2 State Agriculture Fairs

At the conclusion of the 2011 national fair, MAF/MAFCRD recommended that agricultural shows be conducted in each of the nation's ten states and that outstanding farmers identified in each state fair be selected to represent their state's farmers at future national fairs. FARM was asked to facilitate the proposed state trade fairs in the three Equatoria states. The project conducted two-day trainings during 2012 in each of the three states, in order to establish planning committees and teach staff from various state ministries how to organize and implement the events. FARM helped each state develop concept papers with an illustrative budget. The project also helped these state groups print banners, posters, brochures, and invitation cards for their fairs.

State agriculture fairs are more accessible to farmers, traders, and agro-dealers than the national events in Juba. They allow more hands-on buying and interaction between buyers and producers. Because decades of war have destroyed many business relationships and linkages between traders and farmers, the primary objective of the state fairs were to rekindle business ties; showcase the state's production potential; display modern farming technologies; and enable farmer groups, cooperative societies, and cooperative unions to gain access to inputs and output markets.

EES and WES held their initial state agriculture fairs in October and November 2012 during the harvest season. CES opted not to have a fair. The project sponsored 31 farmers in EES and 29 farmers in WES to travel to their respective 2012 state fairs and represent their communities. Prizes were given to the counties with the best promotional stall at each fair. FARM supported 25 farmers from EES and 20 in WES in 2013. Fairs were also held in EES and WES in 2014 with FARM support.

The state agriculture shows proved to be excellent ways to establish business linkages between farmers and agribusinesses in the Greenbelt. Commodities sold at these events include maize, groundnuts, cassava, sorghum, beans, pumpkins, potatoes, honey, oranges, watermelon, cowpeas, sheep, chickens, goats, and pineapples. Inputs bought and sold at these events include hoes, machetes, oxen, rakes, seeds, axes, sprayers, pesticides, and slashers. Surveys of the events showed that state agricultural trade fairs provided a valuable forum for traders, agro-dealers, processors, and farmers who all actively participated in and benefited from these events

5.2.3 Farmer-Trader Forums

A 2012 market study conducted by FARM indicated that poor road infrastructure was not the only impediment to linking rural production to urban markets. The lack of commodity trade from surplus to deficit areas was also due to a lack of business linkages between producer groups and traders and to poor market information.

FARM introduced forums where producers and buyers could meet to develop relationships, foster mutual understanding, and encourage transactions. During these meetings, farmers and traders had opportunities to engage, and learn about each other's costs. These forums showed participating traders where they could locally source goods and helped farming groups and traders learn how to easily contact each other to organize and conduct future business.

From 2011 through 2014, the project supported a total of 14 such meetings in all three states. The forum discussions typically occurred after the second harvest season when smallholder produce became available for sale. Discussions at these forums were quite informative. The earlier forums highlighted the lack of knowledge between the two groups. Traders were often unaware of the existence of surplus crops produced by local farmers and did not know how to obtain this information. Farmers, on the other hand, were also unaware of the traders and did not realize that the traders were potential buyers for their surplus production. In addition, many producers were unaware of the role that traders play in the value chain process and did not know why traders need to charge prices higher than the amount they pay farmers for the commodity. As the farmer-trader forums evolved, role-play exercises and other activities were used to help participants recognize the various actors needed to form a successful value chain system and better understand the role of each actor in the value chain process.

Farmer-trader forums were a good method for connecting farmers to prospective buyers and service providers. They will be continued under FARM II as a way to build and foster business relationships and build capacity for future value chain development.

5.3 COOPERATIVE DEVELOPMENT

Upon project inception in 2010, many farmers and FBOs were challenged simply to produce enough food to feed their families. Most had little or no experience growing a surplus and making a living selling their excess produce at a market. These farmers generally lacked skills to identify, evaluate, and plan for market opportunities; they also did not understand the important of making a profit. They were often risk-averse, mistrustful, and hesitant to explore market opportunities and work together in larger farming groups.

Although FARM conducted FaaB and other marketing and business trainings through 2012 (see section 6.2), the majority of project-assisted farmers were not able to produce enough surpluses to access markets outside their local areas. In fact, these farmers were competing with each other at local markets. This diminished their collective selling power, culminating in lower prices and profitability.

The project began to work with cooperative societies, which in South Sudan are legally registered entities with memberships composed of FBOs located in the same vicinity. FARM assisted 110 of these cooperative societies over the life of the project. However, these groups were not large enough or organized enough to aggregate the amounts of produce needed to access larger markets outside the groups' immediate areas. A FARM assessment found that over 50 percent of cooperative society members paid shares and registration fees, but the cooperative societies were informal with little clarity about investment and business planning.

It is also important to note the importance of women's involvement in the cooperative movement: 39% percent of cooperative union membership is female and 1,431 women have been active in FARM's cooperative formation trainings.

5.3.1 Cooperative Union Formation

FARM began to emphasize the formation of larger aggregated farming groups that extended beyond the FBO and cooperative society levels. This began with the development of cooperative unions in CES in 2012. Unions were later formed in EES and WES as well. The primary purposes of these cooperative unions were to:

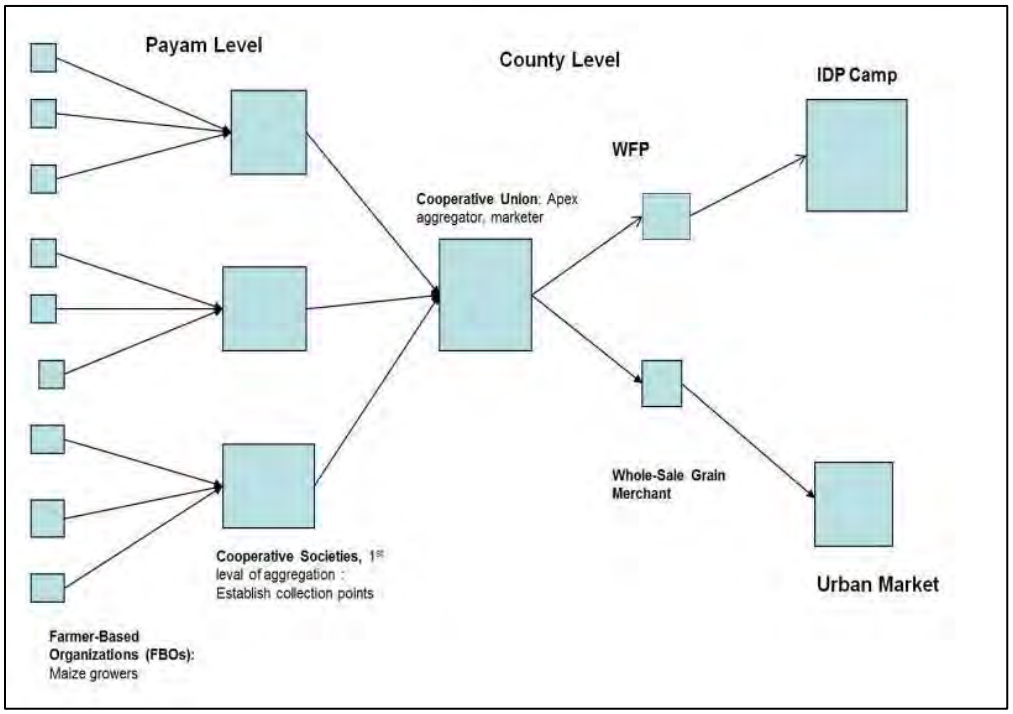
- Facilitate easier market access for local smallholder farmers
- Provide easy access to farming inputs and services at more affordable prices
- Aggregate smallholder produce at sufficient scale and quality to market to larger, more distant markets
- Reduce the costs of transporting produce to markets

Cooperative unions are legally registered entities currently comprised of 5 to 16 cooperative societies. The FARM project believed that if the cooperative unions could aggregate and bulk sufficient surplus quantities, they would be able to access larger markets—including institutional buyers such as the WFP, NGOs, schools, and private processors—and supply urban markets outside the Greenbelt region Figure 3 shows how the FBO–cooperative society–cooperative union framework is structured.

Photo: Michael Godfrey, Abt Associates

Executive team of the Morobo County Cooperative Union.

Figure 3: Farmer Group Model for Aggregating Surplus Production in Greenbelt



FARM assisted with the formation of four cooperative unions during FY 2012, starting with the Kajo-Keji, Morobo, and Yei County Cooperative Unions in CES and Magwi County Cooperative Union in EES. During FY 2014, cooperative unions were formed in Mundri West and Maridi Counties in WES. Due to local problems between the Acholi and Madi ethnic groups in Magwi County, FARM created a separate cooperative union, called Balu Cooperative Union, for the Madi Administrative Area. Table 10 briefly summarizes these unions.

Table 10: Cooperative Unions Receiving Direct FARM Support

	Name	County	State	First Year of FARM Support	Male Participants	Female Participants	Total Participants
1.	Kajo-Keji Cooperative Union	Kajo-Keji	CES	2013	521	351	872
2.	Morobo Cooperative Union	Morobo	CES	2013	419	242	661
3.	Yei Cooperative Union	Yei	CES	2013	446	166	612
4.	Magwi County Cooperative Union	Magwi	EES	2013	206	150	356
5.	Balu Cooperative Union	Magwi	EES	2014	198	229	427
6.	Mundri West Cooperative Union	Mundri West	WES	2014	110	97	207
7.	Maridi County Cooperative Union	Maridi	WES	2014	341	196	537
	Total				**2,241**	**1,431**	**3,672**

The project conducted assessments of Yambio Farmer's Association (YAFA) in Yambio County and Nzara Agricultural Farmers' Association (NAFA) in Nzara County. These two farming associations had already been established prior to receiving project support. NAFA remains active selling farmer produce to WFP. Due to the conflict situation in South Sudan, FARM held off providing supports to these cooperative unions during 2014. There are, however, opportunities for FARM II to support these cooperative unions in a range of areas, including access to credit.

5.3.2 Cooperative Training

The project-supported cooperative unions are relatively new organizations that require significant strengthening assistance. These groups are not sufficiently capitalized, they have limited material resources, and they need a great deal of management support. Union members have little experience working in a group or functioning as business entities. They have limited experience with the various operational aspects of running a successful cooperative service, such as selling or renting out agricultural inputs; organizing and transacting with farmer groups; providing transport; bulking, grading, and storing produce; marketing and selling; managing finances; and governance. The unions will likely need several seasons of training and business planning support to build their capacity to become sustainable private sector entities.

FARM hired a South Sudanese consultant in 2013 to develop a manual to introduce cooperative union members to basic principles of marketing, value chain development, and profit analysis. Project staff delivered two-day trainings to all seven cooperative unions during 2013 and 2014. Over 30% of the participants who participated in these trainings were women.

5.3.3 On-Farm Processing Equipment

As production gains are being realized in the Greenbelt through adoption of new technologies and management practices, FARM has realized that increased production must be complimented with improved post-harvest handling that can efficiently transform harvested commodities into storage- or market-ready products. To date, very little post-harvest mechanization is present in South Sudan and the large majority of post-harvesting handling has been done by hand, mostly by women, in a painstaking and time-consuming manner. Lack of modern processing technology limits efficiency in the production process driving prices up and minimizing market access.

Photo: Jessica Scranton

Project-supported farmer using a motorized maize sheller provided by USAID

To assess the effectiveness of introducing basic on-farm mechanized processing to Greenbelt farmers, FARM purchased and distributed the following on-farm processing equipment to six cooperative unions and two progress farmers during 2013 and 2014 fiscal years:

- Manual and motorized maize shellers
- Manual and motorized groundnut shellers
- Manual and motorized cassava graters
- Manual and motorized cassava chippers
- Manual and motorized sorghum threshers
- Weighing scales

FARM selected cooperative unions to first test the equipment through demonstrations for member-farmers and to then hire out the equipment for members to use. Introducing these on-farm technologies through cooperative unions provided wide coverage, strengthened the links between farmers and cooperative unions, and offered a revenue generation opportunity for the unions.

With cost sharing from the Ugandan equipment vendor, the project trained 69 cooperative members to operate and maintain these machines. In August 2014, FARM staff visited each of the cooperative unions to monitor and assess this pilot initiative. The motorized maize and groundnut shellers and the cassava graters and chippers performed well and were in high demand. The project learned that farmers preferred the motorized equipment to the manual equipment, but the cooperative unions reported that it was expensive to transport the equipment from site to site and that it was difficult to replace spare parts. The program was deemed to be well-received, and cooperative unions will be given the opportunity to receive future support in this area under FARM II. The program was well received by women, who typically do much of the on-farm processing by hand. The equipment frees a great deal of their time to focus on other productive activities for their families and farms.

5.4 GRAIN PROCESSING AND VALUE ADDITION

Cassava chip processing. In 2013, FARM conducted a market assessment in 14 markets in the Greenbelt. The goals were to better understand market dynamics and opportunities for the staple crops supported by the project, and to determine how the project could best enhance the competitiveness and marketability of these crops as produced by Greenbelt farmers.

The study revealed that sweeter imported cassava chips from Uganda were much preferred to chips made from local cassava varieties. Traditional cassava varieties in South Sudan contain high levels of cyanide, requiring retting and soaking in water for five to seven days. This causing the roots to ferment and discolors the cassava, lowering its market value. FARM introduced the sweet TME 14 cassava variety and identified a market opportunity for this crop. Since South Sudanese farmers lacked the know-how to process Ugandan-style cassava chips, the project initially trained 391 FBO members and distributed 185 cassava-chip processing manuals. This intervention primarily targeted women as a time-saving and value-addition activity helping them store cassava longer and obtain better prices at the market. The program was very well received in South Sudan and offers considerable revenue potential.

5.5 MARKET INFORMATION

The lack of easily accessible, timely, and accurate market information is a significant constraint to the development of agricultural markets in South Sudan. Without this information, buyers have limited knowledge of available supply and suppliers have no knowledge of potential demand for their harvest outside their own communities. The project began exploring ways that mobile phone technology could help address this shortcoming.

FARM brought in an information and communications technology (ICT) specialist in 2012 to determine the feasibility of developing a market information dissemination system for South Sudanese farmers and traders using current cell phone technologies. The study concluded that project areas had sufficient coverage to implement a cell phone-based program and that the major constraint was human capacity.

In 2013, the project designed and implemented a three-month pilot to demonstrate that using mobile phones to collect data could streamline internal reporting on market data by project extension staff in CES counties. The project arranged for a second ICT specialist to come to South Sudan to train extension workers and support staff to operate the pilot system. During FY 2014, the expanded pilot platform was rolled out to all 27 payams in the FARM service area.

The project's ICT team created a prototype marketing information system during the last months of the project. Using data that FARM extension workers collect with smart phones, the prototype system tracks commodity prices in 14 urban markets in the Equatorias on a weekly basis. Prices are tracked in the system for beans, cassava, cassava chips, cassava flour, groundnuts (dried, unshelled), groundnuts (shelled), maize flour, maize grain, millet grain, rice (threshed), rice (unthreshed), and sesame. The price information is downloaded from smart phones onto a web-based data collection system that is linked to an Internet interface for public dissemination. Market information can then be taken from the website and disseminated more broadly through local radio, newspapers, texting services, and other public information outlets. Users of this information are expected to include farmers, FBOs, cooperative unions, buyers, brokers, processors, and public sector entities. FARM introduced the prototype to the WFP's P4P program, which expressed interest in the system. FARM II intends to partner with the WFP and FAO to implement and expand the program during 2015 and to ensure continuation of the service at the end of the project.

5.6 MARKET OPPORTUNITY DEVELOPMENT AND FACILITATION

South Sudan's distribution networks and supply channels are quite underdeveloped and fragmented due to the country's history, poor infrastructure, and nascent private sector. There is significant concern that smallholder farmers will be discouraged from participating in a commercial agricultural system if they are unable to quickly receive a return on their initial production investments. A recent discussion with the WFP revealed the private sector's inability to meet the P4P program's annual demand for 2,500 metric tons (mt) of locally sourced grains and legumes. This situation means that there is a significant need to identify early market opportunities for smallholders' surplus production in the Greenbelt to bridge the gap between areas where demand currently exists in the country and areas where there is surplus supply. Impediments to immediate trade opportunities also need to be minimized.

FARM initiated groundwork in this area, which will be followed by additional initiatives under FARM II. The current conflict in South Sudan has changed the dynamics of agricultural markets in South Sudan. As planting seasons in much of the country are missed for the second year, great strain is being placed on the nation's food supply. Commerce is compromised by current security constraints and food importers are not as active as they were in the past. The WFP's P4P program provides the most high-impact opportunity for many Greenbelt farmers in the short run, since this program is a ready buyer and has the capacity to pick up aggregated grains at collection points and distribute the foodstuffs to where they are needed. The WFP's main criteria for selecting suppliers are that 1) aggregated grains must meet minimum quality standards, 2) farmer groups must be willing to accept "going local-market prices" for their produce, and 3) sufficient quantities must be aggregated to justify having 20-ton trucks pick up the harvest.

At the end of the project, FARM facilitated grain sales for cooperative to the WFP. YAFA and NAFA exhibited entrepreneurialism by aggregating produce from smallholders, many of whom were supported by FARM, and selling it at a profit to the WFP. The project also facilitated the sale of surpluses to the WFP by several cooperative societies in Kajo-Keji County in CES and other areas. This activity has the potential to significantly increase after the 2015 harvest, due to anticipated production gains in the Greenbelt, more-evolved cooperative unions, and direct trade facilitation from FARM. Other NGO programs and local buyers also represent short-term markets for smallholder produce. The FARM II project will intensify these linkages between producers and these buyers during the upcoming year.

6 COMPONENT 3: CAPACITY BUILDING

As mentioned throughout this report, due to the country's history and decades of war, human and institutional capacity in South Sudan is quite weak in both the public and private sectors. There is a need for sustainable solutions to build the public sector and private sector human capital and institutional framework for a growing, market-driven agricultural sector. The dilemma, however, is not easy to resolve. Very few private institutions exist in South Sudan other than international NGOs that have been in the country for a long time. Extremely tight resources limit the public sector's ability to provide basic services to its citizens and improve the overall enabling environment for agriculture. Literacy rates remain quite low and over the past 50 years, the country lost much of its traditional knowledge of agriculture. Due to poor transportation and communications infrastructure and poverty, access to knowledge and information is quite limited. Now, one and half years of conflict between the government and opposition has exacerbated the situation, and the conflict is unlikely be resolved soon. Due to this conflict, FARM has discontinued working with its national counterpart, MAFTARFCRD, and its state-level counterparts during the final quarter of the project period.

Despite these challenges, USAID and other donors have made progress in recent years. Projects such as FARM have begun to lay the foundation of knowledge, skills, and organizational capacity in the public and private sectors that is needed to support a sustainable and resilient agricultural system in South Sudan. New policies in agriculture, property rights, and investment regulations have been written and passed. However, the lack of political will and capacity to implement and enforce these policies impedes domestic and foreign direct investment, whether large or small, needed to support technology development and economic growth within the sector.

Photo: Jessica Scranton

FARM extension worker in Yambio teaching farmers proper techniques for planting seeds.

FARM's training initiatives focused on developing private sector and public sectors capacities in the agricultural sector. Training for the *private sector* centered primarily on introducing farmers and farming groups to new technologies and farming practices. The goals were to increase productivity and production and help participants make investment decisions, market their produce, and add value to their surplus production. Training for the *public sector* was carried out by working hand-in-hand on a regular basis with local- and county-level agriculture departments and extension services and state and national counterparts to develop their capacity in these areas.

6.1 INCREASING PRIVATE SECTOR PRODUCTION CAPACITY

As shown in Table 11, trained over 20,000 participants, of which approximately 34% were women, in various aspects of agricultural production. Among all interventions during the course of the project, GAP training on basic farming practices, along with improved seed, had the greatest impact on increasing farmers' productivity. Much of FARM's training, therefore, focused on this area, particularly during the early years of the project. As previously mentioned, one isolated training was normally not sufficient to change local farming behaviors. On-farm field demonstrations, farmer demonstrations and field days, farmer-to-farmer field tours, and direct extension support were used to reinforce GAP principles.

To achieve cost effectiveness and scalability, much of FARM's GAP training was carried out through TOT programs where newly trained instructors passing on their knowledge and skills to others in their FBOs and communities. Most direct training was conducted by project staff from Juba or the three state offices, using project-developed training modules and curriculum. Normally, one or two lead farmers from each FBO were selected to participate. Upon return to their homes, each of them was expected to train and demonstrate what they had learned to other members of their FBO. Since FBO groups typically include 21 to 25 farmers, the carryover effect of FARM trainings was quite substantial. FARM's GAP trainings were successful, as shown in project assessments and feedback from local counterparts.

Photo: Jessica Scranton

Women farmers in Yambio planting seeds using modern techniques promoted by FARM.

The FARM II project is prioritizing the need to make FARM training interventions more accessible to local farmers. Developing FPLCs in each payam (see section 4.4.3) is an important tactic to achieve this objective going forward. FPLCs were piloted in CES in 2014. By bringing the training to payams, rather than requiring farmers to travel within their county or state, the project was able to dramatically increase farmer participation in farm demonstrations and farmer field days from a few hundred to more than 3,500 in one state in FY 2014. In addition to expanding the FPLC program, the FARM II project will explore methods to expand GAP trainings to broader audiences and more target groups, such as women and youth, and decrease costs by using technology and communication tools to reach farmers who could not be reached by FARM.

Training in better post-harvest handling was critical for reducing losses due to spoilage and pests and for enhancing the marketability of surplus production. Over its lifespan, the project trained almost 4,000 farmers in this important aspect of production. This activity will be expanded under FARM II by working through cooperative unions to distribute hermetic bags. These bags are expected to dramatically increase farmers' performance and reinforce the linkages between cooperative unions and their members.

Table 11: Summary of Agriculture Production Training

Training Type	Male	Female	Percentage Women	Total
GAP training	8,447	3,941	32%	**12,388**
Farmer demonstrations (county-level)	354	194	35%	**548**
Farmer demonstration (payam-level)	2,238	1,419	39%	**3,657**
Farmer-to-farmer field tours	511	222	30%	**733**
On-farm demonstration trials	545	84	13%	**629**
Four-wheel tractor training	33	6	15%	**39**
Two-wheel tractor training	158	3	2%	**161**
Post-harvest handling	2,311	1,674	42%	**3,985**
Sustainable land reclamation	335	211	39%	**546**
Total	**14,932**	**7,754**	**34%**	**22,686**

6.2 INCREASING PRIVATE SECTOR TRADE CAPACITY

FARM made significant gains in building a foundation for commercial agriculture in South Sudan. As shown in Table 12, the project provided business, management, marketing, and market-enhancement training to over 3,700 participants during the life of the project.

At the beginning of the project, these efforts primarily emphasized FaaB training for FBO leaders to help them better understand the economics behind commercial farming. Over 350 participants received this training. It assisted farmers to better understand their production costs so they could make better management, marketing, and investment decisions and hence expand their production to surplus levels and become sustainable and profitable business entities. Many of those trained in this program then served as FaaB trainers for others in their FBOs and communities.

Once farmers began to increase their production, FARM introduced training on value-addition processing to help them improve the value of their harvested crops. The first of these technologies to be introduced was Uganda-style cassava chip processing. The project developed a manual for cassava-chip processing and distributed 185 copies. Five TOT events were conducted to develop capacity to conduct this training to a much larger audience. A total of more than 850 farmers were initially introduced to this technology, which aimed to increase the storage life of cassava and respond to market demand in local areas. These trainings taught farmers and local entrepreneurs how to create demand and add value to their crops though value-added processing. The project particularly targeted women's groups for this training, since this type of processing is an attractive livelihood opportunity for women. A women's group was invited to demonstrate the cassava-chip processing skills they learned from FARM to members of U.S. Congress during a CARE Learning Tour visit in 2013.

During the final years of the project, private sector training shifted to emphasize formation of farming groups and development of cooperative unions. Much of this focused on training cooperative union leaders and members on the principles of cooperative formation and business management and marketing. Seven cooperative unions were formed in the Greenbelt between 2012 and 2014 with support from

FARM. FBOs and cooperative societies were trained on the importance of linking with larger groups to create economies of scale and find larger markets for their harvests. Executives and management board member of each cooperative union were trained on business planning, governance, and capital formation. Each cooperative union received value-addition processing equipment, related training, and business planning support before awarded equipment to lease out to their member farmers as a business venture and as a service to their members.

These nascent cooperative unions will need extended strengthening for several years to become sustainable business entities serving their local farming communities. During the upcoming year, FARM II will continue to provide and expand support to these organizations through grants, technical assistance, and training. FARM II will also introduce incentives and support to spur entrepreneurship in the region during FY 2015 and FY 2016 through an entrepreneurial grants and business development services program.

Table 12: Summary of Market and Private Sector Development Training

Training Type	Male	Female	Percentage Women	Total
Farming as a business	243	118	33%	**394**
Cooperative union formation	60	21	26%	**107**
Cooperative business development/ management	207	41	17%	**265**
Cooperative training (county-level)	82	40	33%	**155**
Cooperative training (payam-level)	554	340	38%	**952**
Cassava chip processing	951	640	40%	**1,631**
Other value-addition processing equipment	64	14	18%	**96**
Agriculture trade fair (national)	90	32	26%	**148**
Agriculture trade fair (state)	24	6	20%	**50**
Total	**2,277**	**1,252**	**37%**	**3,778**

6.3 EXPANDING PUBLIC SECTOR CAPACITY

FARM worked closely with national, state, county, and payam agriculture departments over the past five years and project staff worked hand-in-hand with their public sector counterparts. During its first year, FARM added a National Coordinator position, filled by a South Sudanese staffer, to ensure close coordination between FARM and the national ministry. The project's Agriculture Policy and Strategy Director worked daily with ministry staff to draft national policies. FARM produced a closely coordinated quarterly newsletter that was approved and used by the ministry. Many field staff, particularly at the county and payam levels, frequently co-located office space with their government counterparts. The COP made visits to each state government presenting and discussing annual work plans with his state ministry counterparts.

As described in Section 4.2.1, FARM collaborated closely with the national and state ministries to plan and implement the nation's first two national agriculture trade fairs and subsequent state fairs. This included sponsoring observational trips for senior MAFCRD delegations to learn from large national trade fairs in

Jinja, Uganda, and Nairobi, Kenya. The project also planned the 2012 national conference on land reclamation in close collaboration with the national ministry. Ministry staff were frequently invited to join consulting trips by international experts in areas such as integrated pest management and environmental sustainability. Before the July 2013 dissolution of the government, FARM recruited two senior advisors to lead the ministry's embedded NEAT management unit.

With the advent of the conflict in South Sudan in December 2013, the project's close coordination with the government changed. USAID instructed FARM to minimize contact with the national and state ministries except on administrative issues. The project continued with its local programs, which required continued cooperation and coordination with county and payam counterparts.

FARM II will take a more systemic approach to public sector capacity development. The primary objective is to help county- and payam-level government counterparts improve extension services to small farmers. The first step will be an initial assessment of the extension service capacity at the county and payam level in each state. Low-cost interventions will then be devised that will have an immediate impact on improving local service provision. FARM II will provide material resources, training, and technical assistance to support this important initiative. The new project will also form competitive councils in each state to build institutional capacity for local advocacy and provide policy training in each state. This will help South Sudan roll out national policies that have been approved and finalized in recent years, helping create a stronger enabling environment for future business development in the country.

6.4 PUBLIC-PRIVATE PARTNERSHIPS

FARM began a public-private partnership with the Century Seeds Company in 2013 in an initial effort to create local seed multiplication capacity in the country. As described in section 4.10, the project partnered with Century Seeds, the local government, and FBOs in CES to establish the nation's first functional and coordinated seed production process. The goal of the partnership was to create an effective, sustainable, and regulated system for the production and distribution of locally produced and certified seed. This program, part of a long-term effort to develop seed multiplication capacity in South Sudan, was stalled and then discontinued because of the current conflict in the country.

FARM II will re-initiate a public-private partnership to establish seed multiplication capability in the Greenbelt. The project plans to tender an open grant competition to South Sudanese companies committed to becoming sustainable seed producers in the region. FARM II will provide business planning and technical assistance to the selected partner and establish working linkages with project-selected FBOs and cooperative unions. CES will likely serve as the seed source location for the venture due to its historical capacity in this area. Grant resources will be available for the program based on needs identified in the business planning process.

This grant program is to develop private seed multiplication capacity in the country, given the strategic importance of sourcing higher-producing seed in South Sudan. This has become particularly important as the value of the South Sudanese Pound is expected to further decline and government leaders are increasingly concerned about importing crop disease into the country. Technical assistance and matching in-kind grant resources will be provided to the selected seed company to strengthen its linkages with smallholder farmers through training, communications, and transportation support. The PPP grant will also help the private partner acquire some mechanized equipment, due to the limited access to capital in the country. The activity is expected to not only speed up development of this important input market, but also provide value-addition opportunities to local farmers who can earn 50% more profit producing seed than producing standard crops.

7 CROSS-CUTTING ACTIVITIES

In addition to activities in its three main technical components, the FARM project incorporated work in a number of cross-cutting areas that supported its objective of increasing food production in the Greenbelt.

7.1 INNOVATIVE GRANTS FACILITY

The FARM task order included a $5 million Innovative Grants Facility (IGF), which was intended to provide flexible funding to take advantage of new opportunities, pilot innovative approaches, and strengthen the organizational capacity of local NGOs and private firms seeking to enter processing. All grants awarded by FARM throughout the life of the project were in-kind, due to very low capacity levels across the agricultural sector, the lack of commercial activity in the Greenbelt, the scarcity of local NGOs and institutions, and the risk of misuse and corruption. Therefore, no cash was delivered to grant recipients. All grants covered the costs of specific goods and services, and the project made payments directly to commodity and service providers through a competitive procurement process.

FARM awarded more than 2,000 grants, totaling over $2.9 million. Five major types of grants supported the project's production, trade, and capacity development programs, as shown in Table 13 and described more fully below.

Table 13: Summary of Innovative Grants Facility

Grant Type	EES		CES		WES		Total	
	No. of Grants	Total Amount ($)	No. of Grants	Total Amount ($)	No. of Grants	Total Amount ($)	No. of Grants	Total Amount ($)
Seeds	524	558,649	703	690,483	481	560,795	**1,708**	**$1,809,927**
Plowing and harrowing	109	71,511	107	164,382	91	180,610	**307**	**$416,503**
Block farm support	20	428,369	2	74,784	0	0	**22**	**$503,153**
Equipment	1	25,697	5	67,319	12	32,293	**18**	**$125,309**
Goats					3	68,225	**3**	**$68,225**
TOTAL	**654**	**$1,084,226**	**817**	**$996,968**	**587**	**$841,923**	**2,058**	**$2,923,117**

7.1.1 Seeds

FARM awarded over 1,700 seed distribution grants from 2011 to 2014. The purpose was to introduce modern seed technology to smallholder farmers to increase their productivity. As described in Section 3.2.2, the project delivered maize, sorghum, cassava, groundnuts, beans, sesame, rice, and millet seed to FBOs in the target regions. The average size of each seed grant was $1,060, but they ranged in size from several hundred to several thousand dollars. Farmers were expected to contribute a portion of the harvest they produced from planting these seeds (equal to 30 percent of the volume of seeds they received through the grant) to their FBOs for marketing and revenue purposes. While this was difficult to

enforce at the beginning of the project, it became a standard practice as the project progressed. When they received the seeds, farmers were trained in proper selection, storage, and cleaning techniques so they could recycle some of their harvest for use as seed the following year. FBOs did not receive seed for the same crop twice; however, for example, they may have received maize seed one year and beans the next.

7.1.2 Plowing and Harrowing

Because only a small percentage of arable land in South Sudan is being cultivated for food production, FARM placed a priority on preparing and increasing land under cultivation as a means of increasing production. Preparing land for cultivation through plowing and harrowing is very expensive and difficult in South Sudan due to a significant shortage of labor and a dearth of mechanized farm equipment such as tractors. It can cost well over $100 to plow one feddan of land. FARM awarded over 300 plowing and harrowing grants between 2011 and 2014, at an average cost of $1,356 per grant.

7.1.3 Block Farms

As described in Section 3.8.3, 11 block farms were developed between 2012 and 2014 with support from FARM. The project awarded 22 grants to the block farms to reclaim fallow land, to plow and harrow the fields, and to purchase seeds. IGF support delivered over $45,000 in material assistance to each block farm—approximately $915 per feddan.

7.1.4 Equipment

Throughout the project's life span, FARM selectively awarded equipment grants. These grants were used for testing two-wheel, walk-behind tractors and, during the final years of the project, and on-farm processing equipment for cooperative unions. Spending on equipment grants totaled $125,309.

7.1.5 Goats

A total of 624 goats were purchased and delivered to three producer groups in WES during FY 2011 and FY 2012. The average grant size ranged from $18,920 to $29,735. As explained in section 4.11.1, FARM's small ruminants program was discontinued in FY 2012 when the project was directed to focus solely on staple crop production.

7.2 POLICY, LEGISLATION, AND REGULATION

Upon project inception, FARM provided technical assistance and capacity development support to help the Ministry of Agriculture improve the enabling environment for agricultural development and commerce in South Sudan. The project helped the ministry prepare 13 policy documents in a range of areas (see Table 14), all of which were aimed at improving the legal, regulatory, and policy environment for agriculture.

This work began during the initial stages of the project as a policy expert contracted by FARM wrote a long-term strategy document. A full-time expatriate Agricultural Policy Specialist was posted in South Sudan for almost one and a half years, where he worked closely with the ministry to develop 12 policy documents. The advisor worked in close collaboration with the ministry. Supported by FARM, he provided significant leadership in multiple stakeholder meetings and other group discussions for each policy as it was drafted and reviewed. The process continued after the expatriate advisor left his post in FY 2012. FARM contracted a regional policy expert later in 2012 who, with help from the project's National Coordinator, helped finalize the writing for seven policy documents. At the request of the

minister, the consultant also assisted in the creation of an over-arching agriculture policy framework document, called the Agriculture Sector Policy Framework (ASPF).

The ASPF was the first agriculture policy document approved by parliament on December 12, 2012. The project produced 1,920 copies for the ministry to disseminate. The Council of Ministers has approved five additional policy documents on forestry, mechanization, plant protection, horticulture, and soil health and conservation. The government's economic cluster passed an additional training and capacity building policy (with amendments). Further progress in developing agricultural sector policies stalled in mid-2013 due to the dissolution of the government and subsequent conflict in South Sudan. FARM II will help roll out the ASPF and other business enabling policies approved by the government by conducting policy trainings in each state during the upcoming year under FARM II.

Table 14: Summary of Policy Support Provided to Ministry of Agriculture

Serial No.	Policy Document	Accomplishments	Comments
1	Agriculture Sector Policy Framework (ASPF)	• Policy reviewed, edited, and finalized • Summary of ASPF generated. • Cabinet memo developed. • Economic cluster of cabinet reviewed and approved. • Council of Ministers approved. • Forwarded to national assembly.	• Policy passed by parliament on 12/12/12. • Printing of policy to be completed. • 1,920 copies of policy framework submitted to MAFTARFCRD in September 2013.
2	Forestry Policy	• Policy developed and reviewed by USAID technical team. • Document presented to ministry for further directions. • Policy presented to economic cluster and full Council of Ministers.	• Approved by full council of ministers on 2/8/13, with some amendments. • Awaiting presentation to National Assembly.
3	Agriculture Mechanization Policy	• Policy reviewed and edited. • Cabinet memo developed. • Passed to economic cluster of Council of Ministers.	• Approved by full council of ministers on 2/8/13. • Awaiting presentation to National Assembly.
4	Plant Protection Policy	• Policy reviewed, edited, and finalized. • Cabinet memo developed. • Economic cluster of cabinet reviewed and passed to full Council of Ministers.	• Approved by full council of ministers on 2/15/13. • Awaiting presentation to National Assembly.
5	Horticultural policy	• Policy reviewed and edited. • Cabinet memo developed. • Presented to economic cluster of Council of Ministers.	• Approved by full Council of Ministers on 3/15/13. • Awaiting presentation to National Assembly.
6	Soil Health and Conservation Policy (Fertilizer Policy)	• Policy reviewed and edited. • Cabinet memo developed. • Presented to economic cluster of Council of Ministers.	• Approved by full council of ministers on 3/15/13. • Awaiting presentation to National assembly.
7	Training and Capacity Building Policy	• Policy reviewed and edited. • Cabinet memo developed.	• Policy passed by economic cluster with amendments.

Serial No.	Policy Document	Accomplishments	Comments
		• Passed to economic cluster of council of ministers.	• Awaiting amendment by MAFTARFCRD and re-submission to Council of Ministers.
8	Rural Development Policy	• Policy reviewed and edited. • Cabinet memo developed. • Forwarded to economic cluster. • Referred by economic cluster back to Ministry for amendments.	• Policy being reviewed by team from Directorate of Rural Development and Directorate of Planning. • Awaiting comments.
9	Research Policy	• Policy developed • Document presented to Directorate for further review	• Awaiting response from directorate.
10	Seed Policy	• Policy developed. • Document presented to Directorate for further review.	• Awaiting response from Directorate.
11	Rural Finance Policy	• Drafts presented by external consultant. • Ministry requested support to hold validation workshop for stakeholders.	• Stakeholders' consultative forum to be held.
12	Agricultural Marketing Policy	• Drafts presented by external consultant. • Ministry requested support to hold validation workshop for stakeholders.	• Stakeholders' consultative forum to be held.
13	Food Security Policy	• Drafts presented by external consultant. • Ministry requested support to hold validation workshop for stakeholders.	• Stakeholders' consultative forum to be held.

7.3 GENDER

Women represent a very important segment of the farming and rural population in South Sudan. They are critical to the development of the country. Proper development of the agricultural sector would have a very positive impact on the lives of women and their families and would enhance their roles in agriculture and society. Improper development would have an adverse effect.

The FARM project sought to incorporate women in all its activities from the very beginning. Women represented 39 percent of all attendees at the project's agricultural production trainings, and the seed distribution and land preparation programs assisted many women-led farms and FBOs. FARM also included gender considerations in its cassava chip processing activity, which provided promising opportunities for women. While these efforts were recognized in FARM's mid-term evaluation, the report suggested that the project be more proactive and targeted in its approach to gender by developing specific interventions to advance women's role in the sector.

FARM contracted a regional specialist to conduct a gender assessment in September and October 2013. The purpose of this exercise was to examine gender dynamics in the rural Equatorias and make recommendations for strengthening the project's gender approach and deepening its positive impact on women. The specialist conducted field research and interviews to collect information and prepare a report.

This activity included trainings for project staff, public and private sector leaders, and agricultural sector workers. These trainings, designed to further sensitize participants on the importance of gender, included the following:

- One-and-a-half day gender trainings for 46 project staff in CES and EES. Participants included extension workers, state coordinators, component coordinators, and support staff.
- One-and-a-half day stakeholder consultations in all three states. A total of 64 participants included farmers; traders; processors; state- and county-level government officials; and representatives from the Ministry of Gender, Children and Social Welfare.

After receiving the gender training, project staff carried out field surveys for the assessment. They collected data from men and women farmers, agricultural commodity traders, input suppliers, and micro-processors. A total of 124 respondents in 10 payams in four counties in CES and EES were surveyed over a two-day period.

The assessment documented that women represented slightly over one-third of the project's farmer participants (6,600 at the time of the assessment) and that they were being positively impacted by project interventions. There was little evidence, however, that the project was purposefully transformative in its gender approach. The project is accommodating gender in its implementation—recognizing traditional gender-based roles and tailoring programs accordingly. This is recognized as a very good minimum, especially as it avoids creating tension or conflict around women's activities in a violent and conflict-prone country. The project could at the same time be both more transformative (shifting to new and accepted roles) and exploitative (using gender-based roles to an additional advantage to achieve desired project outcomes) in its activities.

Photo: Jessica Scranton

A female farmer in Yambio learning proper planting techniques at a FARM extension training program.

The gender assessment recommended that the project more purposefully design implementation activities to engage greater numbers of women farmers, traders, and input suppliers, and then make a greater effort to address their practical needs related to agricultural productivity or commerce (e.g., mobile communications, banking and credit, safe travel, access to land, and access to education). The assessment also proposed that FARM sharpen its accommodating approach and more diligently address gender equity when distributing project benefits: seeds, tools, equipment, training opportunities, and entrepreneurial opportunities. It also recommended that the project facilitate more effective participation by women in FBOs, cooperative societies, and cooperative unions. Wholly owned or directed female cooperatives merit increased support, and FARM might be able to foster networks among them.

While the four-month evacuation of project management staff during the final year of the contract deterred implementation of some of these gender recommendations, significant gains for women were achieved during the project's life. FARM empowered over 6,000 women in the Greenbelt through its seed distribution and GAP training programs, enhancing their economic stature through increased agriculture productivity. During the project, female farmers began to grow surpluses and gained access to markets creating livelihoods for themselves and their families. Women learned about good farming practices and modern technologies in areas such as planting and on-farm processing, relieving some of their burden in areas such as weeding and on-farm manual processing (e.g., de-cobbing maize) which have traditionally consumed a great deal of their time. Women also became highly engaged in FARM's farming as a business and market development programs. By joining groups and cooperatives while accessing value-addition processing technologies, many women in the Greenbelt have improved their economic

standing in their communities and now serve has role models advancing the progress of women in the Greenbelt.

FARM II will be assertive in advancing women in the Greenbelt. It will maintain high levels of female participation in its market development and capacity development components and will expand women's roles as extension service providers and farming role models in their communities. Value chain enhancement and income-generation activities such as shelling, thrashing, winnowing, and food processing are natural areas in which women can be targeted and advanced. Barriers to advancement, such as limited access to credit, will also be addressed in the upcoming year. Grants will target women to enhance their roles within society by increasing their ability to directly access new high-margin markets through new practices, technologies, and marketing information.

7.4 ENVIRONMENTAL COMPLIANCE AND CLIMATE CHANGE

FARM arranged for an environment expert to travel to South Sudan for one month in early 2011 to define operational parameters for the project that would respect environmental concerns specific to the South Sudanese context. Due to a lack of cultivation, South Sudan's fertile soil has not yet eroded away. Therefore, the fallow period can be as short as two years compared to 10 to 20 years in other countries, due to the richness of the soil. Most areas of the Greenbelt are able to plant crops twice a year. And although the land can be used very productively for several years, this practice places significant stress on the land and quickly reduces its output efficiency. Since they have limited use of fertilizer, the strategy of many farmers in South Sudan is to expand their productive capacity by developing more-fertile virgin land when the previously cultivated land becomes unproductive. Many farmers currently have sufficient uncultivated land to bring into cultivation. This will not be sustainable, however, as the nation's population increases.

Slash-and-burn agricultural practices are currently the norm in South Sudan. The country needs to move toward a more intensive and sustainable agricultural production system. Agricultural intensification is a means to increase farm productivity and help smallholder farmers grow surpluses, participate in market opportunities, and develop strong livelihoods while limiting new land needed for increased production. Therefore, increasing smallholder farmers' productivity by encouraging adoption of modern seed technology, GAPs, and sustainable land management practices is not only prudent for protecting the environment, but is also a sensible economic practice as South Sudan develops.

The project's main environmental concerns were related to 1) distributing a large volume of certified seeds to a large number of farmers in the Greenbelt region, 2) providing land preparation assistance to farmers through plowing and harrowing support grants, and 3) developing block farm sites as demonstrations for sustainable land reclamation and management.

Seed distribution. Treating higher-producing, certified seed with fungicides and insecticides (to protect it during transport, storage, and after planting) raised significant environmental concerns. The chemical treatments Thiram and Imidacloprid were included in a Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP) and approved by USAID. FARM developed an extensive training program to complement the seed distribution to mitigate environment degradation and safety. The curriculum consisted of 15 modules, with topics such as safe storage and handling of treated seed and GAP guidelines.

Land preparation. FARM's land preparation grants included instructions for standard mitigation measures such as using local plowing service providers for plowing and harrowing and minimizing the travel distance for tractors used for the activity. Other guidelines called for the size of each block of land to be no more than 30 feddans and for land to be cleared to have slopes of less than 10 percent. Stumps were to be cut and ground with manual cross-cut saws and small motorized stump grinders. The negative

environmental impacts of soil and water erosion were minimized by contour plowing and by training farmers on GAP. The project particularly emphasized contour ridging for crops planted on steeper slopes and encouraged prudent practices such as using vegetative strips or rows of trees or shrubs to reduce the velocity of water and increase infiltration. Farmers were advised to leave each feddan of their fields with 8-10 multi-purpose trees with economic value, to reduce wind erosion and provide some support for biodiversity, particularly for bees.

Block farm demonstrations. The project developed a set of USAID-approved guidelines for the block farm demonstration activity. These guidelines showed how to rehabilitate formerly cultivated lands in an environmentally sustainable manner following best agricultural practices. The purpose of the block farm demonstrations was to demonstrate how land could be reclaimed for agricultural production while still maintaining the essential character of South Sudan's landscape and supporting resilience against the effects of climate change by retaining indigenous tree cover and associated vegetation. FARM developed and disseminated the following minimum compliance requirements for this activity:

- With respect to pre-existing indigenous tree species: a tree cover with a minimum of seven trees per feddan shall be preserved and in no way damaged through girdling, fire, or other means.
- Tree species determined to have nutritional, medicinal or particular economic value shall be prioritized for conservation; those appearing on a project-prepared short list shall be preserved in all cases and regardless of density.
- Other tree species of nutritional, medicinal, or particular economic value that are in excess of the minimum to be conserved may be cut to ground level, but the buried stump shall be left undamaged by fire and allowed to regenerate by coppicing.
- Tree species not of nutritional, medicinal, or particular economic value that are in excess of the minimum to be conserved may be cut and the stumps removed by manual or mechanical methods, according to available means.
- Slopes greater than 5 percent on cleared land shall be stabilized by defining contour lines on the parcel and subsequently implementing mitigating measures.
- Fire may be used to burn selective heaps of cut brush following clearance, but shall not be used to burn ground cover on the field surface to clear or prepare the parcel for tillage.

7.5 INFORMATION AND COMMUNICATIONS TECHNOLOGY

Beginning in 2012, the FARM project began to seek ICT solutions as part of its market information and M&E activities. A specialist from Abt's home office made a field visit and conducted a feasibility assessment to determine if it would be possible to use smart phone technology to collect data in the Greenbelt. Sufficient coverage was available to start a small pilot program; human capacity was the project's most significant concern. In 2013, FARM carried out a three-month pilot in CES using mobile phones and electronic surveys developed by Abt home office specialists. A second ICT specialist came to South Sudan to train extension workers and support staff in operating the pilot system. During FY 2014, the expanded pilot platform was rolled out to all 27 payams in FARM's service area.

A prototype marketing information system was designed during the last year of the project using smart phones to collect commodity pricing data on a weekly basis for 13 agricultural commodities in 14 Greenbelt markets. The system uses a web-based data collection system to download the data from the smart phones and an Internet interface to report the data and make it available for dissemination. FARM introduced this prototype to the WFP's P4P program, which had expressed interest in it. FARM II will partner with the WFP and the FAO to implement and expand the program during 2015 and to ensure that it continues after the end of the project.

FARM II will continue to build its ICT capacity for general M&E initiatives in the upcoming year. FARM staff have already been trained on smart phone data entry. FARM II will develop electronic surveys for all data collection tasks and work to collect as much data as possible through this technology. M&E data will be downloaded onto a web-based data storage site where it will be accessible from the field and home offices. Using corporate cost-sharing resources, FARM II will also develop standard operating procedures to further systemize and standardized data collections processes, improving project performance in this area.

7.6 SYNERGIES WITH OTHER USAID COUNTRY AND REGIONAL INITIATIVES

Seeds for Development. FARM worked closely with AGRA and IFDC on numerous activities as part of the USAID-funded Seeds for Development initiative, beginning in 2011 and continuing through 2013 when Seeds for Development ended. As explained in Section 2.3, the IFDC team co-located staff at FARM's main office in Juba, while AGRA maintained a nearby office facility. FARM initiated a joint planning meeting at the start of the partnership to develop relationships and begin coordinating activities. The project introduced Seeds for Development staff to high-level national, state, and county government officials in a joint meeting that presented the program's hybrid seed and fertilizer programs and the on-farm demonstration trials, and arranged for IFDC's agro-dealers to participate in the first agricultural trade fair in Juba in 2011. FARM served as the main point of contact with all government counterparts during the joint program and distributed a weekly highlight report on joint program activities, which was widely circulated in South Sudan and USAID. The project also worked with AGRA and Century Seeds Company on a seed multiplication activity, as discussed in section 4.10.

NEAT Initiative. FARM cooperated with the Government of South Sudan's NEAT initiative, which USAID supported through the strategy consulting firm McKinsey and Company. McKinsey worked closely with MAFCRD starting in late 2012 to develop a short- to mid-term plan for rapid development of South Sudan's agricultural sector. At USAID's request, FARM then prepared a proposal on how the project would implement two components to this plan, including embedding expatriate leadership to help the ministry implement the plan and serving as USAID's implementer for the Greenbelt zone, as incorporated into the plan. The NEAT initiative was eventually canceled because of the 2013 dissolution of the government and subsequent conflict.

WFP Purchase for Progress. Joint efforts between FARM and the WFP's P4P program began early, as both parties worked together to provide farmer groups in the region with post-harvest storage training. As farmer groups began to grow surpluses with support from FARM, P4P became a very significant market for these smallholders. It offered demand (2,500 mt per year), financial resources, and the distribution capability to store and transport food crops to where they were most needed. FARM worked with cooperatives and communities to aggregate sufficient volumes for bulk sale to the WFP. It also facilitated linkages between the cooperatives and the WFP by identifying sources of bulked produce and helping establish business interactions. During the upcoming year, FARM II will intensify its relationship with the WFP in a number of areas, including a joint market information initiative and credit access initiative.

U.S. Government delegations. The project supported a number of U.S. Government delegation trips to South Sudan, including a CARE Learning Tour for members of the U.S. Congress.

7.7 COLLABORATION WITH OTHER DONORS AND INTERNATIONAL ORGANIZATIONS

The FARM project demonstrated significant leadership within the donor and international communities in South Sudan on agricultural development issues. Until the meetings were discontinued in 2012, the

project actively participated in MAF's monthly Internal Coordination Committee meetings, which included most of the major donor-funded programs in the country. FARM took part in the monthly donor meetings held at the World Bank or JICA, and assisted JICA with its CAMP strategy development process. FARM's State Coordinators in Torit and Yambio were also very involved in donor and NGO coordination meetings in their states. In addition, the project's expertise was sought and given to the donor community on prioritizing feeder road improvements to link local production to the most important urban markets.

The WFP invited FARM's COP to speak to its leadership at its annual conference in Rome in2013 about agricultural development in South Sudan. The project collaborated with the International Center for Research in Agroforestry (ICRAF) on land reclamation activities; a senior ICRAF expert served as a key speaker in the FARM-supported 2012 national conference on this topic in Juba. The project frequently contributed information to donor-funded assessment and planning trips, due to the experience it had accumulated. During its five year life span, FARM coordinated with many donors (including GIZ, the Netherlands-supported South Sudan Agribusiness Development Project, the FAO, the World Bank, and JICA) and NGOs such as World Relief, CHR, SNV International, and the Mundri Relief and Development Association.

8 MONITORING AND EVALUATION

Monitoring and evaluation was an important function within the FARM project. It provided project management with established targets and goals to focus project interventions, as well as with objective evidence to measure progress towards achieving results and timely feedback to adjust and improve project activities. M&E also enabled the project to report on results and achievement to USAID.

The M&E unit was originally staffed with a South Sudanese specialist based in Juba, supported by a part-time home office specialist in the U.S. The team was augmented by technical and extension staff in Juba and in the field offices who collected data for the M&E team to use in project tracking and reporting. In some cases, data collection was outsourced to a local South Sudanese organization however this practice was discontinued due to poor vendor performance. FARM also recruited South Sudanese college interns on occasion to collect data on project activities such as evaluating the effectiveness of the on-farm demonstration plot program in FY 2012.

Due to limited M&E resources, FARM faced significant challenges in tracking, monitoring, evaluating, and reporting on project activities in the field and in effectively measuring the project's impact on the country's agricultural sector. During FY 2013, once budget constraints were removed, Abt expanded the project's capabilities by hiring an expatriate M&E Specialist and a South Sudanese deputy. The project's capacity to collect data was also greatly improved at this time by the addition of 27 payam extension workers and motorcycles for their transportation.

As it evolved and its capacity increased, the project improved its ability to collect and track data by increasing awareness and through better systems and use of technology. Many lessons learned, both positive and negative, improved FARM's ability to monitor, evaluate, and track data. The project drew on these experiences to strengthen its systems, which in turn improved its ability to collect data, such as attendance data for farmer field days and other training events, and then report the data to the Juba office. Smart phone technology helped the project track sales and volume data that it had not previously been able to collect.

FARM II will continue to build capacity and further emphasize monitoring and evaluation. FARM staff, many of whom are continuing to work under FARM II, have been trained on smart phone data entry. Electronic surveys have been developed for all data collection tasks and can be easily adjusted based on project needs. The project will make significant attempts to collect as much data as possible through this technology, downloading it onto a web-based data storage site where it will be accessible from the field and the home office. FARM II will also develop standard operating procedures to further systemize data collections processes.

8.1 PERFORMANCE MONITORING

The project submitted a Performance Monitoring Plan (PMP) to USAID within the first 120 days of the contract. Many of the indicator targets in this original 2010 PMP were established as "to be determined," so that targets could be set in conjunction with the design of project interventions. Beginning in September 2011, FARM worked with the USAID mission to establish performance indicator targets for FY 2011 through FY 2013. Indicator targets were later adjusted and added for FY 2013 and 2014.

The assistance objective of the FARM project was to increase food production in targeted areas of South Sudan. The project was comprised of three main technical components to accomplish this objective, which included Agricultural Productivity, Agricultural Trade, and Capacity Building. Tables 15 through 17 summarize the results compared to their targets for each of these three components of the project.

8.1.1 Agriculture Production Performance Indicators

FARM's first intermediate objective was to increase agriculture productivity in selected agricultural commodities. The project tracked two sub-intermediate results under this component: 1) increase adoption of improved technologies, and 2) improve producer organization business and management skills. As shown in Table 15, four indicators were tracked for technology adoption and two for producer organizations.

Under this intermediate objective, FARM developed a network of 666 FBOs and block farms, providing them with formation, organization, and management training and assistance. FARM also supported 6,100 women under this objective. A total of 16,167 farmers received direct project assistance in areas such adoption of improved seed technology or improved agronomic practices. Over the course of the project, FARM provided GAP training and other production training to 23,348 farmers, including 4,374 women (39 percent of the total). The project helped farmers plant improved seed on 19,445 hectares of land using improved farming.

8.1.2 Agricultural Trade Performance Indicators

FARM's second intermediate objective was to increase trade in selected agricultural commodities. The project tracked three sub-intermediate results under this component: 1) increase smallholder farmers' access to market services; 2) increase private sector services that support marketing and finance; and 3) improve the legal, regulatory, and policy environment to facilitate market and trade. As shown in Table 16, three indicators were tracked for increasing smallholders' market access and one each for increasing private sector services and improving the legal, regulatory, and policy environment.

Under this intermediate object, FARM delivered agricultural services to 48 cooperative unions, input dealers, tractor and ox-plow providers, and seed and equipment suppliers. The project assisted with more than 28,000 purchases of smallholder-produced commodities, exceeding $2,677,723 in value. FARM funded over $55,000 in private sector services to support market-driven investment. One policy, the ASPF, was signed into law by the National Assembly. Six additional policies have been approved by the Council of Ministers and are waiting for presentation to the National Assembly.

8.1.3 Capacity Building Performance Indicators

FARM's third intermediate objective was to improve capacity to support market-led agriculture. The project tracked two sub-intermediate results under this component: 1) improve the business, management, and service provision skills of private sector; and 2) improve the capacity of the public sector to develop an enabling environment to support market-led agriculture. As shown in Table 17, three indicators were tracked for capacity building in the private sector and one in the public sector.

Under this intermediate object, the project held a total of 121 training events related to improving trade and the investment environment. More than 9,300 individuals received enabling environment training. The project conducted capacity assessments and provide capacity building support to 30 private sector enterprises. FARM's records show that 538 public sector officials received project training to support market-led agriculture.

Table 15: Progress Towards Performance Indicator Targets for Agricultural Production

			2010	FY 2011	FY 2012		FY 2013		FY 2014		FY 2015		Project End
Performance Indicators	**Unit**	**Data Source**	**Baseline**	**Actual**	**Target**	**Actual**	**Target**	**Actual**	**Target**	**Actual**	**Target**	**Actual**	**Actual**
1.1 Increase Adoption of Improved Technologies													
Number of farmers, processors, and others who have adopted new technologies or management practices as a result of USG assistance	No.	Farmer, Processor, Trader Surveys	3,501	4,200	6,900	6,695	11,132	10,830	12,555	13,754	14,442	16,167[1]	16,167
Hectares under improved technologies or management practices as a result of USG assistance (yield of commodities)	Ha.	Farmer Surveys	4,556	4,556	8,694	5,838	7,589	4,171	3,203	4,863[1]	5,107	0[2]	19,445
Number of individuals that have received USG-supported short-term agricultural sector productivity training	No., Gender	Project Record-Keeping	849	3,330	3,960	3,171	3,963	5,711	3,769	11,136	11,693	0[3]	23,348
Number of individuals (women) that have received USG-supported short-term agricultural sector productivity training	Gender	Project Record-Keeping	0	736	792	886	1,107	2,131	1,191	4,374	4,160	0[3]	4,374
1.3 Improve Producer Organization Business and Management Skills													
Number of producers' organizations, water users associations, trade and business associations, and community-based organizations receiving USG assistance	No.	Project Record-keeping	132	186	300	497	484	497	572	585[3]	614	666[1]	666
Number of women farmers, organizations/ associations assisted as a result of USG-supported interventions	No., Gender	Project Record-keeping	0	1,470	1,470	2,360	1,669	4,989	TBD	5,395	TBD	6,141	6,141

Note 1: Includes 2,412 new farmers and 81 FBOs that were identified, assessed, and prepared, but did not receive seeds during FARM, as previously discussed

Note 2: Additional hectares not included in 2015 because seeds will not be distributed until FARM II contract period

Note 3: Training data included in FARM contract period

Table 16: Progress Towards Performance Indicator Targets for Agricultural Trade

			2010	FY 2011	FY 2012		FY 2013		FY 2014		FY 2015		Project End
Performance Indicators	**Unit**	**Data Source**	**Baseline**	**Actual**	**Target**	**Actual**	**Target**	**Actual**	**Target**	**Actual**	**Target**	**Actual**	**Actual**
2.1 Increase Smallholders' Access to Market Services													
Number of agriculture-related firms accessing critical agricultural services (such as credit, veterinary services, agricultural inputs, machinery, and business development) as a result of USG interventions/assistance	No.	Farmer, Processor, Trader Surveys	0	15	20	48	25	34	42	48	50	48	48[1]
Volume of purchases from smallholders of agricultural commodities targeted by USG assistance[2]	mt	Farmer Surveys	NA	0	NA	5,363	NA	2,281	NA	20,427	21,448	0[1]	28,071
Value ($) of purchases from smallholders of agricultural commodities targeted by USG assistance	USD	Project Data From Surveys	0		516,541	404,428	405,860[3]	682,015	800,000	1,591,280[2]	167,084	0[1]	2,677,723
2.3 Increase Private Sector Services (Including MSMEs) That Support Marketing and Finance													
Value ($) of private sector services provided that support marketing and finance	USD	Service Provider Survey	0	0	50,000			0	60,000	56,750	62,425	0[1]	56,750
2.4 Improve the Legal, Regulatory, and Policy Environment to Facilitate Marketing and Trade													
Number of policies, regulations, administrative procedures drafted, analyzed, approved, and implemented as a result of USG assistance	No.	Policy Specialist	0	7	5	3 finalized & approved; 5 drafted not yet approved by RSS	0	7	8	1 policy signed into law; 6 awaiting decisions	7	1 policy signed into law; 6 awaiting decisions	1 policy signed into law; 6 awaiting decisions

Note 1: 2015 data not yet collected in these areas

Note 2: Value of maize aggregated from smallholder farmers/members by 13 cooperative societies or unions and sold to NGOs and WFP

Table 17: Progress Towards Performance Indicator Targets for Capacity Building

			2010	FY 2011	FY 2012		FY 2013		FY 2014		FY 2015		Project End
Performance Indicators	**Unit**	**Data Source**	**Baseline**	**Actual**	**Target**	**Actual**	**Target**	**Actual**	**Target**	**Actual**	**Target**	**Actual**	**Actual**
3.1 Improve Business, Management, and Service Provision Skills of Private Sector, Including MSMEs													
Number of USG-supported training events held that are related to improving the trade and investment environment, and public sector capacity to provide quality services	No.	Project Record-Keeping	0	30	75	13[1]	15	15	27	63	73	121	121
Number of individuals who have received short-term agricultural enabling environment training	No.	Project Record-Keeping	0	600	1,500	300[2]	375	368	3,769	7,969	13,289	9,237	9,327
Number of MSMEs undergoing organization capacity/competency assessment and capacity strengthening as a result of USG assistance[1]	No.	Project Record-Keeping	0	15	20	1[3]	3	6	6	8	10	30	30
3.2 Improve Capacity of Public Sector for Development of Enabling Environment to Support Market-Led Agriculture													
Number of public sector agents sufficiently trained to be qualified to support market-led agriculture as a result of USG assistance	No.	Trainer Records	0	105	165	179	200	103	150	151	406	538	538

8.2 FARMER PROFILE SURVEY

The FARM M&E team began conducting farmer profile data in 2013 to gain a greater understanding of smallholder farmers in the Greenbelt. Information collected in these surveys includes age, education level, proximity to markets and social services, household size, income sources, and farming behaviors. The farmer profile survey work was enlightening. It serves as a basis for refinement and more robust data collection as more is learned about the agricultural sector in South Sudan. Findings from surveys to date are summarized below.

Education. Project data shows that the average male household head has five years of education beyond primary school. This compares to four years of primary school for women. Due to the quality of education during the war years, however, many farmers are illiterate and are unable to understand written materials. Most families in the survey have children attending school. CES scored the best in regards to education attainment.

Age distribution and involvement in farming. The FARM survey showed that many youth under the age of 18 are active in farming in their households (almost equal to the total number of adults) and over half are involved in non-wage work. A higher percentage of male-headed household heads than female-headed households are engaged in farming in the Equatorias. In CES and WES, the differences between the male-headed households and female-headed households are not significant, but in EES, three times more male-headed households than female-headed households are engaged in farming.

Distance to socio-economic activities. Most farming families have to travel long distances to access socio-economic amenities such as schools, clean water, healthcare, and the police. The survey results show the average distance from farmers' homes to amenities as follows:

- Population centers: 15.5 km
- Markets: 6.1 km
- Schools: 2.9 km
- Clean water: 1.5 km
- Health clinics: 3.7 km
- Police: 8.1 km

The survey found that 40 percent of rural farmers must walk more than 30 minutes to access clean water.

Household assets. The studies show that male-headed households own more than twice as much land to dedicate to agriculture production as female-headed households. Male-headed households also own twice as many motorcycles and cattle. The distribution of small animals such as goats and birds is more equal. Both household groups own basic farming tools needed for manual agricultural production, such as hoes and axes, but neither group owns mechanized equipment.

Livestock. Raising livestock has a long tradition in most Greenbelt communities. Eighty-three percent of households own poultry, while 65 percent have goats and 8 percent possess pigs. Male-headed households maintained larger herds or flocks of cattle, goats, and sheep than female-headed households.

Sources of household income. The surveys reveal that most farmers generate their revenue through business dealings and trade (such as local honey trade). The second largest source of revenue was the sale of maize, followed by sale of cassava, groundnuts, wages from labor, vegetables, beans, and charcoal, among others.

Household expenditure. FARM's studies show that smallholders spend more money on agricultural production than on any other category. This is followed by spending on clothes, school fees, food consumption, transportation, and medicine. CES has the highest level of farming expenditures, with WES and CES spending almost the same in this category. Kajo-Keji in CES spends the most on education compared to the other eight counties included in the survey. Mundri, followed by Morobo, spends the most on food consumption, highlighting the commercial activity taking place in these locations.

Photo: David Miller

Cooperative Union members waiting to test maize de-cobber machine

9 FARMER FEEDBACK

The FARM project is grateful for the appreciation, support, and cooperation received from its many counterparts and the thousands of beneficiaries who participated in its programs beginning in 2010. So many of the farmers we worked with over the past five years were heroic in their efforts to benefit as much as they could from FARM's interventions and displayed considerable courage changing from their traditional farming practices. Their hard work and sacrifice illustrates their hope for the future. Below are some quotes we collected from farmers and agriculture leaders highlighting a few of their achievements during the project and providing some insight into the overall impact USAID had in South Sudan under this important program.

Improved Harvests Yielding Better Lives

"Since I have started farming, I have never received any support from anyone. I am grateful to the FARM project for including me in this seed distribution program. I hope to get better yields this season."

- Joice Christopher, Noki FBO, Western Equatoria

"From the money that we got from the sale, all my children have attended school this term. With my other savings, I have also been able to cater for basic needs for my family. Like buy my children clothes and treat them in case any of them fall sick."

- Lilly Achii, Chair of Lew Women's Group, Eastern Equatoria

Post-Harvest Storage

"You can see the difference for yourself. If you stand beside these bags you can hear the weevils creaking in the bags, but if you stand beside these other ones [hermetic storage bags introduced by FARM], it is all silent which means the weevils have failed to find ways to enter."

- Levi Lokosang, Soruba FBO, Central Equatoria State

"Since my store could not accommodate all my harvest I made so many losses. My grains would spoil before getting to market. I can now store my crops for as long as I can [using hermetic storage bags introduced by FARM] while I look for markets from the neighboring towns. …I used the money from my surplus to pay school fees for my ten children, two of who are at university. I used the remaining money to improve the buildings in my compound."

- Natale Zingisi, Nagbaka FBO, Western Equatoria

Investing in Farming

"We plan to hire tractors next year from the income we make from this season's sales to clear more land and expand our cooperative society."

- Francis Juma, Chairperson, Ajugi Cooperative Society, Western Equatoria

"With the money from my crops, I bought already trained oxen because it is very difficult to access tractors for ploughing. I also plan to hire the animals out to other farmers so that I can earn some money."

- Albert Abore, Harambee Block Farm

Value-Addition Processing

"When bagged, cassava chips are sold at 50 SSP while the other forms of cassava sell for 40 SSP at the local market ... I am going back to train members of my group and also encourage them to adopt this technology."

- Flora Ama, Bakobiki, Farmer Based Organization, Morobo County.

"The machine [crop sheller] is fast and can shell up to 100 bags of maize in less than a day. This equipment has motivated us to expand our farmlands and produce more because processing has been made easier."

- Angelo Edward Zingbondo, Chairperson, Nzara Farmers Association, Western Equatoria State

Farming as a Business

"We harvested a lot of grains in the past but most of it would either rot or be attacked by pests. After training from the project, I have so far threshed 30 bags of maize which are ready for sale. Since I started working with the FARM project, I have used part of my profit for hiring labor to expand my farm, and bought a motorcycle for taking my produce to Yei town for sale. The extension officers are always quick to respond to the farmers whenever the need arises. This is the kind of work we want to support and be part of ... we plan to hire tractors next year from the income we make from this season's sales to clear more land and expand our cooperative society.

- Francis Juma, Chairperson, Ajugi Cooperative Society, Central Equatoria.

"In the past, we recorded a lot of losses, especially in cassava production. In 2012, we received 36 bags of cassava stem from USAID's FARM project. We planted the crop on 14 feddans following good agronomic practices the project taught us. In late August this year, one of the international NGOs working in South Sudan purchased stem cuttings worth $11,920 from us. We could not believe that we would receive this amount of support to invest in our FBO even before harvesting the crop. In one of our group meetings, we decided to use this money to acquire our own value-addition equipment. We were able to purchase a motorized two-in-one cassava grater and grinding mill costing $1,140 from Arua, Uganda. ... The new varieties introduced by the FARM project do not require washing and fermentation, so we can grate the freshly harvested crop, dry it and then grind in into flour. This will improve the quality of our produce and also fetch us more income. We also plan to provide grating and grinding services to other famers as an income-generating activity. With all the money we look forward to making, we are in the process of opening up a bank account. Originally, we were 10 active members in this group , but since we bought this equipment 26 youth from the area have registered to join us this year, helping us be more productive. ... we want to become one of the best service providers in the county."

- Manase Sebit, Pisak-Ngakoyi FBO, Central Equatoria

Empowering Women

"Weeding used to be only for women. However, with the new technology of planting in lines, men have joined in, by using hoes and other hand tools, making work easier."

- Moses Indoru, Anika Youth FBO, Central Equatoria State

"We always grew cassava and corn, but the new production techniques and farm equipment lets us greatly expand our commercial sales."

- Mary Itate Benjamin, Chairperson, Christian Women in Action Cooperative, Central Equatoria State

Market Linkages

"This is my first time to attend such an event [Eastern Equatoria's First Annual State Agriculture Trade Fair] ... I have seen products on display that I never imagined could be produced in this country. I have interacted with other farmers ... I hope to stay in touch with them so that we continue sharing our experiences."

- Amone Phillip Bimbo, Chairperson, Obbo-Miikomi FBO

"We cannot practice agriculture without good seeds. The work done so far by the contracted farmers [identified and trained by the FARM project], especially in Yei and Morobo, is very impressive."

- Aaron Ware, Proprietor of Century Seeds Company which partnered with FARM on a seed multiplication pilot program in Central Equatoria State

"I used the money [from the pilot seed multiplication program] to pay school fees for my children for their first term, built a house, and also paid for shares at our cooperative society."

- Kennedy Lugala, Undukori FBO, Central Equatoria

10 CONCLUSIONS

South Sudan is unique among the many countries supported by USAID due to its history, meager infrastructure, poor institutional and human capacity, and limited experience with commercial market-based economics. Economic and commercial development were high priorities at the inception of the FARM project, but the short-term social needs of the rural population were acute due to smallholder farmers' poverty and low levels of resilience. Many were struggling simply to farm at subsistence levels. The situation was compounded by political instability and a fragile security environment. While there was much interest in achieving fast and scalable results, the basic fundamentals under all three project components required substantial strengthening before such results could be achieved in South Sudan.

Today, after five years of support from the project, a strong foundation for agricultural development has been made in the Greenbelt. A great deal of continued work is needed, however, to build on USAID's significant investments under FARM. Constraints, lessons learned, and recommendations for continued development in the agricultural sector are briefly summarized below.

Improved feeder roads

- *Findings.* Support from USAID and other donors have enabled progress to be made over the past five years in improving feeder roads in some locations in the Greenbelt. A recent assessment by a visiting consultant reported that farmers based along the feeder roads leading into Yei said that this past year was the first time traders came to them or to their village markets to purchase agricultural surpluses. The same assessment contained interviews with traders who said they were able to do so not only because surplus production is now available in their areas, but also because the improved quality of the roads now makes it profitable for them to go into smaller markets to purchase and aggregate surplus.

  Recommendations. Future programs may consider to not only aim to improve feeder roads, but also focus on main trunk roads. Better trunk roads would spur in-country trade to Juba and other urban areas in the Equatorias. This, in turn, would significantly enhance local trade of agricultural surpluses and help traders be more cost-competitive with Ugandan imports.

Access to credit

Findings. With many smallholder farmers now growing surpluses and markets now developing, demand for credit and capital investment is quickly growing in the Greenbelt. Capital is needed in all parts of the value chain, including smallholder farmers, input suppliers, cooperative unions, processors, and traders. FARM staff recently received feedback from several smallholder farmers who said that some traders are not promptly paying them after crop sales. Recent discussions with the WFP emphasized that limited access to credit is a major constraint to scaling up its P4P program. USAID has had a partial credit guarantee agreement with two commercial banks and one microfinance company. Apart from the microfinance institution that has started lending under the scheme, the banks are reluctant to provide credit to farmers working with the value chains due to political uncertainties and unreliability of borrowers in paying back loans.

Recommendations. Liquidity should be built into all value chain development programs since smallholder producers greatly prefer instant payment over delayed disbursement. Interventions should help value chain intermediaries such as traders and cooperative unions obtain working capital credits secured by commodity crops. Furthermore, future programs should collaborate

much more closely with financial institutions, including banks and microfinance organizations, to develop credit services specifically targeting the agricultural sector in the Greenbelt. While the enabling environment for commercial banking remains weak, advances should be made in areas such farming-as-a-business and financial literacy training for farmers, linking farmer groups to commercial banks and micro-finance institutions, and building business relationships with them through opening deposit accounts and participating in activities of mutual interest.

Entrepreneurship in the agricultural sector

- *Findings.* As the agricultural sector in South Sudan grows, many venture opportunities will develop in response to the growing need for goods and services. Opportunities will range from one-man or one-woman shops in rural villages to larger-scale ventures in such areas as seed multiplication and milling. Currently, entrepreneurialism is lacking in the Greenbelt, due to the region's nascent level of commercial activity, poor business enabling environment, and weak human and institutional capacity.

  Recommendations. Interventions to infuse entrepreneurialism in the Greenbelt should be encouraged. New programs could include entrepreneurship grant programs to create role models and momentum in local areas, support services and counseling for small businesses, and training programs focused on business skills and financial literacy. Specialized programs to support larger-scale ventures are also highly recommended. They could be delivered through public-private partnerships in strategic areas such as seed multiplication, milling, and food processing.

Farmer support services

- *Findings.* The ability of the public and private sectors to deliver critical services to Greenbelt farmers continues to be a significant constraint. Basic local services such as extension support are weak due to extremely limited resources, low capacity among extension staff, and minimal access to the basic operating equipment (e.g., cell phones and transport) that extension workers need to effectively do their jobs.

  Recommendations. New programs should further develop capacity to enhance the skill levels of extension staff, prudent material support is needed to jump-start local services, and long-term solutions are required to rationalize resources and identify sources of funding. Opportunities should be sought to fill this void by private sector extension service providers through cooperative unions and other intermediaries entering the market.

Scaling up service delivery

- *Findings.* Having future agricultural development programs in South Sudan target a wider range of program beneficiaries would enable service delivery to be scaled up and to reach more farmers and more groups at a lower cost. For example, by focusing more training events at the payam level through FPLCs and farmer field days will make extension service initiatives more accessible to local farmers and increase economies of scale for funds spent on these activities.

  Recommendations. New programs may consider using radio, text message services, and other technologies to deliver farming messages to beneficiaries that cannot be directly reached. Expanding and scaling TOT programs would also improve the cost efficiency of extension services. Payams and counties that were not served by FARM expressed interest in receiving similar support. Therefore, new payams and counties in the Greenbelt that have close access to roads and urban markets should be considered for inclusion in future programs using materials and systems that have been developed by FARM.

  It is also advised that new programs consider providing more intensive and focused support to cooperative unions as an approach for reaching smallholder farmers in a scalable manner.

Continued technical assistance to cooperative unions (in areas such as management, operations, and marketing) over a period of years will be required to help these apex organizations become sustainable service providers to local farmers in their areas. Advancement of these nascent organizations can be expedited through focused technical assistance and targeted grant support.

Geographic Expansion

- *Findings.* The FARM project has worked in 9 of the 24 counties in the three Equatoria States during the life of the project. It worked in 27 of the 47 payams in these nine counties. Under FARM II, the program intends to expand into an additional payam in each county bringing the total to 36, or over three-quarters of all payams in its nine-county service area. These nine counties are located in an agro-ecological zone in the southern strip of the Equatoria states called the Greenbelt region, which enjoys heavy rainfall and fertile soils. This region has served as a traditional agriculture production area for the country and is quite suitable for significant cereal production, particularly maize. Three other agro-ecological zones exist in the Equatoria states including the Ironstone Plateau, which incorporates the northwestern part of Central Equatoria and northern Western Equatoria along with parts of four other states; the Hills and Mountains region, which includes most of northern Central Equatoria and most of the central part of Eastern Equatoria; and the Pastoral region, which forms the eastern half of Eastern Equatoria and parts of Jonglei state. Each of these agro-ecological zones has unique characteristics in regards to agricultural development.

- *Recommendations.* As the FARM programs will have reached out to 76% of the payams in the project's service area by the end of FARM II, significant consideration should be given to geographic expansion in future programming while continuing to build the momentum of agriculture development in the Greenbelt. The FARM program has developed a strong cadre of agriculture specialist and extension workers who are well suited to expand service delivery to other parts of the region and country. The program's design and tried-and-tested interventions are well suited for transfer to other areas of the country. Large donors such as the World Bank are considering future agriculture programming in the Equatorias and other areas of the country based on the FARM model. Therefore a significant amount of donor coordination is recommended before future programming is implemented in the country. While program expansion should be pursued in other geographic locations within the three Equatoria states and other areas of the country, agriculture programming should be tailored to the characteristics of each location and consider agro-ecological features, security, political climate, culture, and market accessibility. For example, groundnut production may be emphasized in the Ironstone Plateau while horticulture may be most suitable for the Hills and Mountains region. However, the timing of implementation should be dependent on the political and security situation of each area.

Fertilizer Use

- *Findings.* FARM was not able to conduct much work in fertilizer during the life of the project. The use of fertilizer is a political and sensitive issue in South Sudan and there was great reluctance from many government counterparts to our working in this area. IFDC did attempt to introduce some fertilizer use in the On-Farm Demonstration Trials activity during 2012, in which FARM was a partner, as explained in section 4.4.3. In the yield assessment that was conducted for this activity, the results directly achieved through fertilizer use were not isolated in the study. However, the overall activity did show that significant gains can be achieved using hybrid seed and fertilizer and following GAP practices.

Recommendations. The Agriculture Sector Policy Framework, supported by FARM, was passed by Parliament in late 2012 and called for a well-functioning fertilizer importation, storage and distribution system for enhancing agricultural productivity. Due to significant changes in government during 2013 and the conflict that broke out in December 2013, most parts of this policy document were not implemented or rolled out to state and local governments. Therefore, little progress has been made since 2013. It is recommended that future agriculture programs give serious consideration to increasing the introduction of fertilizer and developing systems that will support its use. A methodical approach is suggested giving sufficient time to research, train, and socialize counterparts and beneficiaries on fertilizer use to optimize the productivity gains that can be achieved using this important agricultural input.

The role of women and youth

- *Findings.* Women and youth are very large, important population segments of the Greenbelt farming population that are currently underserved. Value chain opportunities must be understood and identified if optimal results are to be achieved for both groups. Properly targeted supports are needed to transform the roles of women and young people in the agricultural sector.

  Recommendations. New programs are advised to provide targeted supports in the form of grants and technical assistance to deliver vocational training, entrepreneurial assistance, and promotional programs.

Donor collaboration

- *Findings.* Further collaboration with other donor and NGO programs can leverage resources to enhance smallholder farmer development in the Greenbelt. The WFP's P4P program, for example, represents an immediate market for smallholder surplus in the region, allowing the sector's value chains to grow and become stronger while private sector demand develops in the country. Currently, the WFP is able to only source only one-half of its local staple crop quota within South Sudan.
- *Recommendations.* New programs are advised to work closely with the WFP to decrease market impediments, such as limited credit access and post-harvest spoilage, which would have a rapid and meaningful impact to the agricultural sector.

Monitoring and evaluation

- *Recommendations.* Monitoring and evaluation systems should continue to be strengthened to improve the timeliness and quality of information needed to determine the effectiveness and results of program activities. Continued development of ICT solutions to improve M&E capabilities should also be emphasized. Much effort should be placed on setting standards and building staff capacity to obtain quality data collection from the field. Yield assessments should expand into other FARM crops (beyond maize), incorporating such staples as groundnuts, beans, and cassava. To improve quality, more sophisticated assessment methodologies, such as control group sampling, should also be introduced.

Security concerns

- *Recommendations.* Security should remain a high priority for delivery of programs in South Sudan for the foreseeable future. Sufficient resources need to be made available for this important

project element. It is highly recommended that an internationally qualified country security and emergency response director be included in project staffing. A proactive and adaptive approach is needed to respond to the ever-changing security situation in the country, and plans must be developed and adjusted to respond to all possible scenarios. Much emphasis should be placed on intelligence gathering. This requires a significant amount of communication with field staff and local counterparts as well as information-sharing with NGOs and other donor programs in South Sudan. FARM learned that project activities can continue at high levels even when expatriates are evacuated; this should be considered for contingency planning purposes.