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

Food, Agribusiness and Rural Markets II Project

Final Report

USAID
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Cover Photo: Jessica Scranton for Abt Associates
A FARM II project extension worker shows a farmer in Yambio how to plant using good agronomic practices during a farmer field day.

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Feed the Future Food, Agribusiness and Rural Markets II Project

Final Report

Contract No.: AID-668-C-15-00001

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Acronyms and Abbreviations

AAH-I	Action Africa Help-International
ASPF	Agricultural Sector Policy Framework
BDS	Business development services
CAD	County Agriculture Department
CES	Central Equatoria State
CSERD	Country Security and Emergency Response Director
DDC	Digital Development Communications
DRC	Democratic Republic of the Congo
EABL	East African Breweries Ltd.
EAGC	East Africa Grain Council
EES	Eastern Equatoria State
FaaB	Farming as a Business
FARM	Food, Agribusiness, and Rural Markets
FARM II	Food, Agribusiness, and Rural Markets II project
FAO	Food and Agriculture Organization of the United Nations
FBO	Farmer-based organization
FPLC	Farmer Participatory Learning Center
GAP	Good agronomic practices
GIZ	German Society for International Cooperation
IGF	Innovative Grants Facility
M&E	Monitoring and evaluation
MAF	Ministry of Agriculture and Forestry
MAFTARFCRD	Ministry of Agriculture, Forestry, Tourism, Animal Resources, Fisheries, Cooperatives and Rural Development
MIS	Market information system
MOU	Memorandum of understanding
MT	Metric ton
NAFA	Nzara Agricultural Farmers Association
OCA	Organizational Capacity Assessment
P4P	Purchase for Progress
PMP	Performance management plan
PPP	Public-partner partnership
RAISE Plus	Rural Agricultural Income and Sustainable Environment Plus

RATIN	Regional Agricultural Trade Intelligence Network
RSM	Risk and Security Management International
SME	Small or medium-sized enterprise
SPLA	Sudan People's Liberation Army
SSP	South Sudanese Pound
TOT	Training-of-trainer
WES	Western Equatoria State
WFP	World Food Programme
YAFA	Yambio Farmers' Association

FARM II's yield assessments showed that productivity yields of beneficiary farmers were 29 percent higher than those of non-beneficiary farmers. Greenbelt farmers also significantly exceeded African continent averages for all four assessed crops. The study suggested that the improved technologies and farming practices introduced by FARM II are taking hold among non-beneficiary farmers in the region. Here, Betty Abou from Magwi County in Eastern Equatoria State packs maize to be taken to Juba for sale.

Photo: Redento Tombe

Executive Summary

Photo: Kamba Anthony, Abt Associates

"If you have been taught a song and you know how to sing it, you will never forget that song. This is the same thing as what we have learnt from the FARM II Project."

Moses Idoru, Farmer, Anika Youth FBO

The people of South Sudan have experienced tremendous hardship and almost all news reports coming out of the country in recent years have been very negative. Despite the difficult environment, USAID has had a positive impact by generating hope and building prosperity for many rural poor in the country's Greenbelt region. The purpose of this final project report is to convey that success. The Food, Agribusiness and Rural Markets (FARM) II project's approach was different from the assistance other international organizations had provided to these farmers in the past. Rather than giving them food or commodity assistance, FARM II, like its predecessor FARM I, helped thousands of Greenbelt farmers plan and work towards a brighter future by introducing them to practical farming technology and knowledge. This approach dramatically improved their lives.

FARM II introduced far more productive seeds than any these farmers had ever used. The project also taught them how to prepare their land, plant their seeds, and harvest their crops using better agronomic practices. Farmers learned not only how to produce enough food for their own families, but also how to move from farming at a subsistence level to producing enough to feed others. This success brought them into a nascent economic system that had not existed in South Sudan for several decades. By linking farmers into an economic system, FARM II helped restart commerce in the Greenbelt and prompted significant behavior changes among farmers and their communities.

FARM II was much more than an agriculture project, however. It was an integrated program that crossed a number of thematic areas—all of which are important to South Sudan's humanitarian needs and development objectives. FARM II was a **food security project** that helped Greenbelt farmers to first feed their families, then their communities, and then their country. It was also a **livelihoods program** that created economic opportunities that had not previously existed in the country, showing the rural poor how to create a living from farming by helping them dramatically improve their productivity and build their business skills to market their surplus crops. FARM II was a **resiliency project** that helped farmers advance their economic progress even during times of heightened insecurity and economic decline by teaching them to produce their own food and work better within their communities, which reduced dependence on imports and foreign aid. The project was a **civil society program** that used agriculture as a mechanism to engage rural populations in a societal framework, showing them how to work together in groups to collaborate on common areas of interest for both individual benefit and the greater good of their communities. FARM II was also a **human capital project** that created a critical mass of knowledgeable and experienced farmers in the Greenbelt, thus establishing a strong

foundation of talent for a burgeoning agriculture sector while strengthening local institutions to sustain this progress in the future.

FARM II, like FARM I before it, accumulated a great deal of learning and knowledge to help guide future programming in South Sudan and similarly distressed areas. Over the last few years, the Fund for Peace's annual Fragile States Index has identified South Sudan as the world's most fragile state. The country's history of not only conflict and war but also isolation and neglect has created a unique development challenge. This challenge is almost unprecedented within the international development community, as South Sudan lacks so many of the elements needed for a modern economic system. Given the scarcity of knowledge and information about agricultural development in South Sudan, the FARM II project offers a wealth of information and lessons learned to guide future evidence-based approaches to improving agriculture and development in the country.

BACKGROUND

FARM II is a one-year follow-on to the five-year FARM project that ended in 2015. It was designed as a robust initiative that would continue the previous project's activities for an additional year, allowing the political and security situation to play out before USAID formulated a long-term assistance plan for the country. Given that South Sudan is aligned with and supported by the U.S. Government's Feed the Future initiative, the overarching goal of FARM II was to sustainably reduce poverty and hunger. The project design was guided by USAID/South Sudan's Operational Framework Objectives, which were established in 2014 as a response to the conflict that broke out between government and opposition forces in December 2013. Under this framework, the primary objective of FARM II was to promote recovery and resilience in selected counties in the Greenbelt region. Project activities addressed this objective by:

1) developing a community-led response to the challenges faced by the Greenbelt's population (through market and cooperative development work)
2) improving the delivery of critical local services to Greenbelt farmers and their communities (through capacity development and grants programs)
3) enhancing disaster preparedness and risk reduction (through efforts to increase productivity and production and support farmer groups)

MARKET DEVELOPMENT

To be resilient, communities need access to markets for their produce. FARM II increasingly emphasized a market-pull strategy to scale up impact and strengthen the resilience and sustainability of selected agricultural communities in the Greenbelt. This strategy promoted the economic principles of supply and demand needed to form a self-sustaining private sector. The project positively impacted livelihoods in the Greenbelt: almost three-quarters of farmers surveyed affirmed that the FARM program positively increased their business revenue.[1] The same proportion of farmers said they are able to reinvest their profits into growing their farming businesses. FARM I and FARM II also influenced collective marketing, as evidenced by the 58 percent of survey respondents who reported that they participated in collective marketing, mostly by working within the structure of their local farmer-based organization (FBO).

[1] FARM II commissioned an independent end-of-project survey in March 2016. This survey asked individual farmers and representatives of farmer-based organizations about their experiences with the FARM program. The survey firm attempted to draw a distinction between assistance provided by FARM I and FARM II, however it is unlikely that the farmers were able to fully differentiate between the two contracts. For that reason, many respondents' answers addressed the FARM program in general rather than the results of the one-year FARM II project.

FARM II achieved the following market development results during its short implementation period:

- ***Bolstered cooperative unions' capacity to serve as market intermediaries.*** Provided skilled management liaisons to each organization, awarded almost $200,000 in in-kind commodity support grants, trained 552 individuals on cooperative formation, and facilitated organizational capacity self-assessments of seven cooperatives.
- ***Expanded value addition opportunities.*** Introduced opportunities in areas such as post-harvest storage, on-farm and off-farm processing, transportation, aggregation, and crop and market selection.
- ***Facilitated market linkages.*** Facilitated almost $2 million of commercial activity, including the sale of 210 metric tons (MT) of maize to the World Food Programme's Purchase for Progress initiative. Organized six farmer-trader forums that brought together more than 200 key trading partners in the region. Introduced contract farming between 50 farmers and East African Breweries Ltd. to source white sorghum for the company's breweries in Uganda and Kenya. Linked 28 smallholders with a South Sudanese seed company, providing access to higher-value markets.
- ***Strengthened value chain integration.*** Organized three forums that brought together farmers and input suppliers. Facilitated relationships between cooperative unions and two South Sudanese input suppliers that provide seed, agricultural chemicals, and farming implements. Enabled cooperatives to open two agro-dealer shops in Magwi County in partnership with one of the input suppliers and two more cooperatives to plan three partnerships in Central Equatoria.
- ***Improved access to credit.*** Designed new financial lending products with two South Sudanese financial institutions, giving intermediary organizations access to credit by using lending instruments collateralized by sales contracts with reputable buyers. More than 6,000 farmers are now receiving quick payment at the farm gate thanks to this capital infusion in Western Equatoria.

AGRICULTURE PRODUCTIVITY

Increasing the agricultural productivity of smallholder farmers in South Sudan was one of FARM II's fundamental goals. Increased productivity helps the rural poor move beyond subsistence farming and enables them to independently carve out a living. The FARM I and II projects impacted behavior change in Greenbelt's agriculture sector. Almost 94 percent of farmers surveyed stated that they have experienced the benefits of new farming methods and 85 percent reported that the new practices resulted in a better-quality harvest. Almost all (93.8 percent) said that they will continue applying these improved farming practices. In addition, almost 89 percent of the respondents claimed that FARM assistance led them to increase their land under cultivation. FARM II's yield assessment showed that beneficiary smallholders' yields were 29 percent higher, on average, than the yields of farmers in the non-beneficiary control group (22 percent higher for maize, 37 percent higher for groundnuts, 50 percent higher for beans, and 7 percent higher for cassava). Interestingly, FARM I and FARM II collectively increased maize yields from 800 kg/ha in 2010 to 4,274 kg/ha in 2016, a 535 percent increase over the six-year period during which yields were tracked each year. The assessment showed that both beneficiary and non-beneficiary farmers in the Greenbelt exceeded the African continent average for all four crops—in most cases doubling or tripling it. The results of the yield assessment also suggest that technology and farming knowledge are being broadly spread to non-beneficiary farmers in the region.

FARM II achieved the following productivity results over the past year:

- ***Introduced modern seed technology that dramatically increased yields.*** Distributed 294 MT of improved seed and 200 MT of locally sourced cassava stems to 5,774 farmers in the Greenbelt. Sourced all cassava cuttings from local cassava farmers.
- ***Reduced post-harvest losses from 40 percent to 7 percent.*** Distributed 40,000 fifty-kilogram hermetic storage bags through cooperative unions across all three Equatoria states. A random sample of 60 bags showed that hermetic bag use cut post-harvest losses from 40 percent of crop volume to 7 percent.
- ***Increased land under improved cultivation.*** Placed 29,607 hectares (114.3 square miles) under cultivation with improved technologies and practices.
- ***Delivered training on good agronomic practices.*** Established demonstration plots in 32 of the project's 36 payams and conducted at least one farmer field day at each site. Aggressively delivered training on good agronomic practices (GAPs) and post-harvest practices.
- ***Expanded the reach of agricultural extension services.*** Extended service area from 27 payams under FARM I to 36 under FARM II. Increased size of FBO network from 666 to 732, a 10 percent increase during the one-year implementation period. Identified and trained 772 lead farmers, 20 percent of whom were women. Carried out training-of-trainer program to empower lead farmers to disseminate GAP knowledge in their communities. Completed an alternative technology and communications assessment to learn how to reach a much greater number of farmers through radio and SMS.
- ***Examined seed multiplication potential.*** Completed seed multiplication assessment to determine how future programming can positively impact this strategically important input.

CAPACITY BUILDING

Agriculture shows great promise to help build South Sudan's economy and create social bonds, but human and institutional capacity remains a significant constraint to the sector's development. To improve farming in the Greenbelt, FARM II strengthened human capacity and private and public sector institutional capacity. The project also facilitated advocacy. FARM II achieved the following capacity building results during the contract period:

Strengthened Human Capacity

- ***Directly trained 5,839 discrete individuals***. Trainings focused on agricultural productivity (61 percent) and market and business development (39 percent), covering thematic areas such as collective marketing, farming as a business, financial literacy, and cooperative formation. Women made up large portions of those trained in productivity (63 percent) and marketing and business skills (37 percent).

Strengthened Institutional Capacity of Private Sector

- ***Strengthened FBOs.*** Improved technical and managerial capacity of 542 FBOs.
- ***Improved capacity of cooperatives.*** Delivered collective marketing, farming as a business, and financial literacy to 1,763 participants and provided cooperative formation training to 552 individuals. Enabled cooperative unions to serve as input dealers by distributing seed and hermetic bags. Facilitated organizational capacity self-assessments for five cooperative unions and two large farmer associations.

- ***Enhanced business development services.*** Awarded a $49,740 grant and provided technical assistance to a private South Sudanese firm that provided business development services support to cooperatives and other agricultural enterprises in Greenbelt.
- ***Stimulated entrepreneurialism.*** Awarded grants and provided business skills training to three plowing service providers in Eastern Equatoria, three grinding mill service providers in Central and Eastern Equatoria, and one poultry venture in Juba County.
- ***Strengthened access to inputs and markets by fostering public-private partnerships.*** Awarded a public-private partnership (PPP) grant to a South Sudanese agro-dealer to fund and support a pilot seed multiplication program in Eastern Equatoria. Introduced new lending products through PPPs with two South Sudanese financial institutions. Established a PPP with an East African brewery to set up an outgrower scheme in Eastern Equatoria.

Strengthened Institutional Capacity of Public Sector and Advocacy Organizations

- ***Strengthened public sector extension services' ability to serve smallholders.*** Awarded $52,455 in grants to nine County Agriculture Departments to supply transport and office equipment.
- ***Engaged local private and public sector leaders to strengthen enabling environment.*** Delivered six policy-oriented training sessions on youth in agriculture, land management and climate-smart agriculture, and roles and responsibilities of the private and public sectors in local agricultural development in Eastern and Central Equatoria.
- ***Helped create the first sector-wide consultative body for the grain industry in South Sudan.*** Initiated a partnership with other international donor programs that led to the formation of a grain competitiveness committee.

MONITORING AND EVALUATION

FARM II instituted a robust monitoring and evaluation (M&E) program that tracked the project's 25 performance targets, including seven Feed the Future indicators. The M&E program was designed not only to monitor performance, but also to advance learning for further development programs in the country. The project achieved the following results.

- ***Tracked 25 indicators.*** Exceeded or met 20 of project's 25 indicator targets. Did so during a very short timeframe in a highly insecure and uncertain environment. Exceeded all seven Feed the Future targets.
- ***Completed farmer and FBO survey.*** Collected survey data from 598 farming beneficiaries and 74 project-supported FBOs in all three states during final month of project to gain knowledge about FARM projects' impact in Greenbelt.
- ***Commissioned and completed yield assessment.*** Assessed yields for FARM's four main crops, randomly sampling 365 project-supported farmers and a control group of 100 non-beneficiary farmers to study FARM's impact on farmer productivity.

GENDER AND YOUTH

FARM II's farmer survey showed that 22 percent of the farming households supported by the project are women-led and 80 percent of the farming households in the Greenbelt have active spousal involvement. Approximately 40 percent of all FARM II beneficiaries and training participants were women. While the project has proven that women can be highly productive farmers, they need to be

further economically empowered with stronger business skills and more leadership experience. Youth are also an important impact group and are very important to present-day and future South Sudan. They, too, have special needs and opportunities that require particular forms of development support.

FARM II achieved the following results over the past year:

- ***Provided business skills and leadership opportunities for women.*** Helped women become more involved in their communities and gain leadership and management experience by actively involving them in collective marketing activities with FBOs and cooperative organizations.
- ***Conducted youth in agriculture assessment.*** Completed a study to determine how to best incorporate and uplift youth in future agriculture development programs.

Increasing land under cultivation is a national goal in South Sudan and an important way to increase production. With most farmers continuing to use laborious methods and hand tools to clear land for crops, FARM II supported the use of ox-plows. For example, a project staff member helped a farmer in Yei who had an ox-plow begin to rent it out. He earned a small fee for himself and enabled his neighbors to expand land under cultivation, benefiting himself, his farming organization, and other members of the community.

Photo: Abt Associates

1. Introduction

Photo: Kamba Anthony, Abt Associates

"If we could ask death to wait, this is the time to ask, because it looks like we spent a lot of our time in the past with little knowledge, but now, at my age, I have a lot of knowledge that needs to be used productively."

Lokosang Levi, Farmer and member of Soruba FBO, Yei River County

FARM II BACKGROUND

The Food, Agribusiness and Rural Markets II (FARM II) project is a one-year follow-on to the five-year FARM contract, which ended in 2015. USAID intended it to be a robust program that would continue the previous project's activities for an additional year, allowing the political and security situation to settle before the Agency formulated long-term assistance plans for South Sudan. As South Sudan is a Feed the Future aligned country, FARM II's overarching goal was to sustainably reduce poverty and hunger.

The project continued working in the same nine counties in the three Equatoria states that had been covered under FARM I. The new project, however, expanded into one additional payam per county, increasing its geographic service area from 27 to 36 payams. FARM II remained focused on staple crops: maize, sorghum, cassava, groundnuts, and beans. It also resumed support for other specialized crops, including millet, sesame, and rice. The project continued to scale up smallholder production gains to a larger body of farmers while also more aggressively helping them develop and access markets for their surplus production. A capacity building program supplemented FARM II's production and markets components. It strengthened the human and institutional capacity of the private and public sectors, addressing areas such as cooperative union development, business development services, public-private partnerships (PPPs), advocacy and policy, extension service delivery, and entrepreneurship.

FARM II also undertook several learning activities to help advance future agriculture programming in South Sudan, including the following:

- Assessment reports in strategic areas such as youth in agriculture, extension service communications, and seed multiplication.
- Do No Harm training for senior project staff, to help them become more sensitive to their influence—positive or negative—on potential conflicts in their work and learn how to mitigate conflict risks.
- Organizational capacity assessments (OCAs) of five cooperative unions and two large farming associations, providing an in-depth understanding of these civil society organizations' current strengths and weaknesses and recommendations for further developing these important intermediary value chain groups.

Consistent with contractual requirements, the project limited contact with the Ministry of Agriculture, Forestry, Tourism, Animal Resources, Fisheries, Cooperatives and Rural Development (MAFTARFCRD) and other national government bodies due to the political and diplomatic situation. While maintaining modest coordination with state

governments during this volatile period, FARM II continued to work closely with and strengthen local government services at the county, payam, and boma levels.

CONTEXTUAL OVERVIEW OF SOUTH SUDAN

South Sudan covers an area of approximately 640,000 square kilometers, roughly the size of Alaska. It includes stretches of tropical and equatorial forests, wetlands, savannah, and mountains. There are six agro-ecological zones corresponding to distinct areas with 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 Central Equatoria State, Eastern Equatoria State, and Western Equatoria State, offers the greatest agricultural potential in the country. This zone has substantial rainfall, fertile and arable land, sufficient population density, and a past farming tradition.

Photo: DDC International for Abt Associates

A typical Greenbelt farming landscape

With an estimated population of 11.5 million, South Sudan has a population density approximately one-tenth that of neighboring Uganda. Two-thirds of South Sudanese are under age 30 and about 83 percent live in rural areas. Only about 27 percent of the population over the age of 15 is literate, but the literacy rate for adult men (above 15 years of age) is 250 percent higher than the rate for adult women (40 versus 16 percent). 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 mortality rates for infants and children under 5 years of age (102 for 1,000 births).[2]

South Sudan has been war-torn since the Republic of Sudan achieved its independence in 1956. Sudan experienced two bloody 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 development of institutions and infrastructure. A

[2] National Baseline Household Survey conducted by Southern Sudan Center for Census, Statistics, and Evaluation in 2009.

Comprehensive Peace Agreement signed between the Sudan People's Liberation Movement 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. A referendum on independence took place January 9–15, 2011; the vast majority of Southern Sudanese voted for independence. The Republic of South Sudan became the world's newest independent country on July 9, 2011.

Ninety-eight percent of the government's revenue and 60 percent of South Sudan's gross domestic product come from the petroleum industry. One half of the land in South Sudan has high potential for agriculture, but the United Nations Food and Agriculture Organization (FAO) has reported that only 4.5 percent of the country'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.[3]

When the first 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 locations and were highly risk-averse due their war experiences and severe poverty. For several decades, little commercial agriculture existed in southern Sudan, leaving insufficient institutional or human capacity to support agribusiness development. The country also had little infrastructure. Roads were poor, electricity (from generators) was sparse, and basic services did not exist. Inexpensive imported foods were highly prevalent in local markets and humanitarian organizations had a long history of providing food and relief assistance to local populations.

FARM I BACKGROUND

The end of the second civil war in 2005 provided sufficient stability to establish agricultural development programs in southern Sudan. USAID created the FARM project to support the country's goals of achieving food self-sufficiency, reducing poverty, and promoting economic growth. The FARM contract was signed on February 18, 2010, approximately 11 months before the January 2011 referendum vote and approximately 17 months before South Sudan became an independent country.

The project was awarded to Abt Associates under the Rural Agricultural Income and Sustainable Environment (RAISE) Plus indefinite quantity contract. The primary purposes of FARM were to sustainably increase agricultural productivity and food production, especially among smallholder farmers, to meet the host government's food security objectives, promote market development, and increase trade. Its main components were agricultural productivity, agricultural trade, and capacity building.

Because of the Greenbelt's strong agricultural potential, USAID directed the FARM project to concentrate its efforts in that region of the country. The project's geographic area of focus included nine out of 27 counties in the Greenbelt, which extends from Budi County in Eastern Equatoria through the southern tip of Tambura County in Western Equatoria. FARM's target commodities were 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 national and state ministries. The FARM project worked closely with the national ministry until 2013.

FARM underwent a number of evolutions during the contract period, based on USAID's needs and the changing working environment in the country. At the request of the MAF, within the first year the project changed focus to center only on cereal crops so it would align closely with the government's

[3] A feddan is the commonly used measure for a plot of land in South Sudan. 1 feddan = approximately 1.038 acres, equivalent to a 60 meter x 70 meter plot totaling 4,200 square meters.

food security objectives, which emphasized 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 current conflict between the Dinka-led government and the opposition parties, which started in December 2013, significantly altered implementation for the remainder of the project. Upon mission orders, FARM evacuated all expatriate staff on December 19, 2013. 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. During this period, FARM was able to complete the 2014 seed distribution program for Greenbelt farmers.

When the leadership team returned to South Sudan in late April 2014, FARM continued operations for the final contract year. During this final year, the mission asked the project to concentrate on carrying out existing key activities, particularly in agricultural production and farmer group formation, rather than initiating new ones. USAID also requested that FARM limit direct interactions with the national government to only administrative actions, while continuing to work with local government counterparts, particularly at the payam and county levels. FARM began close-out procedures during the final six months of the contract period. In February 2015, USAID extended the project by two months and asked Abt Associates to submit a proposal for a sole-source, one-year bridge contract. The initial FARM project's final report can be accessed through USAID's Development Experience Clearinghouse at the following website address: http://pdf.usaid.gov/pdf_docs/pa00m2zk.pdf.

FARM II produced three short videos about the impact the project has had on farmers in the Greenbelt. They can be accessed at: http://www.abtassociates.com/Noteworthy/2016/Videos-Helping-Farmers-Grow-in-South-Sudan.aspx

Above: A scene from one of the videos: "From the Ground Up: Rebuilding Agricultural Systems in South Sudan"

"As a senior extension worker, I feel this training has helped me to understand how my actions and behavior can portray things about my work and affect how people see my work."

—Joel Taban, FARM II project extension worker, Eastern Equatoria

Mr. Taban and 19 other senior FARM II staff participated in Do No Harm training to increase their understanding of the need for conflict-sensitivity in agricultural programming. Peter Bauman of Bauman Global led the training, which helped attendees learn to identify and address potential tensions. The workshop included discussions of real-world scenarios, as well as skills-building in areas such as transparency, resource transfers, and impact assessments. Because project leaders from all four FARM II offices participated, the training also included team-building exercises such as the one shown in the photo, which built cohesion and trust.

Photo: Amule Timothy

2. Project Management

When asked about the biggest barrier to farming, only 1.7 percent of farmers in the Greenbelt named insecurity. This clearly suggests that agriculture can develop despite the ongoing conflict.

USAID awarded the FARM II contract, No. AID-668-C-15-00001, to Abt Associates on April 16, 2015, with an end date of April 15, 2016. It was a cost-plus-fixed fee agreement with a maximum value of $11,999,142. Abt's team included the three core subcontractors from the first FARM project team: Action Africa Help-International (AAH-I), which primarily focused on community involvement and the provision of extension services; ACDI/VOCA, which supported the production and trade components; and Risk and Security Management International (RSM), which provided local drivers, some logistics, and security management. Three additional subcontractors were added to the team: BBC Media Action conducted an extension services communications assessment, Making Cents International carried out a youth in agriculture assessment, and the Norman Borlaug Institute of International Agriculture of Texas A&M University provided a third-party assessment of FARM II's impact on harvest yields. Abt also subcontracted Veteran Security Services to provide local guard services, Bauman Global LLC to deliver a Do No Harm assessment and training, UNESCO Club to complete OCAs of seven farmer organizations, Digital Development Communications (DDC) International to produce three project videos, and Forcier Consulting to collect data for an end-of-project farmer and FBO assessment that provided insight into the FARM projects' overall impact in South Sudan.

2.1 MANAGEMENT AND STAFFING

The FARM II project had 110 positions, including 10 expatriates, 48 extension staff, and 14 drivers. They were employed by Abt Associates or one of the three core subcontractors. Of this total, 76 positions (69 percent) were based in the field while 34 (31 percent) were located in Juba. FARM II maintained four key personnel: an expatriate Chief of Party (COP) and Deputy Chief of Party and two South Sudanese specialists—the Community Outreach Expert and the Markets and Warehouse Specialist.

While most of the staff who filled project positions were carried over from the FARM I project, several were new. These included the Agricultural Value Chain Director, the Monitoring and Evaluation (M&E) Director, the Grants Manager, the Central Equatoria Coordinator, the Eastern Equatoria Coordinator, and 12 payam extension workers. Table 1 lists the 10 expatriate positions.

The project experienced turnover in the COP and M&E Director positions during the year, but both were filled by qualified and competent staff in a timely fashion. The Grants Manager and Eastern Equatoria Coordinator candidates withdrew at the last minute. The Grants Manager position was filled by short-term specialist who became long-term approximately five months into the project. The intended replacement for the Eastern Equatoria Coordinator

position accepted another job during the approval process. This position was filled by a short-term specialist during the final five months of the project.

FARM II implemented a very ambitious work plan relative to the short-term nature of the contract and the difficult work environment in South Sudan. With the first two months of the contract period dedicated largely to start-up and the final two months focused on close-out, the project effectively had eight months to deliver activities and achieve results. Staff worked intensively throughout this period and management focused on risk mitigation since the short implementation period left little margin for error.

Table 1: FARM II Expatriate Positions

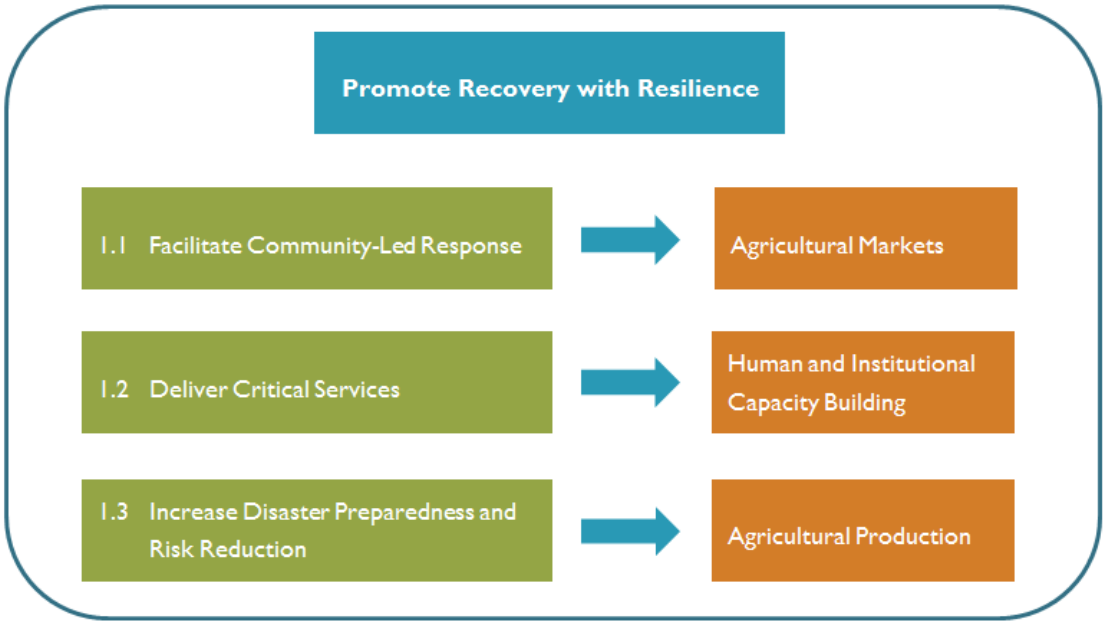
	Position Title
1.	Chief of Party
2.	Deputy Chief of Party
3.	Agricultural Value Chain Director
4.	Agricultural Production Director
5.	Monitoring and Evaluation Director
6.	Grants Manager
7.	Eastern Equatoria State Coordinator
8.	Central Equatoria State Coordinator
9.	Western Equatoria State Coordinator
10.	Country Security and Emergency Response Director *

* Filled by two security specialists in a six- to eight-week rotation.

2.2 TECHNICAL SCOPE

FARM II's design was guided by USAID/South Sudan's Operational Framework Objectives, which had been established in 2014 in response to the conflict that broke out December 2013. Under this framework, the primary objective of the FARM II project was to promote recovery with resilience in the Greenbelt region of South Sudan. As shown in Figure 1, FARM II organized all activities to address this objective by 1) developing a community-led response to the challenges faced by the Greenbelt population by helping develop markets and cooperatives, 2) improving the delivery of local services critical to Greenbelt farmers and their communities by building capacity and providing grants, and 3) enhancing disaster preparedness and reducing risk by continuing to help increase smallholder farmers' productivity and production and advancing the formation of farmer groups.

Figure 1: FARM II Operational Framework



FARM II continued to work with the same staple crops supported by FARM I, as these crops contribute to the nation's humanitarian needs and food security objectives. Because cassava is a calorie crop and due to the food shortages in South Sudan, this value chain was re-emphasized under FARM II. The project also made a move toward expanding future value chain opportunities for smallholder farmers by providing an entrepreneurship grant to a poultry production venture near Juba.

2.3 GEOGRAPHIC SCOPE

FARM II had the same general geographic scope as FARM I. While working in the same nine counties as the first project, FARM II increased the scale of the project and reached more farming communities by adding one additional payam per existing county, as shown in Table 2. The project hired additional payam extension workers equipped with motorcycles for each new payam and introduced project interventions as discussed in other chapters of this report. Due to the conflict in Western Equatoria, FARM II was not able to do substantial work in Kozi and Amadi payams in this state. In addition, drought in Loshite payam in Eastern Equatoria limited work in this location during the project period.

Table 2: Payams Supported by FARM II Project

County	Payams Supported Under FARM I			New Payams
Eastern Equatoria State				
Torit	Iyere	Imurok	Ifwotu	Kudo
Ikotos	Lomohidang North	Ikotos Central	Katire	Loshite
Magwi	Magwi	Pageri	Pajok	Lobone
Central Equatoria State				
Yei	Mugwo	Otogo	Lasu	Tore
Morobo	Gulumbi	Kimba	Wudabi	Nyepo
Kajo-Keji	Lire	Kangapo 1	Kangapo 2	Panyume
Western Equatoria State				
Yambio	Yambio	Ri-rangu	Bangasu	Gangura
Maridi	Maridi	Mambe	Landili	Kozi
Mundri West	Mundri	Kotobi	Bangallo	Amadi

Figures 2, 3, and 4 contain state maps showing the payams supported by the project, both those that were supported under both FARM I and FARM II (labeled "old") and those new to FARM II (labeled "new").

Figure 2: Project-Supported Payams in Eastern Equatoria State

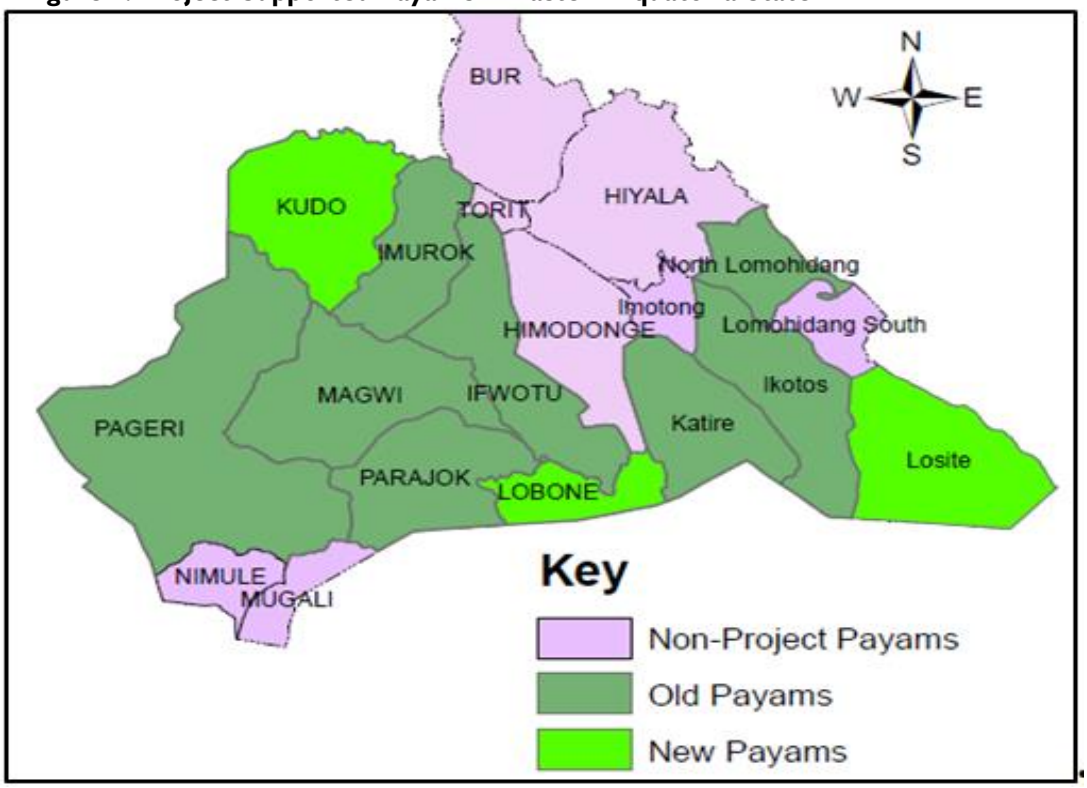


Figure 3: Project-Supported Payams in Central Equatoria State

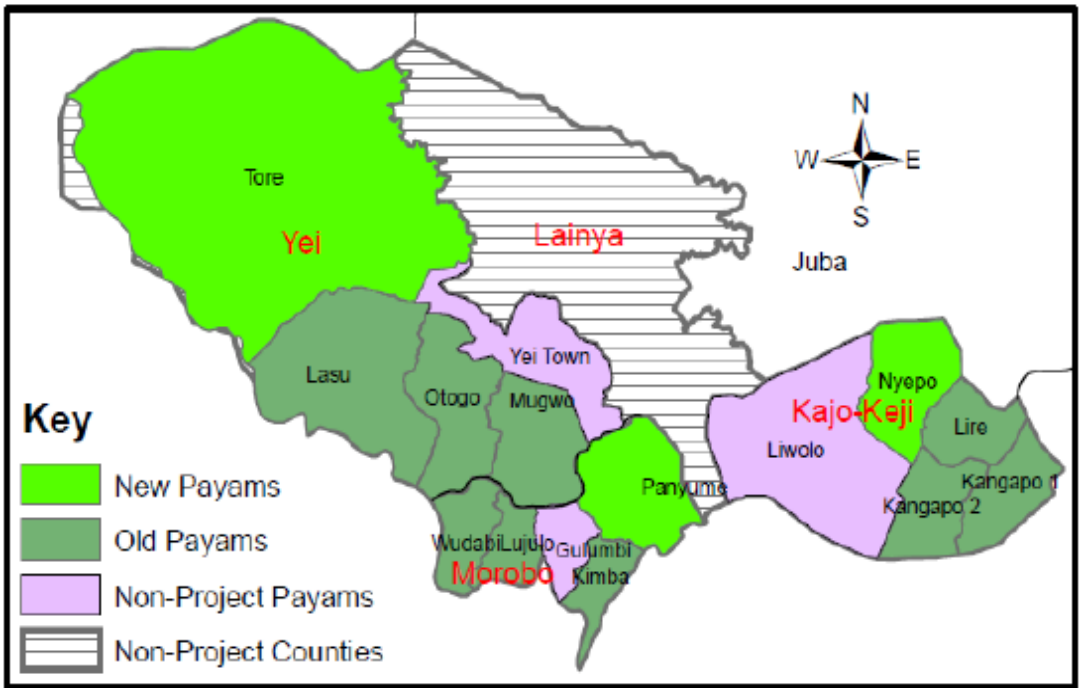
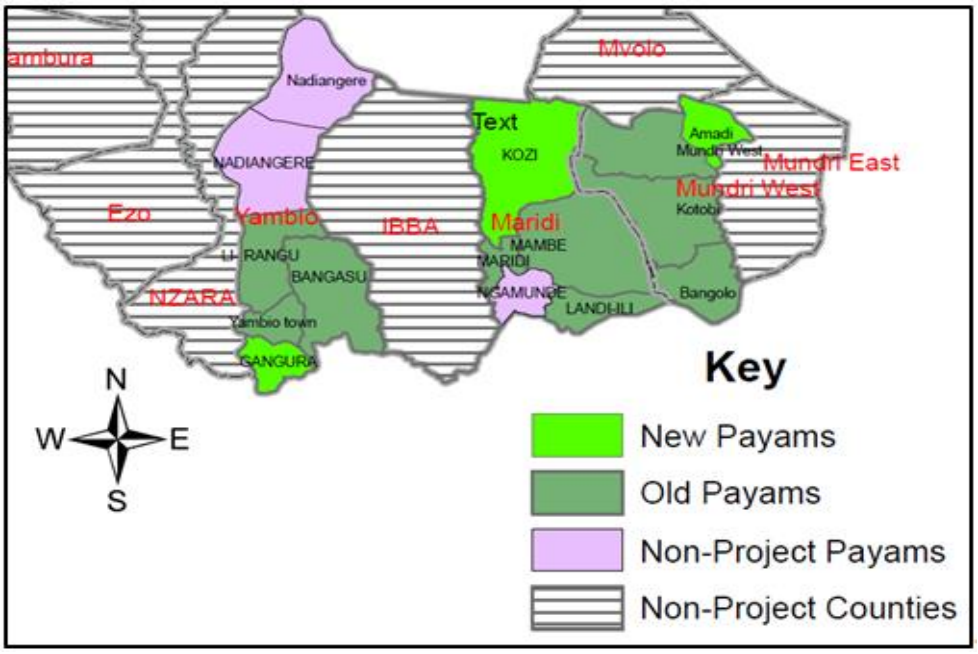


Figure 4: Project-Supported Payams in Western Equatoria State



2.4 SECURITY

When FARM II commissioned an independent end-of project survey in March 2016, only 1.7 percent of smallholders felt that security was the biggest barrier to developing their farming businesses. The assessment showed that the Greenbelt's farmers achieved significant development gains despite South Sudan's difficult security situation and that rural communities in the region have become more resilient and self-reliant. FARM II was one of few development programs in the country during 2015; most international assistance provided to South Sudan during the year focused on emergency relief or humanitarian assistance. The experience of FARM II shows that development assistance remains highly relevant in South Sudan's current context—such assistance builds a foundation for peaceful and prosperous societies in the country.

FARM II integrated security management into all aspects of operations and decision-making, as security continued to be a critical issue throughout the contract period. Proactive security management allowed the project to implement the large majority of planned activities and perform well beyond most performance targets with limited security challenges. The FARM II team was comprised of dedicated, mission-focused staff who worked cooperatively to implement project activities while mitigating security risks. The project established a culture among staff that emphasized security as the top priority. Management consolidated expatriate housing into one central location and carefully maintained curfews to safeguard staff. As office break-ins became more prevalent in Juba and other cities, FARM II increasingly fortified all project offices. The project eventually prohibited ground travel on most major roads and relied heavily on infrequent air travel to transport staff between Juba and most project sites. Evacuation plans were established, and sometimes used, and project activities were postponed or sometimes canceled when certain areas became too dangerous.

Continuing FARM I's approach, an international Country Security and Emergency Response Director (CSERD) provided by RSM gave full-time attention to security management and to oversight of staff safety and asset protection. The expatriate CSERD position was filled by two highly qualified international security professionals who alternated with each other for six- to eight-week shifts. They assisted project management with security planning, security management, and emergency responsiveness. The CSERDs maintained regular contact with project staff in all implementation areas and closely networked with the professional security community in Juba to stay current on the country's latest security information. They reported directly to the COP as well as to Abt's home office Security Director. The CSERDs prepared weekly security analyses for project management in the field and for Abt's home office.

The project's security concerns mainly revolved around 1) a rapidly deteriorating economic situation, creating increased desperation among many South Sudanese and leading to a growing crime rate in the region's major urban areas and along transportation routes; 2) expanding violence in Western Equatoria, which centered around conflict over local grazing rights between the Zande population, which is primarily agriculturalist, and Dinka-dominated Sudan People's Liberation Army (SPLA) units deployed to protect migrating Dinka pastoralists; and 3) a great deal of political uncertainty due to arduous peace talks between the government, led by President Salva Kiir, and the opposition, led by Riek Machar.

Despite the challenges, FARM II was able to continue project operations in most areas of the Greenbelt. However, the security situation in Western Equatoria continued to deteriorate throughout the project's life. Although activities in that state were sometimes delayed, FARM II was able to implement a substantial portion of planned work there, including seed distribution and training activities. Some activities, particularly those scheduled during the final months of the project, were canceled because of safety concerns.

Photo: Deborah Dangay, Abt Associates

Members of the FARM II Western Equatoria team with Redento Tombe, Community Outreach Expert (center)

2.5 FINANCIAL MANAGEMENT

The overall contract budget for FARM II was $11,999,142. Full obligated funding was received by the middle of the implementation period. Although the project numbers are not yet completely final, approximately 98 percent of FARM II's contract value was spent and approximately $273,270 of the contract budget remained unspent.

As shown in Table 3, FARM II spent 18 percent less than the budgeted amount for grants. Commodity prices for purchases such as processing equipment were lower than expected, which reduced overall costs for many grants. Also, despite aggressive solicitation efforts, a shortage of acceptable applications for the entrepreneurial grants program limited spending in this grant area. FARM II anticipated that a balance would remain in the grants line item and received USAID approval to purchase more oxen and equipment for five cooperative unions with these funds. However, these additional grant expenditures had to be cancelled due to vendor delays during the final month of the project.

Table 3: Cost Line Item Summary Analysis

Cost Line Item	Contract Budget	Incurred Costs	Remaining Balance	Percentage of Budget Spent
Direct Costs	7,892,155	7,890,596	1,559	100
Grants	1,200,000	982,364	217,636	82
Indirect Costs	2,227,790	2,173,715	54,075	98
Total Costs	11,319,945	11,046,676	273,269	98
Fixed Fee	679,197	679,197	0	100
Total Costs Plus Fee	**11,999,142**	**11,725,872**	**273,270**	**98**

"We will train our farmers the right way to grow crops, one seed per hole, in straight lines with correct spacing. With proper training and the right kinds of support, Greenbelt farmers will adopt these practices!"

—Costa Mwale, FARM projects' Agriculture Production Specialist

Many argued that South Sudanese farmers' low levels of education would make it too hard for them to learn modern farming methods. Mr. Mwale argued otherwise, boldly proclaiming that the project would teach local smallholder to farm the right way. Mr. Mwale's vision guided FARM's approach for all six years. This confidence and commitment paid off as local farmers' yields continued to rise year after year.

Above: Mr. Mwale (center) and farmers look at cassava leaves in a field.

Photo: Abt Associates

The FARM II project was about helping to create a peaceful society in South Sudan, …. one seed, per hole, at a time."

David Miller, Abt Associates Portfolio Manager

3. The FARM Model

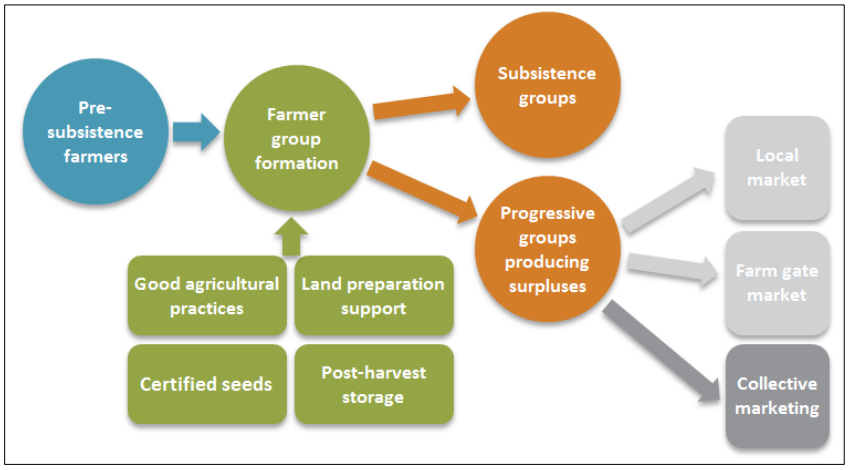
The FARM model for agricultural development centered around support for South Sudanese smallholder farmers. The vast majority of smallholders were pre-subsistence farmers when the first FARM project began in 2010. Many were dependent on outside assistance or reduced to eating one meal a day for long periods prior to each harvest season.

3.1 FARM'S FBO MODEL

FARM I began by working with pre-existing farmer clusters and helping local farmers gather together to form community farming groups, which the project called farmer-based organizations (FBOs). Both FARM I and FARM II assisted the FBOs in establishing governance procedures and helped them formalize by obtaining recognition from their local governments. The FBOs vary in size, with a current average of 27 farmers per group. Some FBOs were structured to emphasize the special interests of groups such as women or youth.

During the early years of the first FARM project, the objective was to help smallholders become food secure at the household level. The project achieved this by focusing on interventions to increase farmers' productivity and overall production. The FBOs, now 732 strong, serve as a distribution network to efficiently disseminate project interventions to individual farmers. Figure 5 illustrates how FARM I and FARM II supported FBOs in the Greenbelt.

Figure 5: FARM's FBO Support Model



Once an FBO was established, FARM's first intervention was to introduce improved planting material for staple crops such as maize, groundnuts, or cassava. The seed was imported from suppliers in Uganda and provided to FBOs through in-kind grants. To complement the seed program, the projects introduced good agronomic practices (GAPs) through field training delivered by FARM I and FARM II

extension workers to FBO leaders and public sector extension staff. Other project initiatives helped some FBOs increase land under cultivation by providing land preparation and plowing services through in-kind grants to local service providers. Lastly, both FARM projects trained FBO leaders on how to minimize post-harvest losses and increase the quality of their harvests. They were then expected to pass this knowledge along to their members.

These interventions required changes in behavior, which did not quickly take hold for many farmers. Given that farmers were highly risk-averse and had low educational levels, the adoption rate was rather slow at the beginning. FARM I developed targeted behavior change initiatives during the first years of the project and built solid relationships between project staff and local farmers. These factors—coupled with the results achieved by early adopters, which other farmers could see with their own eyes—led to growing adoption rates that took hold more broadly after several planting seasons.

To date, farmers in the Greenbelt have had three fundamental choices for marketing their surplus produce:

- ***Sell at the local market.*** While locally grown produce is now prevalent in Greenbelt markets, over-supply, limited product differentiation, and high competition among local farmers result in low prices.
- ***Offer surplus to traders who bring trucks to the farm gate.*** These opportunities are not ideal because traders enjoy greater bargaining power, leading to low prices and slow payment.
- ***Engage in collective marketing.*** Communities pulling together can reduce production costs, improve product quality, and aggregate harvest to achieve economies of scale, enabling them to access higher-paying buyers and gain trading power.

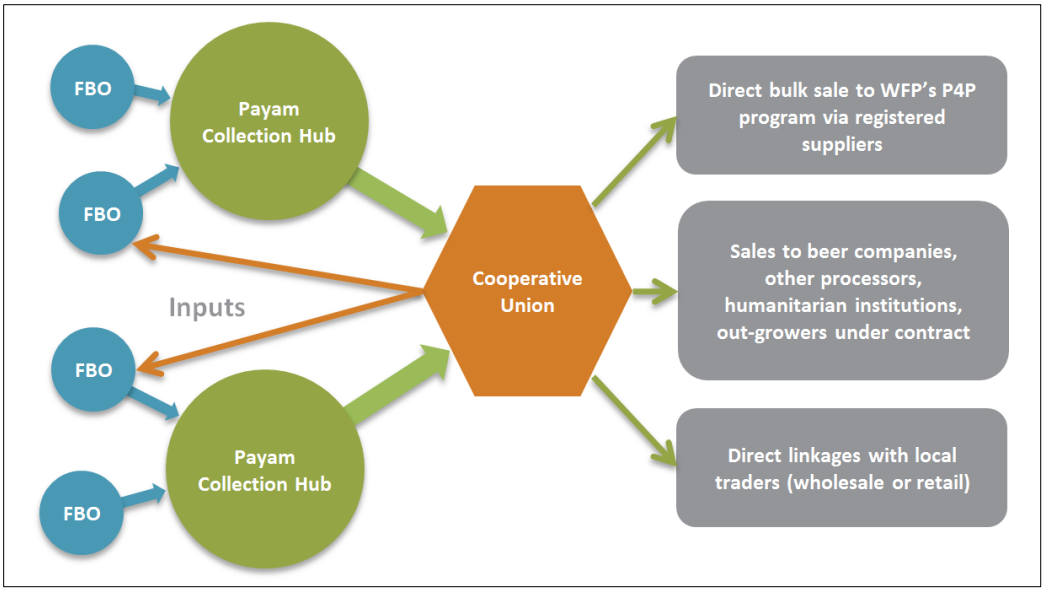
FARM II continued to support many beneficiaries who remain subsistence farmers, as it is vitally important to maintain food security and continue providing social services to this fragile group. However, a large number of project-supported farmers are now growing surpluses; they need to market their surplus production to improve their livelihoods and uplift the status of their families.

3.2 FARM'S COLLECTIVE MARKETING MODEL

FARM II implemented a private sector-based collective marketing model (see Figure 6). This approach was an appropriate and effective way to grow the agricultural economy in South Sudan, where government resources for this purpose are extremely scarce. While the agricultural sectors of many African countries are stifled by excessive government control, South Sudan has the opportunity to build a private sector-led agricultural system driven by market incentives and economic principles. This could provide a comparative advantage on the African continent.

FARM II's collective marketing model achieved significant impact. Fifty-eight percent of farmers surveyed reported engaging in collective marketing, with 54 percent saying they participate in collective marketing through their FBOs. This model gave farmers and farming groups entry to better markets for their produce while also providing them with access to empowering inputs such as seed, land preparation services, and value-addition processing technologies. These services allow them to reduce operational costs and expand the scale of their production.

Figure 6: FARM II Collective Marketing Model



FBOs begin the aggregation process by consolidating members' surplus production. They then further aggregate by bringing it to a payam collection hub or one of the 130 cooperative societies in FARM II's nine-county service area. Under the FARM II model, once harvests are consolidated at this level they can be further aggregated at the county level through cooperative unions; sold to other buyers offering the best business arrangements, such as the World Food Programme (WFP) Purchase for Progress (P4P) program, large beer companies or other processors, humanitarian assistance organizations, or outgrowers; or sold through direct linkages with broker and traders.

Text Box 1: Types of Farming Organizations in the FARM Collective Marketing Model

FBOs. Civil society organizations composed of farmers in the same community who come together to learn and apply new technologies and practices and benefit from economies of scale.

Cooperative societies. Legally registered entities formed by their members—FBOs located in the same vicinity. Tend to be relatively informal with limited understanding of investment and business planning.

Cooperative unions. Legally registered entities comprised of 5 to 16 cooperative societies in the same county. Created to serve as intermediaries to aggregate produce and provide members with access to larger buyers and to input technologies.

Quality is a critical element of the aggregation process. Produce that does not meet buyers' standards is not accepted into the aggregation system at the payam or cooperative levels. Due to the need to preserve quality, post-harvest storage is very important at all levels of the collective marketing system.

As key intermediaries in the value chain system, cooperative unions create significant market demand for smallholder produce and link farmer groups with large-scale buyers. They play a number of vital roles, including:

- *Aggregator of surplus harvest* from local producers, allowing access to distant markets where better prices can be obtained
- *Powerful bargainer*, enabling farmers to join together to obtain the best prices and business conditions for their harvests rather than compete against each other

- *Market intermediary,* helping producers meet buyer preferences in areas such as price, harvest quality, crop variety, supply reliability, and desired quantity, and then providing extension support to help farmers respond to buyer requirements
- *Agro-input dealer,* helping member farmers gain access to farming technologies and services that increase productivity and expand production
- *Credit intermediary,* absorbing and flowing down much-needed capital investment in the local agricultural sector, as the unions have the scale, management capacity, and assets to be credit- or investment-worthy

As shown in Table 4, FARM II worked with seven cooperative unions in all three Equatoria states and with two large farmer associations in Western Equatoria that play roles similar to unions. All of these organizations had also received assistance from FARM I. Unfortunately, FARM II was not able to deliver a full program to cooperative unions in Mundri West and Maridi Counties in Western Equatoria due to significant conflict in these areas throughout the year.

Table 4: Cooperative Unions and Farming Associations Receiving FARM II Support

	Name of Cooperative/Association	County	State	First Year Supported by FARM
1.	Kajo-Keji Cooperative Union	Kajo-Keji	Central Equatoria	2013
2.	Morobo Cooperative Union	Morobo	Central Equatoria	2013
3.	Yei Cooperative Union	Yei	Central Equatoria	2013
4.	Magwi County Cooperative Union	Magwi	Eastern Equatoria	2013
5.	Balu Cooperative Union	Magwi	Eastern Equatoria	2014
6.	Mundri West Cooperative Union	Mundri West	Western Equatoria	2014
7.	Maridi County Cooperative Union	Maridi	Western Equatoria	2014
8.	Yambio Farmer's Association (YAFA)	Yambio	Western Equatoria	2013
9.	Nzara Agricultural Farmers' Association (NAFA)	Nzara	Western Equatoria	2013

These unions and farmer associations remain nascent. As discussed in section 6.2.2 of this report, the FARM II OCAs of these groups found that they need significant organizational and managerial strengthening to fulfill their potential role as a driving force behind the region's agricultural growth. Although strengthening private intermediary organizations is a long-term endeavor that will require significant time and resources, it is critical for the development of a thriving and sustainable agricultural sector in South Sudan. FARM II recommends that future agriculture programs in the Greenbelt place a heavy emphasis on these strategically important organizations, which serve both commercial and civil society roles in their communities.

"Instead of the government helping the farmers, the farmers now are helping to feed people in other parts of South Sudan."

These are the words of German Oken, a FARM II extension worker, who pointed out one of the key impacts of the project's work to link smallholder producers with large buyers. FARM II facilitated the sale of maize from cooperative groups to the World Food Programme, which used the grain to feed some of the country's displaced population in the Greenbelt and other parts of the country.

Photo: Abt Associates

4. Component 1: Agriculture Markets

Photo: Abt Associates

"We are here to transform the lives of South Sudan's farmers."

Ms. Mary Achini, Cooperative Bank of South Sudan

At the launch of the *Crop Advance* bridging credit scheme that FARM II designed in collaboration with the Co-operative Bank of South Sudan. This financial instrument is designed specifically for smallholder farmers.

Building on the successes of the FARM I project, FARM II as able to successfully increase smallholder productivity in the Greenbelt region of South Sudan. FARM II's 2015 yield assessment highlights the Greenbelt's status as a very productive agricultural region with comparative advantages that include an abundance of fertile land, a favorable climate, and access to water. The region is also blessed with a talented farming population that has the potential to be among the most productive smallholder farmers on the African continent.

No matter how productive they are, however, the Greenbelt's farmers cannot move beyond subsistence farming unless they have access to markets. Furthermore, South Sudan's future health as a nation depends on the strength and resiliency of its communities, and self-reliance cannot be achieved without market access. Trade creates interdependence and common interests within communities, which in turn encourage cooperation and compromise at an even broader level, bringing mutual benefits to all.

FARM II tackled the challenge of helping farmers and communities develop their capacity to market surplus production, while simultaneously introducing market opportunities in the region's agricultural sector. Development professionals working in South Sudan are quite aware of the many barriers impeding market development: poor infrastructure, a largely illiterate population, instability, and a poor enabling environment. However, FARM II and project beneficiary communities overcame many of these challenges and made substantive market development gains over the past year.

FARM II increasingly utilized a market-pull strategy to scale up impact and strengthen the sustainability of the Greenbelt's agricultural sector. New market prospects were introduced to smallholder farmers, encouraging them to adopt and invest in improved technologies and farming practices so they can expand their farms and increase their productivity. FARM II introduced the economic principles of demand and supply needed to form a self-sustaining private sector, and taught farmers and agribusinesses to operate and function within such a system. The project then helped farmers learn how to make sound economic decisions for investment, sustainability, and profit-making.

4.1 STRENGTHENED COLLECTIVE MARKETING SYSTEM

FARM II continued work that began under FARM I to strengthen FBOs, cooperative societies, cooperative unions, and farming associations—the key intermediate value chain actors in the Equatoria states. As the collective marketing system is new in South Sudan, FARM II took a very active role in forming the system and used project resources to demonstrate the value of collective marketing to farmers and farming

groups. The project did this by carrying out a robust training program that introduced collective marketing to a critical mass of farmers and farmer group leaders, conducting management and organizational strengthening activities, and providing material support through in-kind grants. However, to be viable in the long term, a sustainable and effective collective marketing system must be based on a market-driven commercial approach led by actual participants in the system—primarily farmers, farmer groups, local private and public sectors, and civil society. The development of a participant-driven collective marketing system is a long-term endeavor. Each collective organization will evolve with its own unique characteristics over time, depending on its opportunities, needs, and leadership. Therefore, donor support should assume a long-term facilitative role, such as by providing training and targeted technical assistance to help collective organizations and agribusinesses work together to achieve mutual business interests.

Text Box 2: FARM II Interventions in the Maize Value Chain

Maize is an essential staple crop in East Africa, grown by most farmers for food security and income generation. FARM successfully introduced one of East Africa's most technically advanced varities—Longe 5 maize seed—into South Sudan from Uganda starting in 2011 and continued distributing it to smallholders in the Greenbelt through the end of FARM II. Longe 5 is a drought-tolerant, open-pollinated variety with high-yielding attributes. It produces a quality protein maize that produces 70 to 100 percent more lysine and tryptophan than most modern tropical maize varieties.

Maize was FARM II's predominant crop, and was in demand in local markets and by large institutional buyers such as the WFP. FARM II procured 60,000 kg of Longe 5 seed from Uganda and distributed it to local FBOs through project-supported cooperative unions. The large majority of these seeds were planted during the second harvest season, due delays in the seed approval process.

The FARM II yield assessment overseen by the Borlaug Institute measured an average yield of 4,274 kg/ha among FARM II beneficiary farmers—122 percent of the non-beneficiary control group average. The assessment also showed that the maize yields of FARM II-supported farmers were 204 percent of the African continent average, 170 percent of the Ugandan average, and 257 percent of the Kenyan average. Overall, USAID support enabled project-supported farmers to achieve maize yields that were 535 percent of the FARM I baseline of 800 kg/ha established in 2010.

Maize served as the lead and proxy crop for developing the collective marketing system in the Greenbelt. FARM II fostered the development of the maize value chain through seed distribution, land preparation, seed multipication, GAP training, post-harvest handling and storage, value-addition processing, aggregation, logisitics, business linkages, and credit access support.

4.1.1 Enhanced Collective Marketing Skills

For an effective collective market to take hold in South Sudan, a critical mass of farmers and farming group leaders must have the basic business skills to function in a market-driven agricultural system. They must also understand why collective marketing provides value to their farming system. As farmers in South Sudan have low levels of education and a dearth of commercial experience, the lack of basic skills such as financial literacy poses a significant constraint to development of an effective market-driven agricultural sector in the Greenbelt.

FARM II addressed this problem by launching a training-of-trainers (TOT) program to teach smallholder farmers and cooperative organizations what it means to be a commercial farmer and why it is important to participate in a collective marketing system. Trainees included project extension staff, cooperative representatives, progressive farmers, lead farmers, and local government officials. These trainings were largely delivered by South Sudanese consultants. FARM II verified that 1,763 participants attended the collective marketing, farming as a business (FaaB), and financial literacy training programs and 552

attended cooperative formation training during the one-year contract period. As the trainees were expected to disseminate this information back to their communities, many more farmers are likely to have benefited from this training. The project also organized several exchange visits where cooperative union members could learn from each other.

4.1.2 Strengthened Cooperative Unions as Key Intermediaries

In addition to training, FARM II engaged in management and organizational strengthening for cooperative unions and farming associations. The OCAs discussed in section 6.2.2 helped the leaders of five cooperative unions and two farming associations understand their groups' strengths and weaknesses so they can become more effective collective organizations for their members.

The project also provided six cooperative unions with skilled Cooperative Union Liaisons, who delivered day-to-day support and more firmly linked project interventions to union operations. These liaisons were well-educated, with backgrounds in agriculture and an understanding of business principles. Although they were project employees, they were embedded within the unions so they could strengthen organizational and management capacity from the inside. They helped the unions become better organized and more effectively involve their members in collective marketing and begin to apply the principles of FaaB. All of the Cooperative Union Liaisons completed training in collective marketing, FaaB, and financial literacy; they then passed that knowledge along to the members.

4.1.3 Introduced Member Service Delivery Options to Cooperative Unions

The relationship between farmers and farmer groups and their cooperative organizations is vitally important to optimize the benefit of a collective farming system. FARM II's grants and technical assistance provided cooperative unions with advice and helped them gain experience providing meaningful services to their members. Specific areas of assistance in this area included:

- *Distributing seed and hermetic storage bags.* FARM II guided cooperative unions and gave them experience serving as agro-input suppliers for their member farmers by distributing and training farmers on these two important input technologies.
- *Providing oxen and plows.* The project provided 34 oxen and 17 plows to four cooperative unions and showed them how to generate revenue by providing land preparation services to members.
- *Delivering raksas.* A FARM II grant covered the cost of these three-wheeled motorcycle trucks, and the project advised the unions on renting them out to members for transportation of farming inputs or harvest surpluses.
- *Providing processing equipment.* The project showed cooperative unions how to support their members by making on-farm processing equipment (e.g., maize shellers, cassava chippers, and ground paste millers) available for a fee.

4.2 EXPANDED VALUE-ADDITION OPPORTUNITIES

As smallholders begin to engage in the market to sell their excess produce, they must understand the needs and requirements of their paying customers. Higher-paying customers demand higher quality, larger quantities, and better reliability. To obtain better prices, farmers must learn how to increase the value of their products. And to meet buyers' demands and become viable business entities, smallholder farmers must learn to adapt to better technologies and management practices such as improving post-harvest handling and processing to increase the marketability of their crops. FARM II implemented several interventions to help farmers in these areas.

4.2.1 Improved Post-Harvest Storage

Poor storage leads to net losses and a decline in the quality of the harvested crop. Post-harvest storage is needed at various levels of the value chain—beginning at the farm and continuing throughout the aggregation and distribution process. Because post-harvest storage is such a valuable component of the value chain, FARM II helped improve post-harvest storage at both the farmer and cooperative levels. The project also worked to speed up the harvest collection process.

Table 5: WFP Maize Grain Quality Specifications

	Grain Specification	Grade 1
1	Moisture content %/w/w[1] (maximum)	13.5
2	Pest damaged grain %/w/w (max)	1.0
3	Broken grain %/w/w (max)	2.0
4	Rotten and Diseased grain %/w/w	2.0
5	Immature/Shriveled %/w/w (max)	1.0
6	Discolored grain %/w/w (max)	0.5
7	Foreign matter %/w/w (max)	0.5
8	Inorganic matter %/w/w (max)	0.3
9	Filth, %/w/w (max)	0.1
10	Aflatoxin, %/w/w (Maximum)	10ppb B1
11	Total defective grain	4.0
12	Maximum allowable dead weevils/kg	10/kg
13	Live weevil	Nil

1 (w/w) = Weight of impurities over Weight of working sample.
Source: WFP/P4P, July 2015

As the largest institutional buyer of harvested grains in South Sudan, WFP-P4P offers a significant market opportunity for the Greenbelt's farmers. P4P aims to purchase up to 750 metric tons (MT) of maize per year from local farmers. The program, however, has stringent quality standards that producers must meet if they are to sell maize to P4P (see Table 5). In addition, the WFP tests all produce for aflatoxin, and levels cannot exceed 20 parts per billion (10 parts per billion for grade 1 grain). While these criteria are not easy to meet, FARM II helped farmers pass the WFP quality tests by following effective post-harvest storage and distribution practices.

At the farm level, FARM II trained 2,199 smallholders on post-harvest handling and distributed 40,000 fifty-kilogram hermetic storage bags, which significantly improved grain quality and increased the storage life of harvested grains. This on-farm storage technology dissemination activity is discussed in greater depth in section 5.1.1.3. At the intermediary level, the project provided warehouse management training to all seven project-supported cooperative unions and to two farmer associations.

Text Box 3: FARM II Interventions in the Groundnut Value Chain

Groundnuts are one of the most important crops in the Greenbelt, used as a good source of protein and vitamins for the South Sudanese population. Groundnuts are used for home consumption and can also be marketed as a cash crop. They 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. FARM II procured 150,000 kg of unshelled Red Beauty groundnut seed from a Ugandan vendor and distributed it to all nine counties in the service area. Red Beauty is a high-yielding variety preferred by Greenbelt consumers with a short 90- to 110-day growing season. The large majority of this seed was planted during 2015's second planting season.

The Borlaug Institute yield assessment showed an average groundnut yield of 2,487 kg/ha among FARM II beneficiary farmers—137 percent of the average for the control group of non-beneficiary Greenbelt farmers, 259 percent of the average for the African continent, and 355 percent of the Ugandan average. They closely matched Kenya's high yields of 2,598 kg/ha.

FARM II fostered the development of the groundnut value chain through seed distribution, land preparation, GAP training, post-harvest handling and storage, value-addition processing, aggregation, logisitics, business linkages, credit access support, and market and business training. The project also emphasized groundnut cultivation during crop rotation and sustainable agriculture training.

In addition to having strict quality standards, the WFP only purchases maize in large quantities. The minimum order is typically 20 MT. Therefore, the unions need to aggregate significant amounts before they can sell. The unions and farmer associations reported that it can take up to two and one-half months to collect enough maize to fill a WFP order. The raksas that the unions received through FARM II grants are enabling them to speed up the harvest collection process. By more quickly collecting farmers' produce, they can reduce the time the crops spend in storage before they are delivered to the customer.

4.2.2 Enhanced Primary Processing

4.2.2.1 Cooperative Unions

Photo: Abt Associates

A multi-crop thresher and maize sheller, one of the types of processing equipment that FARM II grant funds enabled cooperative unions to purchase

Following a similar distribution program by the first FARM project, FARM II helped strengthen cooperative unions' member services by awarding in-kind grants totaling $23,150 for post-harvest processing equipment. This equipment included maize and groundnut shellers, sorghum threshers, and cassava graters and chippers. The machinery improves crop quality, reduces drudgery for those responsible for primary processing at the farm level (mostly women), and enhances incentives for farmers to increase production. It can make farmers more efficient and save labor, helping South Sudanese smallholders be more competitive against Ugandan importers. With increased agricultural production in the Equatorias, there is a need to further expand the availability of such technologies.

FARM II staff met with most of the cooperative unions that had received processing equipment under FARM I. Most of the equipment was found to be lying idle. There were two main reasons for this:

- The unions were requesting that members pay cash to use the equipment, but because cash is not readily available in rural areas, farmers were reluctant or unable to use the machines.
- Because the equipment is very valuable, the unions' practice was to keep it at their headquarters for the sake of security. But since each union has members in multiple payams, these centers were not convenient for most farmers, making it difficult and expensive for them to transport their crops to use the equipment.

The project recommended that the unions address the problem by treating the equipment as one more tool in their evolution toward farming as a business. First, FARM II advised the unions to ask for payment in kind rather than cash. This improved farmers' ability to use the machinery, since they have the means of payment at hand. The unions can then sell this produce to earn revenue. Secondly, the project recommended that the unions distribute the equipment throughout their service areas, relying on trustworthy members to manage the machinery in exchange for a fee. In addition to making the machines more accessible to a broader range of farmers, this practice gave the equipment managers valuable business experience and enabled them to earn fees. Many union members are female, and FARM II suggested they be prioritized for this activity to strengthen their commercial skills and elevate their roles in local farming communities.

Photo: FARM II project

A raksa being used to transport a maize sheller to a union's member-farmers.

4.2.2.2 Small Enterprises

By distributing maize and cassava grinding mills to three groups through the entrepreneurial grants program, FARM II introduced flour milling for the first time as a commercial business opportunity for agribusiness entrepreneurs in the Equatorias. Because mechanized flour milling is rare in the region but the demand for flour is high, business opportunities for this value-addition technology have significant potential for success. Although it is happening very slowly, there are signs that some independent entrepreneurial activity is taking hold in the Equatorias, with some farming groups using their harvest profits to purchase processing equipment for their own farming operations and for commercial purposes.

"In one meeting, we decided to use [the money earned selling cassava stems] to acquire our own value-addition equipment… We plan to provide grating and grinding services to other farmers as an income-generating activity… we want to become one of the best service providers in the country."

Manase Sebit, Pisak-Ngakoyi FBO, Central Equatoria

4.2.2.3 Value-Addition Equipment Operators

To make value-addition processing sustainable, FARM II trained operators of primary processing and value-adding enterprises to further strengthen their skills and help their businesses become more successful. The training was offered over a two-day period, with intensive working sessions focused on topics such as business plan development, business profile development, business profitability analysis, business management, and enterprise development. Many of the participants had obtained equipment through the FARM I and II projects; seven had received FARM II entrepreneurship grants.

4.2.3 Targeted Higher-Value Crops

Because seed is a strategic agricultural input, seed multiplication creates an important value-addition opportunity for farmers who 1) can meet the high quality standards of seed multiplication buyers, and 2) have outgrower relationships with these companies. Seed producers can receive prices up to 50 percent higher than farmers who grow standard crops. FARM I began supporting seed multiplication linkages between FBOs and seed companies in 2013. FARM II further developed this market opportunity for smallholders by working with two South Sudanese input suppliers—Seed Grow and Century Seed—during the contract period. FARM II also helped some farmers grow higher-margin crops such as sesame and white sorghum, which often command higher prices if markets can be identified for them.

4.3 FACILITATED VALUE CHAIN LINKAGES

FARM II worked aggressively to build linkages among different segments of the value chain during its short implementation period. For the first time in South Sudan, financial institutions have developed a financial product specifically targeting smallholder producers, private input supply companies have geared up to establish agro-dealer partnerships with farmer groups to bring seeds and other inputs closer to farmers, and breweries are tapping the production potential of smallholders to source raw materials. The project also made progress in integrating smallholder producers into both the input supply chain and the grain markets by helping link them with aggregation centers and warehouse facilities. All these activities are beginning to boost confidence and hope among many smallholder producers and farmer groups.

4.3.1 Assessed Markets and Stakeholders

During the first quarter of operations, FARM II conducted a rapid market assessment and stakeholder analysis to determine key value chain players, obtain a deeper understanding of prevailing market

dynamics, and gain an understanding of the market position of South Sudanese commodities against popular imports.

Photo: Jessica Scranton for Abt Associates

Women selling produce at a local market in Yambio.

Since the Juba market plays a significant role in determining product prices, the team assessed six markets within the city. A key finding was that the larger traders dominating Juba markets were primarily Somalis, Ethiopians, Eritreans, Ugandans, and Kenyans. Many of them were known to import food products by the truckload for distribution in key markets in Juba, and from there to other larger towns in the north and west. The study confirmed that almost 75 percent of agricultural products, including staples, were being imported from Uganda. South Sudanese products were perceived as being more costly and of lower quality. Domestic producers and traders were also perceived as unreliable. The traders were unfamiliar with supply market opportunities for staple crops that existed in the Greenbelt. However, given the devaluation of the South Sudanese currency during the course of the FARM II implementation period, many of the traders expressed openness to domestic procurement if their requirements for quality, volume, and cost could be met. FARM II invited a number of these traders to participate in the farmer-trader forums scheduled later in the project.

The FARM team also visited five weekly or daily markets in Western Equatoria to better understand product flows and marketplace dynamics outside Juba. These markets drew large numbers of traders and consumers from surrounding areas within the county. Rural women play a prominent role in marketing both primary and processed products at these markets.

4.3.2 Linked Key Value Chain Components

FARM II helped attract the attention of targeted buyers, increasing their awareness of agricultural opportunities in the Greenbelt, and worked to raise the business confidence of buyers, key service providers, and investors. The project also increased farmers' and farmer groups' contact with these key players, providing information, technical assistance, and sometimes grants to support market entry. By facilitating numerous partnerships that benefited farmers and farmer groups, the project helped them tap into input and output markets to improve their livelihoods and resilience.

4.3.2.1 Organized Farmer-Trader Forums

FARM II organized six farmer-trader forums in all three states, drawing a total of 204 participants. The purpose of these forums was to bring together key players to discuss prevailing trade issues, establish business connections, and understand access to credit issues. Local traders, larger Juba-based traders, financial institutions, and state government representatives attended these events. The presence of the Chamber of Commerce proved particularly valuable, as it provided farming groups with useful information about marketing their produce across state lines. Financial institutions such as Kenya Commercial Bank and Equity Bank also attended some of the forums. The forums drew substantial participation from cooperative unions, cooperative societies, and block farm groups.

In these meetings, FARM II staff introduced farmer groups to the major buyers of staple crops in the region. The WFP used the meetings to explain its P4P program and express its desire to purchase maize, red sorghum, and other grains from local farmers if they can accumulate sufficient volumes and meet product quality standards. East African Breweries Ltd. (EABL) also participated in some of the events, expressing an interest in purchasing white sorghum from South Sudanese farmers. The main outcomes of these meetings were relationships among farmer groups, traders, and buyers. They also resulted in improved understanding between farmers and traders, which was later parlayed into future business deals.

How did farmer-trader forums work?

Planning began well in advance when project staff prepared two templates—one for farmers and the other for traders and buyers. The first part of each forum was spent in working groups guided by FARM II specialists. Farmers met and brainstormed about production costs. Using the template, they calculated their pricing structures. Meanwhile, the traders and buyers did the same. Using their own template, they laid out the costs of taking farmers' produce to market and selling it.

Once this process was complete, the two groups came together and shared information fully and openly so that each side could clearly appreciate the other's costs. In most cases, farmers had expected traders to pay them full market prices because they did not understand that the traders themselves had costs. The traders, in turn, learned why farmers' prices were higher than they had previously anticipated.

4.3.2.2 Convened Farmer-Input Supplier Forums

FARM II organized three farmer-input supplier forums in Eastern and Central Equatoria. The purpose was to develop relationships between cooperatives and two South Sudanese input supply companies that provide seed, agricultural chemicals, and farming implements. A total of 36 participants attended these meetings, mostly representatives of cooperative societies and unions. The two companies, Yei-based Century Seed and Juba-based Seed Grow, viewed the forums as a way to strengthen and grow their input supply networks and improve their outreach to smallholder farmers in a cost-effective manner. The forums provided an opportunity for the farming groups to consider options for serving as agro-dealers, thus improving their members' access to critical inputs in locations closer to their farms.

Through these forums, FARM II developed a micro-franchise concept linking farmers directly with commercial input suppliers. As a result, the Magwi and Pageri Cooperative Unions have signed memoranda of understanding (MOUs) with Seed Grow and have opened agro-dealer shops in their main towns. Both shops are strategically located to provide easy access to members and passersby. At the end of FARM II's contract period, these shops were beginning to sell maize seed in preparation for the first 2016 planting season. Seed Grow is also engaging with two cooperative societies in Palwar and Pajok to establish similar agro-dealer shops. This will further extend the company's reach to smallholder producers who want to produce maize and sorghum to sell to large buyers such as the WFP or EABL. Century Seed is interested in establishing similar micro-franchising relationships with cooperative unions in Yei, Kajo-Keji, and Morobo in Central Equatoria and creating links with YAFA and NAFA in Western Equatoria, since this state lacks a credible input supply company.

Photo: FARM II project

Members of the Magwi Cooperative Union in front of the agro-dealer shop they created after FARM II helped link the union to Seed Grow.

4.3.3 Supported State Agriculture Show

FARM II supported a three-day trade show in Torit from November 18 to 20, 2015. The event was sponsored by the Eastern Equatoria Ministry of Agriculture, which had been trained in trade show organization by the first FARM project. FARM II provided logistics and accommodations support to enable 30 farmers from two unions in Pageri and Magwi, along with members of several FBOs in Ikotos and Torit Counties, to attend. Western Equatoria did not hold an agricultural trade show in 2015 due to the conflict. Central Equatoria has not yet sponsored an agricultural trade show.

Photo: Redento Tombe

A farmer from the Ngoge FBO shows her wares at the agricultural show in Torit.

4.4 FACILITATED STRATEGIC MARKET LINKAGES

Despite the troublesome security situation and declining economy in South Sudan, FARM II was able to successfully establish a number of strategic linkages to boost smallholders' market opportunities and sales. In fact, South Sudan's weakened currency makes domestic production more price-competitive in both domestic and regional markets. These early commercial activities are important for the Greenbelt's farmers, since they may parlay into significant business opportunities in the future.

4.4.1 Facilitated Sales to the World Food Programme-Purchase for Progress Program

The WFP's P4P program, the leading buyer of grains and legumes in South Sudan, uses these foodstuffs to feed thousands of refugees, vulnerable families, and school children. Since the WFP procures approximately 3,000 MT annually, it provides one of the largest ready markets in South Sudan. P4P's practice is to purchase commodities through vetted traders who serve as "registered suppliers." From the very start, FARM II worked closely with P4P to link it with farmer groups across the Greenbelt.

The WFP had hoped to purchase 750 MT of maize from South Sudanese smallholders during the 2015 second marketing season, but was unable to do so. Due to insufficient aggregated volumes, inadequately organized farmer groups, and delayed responses from smallholder farmer groups and traders, the WFP was able to issue supply contracts for only 300 MT of maize from FARM II-supported farmers and others. P4P hopes to procure the remaining 425 MT of maize during the next marketing season.

FARM II addressed this demand-supply gap by helping farmer groups in the Greenbelt develop the capacity to meet the P4P demand. The project team carried out an assessment to identify farmer groups and cooperatives with potential capacity to meet the WFP's requirements. After identifying 10 promising farmer groups, cooperative societies, and cooperative unions, FARM II helped them become registered suppliers. These organizations were then able to apply for supply contracts, which would essentially ensure them a market for the season.

YAFA and NAFA in Western Equatoria and the Alarokodi Cooperative Society in Eastern Equatoria have already signed contracts to sell maize to the WFP after 2015's second harvest. While Alarokodi has already delivered 83 MT more than its contracted volume, as of the end of FARM II's contract period, NAFA and YAFA were continuing to deliver maize under their supply contracts. By the end of this marketing season, these three farmer organizations will have sold a total of 210 MT of maize to P4P.

4.4.2 Built Relationships Between Farmers and East African Breweries Ltd.

East African Breweries is keen to establish long-term outgrower relationships with smallholder farmer groups in the Greenbelt. EABL seeks to source locally produced commodities, primarily white sorghum. The company's plan is to source the sorghum in the Greenbelt and export it across the border into Uganda and Kenya, where it operates two breweries. Early in the contract period, FARM II worked with EABL to launch a pilot initiative to test its favored variety of white sorghum, Gadam, with several farmer groups in Eastern Equatoria.

Photo: Bagie Sherchand

EABL's preferred variety of white sorghum, used to launch the pilot program in Eastern Equatoria.

The pilot initiative kicked off with distribution of certified sorghum seed to 50 FARM II-supported farmers in Pageri, Magwi, Palwar, and Pajok. Each of the smallholders received 2 kgs of seed. This seed is a short-season (90-day) variety with yield potential of up to 4.5 MT per hectare. This variety is attractive to farmers because it will enable them to produce and harvest sorghum in the first season. Sorghum production for many in the Greenbelt has largely been a second season crop because of the extremely long maturity period required by traditional varieties.

Most of the 50 farmers selected to serve as pilot outgrowers for EABL are FARM II lead farmers who have agreed to assign the land used for the sorghum pilot as demonstration sites. This will enable others in their communities to observe and learn about this hardy, high-yielding variety, which is not only nutritious but also ideal for brewing beer.

4.4.3 Fostered Other Market Linkages

Groundnuts for regional export. The significant devaluation of South Sudan's currency over the past year has created a great deal of hardship for the people of South Sudan. It has also, however, created opportunities for local farmers, as Ugandan crop imports are now quite expensive and South Sudanese crop exports inexpensive. Regional buyers are tapping Century Seed to source and supply groundnuts in South Sudan because even though it is an input supply company it has deep roots and a strong presence in the country. With a supply contract for 90 MT of groundnuts valued at roughly SSP 1.08 million, Century Seed is looking to Greenbelt farmers to fulfill the order.

Grains for poultry feed. FARM II worked with one of South Sudan's commercial integrated poultry and hatchery operations to help it buy grains, particularly maize, from the project's beneficiary farmers. This Juba-based firm, South Farmers Company Limited, is keen to establish linkages with smallholder farmers who can supply maize to meet its need to feed 40,000 baby chicks per month (current production). FARM II also awarded a $10,000 grant to Global Agro Venture Ltd. under the entrepreneurship grants program to further support poultry production in the country, as this industry represents a potential market opportunity for smallholder farmers in the Greenbelt.

4.5 MADE CREDIT MORE ACCESSIBLE

Credit and financial services are very important to the Greenbelt's grain sector, and limited access to these services has become a significant obstacle at all levels of the value chain. Farmers' need for immediate cash causes some to harvest their crops early or offload their crops to roaming traders who offer ready cash but at very low prices. Traders, however, are typically under-capitalized and unable to pay farmers at the point of sale. Smallholders must frequently wait several months to get paid, creating a significant disincentive to grow surpluses. WFP-P4P claims that lack of working capital is one of the biggest barriers towards meeting its purchase quotas in South Sudan.

Although credit access was a significant problem before the December 2013 conflict, it has become a more pressing issue as banks have become even more reluctant to lend due to the current security and political situation. The economy has been in significant decline and the value of the South Sudanese Pound dropped precipitously during FARM II's contract period, falling from 4.1 SSP/$1 at project inception in April 2015 to 30 SSP/$1 at project end in April 2016. Despite this unfavorable environment, FARM II made significant progress in improving access to credit during the contract period, creating a strong foundation for improved credit and financial services to help fuel future agricultural growth.

"When we borrow from the bank and pay the farmers, we ease the tension that arises from delayed payment…we can now pay them in time and they will be encouraged by prompt payment to work harder making farming truly a business. As a result they will bring more products to our warehouses."

Anthony Ezekiel Ndukwo, YAFA Chairperson

The project developed collaborative relationships with two financial institutions over the past year. In partnership with FARM II, the Cooperative Bank of South Sudan developed *Crop Advance*, a bridging credit scheme to help cooperative groups and associations access up to 150,000 SSP in credit to provide working capital until they get paid. Similarly, the project partnered with the microfinance institution Finance South Sudan Ltd. to create another bridging credit scheme that provides up to 100,000 SSP to agricultural enterprises. FARM II helped both institutions take their lending products directly to farmer groups in the Greenbelt.

Over 70 cooperative and agribusiness leaders participated in farmer-financial institution forums during the contract period. In these meetings, the two financial institutions introduced their financial products; explained their borrower requirements; and shared the terms, conditions, and duration of their credit facilities. The Dutch-funded SPARK project has joined the partnership and strengthened both financial instruments by providing a partial credit guarantee for up to 70 percent of the loan value. The guarantees will reduce lenders' risk, encouraging them to make more loans available in the sector at lower borrowing costs.

Both NAFA and YAFA received supply contracts from the WFP to deliver 140 tons of maize this marketing season. NAFA's 1,300 members and representatives of YAFA's 4,700 members authorized their associations to borrow funds to facilitate maize aggregation to meet their supply contracts with the WFP. NAFA has already borrowed $10,000 from Cooperative Bank of South Sudan, and YAFA is in the process of concluding the same process with this lender. These borrowing arrangements enable approximately 6,000 smallholder farmers in Western Equatoria to benefit from this credit innovation. As the 2016 harvest season gets underway, the project's target for 10,000 farmers to access credit and financial services could be far exceeded.

Banking is a relationship business. It is therefore important for agricultural enterprises to form long-term relationships with the financial institutions from which they hope to borrow. It is also important for these businesses to work in a formal manner and to securely and transparently manage their cash. Twenty-one farmer groups assisted by FARM II are either opening a bank account or have already opened one with the Cooperative Bank of South Sudan so they can access credit in the future, as shown in Table 6 on the following page.

Table 6: Farmer Groups Receiving FARM II Assistance to Open Bank Accounts

No.	Name of Farmer Group	State	Payam/ Boma	Known Status
1	Yambio Agricultural Farmers Association (YAFA)	WES	Yambio	Account opened
2	Nzara Agricultural Farmers Association (YAFA)	WES	Nzara	Account opened
3	Maperegizo Primary Cooperative Society	WES	Gangura	Ongoing
4	Baalu Cooperative Union	EES	Pageri	Account opened
5	Magwi County Cooperative Union	EES	Magwi	Account opened
6	Yei River County Cooperative Union	CES	Yei	Account opened
7	Kalaba Primary Cooperative Society	CES	Otogo	Documents submitted
8	Abulo Meta Primary Cooperative Society	CES	Mugwo	Documents submitted
9	Dumo Primary Cooperative Society	CES	Monyo	Documents submitted
10	Turenzu Abe and Sons Primary Cooperative Society	CES	Wotogo	Account opened
11	Marakonye Multi-purpose Cooperative Society	CES	Yei	Documents submitted
12	Damandi Farmers General Purpose Cooperative Society	CES	Lasu	Documents submitted
13	Lemeri Randdukwe Farmers Cooperative Society	CES	Yari	Documents submitted
14	Morobo Cooperative Union	CES	Morobo	Ongoing
15	Kendila Primary Cooperative Society	CES	Kendila	Ongoing
16	Pakujo Primary Cooperative Society	CES	Gulumbi	Ongoing
17	Tandiba Primary Cooperative Society	CES	Wudabi	Ongoing
18	Kajo-Keji Cooperative Union	CES	Kajo-Keji	Ongoing
19	Rewolo Primary Cooperative Society	CES	Kajo-Keji	Account opened
20	Mvolo Primary Cooperative Society	CES	Kajo-Keji	Account opened
21	Rural Urban Savings and Credit Cooperative	CES	Kajo-Keji	Account opened

4.6 ADVANCED MARKET INFORMATION SERVICES

The absence of accessible, timely, and accurate market information is a considerable barrier to the development of efficient markets in South Sudan—markets that would enable buyers and sellers to make rational economic decisions about crop selection, investment, and trade. Without such market information, buyers have limited knowledge of available supply and suppliers have no knowledge of potential demand for their harvest outside their own communities.

The first FARM project created a prototype rural markets information system (MIS) to help address this shortcoming. Under this system, project extension workers use smartphone technology to track commodity prices in 14 urban markets across the Equatorias. The system collects weekly prices for beans, cassava, cassava chips, cassava flour, groundnuts (dried, unshelled), groundnuts (shelled), maize flour, maize grain, millet grain, rice (threshed), rice (unthreshed), and sesame. After being collected directly from markets, FARM II's MIS data is sent via smartphone to Mobile Data Collection Software. After the data is processed, it is synchronized with a public dashboard for public access and use. (http://www.southsudanagprices.com)

The first FARM project made the system functional, and over the past year FARM II focused on disseminating the information to a broad range of users and developing a long-term plan for sustainability and continued evolution. To avoid duplication and promote cross-donor synergy, project staff collaborated with the East Africa Grain Council (EAGC) to integrate the rural MIS into the Regional Agricultural Trade Intelligence Network (RATIN), EAGC's market information portal. RATIN monitors regional agricultural commodity trade flows in selected East African markets, including at South Sudanese border crossings. Since EAGC is a locally registered entity with a regional presence across East Africa, RATIN provides the best option for ensuring that market information continues to be available to farmers and businesses after the end of FARM II.

By the end of the contract period, EAGC was taking steps to access some of FARM's historical market information through the public dashboard, to test its compatibility with RATIN. This preliminary phase is continuing. Since FARM II extension workers are no longer able to collect data, other organizations will need to assume responsibility for re-establishing the system's operations.

Photo: Abt Associates

Project extension workers discuss the FARM rural markets information system. FARM II worked to make the system sustainable by folding it into the East Africa Grain Council's Regional Agricultural Trade Intelligence Network, known as RATIN.

"When I received the training on planting in lines, I went back and trained members of my group. When some members of our community saw me, they thought I was wasting time at first. But when harvest time came, they were surprised. I had to go to my village to train another five members of my clan on this new knowledge."

—Lokosang Levi, Soruba FBO, Yei River County

Photo: Abt Associates

5. Component 2: Agriculture Productivity

Photo: Kamba Anthony, Abt Associates

"I used to fetch like 8 bags (100 kg each) of maize when I planted the local variety. But since I got improved seeds, I realized 20 bags of maize this planting season."
Henri Lokiri, Pekido FBO, Kajo-Keji County

One of the significant technical debates early in the first FARM project was how the project should train farmers. Some thought that FARM should continue to allow farmers to broadcast their seeds, scattering seed by hand over large areas of land. They contended that because their levels of education were so low, it would be too difficult to train farmers any other way. Costa Mwale, the FARM I and FARM II Production Director, boldly claimed that the project would train our farmers the *right* way to grow crops, one seed per hole, in straight lines with proper spacing, and argued that with proper training and the right kinds of support, Greenbelt farmers *would* adopt these practices. This confidence in the South Sudanese people and commitment to helping them reach their potential, as articulated by Mr. Mwale, was the fundamental driver behind the projects' methods for all six years of work under both FARM I and FARM II.

When FARM II received the results of the third-party yield assessment in April 2016, this confidence in South Sudan's farmers was vindicated. These results show that the project's approach for training rural farmers was very successful. In fact, uneducated farmers outperformed educated farmers during the 2015 harvest season. All groups of FARM-supported farmers, for all four surveyed crops, achieved productivity levels that were more than double that of the African continent average.

While a great deal of hopelessness prevails in South Sudan due to the current political and economic crises, FARM II's productivity results suggest that the country should be accorded some optimism. The project's bottoms-up approach, based on increasing smallholder productivity, is having an impact on building the fundamentals for resilient and peaceful societies in South Sudan.

With proper support, South Sudan's farmers have shown that they can farm themselves out of poverty. With the gradual evolution of surplus markets in the Greenbelt and nascent but dedicated local institutions to support it, civil society is taking hold in communities throughout region, and these communities are becoming more self-reliant and resilient.

5.1 IMPROVED FARMING PRACTICES

FARM's and FARM II's most impactful interventions over the past six years were the introduction of improved seed technologies and the promotion of good agronomic practices. This combination of scientific innovation and behavior change adoption significantly empowered the Greenbelt's rural poor, particularly for targeted groups with specialized needs, such as women and youth. The FARM projects invested significant resources in these two intervention areas. The result was dramatic gains in farmer productivity, as illustrated by the findings of the third-party yield assessment conducted by the Borlaug Institute during the second 2015 harvest season.

FARM I had conducted its own yield assessments, carried out by project staff, to measure its impact on smallholder productivity. As agricultural productivity data is quite limited in South Sudan, FARM II decided to invest resources to formalize and enlarge the yield assessment, by having the Borlaug Institute design and oversee a third-party 2015 yield assessment that covered not only maize, but also cassava, groundnuts, and beans.

FARM II's yield assessments showed that beneficiary farmers' yields were 29 percent higher, on average, than non-beneficiary farmers' yields (22 percent for maize, 37 percent for groundnuts, 50 percent for beans, and 7 percent for cassava). The assessment showed that both beneficiary and non-beneficiary farmers exceeded the African continent's productivity averages for all four crops, more than doubling or tripling the amount in most cases. The results of the yield assessment also suggest that the new technologies and agricultural practices introduced by FARM II are being spread broadly among non-beneficiary farmers in the region through informal markets and communication.

5.1.1 Increased Farm-Level Production and Small Farmer Productivity

The FARM II project had significant impact on increasing smallholder productivity in the Greenbelt. As shown in Table 7, project-supported farmers out-performed their contemporaries in neighboring East African counties and across the African continent as a whole. These numbers illustrate the Greenbelt's comparative advantages for grain production, which are largely due to the region's fertile land, sufficient rainfall, and hardworking smallholder farmers. In addition to these three fundamental resources, FARM II's seed distribution and GAP training interventions made possible large advances that highlight the country's vast agricultural potential.

Table 7: Crop Yield Comparisons (kg/ha) by Country or Location

Location/Country	Maize	Groundnuts	Beans	Cassava
Greenbelt FARM II Beneficiary	4,274	2,487	3,084	42,506
Greenbelt FARM II Control	3,510	1,814	1,856	42,052
Uganda *	2,500	700	1,300	3,300
Kenya *	1,660	2,598	585	13,471
DRC *	778	768	610	8,077
Chad *	1,260	900	1,260	10,442
South Sudan (FAO) *	964	533	3,090	1,666
African Continent *	2,098	961	816	8,379

* Data Source: FAO Website www.faostat3.fao.org

5.1.1.1 Expanded Access to Improved Seed Varieties

FARM II continued FARM I's efforts to distribute improved seed varieties to farmers across the Greenbelt. This important activity introduced farmers and farming groups to new seed technologies, while complementary project trainings encouraged them to adopt GAPs.

During the one-year contract period, FARM II distributed 494 MT of improved seeds and cassava stems. The procurement and distribution was to have taken place during March 2015, under the FARM I project, in preparation for the year's first planting season. Seed waiver delays, however, unexpectedly postposed these plans until late May 2015, during the FARM II contract period. FARM II therefore assumed the responsibility of procuring and delivering the seed, which did not reach most farmers until the second planting season, which began in July.

As shown in Table 8, FARM II distributed 294 MT of seeds procured through Equator Seeds, Victoria Seeds, and East Africa Seed—all vendors based in Uganda. Project staff traveled to Uganda in March to inspect the seed multiplication fields prior to final purchase. The vendors then transported the seed across three border crossings to storage facilities in each project-supported county.

Table 8: FARM II Seed Distribution by Location and Type of Seed (in kg)

Border Entry Location	Warehouse Location	Maize Longe 5	Beans K132	G/nuts Red Beauty	Rice Nerica 10	Sesame Simsim II	Finger Millet Serami II	Total to Warehouse
Eastern Equatoria		**23,150**	**41,780**	**74,770**	**635**	**4,002**	**3,090**	**147,427**
Nimule	Pageri	1,620	2,925	5,234		280	281	10,340
	Magwi	6,716	12,116	21,684	335	1,161	804	42,816
	Torit	14,814	26,739	47,852	300	2,561	2,005	94,271
Central Equatoria		**20,120**	**18,220**	**30,735**		**1,618**		**70,693**
Kaya	Morobo	7,070	6,134	12,517		556		26,277
	Yei	6,180	5,538	8,815		498		21,031
Moyo	Kajo-Keji	6,870	6,548	9,403		564		23,385
Western Equatoria		**16,730**		**44,495**	**9,365**	**2,380**	**2,910**	**75,880**
Kaya	Maridi	5,490		14,600	4,370	780	955	26,195
	Mundri West	4,966		13,209		707	864	19,746
	Yambio	6,274		16,686	4,995	893	1,091	29,939
TOTAL		**60,000**	**60,000**	**150,000**	**10,000**	**8,000**	**6,000**	**294,000**

FARM II distributed approximately 200 MT of cassava stem, as itemized in Table 9. The project procured the planting material through a South Sudanese vendor, Gilkam International Ltd., which was able to source all cassava cuttings domestically in South Sudan because the first FARM project had carefully built up a supply of cassava stems resistant to Cassava Mosaic Disease and tolerant of Cassava Brown Streak Disease, which are quite prevalent in Uganda and other countries. FARM II staff worked closely with MAFTARFCRD authorities to inspect the cassava for disease before accepting it for purchase. The success of the domestic cassava stem program suggests future possibilities for local farmers to engage in production and multiplication of planting material in South Sudan.

Table 9: FARM II Distribution of Cassava Stem by Location and Volume (kg)

State/County	Cassava
Eastern Equatoria	**40,000**
Ikotos	11,200
Torit	14,400
Magwi	14,400
Central Equatoria	**60,360**
Morobo	13,000
Yei	16,120
Kajokeji	31,240
Western Equatoria	**100,000**
Yambio	37,600
Maridi *	32,800
Mundri West*	29,600
TOTAL	**200,360**

FARM II's approach for seed distribution was designed to empower cooperative unions and build their capacity to serve as agro-input dealers and engage in seed distribution as a business. The project distributed all planting materials to cooperative unions, which in turn distributed them to 310 FBOs. In Torit and Ikotos counties, the project distributed the seeds and cassava stems directly to FBOs, as cooperative unions have not yet been established in these areas. Each FBO receiving seed was responsible for distributing the material and providing support services to its farming members.

FARM II only provided seeds and cassava cuttings to FBOs that had not previously received the same planting material, although they may have received seeds for different crops in previous years. In all, FARM II distributed planting material to 19 percent of the farming groups for the first time. Eighty-one percent had previously received seeds for different crops.

Following the distribution, project teams visited farmers who had received seed from the 2015 seed distribution to ensure that they had actually received the seeds and had planted them according to project guidelines. Staff also provided further guidance and answered farmers' questions.


Photo: Abt Associates

Bags of Longe 5 maize seed awaiting delivery to farmers

The seed and stem procurement process ran into unexpected challenges. FARM II was unable to purchase the planned 10 MT of sorghum seed because the Seredo seed variety that farmers preferred was not available, a common problem in East Africa. In addition, violence in Maridi and Mundri West delayed distribution to warehouses and subsequently to FBOs in these counties until the second quarter of the project.

Text Box 4: FARM II Interventions in the Bean Value Chain

Beans are becoming an increasingly important crop in South Sudan for food security as well as household income. They provide a good source of protein and vitamins and are particularly beneficial for children, women, and the elderly. Because bean supply in South Sudan is currently inadequate, they are frequently imported from Kenya and Uganda. With the sharp devaluation of South Sudanese Pound over the past year, local bean production has become increasingly important. The WFP faces significant challenges sourcing beans for its food distribution programs in South Sudan.

FARM II procured 60,000 kilograms of K132 beans from Uganda for distribution throughout the project's service area. K132 is a preferred variety among Greenbelt consumers. This is a high-yielding bean variety with an early maturity period, from 85 to 90 days, which is resistant to black root disease and requires a short cooking time. Beans, a nitrogen-fixing legume, are also a good rotation crop for sustainable agriculture purposes.

The FARM II yield assessment showed that beneficiary farmers' average bean yield of 3,084 kg/ha was 167 percent of the average yield of their non-beneficiary control group counterparts. Beneficiary farmers were able to more than triple bean productivity of the average farm in Africa (816 kg/ha) and achieve yields that were 237 percent of the Ugandan average and 527 percent of the Kenyan average.

FARM II has advanced the development of the beans value chain through land preparation, GAP training, post-harvest handling and storage, value-addition processing, aggregation, logistics, business linkages, credit access support, and market and business training. The project also emphasized beans during crop rotation and sustainable agriculture training.

5.1.1.2 Increased Land Under Cultivation with Improved Technologies

In addition to increasing farmer productivity, expanding land under cultivation is fundamental to increasing South Sudan's agricultural production. It is estimated that only 4.5 percent of South Sudan's arable land is currently being cultivated. In addition, the smallholder farmer typically needs to cultivate more than two feddans of land to achieve surplus production. FARM II continued to provide land management trainings to help farmers reclaim fallow land using sustainable methods to optimize the productivity of the land and ensure the land can be continually used.

Land reclamation for agriculture is an expensive endeavor in South Sudan, due to the country's lack of functioning tractors and inability to maintain them. There is also a shortage of labor to clear land by

hand, which is typically done using hand tools such as *pangas* and hoes. FARM I provided limited in-kind land plowing and harrowing grants to selected new farming groups to help them begin cultivation. In all, this program enabled farmers to plow up to 2,541 feddans of land during a four-year period. FARM I also implemented a pilot block farming program, under which 11 communities in Eastern and Central Equatoria each cleared and prepared for cultivation 100 feddans of contiguous land in carefully selected sites. The purpose of the block farming program was to demonstrate safe land reclamation practices using project-established guidelines.

FARM II discontinued these two grant programs to re-prioritize resources for market development and to allow local land preparation and plowing markets to take hold in the country. A number of communities were distressed by this program shift, reflecting the importance of land preparation in South Sudan. However, the project and local farming groups worked through this challenge.

Mechanized plowing remains problematic in South Sudan due to an inability to maintain the equipment. Animal traction via ox-plow is proving to be a more appropriate technology in many Greenbelt areas, particularly in Lobone, Magwi, and Ikwoto in Eastern Equatoria. As a substitute for providing direct plowing support, FARM II awarded in-kind grants to four cooperative unions to provide them with a total of 34 oxen and 17 plows. This helped these organizations provide land preparation services to their members. In addition, FARM II awarded entrepreneurship grants to three business groups in Eastern Equatoria so they could obtain 42 oxen and 21 plows to meet market demand in their local areas. The project also has evidence that some local farming groups are using profits from surplus sales to invest in oxen that they will use to plow their own farms and the fields of other farmers in their areas as an income-generating business.

5.1.1.3 Improved On-Farm Post-Harvest Handling and Storage Practices

Inadequate on-farm storage technologies and practices cause farmers in the Greenbelt to lose up to 40 percent of their crops after harvest. Losses are not the end of the story, however. Poor storage can also result in contamination by aflatoxin or other impurities, creating health risks for farmers, their families, and the public. Therefore, before purchase large commercial buyers such as the WFP closely examine farmers' grain harvest for impurities, aflatoxin, and other deficiencies. Smallholders whose grains do not meet these standards cannot access these higher-paying markets.

Photo: Jessica Scranton for Abt Associates

You can see the difference for yourself. If you stand beside this bag, you can hear weevils creaking in the bag, but if you stand beside these other ones, it is all silent—which means weevils have failed to find ways to enter."

—Lokosang Levi,
Soruba FBO, Yei River County

FARM II combatted this problem by continuing work begun under the first FARM project. FARM I had tested three technologies for combating on-farm storage losses and improving quality at the farm-gate, including 50-kg hermetic storage bags. As part of this test, FARM I distributed 150 hermetic bags to 37 smallholders in Western Equatoria in 2014. The results were striking—in some cases, the bags reduced losses by as much as 90 percent. The project then ran a pilot distribution of 6,000 bags during the final year of FARM 1, which was also successful.

To build on this success, FARM II provided in-kind grants to six cooperative unions and one farmer organization to scale up the use of hermetic bags as a practical and economically viable technology for reducing post-harvest losses and increasing product quality in the Greenbelt. In all, the project distributed 40,000 of the 50-kg hermetic storage bags. The unions then sold them to their FBO members and other farmer representatives at a subsidized rate of 5 SSP

per bag. The cooperative unions were instructed to reinvest proceeds from these bag sales back into their organizations as working capital to grow their operations. Using the unions to get the bags into the hands of farmers was part of FARM II's strategy for building the unions' capacity to serve as agro-input dealers and deliver services to their members. With farmers having experienced the effectiveness of these bags, demand for them is expected to grow, providing more opportunities for the cooperative unions to serve as dealers.

These specialized synthetic bags create an air-tight, oxygen-free storage environment that controls insect infestation and curbs the humidity that changes the crop's chemical composition, taste, and color. Using the bags effectively also prevents mold buildup, which causes stored grain to spoil. The bags can generally be purchased for less than $3 per 50-kg unit and reused for multiple harvest seasons.

Training on proper usage was an integral part of the project's hermetic storage bag distribution plan. FARM II trained each cooperative union on proper usage when it received the bags. The unions were expected to provide the same training to farmers or FBO representatives who purchased bags from them, so that they in turn could pass the training on to their communities.

To measure the effectiveness of the bags, FARM II staff tested 60 randomly selected bags during the contract period. The test showed that only 7 percent of crops stored in these bags failed to meet acceptable standards. Through this intervention, farmers were able to reduce their post-harvest loss rate by 33 percentage points (from a baseline of 40 percent losses to 7 percent losses). This is an 82.5 percent improvement over the baseline, and exceeds FARM II's target by 165 percent.

Text Box 5: FARM II Interventions in the Cassava Value Chain

Cassava is a very important local food security crop. While primarily used for household consumption and not considered a cash crop, cassava can be marketed through value-addition processing such as producing cassava chips. Although low in nutritional content, it is an ideal source of calories for the South Sudanese diet. As a root and tuber crop, cassava stores well in the ground for up to 12 to 18 months and can therefore be harvested on an as-needed basis. It is becoming more popular in South Sudan, particularly in Eastern and Central Equatoria, as returnees bring knowledge of the crop from neighboring countries.

Cassava production in South Sudan faces a significant threat from Cassava Mosaic Disease (CMD), a single-stranded DNA virus transmitted by white flies. Cassava Brown Streak Disease (CBSD), another common cassava disease prevalent in East Africa, is already in South Sudan. For this reason, FARM II sourced 200,000 kg of disease-free cassava cuttings from within South Sudan for the 2016 distribution. Most of these cuttings came from FARM cassava stem distributions to local farmers in previous years.

Cassava stem cuttings are perishable and must be planted within several weeks of the initial cutting. Therefore, distributing cassava cuttings is much more challenging than distributing seeds. FARM II disseminated the TME 14 and NASE 14 varieties, which are resistant to CMD, high yielding (up to 40 MT/ha), and offer early maturity (12 to 18 months). NASE 14 is also tolerant to CBSD.

FARM II's yield assessment showed little difference in cassava yields between beneficiary and control group farmers: 42,506 kg/ha versus 42,052 kg/ha, respectively. However, FARM II-supported farmers grew fewer diseased crops and 83 percent of their harvest was marketable compared to 77 percent of the control group harvest. The assessment showed that cassava yields in the Greenbelt were outstanding compared to the African continent average of 8,379 kg/ha, a 507 percent difference. FARM II beneficiaries also out-performed farmers in neighboring countries, with yields that were 1,288 percent of the Ugandan average and 315 percent of the Kenyan average.

FARM II furthered the development of the cassava value chain through distribution of cassava cuttings, land preparation, GAP training, post-harvest handling and storage, value-addition processing, and marketing and business training.

5.1.2 Increased Efficiency and Cost-Effectiveness of Delivering Extension Services

The transition from a subsistence-based to market-based agricultural system requires effective extension services that can act as intermediaries between farmers and improved technologies, management practices, and marketing methods. These 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. FARM II followed the extension approach established under FARM I, which organized farmers into FBOs to facilitate the delivery of services and dissemination of new technologies and practices. This approach helped address the inherent challenges of delivering extension services to large numbers of farmers in a region where farms are sparsely distributed over a large geographic area. By working through FBOs, the projects were able to scale up more rapidly and reach many more farmers than would have been possible by directly targeting individuals.

The project relied on its extension staff and lead farmers to directly deliver assistance to the 14,155 farmers, through 732 FBOs, that have been verified to have received services during the FARM II contract. However, the end-of-project farmer and yield assessments, combined with a significant amount of anecdotal evidence, suggest that many more Greenbelt farmers were indirect beneficiaries whose livelihoods were significantly advanced by project interventions.

5.1.2.1 Delivered Extension Services

Extension workers. The first FARM project had 39 extension staff: three at the state level, nine at the county level, and 27 payam extension workers—one in each payam. When FARM II added nine new payams to the project area, the number of extension staff also expanded. The project hired new extension workers in all but one of the new payams.

Photo: Redento Tombe, FARM II Project

"I love to see my farmers' excitement at their first harvest when they see how much more they are harvesting from the same land!"

Miidie Silvana, FARM II extension agent (left, shown here with farmer Michael Kalisto of the Maposu FBO)

Training for extension workers under the first FARM project had been interrupted by the conflict in December 2013, but was re-instituted under FARM II. This training covered a wide range of topics: extension methods, agricultural production practices, crop conditioning, collective marketing, FaaB, financial literacy, cooperative formation, and use of SMS for data collection. The project also taught extension workers to address gender and youth needs and follow a "Do No Harm" approach (see section 7.4).

Lead farmers. Relying only on project-supported extension workers is not a cost-effective or sustainable solution. In the long term, extension services in South Sudan need to be provided by functioning public sector providers or through the private sector. Given the relative weakness and lack of funding for government agricultural extension services, FARM II identified and trained lead farmers to serve as community-based extension agents. These lead farmers shared key messages and disseminated new technologies within their own communities, reaching farmers in their own languages and with tailored techniques. This approach not only ensures transfer of technology and fosters rapid and more effective delivery of extension services, but it is also an important step towards sustainability. With the

ending of FARM II and with project-funded extension agents no longer available, the FBOs and cooperatives whose members include lead farmers can continue to advise and assist their members.

The FARM II project team worked with 772 lead farmers, 20 percent of whom (153) were women. They were members of project-supported FBOs and cooperative societies, which helped select them, or government extension staff. FARM II extension workers provided TOT training on GAPs and gave the lead farmers extension packages to support their efforts. The lead farmers then cascaded their knowledge down to farmers in their communities—both members of their FBOs and others who were interested.

5.1.2.2 Increased Accessibility of Farmer Demonstration Sites

Yield assessments completed early in the first FARM project showed that few farmers were adopting the GAPs promoted during project trainings. The low adoption rate was attributed to the highly risk-averse nature of farmers in South Sudan, who were reluctant to try new practices because they were not sure how well they would work. Following the principle of "seeing is believing," FARM I developed demonstration plots, called Farmer Participatory Learning Centers (FPLCs), to provide a visual demonstration of the benefits of following improved practices. The first FPLCs were established at the county level, but attendance was low. To address this problem, in 2014 FARM I moved the demonstration plots in Central Equatoria from the county level to the payam level to make training more accessible to local farmers. The shift dramatically increased participation.

FARM II built on this success by setting up 29 demonstration plots across the three Equatoria states. The original plan was for FARM II to establish 36 FPLCs, but four sites in Eastern Equatoria could not be developed due to drought and three in Western Equatoria were hindered by insecurity. Local FBOs donated the land for the FPLCs, each of which was 1 to 2 feddans in size. The plots were managed by local communities with technical support from FARM II extension staff. Technologies demonstrated on these plots included improved seeds, seeding rates, row planting, plant spacing, plant population, and field hygiene such as proper weeding. The sites showcased a variety of crops: improved maize, sesame, finger millet, cassava, groundnuts, rice, and beans.

The FARM II Agriculture Production Director reported that the locations of the project's demonstration plot became obvious when he was driving through Kotomi in Western Equatoria. As he began to see more and more fields planted in lines, he knew he was approaching an FPLC. When all the fields were planted in lines, he knew that he was about to arrive.

Photo: Kamba Anthony, Abt Associates

Demonstration sites not only teach farmers, but also help feed the community

Yabongo Girls School in Western Equatoria is addressing gender inequality in South Sudan, where women's literacy rates lag far behind those of men. But with the country's economy suffering from two years of civil conflict, fee collection has dropped. As exams approached in November 2015, the school struggled to afford enough food for the girls. Some students were skipping classes to go home and collect food to supplement the school's meager rations.

FARM II stepped in to help. To ensure that students would not have to sit in examinations on empty stomachs, the project provided the school with 800 kilograms of cassava chips grown on nearby demonstration plots. The State Ministry of Education said the donation allowed time to better plan for the students' welfare in the next budget, adding that other organizations could learn from FARM II about giving back to their local communities.

The success of the project's FPLCs led several individual farmers to take the initiative and establish their own demonstration plots to showcase new technologies and practices for their neighbors. One farmer in Tore, for example, returned home from visiting a FARM II FPLC and enthusiastically set one near the location where members of his FBO hold meetings. Project staff identified three such sites, but there may be others that were not brought to the project's attention. This represents an important move toward sustainability, with local sources beginning to share the knowledge that was left behind by USAID's six years of intervention. Table 10 lists the locations of FARM II's demonstration sites, including known locations established privately by farmers.

Table 10: Demonstration Plots by Location and State

Eastern Equatoria State	Central Equatoria State	Western Equatoria State
Payams (11)	Payams (12)	Payams (9)
Isohe	Kangapo 1	Bangallo
Katire	Kangapo 2	Mundri town
Lobone	Lire	Kotobi
Pajok	Ngepo	Landilli
Obbo	Kimba	Maridi
Iyre	Wudabi	Mambe
Imurok	Gulumbi	Bangasu
Ikotos Central	Panyume	Rirangu
Obbo Mikomi (established by farmer)	Lasu	Yambio
Lerwa (established by farmer)	Ottogo	
Obbo Palotaka (established by farmer)	Mugwo	
	Tore	

5.1.2.3 Conducted Farmer Field Days

Following the practice of the first project, FARM II hosted farmer field days at FPLCs to increase farmers' understanding of how GAPs and new technologies can strengthen their cropping systems. Extension staff organized and conducted farmer field days at all 29 FPLCs. The participatory, visual approach used at farmer field days enhanced attendees' capacity to retain information. The events also strengthened social cohesion and provided opportunities for business linkages, since various value chain actors participated and interacted with each other.

Farmer field days provided first-hand information on the seed varieties and farming practices demonstrated at the FPLCs. Farmers had a chance to practice the new technologies, develop their practical skills, and share experiences. Hands-on training covered topics such as planting in a line, using one seed per hole, and weeding. Each demonstration plot hosted six farmer field days during each planting season, covering the following points:

- Land preparation
- Planting
- First weeding, demonstrating how much easier weeding is when crops are planted in lines
- Second weeding
- Crop maturity, showing that improved seed matures more quickly than traditional seed
- Harvest, illustrating that improved seed yields a more bountiful harvest

FARM II verified that at least 1,295 farmers attended the field days. Members of FARM II-supported FBOs participated actively, but the events also attracted others—non-member farmers who wanted to

learn to use the technologies the project promoted. One challenge was that many farmers were not able to attend all six sessions. The full benefit of the program would have come from individual farmers learning first-hand about each key point of the farming season, which would require attendance at all sessions. More careful planning and coordination between project extension staff and community members to select days for field days would likely help, as would more frequent reminders of upcoming events. In addition, establishing even more demonstration plots and placing them closer to FBOs and farmers' communities would likely improve participation.

Text Box 6: FARM II Interventions in the Sorghum Value Chain

Sorghum seed has a fairly soft exterior, making it more appropriate for use in dryer climates. While it is a preferred crop in the northern states of South Sudan and some parts of Eastern Equatoria, sorghum is not as preferred in many areas of the Equatorias because they have high levels of rainfall and humidity. Preferred sorghum seed varieties are also difficult to source in East Africa and are often not available. FARM II was unable to source sorghum seed from Uganda or Kenya for the 2016 season.

A market does exist for sorghum in the Greenbelt. The WFP is interested in sourcing red sorghum within South Sudan, and processors such as East African Breweries Limited (EABL) are interested in sourcing white sorghum in South Sudan. FARM II kicked off a PPP pilot initiative with EABL. The brewing company distributed 100 kg of a white sorghum seed variety called Gadam to 50 lead farmers in Pageri, Magwi, Palwar, and Pajok. FARM II identified these farmers as outgrowers for the pilot, created the business linkages between the local farmers and EABL, and arranged GAP training. These farmers agreed to help other farmers observe and learn about this hardy, high-yielding variety, which is not only nutritious but also ideal for brewing beer.

In addition to the PPP with EABL, FARM II fostered the development of the sorghum value chain through land preparation, GAP training, post-harvest handling and storage, value-addition processing, business linkages, credit access support, and market and business training. Sorghum was not included in FARM II yield assessment study.

5.1.3 Explored Delivery Options for Extension Services Through Alternative Media

In concert with the lead farmer program, FARM II explored ways that alternative media could help extension services reach even more farmers at a lower cost. The project conducted an assessment of communications delivery options, even though the limited contract period precluded implementation under FARM II.

The majority of the FARM projects' activities over the past six years were implemented as direct interventions that reached project beneficiaries through training, grants, and behavior change activities. This meant that the projects' cost per number of beneficiaries was initially quite high. As FARM II continued to scale up activities to a much broader group of farmers, the costs per beneficiary were significantly reduced. Now, with many adopters across the Greenbelt and evidence that extension information is being shared with non-beneficiary farmers through informal channels, USAID is beginning to see significant returns on its investment in the FARM projects.

As momentum developed in the extension services program, FARM II explored ways to better use mass media and telephone technology to reach an even larger farming audience at a lower cost. Such initiatives would complement the project's core extension services work. There are approximately 2 million people living in the Greenbelt; about 80 percent of them depend on agriculture for their livelihoods. FARM II asked subcontractor BBC Media Action, a UK-based development organization with a mission to use media and communication to reduce poverty and significant program experience in South Sudan, to conduct a communications assessment to explore technology options for reaching

more farmers. The firm developed a series of recommendations to help future agricultural development programs incorporate communications technology to reach many more farmers in the Greenbelt than the FARM projects could support directly (see text box on following page).

Radio. Radio ownership remains generally low in many rural areas of the Greenbelt. The rate in Eastern Equatoria is the lowest, where only about 34 percent of people have access to a radio.[4] Radio ownership is higher in Central Equatoria, at 50 percent, and highest in Western Equatoria, where 63 percent of the population has access to a radio. Further compounding the limited access to radios, broadcast reliability is also a challenge. Radio stations in South Sudan frequently go off the air for long periods, thanks to frequent equipment breakdowns and an inability to repair them quickly. Despite these constraints, BBC Media Action's assessment revealed that many farmers in the region are keenly interested in radio programming on agriculture if the information would help them improve productivity. The study concludes that radio would be the most effect communications media for reaching smallholder farmers in the Equatorias.

Farmers in the Greenbelt speak a variety of languages and dialects. Their fluency in Juba Arabic, the most common language in South Sudan, is limited. The BBC study recommends that radio programming on agricultural issues be broadcasted in local languages to maximize comprehension, awareness, and impact. As discovered under FARM I, any communications initiatives are likely to be unsustainable without significant institution building. Currently, local and state governments lack the capacity and financial resources to maintain a sustainable broadcast campaign on agriculture through local radio stations.

Text Box 7: Recommendations from Alternative Media Study by BBC Media Action

A combination of SMS messaging and radio broadcasts would be an effective mix, since phone coverage reaches areas that radio cannot and radio covers some areas where phone coverage is not available. In addition, radio provides audio information on extension information while SMS messages complement this with written information. The BBC study recommends that a future donor program partner with 8 to 12 local radio stations in the main agricultural areas in the Greenbelt. The radio initiative should include three types of broadcasts:

- *Fifteen one-minute public service announcements (PSAs).* Each announcement would be broadcast several times per day on each partner station for a period of two to four weeks.
- *Eight five-minute mini-dramas.* Each mini-drama would discuss and develop the key messages contained in two or more of the PSAs. Each mini-drama would be broadcast four times on each station during the peak evening listening period. Whenever possible, a repeat of each mini-drama would be followed by a phone-in program to discuss the issues raised. Each phone-in would feature a local agricultural expert as a studio guest to answer listeners' questions.
- *Two-minute weekly market price bulletins.* Selected radio stations would report wholesale prices for staple food commodities in at least 14 reference markets across the Greenbelt. Each radio station would broadcast price bulletins from two to four local markets that its listeners use regularly. Each bulletin would broadcast on the evening of the market day concerned and repeated the following day.

The study also recommends including market price messaging. The radio partners would communicate market prices and other important agricultural information directly to a designated focal person in each FBO in the coverage area who has a telephone and who can read and write in English, Juba Arabic, or a local language. The focal points would pass on the information to other members of their groups by word of mouth. They would also send information by SMS to the donor project on behalf of their FBOs.

[4] Media access figures are drawn from the BBC Media Action Girls' Education Survey conducted in June/July 2014. This survey was carried out in all three states in the Greenbelt and is representative of the accessible areas in those states.

Donor support, therefore, will be needed for some time to implement an extension services program through radio. To achieve sustainable results, such an initiative should incorporate a long-term local institutional capacity building program.

Telephone. BBC Media Action also collected information on phone ownership rates among the farmer groups it visited. This research estimated that phone ownership rates are highest in Western Equatoria (45 percent) and somewhat lower in Central Equatoria (38 percent). While BBC did not travel to Eastern Equatoria, telephone ownership is likely lowest in this state. Overall, mobile network coverage in the Greenbelt is good and most areas can receive a signal from at least one of South Sudan's four mobile networks.

5.1.4 Explored Sustainable Seed Multiplication Options

As briefly discussed in section 4.2.3, FARM II explored the potential for domestic seed production in South Sudan. Since 2011, the FARM projects imported over 1 million kg of seed from Uganda. FARM II recognized that its seed distribution program was not sustainable and that the long-term viability of South Sudan's agricultural sector requires the country to establish its own seed production and distribution systems. However, the current enabling environment is not conducive to rapid progress in this area, due to significant capacity limitations and the absence of policy, infrastructure, and standards. Despite the current political and economic situation, there are significant possibilities for rapidly creating seed production systems and informal seed markets at the local level. These would make communities more resilient and help them continue their economic development.

The current seed import system has been exacerbated by the collapse of the South Sudanese Pound within the past year, which has made imported seed very expensive for local farmers. The South Sudanese Government has expressed a growing reluctance to import seed, seeking to mitigate the risk of crop diseases spreading into the country. East African seed markets are also unstable, leading to frequent shortages of supply and contaminated seed deliveries.

In this environment, there are some positive developments that suggest that the Greenbelt is ready for more-intensive seed multiplication assistance. As pointed out above, FARM II's yield assessment suggests that informal seed markets are developing in South Sudan. In addition, some seed multiplication is continuing through linkages established by the FARM projects with local South Sudanese agro-input dealers such as Century Seed and Seed Grow. FARM II also has some evidence that a few farmers were able to sell part of their harvest as seed to humanitarian assistance organizations.

FARM II addressed the seed multiplication challenge through a number of activities: 1) distributing seed through project-supported cooperative unions; 2) training farmers to condition and store a portion of this year's harvest to serve as next year's seed; 3) awarding a $45,158 PPP grant to a South Sudanese agro-input dealer to help it work with smallholder farmers to advance seed multiplication and seed marketing capacity; and 4) conducting a technical assessment of the current status of seed markets in the Greenbelt.

The technical assessment made recommendations on how future programs can proactively improve seed multiplication. The report presented several findings that suggest that future agriculture programs in the Greenbelt should consider particular investment in this strategic component of the grain value chains. These findings included the following:

- *Informal seed markets prevail in South Sudan.* While relief organizations are heavily entrenched in South Sudan's seed markets, relief seed only accounts for about 10 percent of total seed used and most seed continues to be sourced informally.

- *The private seed sector is nascent, but growing.* A number of commercial seed companies—including Century Seed, Green Belt, and Afroganics—have established outgrower arrangements with smallholder seed producers and are registered as certified seed producers.
- *Planting seed is a "higher-value crop."* Smallholder farmers can earn 50 percent more profit from growing seed than from growing grain for sale in the market.
- *FARM's seed multiplication pilot program is working.* The FARM I and FARM II model of developing farmer organizations, providing training, and linking farmers to seed companies has contributed to a regeneration of the domestic seed industry, particularly in Yei. This model can be expanded to other areas of the Greenbelt and the country.
- *Improvements are needed to formalize seed multiplication*. Critical components of the seed value chain—including inspection, packaging, and labeling—are limited. There are no official procedures for testing and releasing seed. The government's research and testing facilities are underfunded and lack vital personnel.

5.2 STRENGTHENED PRODUCER ORGANIZATIONS

FARM II's network of 732 FBOs is possibly the biggest asset the two projects leave behind after six year of work in the Greenbelt. These FBOs were organized as civil society groups for economic purposes. They offered a new way for farmers to work together for their individual benefit and the

Photo: Kamba Anthony, Abt Associates

FARM Agriculture Production Director Costa Mwale (center) meets with members of the Moonlight FBO in Kudo in Torit County.

common good of their communities. These organizations now have the knowledge and skills to not only increase farmer productivity, but to also work together as a community to share information, solve problems, address issues, and invest in their futures. With support from FARM I and FARM II, these communities are now much more resilient and able to continue to grow and develop despite ongoing

conflict, political uncertainty, economic decline, and devaluation of the national currency over the past year.

The end-of-project survey of 74 randomly selected FBOs, representing all nine counties in FARM II's service area, determined that the membership size of project-supported FBOs ranged from 11 to 70 members. The average was 27 members per group. While FARM II identified 14,155 individual farmers who directly benefitted from project services over the past year, the total number of farmers included in the FBO network is likely to be approximately 19,764 (732 FBOs x 27 farmers/FBO). Approximately 40 percent of the FBOs reported that their memberships are increasing, while 32 percent reported that the size of their membership has not changed.

The project's end-of-project survey of farmers and FBOs demonstrates a great deal of membership involvement and democratic participation in decision-making within FBOs. The farmer survey, which included 598 randomly selected farmers, showed significant farmer involvement in their FBOs. Almost 92 percent of farmers surveyed said that they frequently participate in FBO activities and 96 percent stated that their FBOs encourage all members to voice their opinions. FARM's model has also been able to achieve sustainability. More than 85 percent of FBO leaders interviewed reported that their FBOs will continue to function regardless of future project support, and 62 percent felt that the project provided sufficient training to support their organization.

The first FARM project delivered assistance to 666 FBOs spread across the project's service area.[5] As shown in Table 11, FARM II established 106 new FBOs in six of the new payams, yielding a net increase of 66 FBOs (40 FBOs assisted by FARM I were not verified to have received services under FARM II). These new FBOs participated in FARM II's hermetic bag and seed distributions, lead farmer and training programs, and demonstration plot activities during the year. Unfortunately, insecurity in Maridi and Mundri West Counties in Western Equatoria precluded the project from adding new FBOs in Amaki and Kozi. In addition, a significant drought in Losite Payam in Ikotos County in Eastern Equatoria limited activity in this area during the contract period.

Table 11: Status of New Project Payams in Each State

State and County	Payam	Number of New FBOs	Number Receiving Hermetic Bags	Number Receiving Seeds/ Cuttings	Number Participating in Lead Farmer Program	Number Participated in Trainings	Number Receiving Demo Plots
Eastern Equatoria							
Torit	Kudo	13		11	9	4	
Magwi	Lobone	21	1	7	7	20	1
Ikotos	Losite	0					
Central Equatoria							
Yei	Tore	19		0	12	15	1
Morobo	Panyume	23		1	15	20	1
Kajo-Keji	Ngepo	14			13	13	1
Western Equatoria							
Yambio	Gangura	16	2		10	11	
Mundri	Amaki	0					
Maridi	Kozi	0					
Total		**106**	**3**	**19**	**66**	**83**	**4**

[5] This total includes 11 block farms.

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"Our traditional ways of planting used to be like having so many children struggling for the same plate of food. There is always no chance for healthy growth. Now is different, our crops looked more healthy."

—Emmanuel Dravule, Tandeba Cooperative Society

Above, FARM II extension workers in Torit examine fields planted using good agronomic practices—with seeds planted in a line, one seed per hole. Farmers across the Greenbelt are now using the improved practices and technologies advocated by FARM II, and there is evidence that they are sharing what they've learned with their neighbors. A new farming culture seems to be taking hold in the region.

Photo: Redento Tombe

6. Component 3: Capacity Building

Photo: Abt Associates

"Last year, we visited farmers in Magwi and what I saw there amazed me; the large fields, the level of organization and people's lives. I returned and immediately wanted to replicate the same."

Rose Lino, Farmer, Amuno-hutok FBO, Eastern Equatoria

Human and institutional capacity in all public and private sectors, including agriculture, remain quite weak in South Sudan. The country has remained in crisis since December 2013, limiting capacity building advances over the past two and one-half years. Few development programs remain; most donor resources are now concentrated on relief and humanitarian assistance. Virtually all of FARM II's public sector work focused on county-, payam-, and boma-level government bodies, and the project maintained positive and productive relationships with these public institutions throughout the contract period. The government efforts to transition from 10 states to 28 states did not significantly affect operations except during the final months as field programs were closed. At that point, the changes did cause some disruptions in disposing of project property.

The general environment in South Sudan during the past year was not conducive to achieving high-level capacity building gains, but FARM II continued to foster significant capacity improvements through a bottom-up community focus. The project's training in GAPs and business management helped build the skills of a critical mass of rural farmers, with an expectation that some of them will rise up to assume leadership roles in the sector. In-kind grants and training supported local government counterparts, and FARM II continued the previous project's activities to strengthen local institutions—such as FBOs, cooperative societies, and cooperative unions—that have business and civic functions within their communities. These institutions play a vital role by helping farmers work together to benefit themselves and their communities. The project also made advances strengthening other civic institutions and commercial organizations that support the sector in areas such as business development services, agro-dealer input supplies, seed multiplication, and financial services. Both grants and training helped stimulate entrepreneurialism in the agricultural sector.

6.1 IMPROVED HUMAN CAPACITY

6.1.1 Trained Farmers and Farmer Groups

Helping farmers increase their productivity and develop their livelihoods has been a core function of the FARM program since its inception. The impact of these efforts on smallholders' farming practices is illustrated by the results of the independent end-of-project survey commissioned by FARM II. Almost 94 percent of farmers surveyed said that they now see the benefits of the new farming practices introduced by the project, and almost 85 percent reported that the new practices have given them a better-quality harvest. In all, almost 87 percent agreed or strongly agreed that they have increased their farm size since they began working with the project. FARM also improved smallholders' livelihoods, as shown by the more than 74 percent of survey respondents who said the project helped them increase their revenue. The project influenced

capital investment as well: more than 74 percent of farmers surveyed stated that they reinvested their profits into growing their farming businesses. As expected, GAP training was the most popular among farmers (chosen by 74 percent of those surveyed) followed by collective marketing (23.6 percent), and post-harvest handling.

FARM II's outreach training program was expansive. Over the short, one-year contract period the project trained 5,839 discrete individuals to support production and marketing component activities.[6] Almost 41 percent of those trained were women, illustrating the impact that the project had on this vulnerable group. Training programs were carefully and successfully tailored to meet the needs of beneficiaries. As the farmer survey indicates, 31.3 percent of beneficiaries are uneducated and an additional 43 .5 percent have only limited primary school education. In this context, FARM II designed training programs that used hands-on learning or picture-based training materials. The project also relied on training 772 lead farmers who then transferred their skills and knowledge back to other members of their FBOs and communities. Table 12 below highlights the different topics of FARM II training and the total number of participants in each.

Table 12: FARM II Training Participants by Topic

Training Program and Topic	No. of Participants*
Market Development and Organizational Strengthening	
Collective marketing, farming as a business, and financial literacy	1,763
Cooperative formation	552
Farmer-trader forums	204
Business development services	126
Farmer-financial institution forums	70
Policy dialogues	52
Farmer-input dealer forums	36
Exchange visits	35
Trade fair	25
Agriculture Productivity	
Post-harvest handling	2,199
Farmer field days/demonstration plots	1,295
Good agronomic practices (GAPs)	877

[6] The total number of separate individuals trained does not equal the total numbers of participants in various training programs, because many individuals attended more than one type of training.

Photo: Redento Tombe

"In Morobo, our farmers do not work on unified farms as here. So, on return, I think at the start of the rainy season, we will have to organize our farmers to start working together."

Mawa Milton, Chair of Morobo Cooperative Union during a January 2016 exchange visit to Kajo-Keji Cooperative Union. Union members said this was best learning they could ever get.

FARM II conducted training in all nine counties in the project's service area, while also including some NAFA representatives from Nzara County in Western Equatoria. Although training was curtailed in Western Equatoria due to the conflict, 26 percent of training participants were from this state. The counties with the largest proportion of FARM II farmer trainees were Kajo-Keji and Morobo in Central Equatoria, Magwi in Eastern Equatoria, and Yambio in Western Equatoria. Table 13 on the following page shows the number of participants from each location.

6.1.2 Trained Lead Farmers

One of the keys to FARM II's strategy for scaling up extension services delivery was to identify and train lead farmers to serve as community-based extension agents. These lead farmers, who were members of project-supported FBOs and cooperatives or local government staff, expanded FARM II's extension service outreach by delivering key agriculture messages and disseminating new technologies at the local level. This approach delivered a range of benefits: it expanded the project's outreach capability, ensured transfer of technology and information, and enabled services to be delivered more rapidly. It also fostered sustainability—even though FARM II has ended, FBOs, cooperatives, and county departments themselves can continue to provide advice and assistance to local farmers. During the one-year implementation period, FARM II prepared 772 lead farmers, of whom 153 (19.8 percent) were women.

FARM II's selection criteria for lead farmers included 1) an ability to communicate, 2) a clear understanding of project-promoted technologies, and 3) access to transportation to reach neighboring farmers. FBOs and cooperative societies, along with government extension staff, helped select them. Members of each organization sat down with a FARM II extension agent to review possible candidates,

look at the selection criteria, and name lead farmers. One lesson learned was that there should be at least two lead farmers in each FBO so that if one is ill or away from home, the organization still has someone available to serve its members.

6.2 STRENGTHENED INSTITUTIONAL CAPACITY OF PRIVATE SECTOR

With a history of neglect and war, South Sudan has very few private institutions to support the country's growth and development. International organizations and donor programs have filled the void for many years, limiting the country's ability to develop an independent, self-reliant, and sustainable agricultural sector. The private sector, however, is essential for developing a civil society and building resilient communities in South Sudan. With farmers in the Greenbelt producing surpluses and engaging in the local economies that are now forming in the region, FARM II prioritized resources to help develop private institutions. The project's private enterprise development activities focused on collective producer organizations: cooperative unions, cooperative societies, and farming associations. FARM II also supported the development of several input organizations important for grain value chains. These included agro-input supply companies; financial institutions; and several small entrepreneurial groups interested in providing input services such as plowing and land preparation services, value-addition processing (e.g., flour milling), and credit services. The project also provided assistance to two professional services organizations (Enterprise Inc. and UNESCO Club) that offer business development and analytical services to the agricultural sector.

Table 13: Training Participants by Location

State and County	Number of Participants	Percent of Total
Eastern Equatoria		
Ikwoto	269	4%
Magwi	796	14%
Torit	277	5%
Subtotal	**1,342**	**24%**
Central Equatoria		
Kajo-Keji	1,496	26%
Morobo	1,023	17%
Yei	452	8%
Subtotal	**2,971**	**52%**
Western Equatoria		
Maridi	415	7%
Mundri West	162	3%
Nzara	20	0%
Yambio	929	16%
Subtotal	**1,526**	**26%**
Total	**5,839**	**100%**

*These numbers represent distinct individuals who received training, and not the aggregate number of attendees at all training programs, because some individuals attended more than one training.

6.2.1 Improved Business Development Service Provision

Development of a functioning agricultural economy requires effective business development services (BDS) providers. To date in South Sudan, these services have been primarily delivered by international donors and NGOs. To help move beyond this dependence on international support, FARM II used a competitive selection process to award a $49,740 grant to Enterprise, Inc., a private South Sudanese professional services organization. Enterprise's mission is to help local small enterprises and start-ups in all industry sectors become viable and profit-making companies, thus creating jobs for the citizens of South Sudan. The purpose of the grant was twofold: 1) develop Enterprise's capacity to provide sustainable business development services in South Sudan's private sector; and 2) strengthen project-supported cooperative unions, cooperative societies, and farmer associations.

The grant covered the cost of having Enterprise deliver business management and governance training to these organizations. Enterprise trained 128 individuals from four cooperative unions, 40 cooperative societies, and two farming associates in all three states. The participants had little formal experience with or knowledge of governance and enterprise development. Now, as their involvement with farmers

has grown, they have expressed an appreciation for the knowledge and skills they learned at these trainings and a desire for further support in this area.

Enterprise training. There were five three-day enterprise trainings for local groups in Magwi, Pageri, Kajo-Keji, and Yei in December 2015 and in Yambio in February 2016 (after it stabilized following conflicts in December and January). The trainings focused on building participants' entrepreneurial skills in areas such as business formation, understanding business costs, sales and marketing, financial management, planning and budgeting, and the importance of savings and investment.

Governance training. In February, Enterprise delivered five three-day governance trainings to the same organizations in the same locations. This training focused on business governance, targeting such subjects as democratic principles, business process controls, human resource management, leadership, and performance management. Recommendations from the project's OCAs were used to enrich the content of both training modules.

6.2.2 Bolstered Cooperative Unions

The cooperative movement is novel in South Sudan. This approach introduces new ways for communities to work together for individual benefit and the common good. The unions and farmer organizations are organized to achieve their members' business objectives, and their decision-making practices offer alternatives to local traditions.

As intermediary organizations that currently support more than 8,500 farmers, cooperative unions are very important to the future development of agricultural value chains in the Greenbelt. The unions are relatively new and their leadership is inexperienced in areas such as association management and business. FARM II delivered significant support to cooperative unions during the contract period through the following activities:

- Provided skilled Cooperative Union Liaisons to six of these organizations. The liaisons supplied hands-on management support and technical assistance.
- Distributed seeds and hermetic bags to farmers through the unions, to give the unions experience serving as agro-input suppliers for their farmer-members.
- Awarded more than $98.565 worth of in-kind commodity grants to give the unions the resources to provide their members with land preparation, transportation, and on-farm processing services.
- Introduced business linkages with two South Sudanese agro-input companies. Three unions have already formed partnerships with these companies, establishing input supply shops for their members and communities.
- Linked the unions to WFP-P4P program, generating grain sales opportunities.
- Connected the unions with two financial institutions that can provide working capital credit, speeding up the transaction time between unions and farmer groups.
- Organized several exchange visits, enabling union leaders to learn from strong unions within each state. Topics discussed during these exchange visits included the importance of group work, business conduct and management, human resources and membership involvement, member outreach, post-harvest handling and warehouse management, and collective marketing.

FARM II contracted a South Sudanese professional services company, the UNESCO Club, to conduct OCAs for five cooperative unions and two farmer associations, using a USAID-developed OCA tool. The purposes of the assessments were threefold: 1) better understand the competency levels and

Photo: Redento Tombe

"Allowing the cooperative unions to distribute the seeds has helped build trust among local farmers, the local cooperative societies, and the unions."

Redento Tombe,
FARM II Community Outreach Director

Above: Farmers, payam agriculture officers, and cooperative union members in Pageri verify groundnut seeds being loaded from the Baalu cooperative union warehouse, ready for distribution to farmers.

strengthening needs of each organization; 2) develop an intervention plan to strengthen each organization; and 3) establish baseline data to measure future progress, including in such areas as involvement of youth and women. The OCAs were carried out through a facilitated self-assessment process at each cooperative union and farmer association. They took place in Magwi, Pageri, Yei, Morobo, Kajo-Keji, and Yambio from November 2015 through February 2016. A total of 31 men and 12 women, all board members and management representatives of the organizations, participated in the self-assessment. The OCAs followed a four-step methodology that facilitated 1) discussions of seven key capacity areas, 2) participant scoring of current organizational status within each criteria, 3) participant identification of the stage the leaders want their organization to reach in the next 12 months, and 4) creation of development plans that identify priority areas for improvement. At the end of the facilitated assessments, each organization developed an action plan for strengthening its organizational and management weaknesses.

Table 14 summarizes the results of the seven OCAs. Scores from 1 to 1.99 represent basic skills, 2 to 2.99 characterize moderate capacity, and a score of 3 or above indicates strong capacity. The scores show that the organizations each face unique challenges and have varying strengths and weaknesses. While several have some structure and management systems in place, others continue to be operated in an informal manner. Overall, the cooperative unions and farmer associations are more advanced in governance and organizational management but quite weak in other areas, including human resources, financial management, and performance management.

Table 14: Summary of OCA Results for Cooperative Unions and Farmer Associations

Topic	Eastern Equatoria		Central Equatoria			Western Equatoria		Average
	Magwi	Baalu	Yei	Morobo	Kajo-Keji	YAFA	NAFA	
Governance	1.60	2.03	2.33	2.55	3.00	2.05	2.08	**2.23**
Administration	1.33	1.74	2.10	2.30	2.74	1.23	1.67	**1.87**
Human resources	1.00	1.38	1.50	1.94	2.00	1.32	1.06	**1.46**
Financial management	1.00	1.38	1.35	1.90	2.38	1.83	1.55	**1.63**
Organizational management	1.16	1.45	2.72	2.44	2.75	1.73	1.90	**2.02**
Program management	1.12	1.49	1.86	2.54	2.72	2.63	1.15	**1.93**
Performance management	1.00	1.28	2.24	2.30	2.46	1.78	1.90	**1.85**
Average	**1.17**	**1.54**	**2.01**	**2.28**	**2.58**	**1.80**	**1.62**	**1.86**

The FARM II OCA activity also looked at the involvement of women and youth in the Greenbelt's cooperative movement. Both of these targeted groups have special needs related to their roles and opportunities in South Sudan's nascent agricultural sector. Table 15 illustrates women's involvement in the management and operations of the seven cooperative groups that conducted an OCA during the contract period.

Table 15: Women's Involvement in Management of Cooperative Unions and Farmer Associations

	Eastern Equatoria		Central Equatoria			Western Equatoria		Average Percent
	Magwi	Baalu	Yei	Morobo	Kajo-Keji	YAFA	NAFA	
Women's involvement	30%	40%	30%	30%	38%	30%	40%	34%

The OCAs showed that in at least three cooperative unions (Magwi, Yei, and Morobo), the majority of members are women. While 30 to 40 percent of management and operations staff of these cooperatives in comprised of women, women tend to yield to men for leadership and decision-making. A range of barriers—including illiteracy, limited leadership experience, and cultural norms—inhibit women from taking more active leadership roles in the cooperative unions. Targeted adult literacy and numeracy training for women, in addition to leadership training, are recommended for future cooperative union programs.

6.2.3 Stimulated Entrepreneurism

As commercial agriculture is a relatively new and growing sector in South Sudan, many needs and opportunities are arising for entrepreneurs in the Greenbelt. So far, however, very few individuals in the region have the entrepreneurial skills and experience to seize these new opportunities. To spark entrepreneurial activity and build entrepreneurial capacity in South Sudan's agricultural sector, FARM II developed a program of competitive grants coupled with technical assistance and training. This grants program was designed to pilot innovative and growing business ideas, introduce value-addition technologies, and respond to market opportunities in the Equatorias. The project envisioned possible awards in areas such as land preparation, input services, post-harvest storage, commodity or food processing, transportation and logistics, commodity trading, and credit access.

As discussed in section 7.1.6, the grants selection process revealed a lack of entrepreneurial experience and skills in the region. The project was able to make three awards to local groups in Eastern Equatoria, which received a total of 42 oxen and 17 plows to expand land preparation and plowing services. Another three grants covered the cost of grinding mill equipment for maize and cassava flour in Central and Eastern Equatoria. The seventh supported a poultry venture in Juba County that plans to introduce a new breed of chicken. Project staff introduced this poultry entrepreneur to beneficiary farmers, because poultry feed creates a potential market for smallholders. FARM II directed its BDS provider, Enterprise Inc., to deliver training on business management and planning to all these grant recipients.

Photo: Paul Mailhot, Management Systems International

FARM II staff members Redento Tombe and Alex Rivera sit in Juba's Eye Radio studio with presenter Rosemary Joseph to publicize the project's entrepreneurship grants.

6.2.4 Established Public-Private Partnerships

FARM II's comprehensive approach to capacity building also emphasized the creation of PPPs. To foster these relationships, the project provided grants, training, technical assistance, and business linkage support to private organizations in strategic segments of the grain value chains, which are essential if the agricultural sector is to grow. FARM II established strategic PPPs with four private sector organizations.

6.2.4.1 Seed Multiplication

The development of in-country seed production capacity has become increasingly urgent, especially given the recent significant drop in the value of the South Sudanese Pound. To foster private sector seed multiplication capacity in South Sudan, FARM II awarded a $45,158 PPP grant to Seed Grow Ltd., a local agro-dealer. Seed Grow contributed $53,240 as cost-share. The company was selected over eight other applicants through open competition. Incorporated in 2012, Seed Grow specializes in providing agricultural inputs and services that improve rural communities in South Sudan. The company aspires to become a research, training, and seed breeding agribusiness.

The purposes of this grant were to 1) create linkages between a seed multiplication company and a pilot group of smallholder farmers in South Sudan; and 2) provide technical assistance, seed processing equipment, and other resources needed to make a seed multiplication operation work. The first FARM project had provided seed multiplication support to Century Seed in Central Equatoria, FARM II chose Magwi County in Eastern Equatoria as the site for this pilot. FARM II and Seed Grow selected 19 beneficiary farmers from Magwi Cooperative Union and nine farmers from Baalu Cooperative Union to participate in the pilot as outgrowers. A local researcher at Palo Taka Basic Seeds Center trained 23 of the farmers on the basic principles of seed multiplication. Seed Grow developed three training manuals and a comprehensive curriculum for the training. FARM II staff worked closely with Seed Grow on every aspect of this activity, which was an exemplar of a learning-by-doing approach to capacity building.

The program's outcomes were quite positive considering the grant's short implementation period. Seed Grow signed agreements with the Magwi and Baalu Cooperative Unions to establish agro-dealer input shops to sell seeds and other agricultural inputs for their members. FARM II also connected Seed Grow with EABL to support a pilot outgrower scheme with local farming groups. The company's seed multiplication operations are proceeding as planned. Seed Grow plans to continue to grow its seed multiplication business through linkages with farmer groups and expand agro-input dealer shops to other strategic locations in South Sudan.

6.2.4.2 Access to Credit

FARM II established MOUs with Finance South Sudan Ltd. and the Cooperative Bank of South Sudan. These two PPPs helped the companies develop and market financial products that make credit more accessible to smallholder farmers in South Sudan through intermediary farming organizations. As explained in Section 4.5, working capital loans from both institutions will be backed by sales contracts with reputable buyers such as the WFP and guaranteed in amounts up to 150,000 SSP through the Dutch-funded SPARKS project. As of the end of the project, YAFA and NAFA were already using these credit instruments to pay smallholder farmers more quickly after purchasing produce from them.

6.2.4.3 Business Linkages

The project established an MOU with East African Breweries to create a PPP for a pilot outgrower scheme with 50 farmers in Eastern Equatoria who will supply white sorghum for the company's breweries in Uganda and Kenya. FARM II integrated Seed Grow into this partnership, since that company will also be working with outgrowers to multiply white sorghum seed as an input into the overall production system for EABL's promising export business model.

6.3 INCREASED CAPACITY OF PUBLIC SECTOR AND ADVOCACY ORGANIZATIONS

While the political environment remained disrupted at the national level, and the possible reconfiguration of states caused uncertainty at the local level, FARM II continued to make gains by working closely with local government counterparts at the county and payam levels.

6.3.1 Supported Public Sector Extension Services

FARM II signed programming agreements with 35 of the 36 payams in the service area and developed the human capacity of public extension agents by incorporating them into the project's lead farmer training activities. In addition, FARM II conducted a needs assessment of each of the nine County Agriculture Departments (CADs). A significant finding was that these offices faced major constraints that severely curtailed their effectiveness. For example, they lacked means for their extension workers to travel around their service areas to reach the farmers and they did not even have telephones to communicate within their offices. To address these challenges, FARM II awarded in-kind commodity grants to all nine CADs, totaling $52,455. These grants provided low-cost solutions and had an immediate impact on the departments' ability to deliver extension services to smallholder farmers.

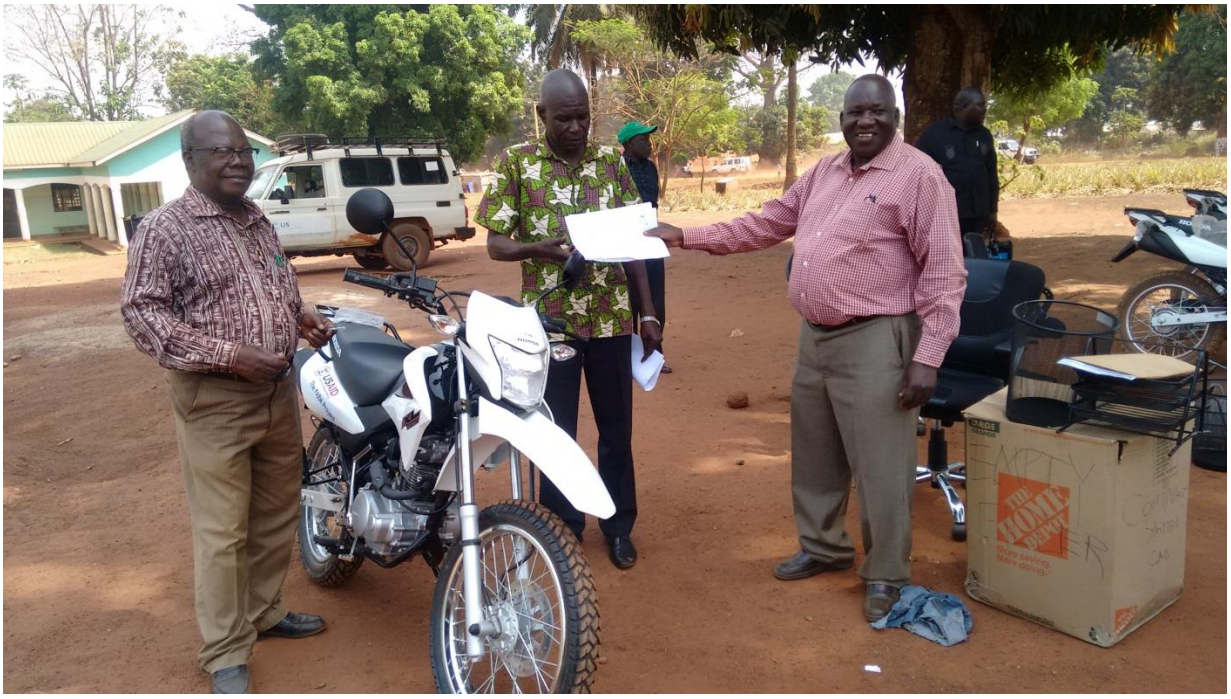


Photo: FARM II Project staff

Redento Tombe, FARM II's Community Outreach Expert, hands over a motorcycle and other materials to county government officials. The equipment was purchased through an in-kind commodity grant from the project.

6.3.2 Conducted Local Policy Dialogues

Before the current conflict erupted in December 2013, USAID and other donors invested considerable resources in helping South Sudan develop nationally approved policies. USAID, through the first FARM project, was instrumental in helping the Republic of South Sudan draft the Agriculture Sector Policy Framework (ASPF), an over-arching policy for improved management of the agricultural sector. In addition to the ASPF, the first FARM project worked with MAFTARFCRD on the development of 11

other agriculture-related policies. Although these policies are in various stages of the government approval process, little progress has been made in moving them forward since 2013.

The current security and political environment in South Sudan is not conducive to enacting and moving forward with national policies. At the national level, political issues between the government and opposition are far from being resolved. The FARM II project, along with most USAID-funded projects, was instructed by the mission not to work with the national government. Tensions between state and national government bodies also remain unresolved. During the contract period, two of the three state governors in the Equatorias were removed from office by the national government. And although the President signed a decree reorganizing the country into 28 states from the initial 10, there is significant uncertainty and contention as the country addresses the implementation of this change.

In this unsettled environment, implementing the policy dialogue requirement of the FARM II contract was not straightforward. USAID advised the project to engage by delivering trainings on practical themes that would best serve the long-term interests of the agricultural sector in the Equatorias. Project staff prepared a list of potential thematic areas. The mission chose the following four: 1) youth in agriculture, 2) land management and climate-smart agriculture, 3) standards and quality, and 4) the roles of the local public and private sectors in agricultural development.

FARM II delivered two-day trainings in Torit and Yei in January 2016. The plan was for a half-day to be devoted each of the four topics. However, the session on standards and quality had to be canceled immediately before the trainings as the trainer for this subject fell ill and was not available for the trip. As a result, each training covered only three topics. The 52 participants who attended the trainings included representatives from state and county governments, cooperative unions, cooperative societies, and several international NGOs. Due to significant conflict in Yambio, the training was not delivered in Western Equatoria. David Hughes, a former COP of the FARM project and a South Sudan agriculture expert, prepared and delivered presentations and led discussions on land management and climate-smart agriculture, and on the roles of the local public and private sectors in agricultural development. Paul Bell, who had conducted FARM II's Youth in Agriculture assessment earlier in the year, led the sessions on this topic.

Photo: Amule Timothy, Abt Associates

Policy dialogue training in Torit, January 2016

The policy dialogue trainings confirmed that project-assisted farmers who planted improved seed and adopted GAPs have achieved yield gains. The farmers' ability to form FBOs and cooperatives shows that social cohesion can be built within communities and farmers are willing to work together. It was also clear that progressive farmers developed with assistance from FARM I and FARM II have succeeded in transforming their livelihoods. As the project ended, local leaders understood that they need to continue the progress and momentum created by the two FARM projects over the past six years.

Additional sensitization is likely needed for climate-smart agriculture. While many farmers understand traditional land management practices in their local areas and this topic has been included in their GAP trainings, contemporary climate-smart terminology and concepts were new to many participants and will likely need reinforcement. For example, adoption of climate-smart agriculture will require improved water harvesting and conservation agriculture practices. These practices need to be linked with business training, gender training, and MIS access. In addition, fertilizer will need to be used to further increase productivity and intensify land use for land management purposes. To optimize agricultural productivity, value addition and storage need to be improved. Outstanding land tenure issues, which were outside FARM II's scope, must also be resolved by the national government.

The youth in agriculture training also unearthed some important findings. The group felt that future programs should consider providing more extensive training to increase youth engagement in the agricultural sector and improve their awareness and ability to identify value chain opportunities where they have a comparative advantage. One participant suggested creating youth support organizations that specifically address the needs and opportunities of youth in agriculture. There was also a proposal to pilot several youth-centered activities to learn about their effectiveness and potential to be scaled up. Still another suggestion was to start up agribusiness ventures that would create jobs for youth and capitalize on attributes such as their ability to communicate and be mobile.

6.3.3 Initiated Grain Market Organization and Advocacy

FARM II initiated a partnership with the EAGC, WFP, and the German Society for International Cooperation (GIZ) to jointly launch a one-day "Grain Sector Stakeholders Consultative Workshop" in Juba on February 11, 2016. The purpose of the workshop was to discuss how to strengthen market opportunities for grain producers in South Sudan. Thirty-four representatives of various segments of the industry participated in the workshop. Discussions focused on issues and challenges that negatively affect the competitiveness of the sector. Suggestions were made to address the four most significant areas of concern:

- Lack of access roads linking farmers to markets
- Lack of high-quality seeds of improved varieties
- Lack of fertilizer use
- Limited policy advocacy with local governments to address the need to increase farmer productivity through training and adopting GAPs

As a result of this workshop, participants formed a multi-stakeholder Competitiveness Committee, which is tasked with reviewing policy issues that constrain the sector's growth. The committee will also advocate for the sector and lobby local and central governments on behalf of farmers, farmer groups, and agribusinesses in South Sudan. The committee includes representatives from various segment of the grain value chain: farmers, cooperative unions, and cooperative societies; agro-input suppliers; grain traders; financial institutions; and processing companies.

Photo: Abt Associates

Participants in the Grain Sector Stakeholders Consultative Workshop in Juba, February 2016

"I want people to say that this is a woman of South Sudan!"

Margret Duku, a member of the Afoyi Hill Primary Cooperative in Eastern Equatoria, is proud of her success. "When the war came," Margret points out, "it brought poverty and hunger." After she and her neighbors returned to their farms in 2008, they decided to work collectively and formed the cooperative. It wasn't until they began receiving assistance from FARM, however, that they were able to make a bigger impact. FARM provided training and helped the cooperative purchase hermetic storage bags and hire a truck to transport members' crops to market. The project also sponsored Margret's attendance at a national agricultural show, where she won first prize. Today, she says "***Because of USAID's help, I have been able to raise my children. I have sent two of them to university in Kampala…I have wisdom for agricultural work and I am happy."***

Photo: DDC International for Abt Associates

7. Cross-Cutting Areas

Photo: Jessica Scranton for Abt Associates

"Our local variety used to grow tiny and not well-seeded. The Longe 5 has changed my farming and encouraged me to increase my cultivation."

Michael Kalisto, Chair, Mapuso Farmers Cooperative Society, Western Equatoria

Speaking of the Longe 5 maize variety his cooperative received thanks to a project grant.

7.1 GRANTS

FARM II expanded on the Innovative Grants Facility (IGF) developed under the first FARM project. Given FARM II's emphasis on a market-pull approach, the project's IGF was primarily designed to support entrepreneurship, business and value chain development, cooperative advancement, and public sector extension services. However, a substantial portion of grant funds was used to distribute seed for the 2015 planting season. The seeds were originally scheduled to be provided under FARM I, but waiver and approval delays prevented that from taking place as planned and the seed distribution was shifted to FARM II. Including these seed grants, the IGF awarded funds through six different grant-making programs.

7.1.1 Seed Grants

FARM II made grants to FBOs in all three Equatoria states to cover the cost of procuring improved seed and cassava stem (see Table 16). The grants covered the cost of the seed and stems, the bags they were packed in, and transportation to cooperative unions. The unions, in turn, distributed the seeds and stems to member FBOs, who passed them along to members. Ultimately, 8,983 farmers in the Greenbelt received planting material. As mentioned in section 5.1.1.1, FARM II distributed 294 MT of improved seed and 200 MT of locally sourced cassava stems. The security situation in Western Equatoria created difficulties and delays in disseminating cassava in that state and in tracking the stems after they were received by cooperative unions.

Table 16: Seed Distribution Grants

Grants	No. of FBOs	Total Amount
Seed		
Central Equatoria	134	$100,048
Eastern Equatoria	155	$199,901
Western Equatoria	65	$129,097
Sub-total	354	$429,045
Cassava Stems		
Central Equatoria	33	$41,400
Eastern Equatoria	42	$27,600
Western Equatoria	57	$69,000
Sub-total	132	$138,000
Total		**$567,045**

7.1.2 Cooperative Union Support Grants

FARM II issued in-kind grants to cooperative unions to cover costs in four key areas, as shown in Table 17. The grants provided the unions with inputs and equipment that they then passed along to their members (hermetic bags) or used to deliver services to their members (raksas, ox-plows, and processing equipment). This approach, more fully described in section 6.2.2, helped build the unions' capacity to function as service providers.

Table 17: In-kind Grants to Cooperative Unions

Items	Purpose	Cost*
40,000 hermetic storage bags	Reduce on-farm post-harvest losses and contamination by aflatoxin and other impurities	$110,390
11 raksas (motorized carts)	Transport members' grain to aggregation points; transport processing equipment to more accessible locations; rent to non-members to earn cash income	$33,880
34 oxen and 17 ox-plows	Prepare members' land for cultivation; rent to non-members to earn cash income	$31,535
Processing equipment (3 maize shellers, 3 sorghum threshers, 2 cassava chippers, 2 maize hullers, 3 groundnut paste millers)	Facilitate post-harvest processing to increase value-addition	$23,150
Total cost of all grants		**$198,955**

*All items were purchased in U.S. dollars to avoid problems associated with South Sudan's rapidly changing exchange rate.

7.1.3 Business Development Services Grants

A FARM II grant to a South Sudanese BDS provider covered the cost of training for cooperative unions, cooperative societies, and farmer associations. After receiving eight applications, in November 2015 the project initially awarded two grants: one to Enterprise Inc. for $24,140 and one to Rising Dawn Ltd. for $24,952. Unfortunately, Rising Dawn was unable to meet its commitments under the grant because it had over-leveraged its time and resources. Accordingly, FARM II consolidated all work into the agreement with Enterprise and increased its grant amount to $49,740. In conjunction with the grant, FARM II provided substantial capacity building assistance to Enterprise to help it become a strong BDS provider for South Sudanese businesses.

7.1.4 Seed Multiplication Grant

FARM II provided a $45,158 grant to a local company, Seed Grow, to help fund a seed multiplication pilot program in Eastern Equatoria. Seed Grow contributed another $53,240. The project grant covered the costs of seed multiplication training and field days; renovation of a warehouse to store the seed; a processing plant to clean, grade, and sort the seed; a portion of foundation seed (groundnuts, sorghum, and maize); a machine to stitch bags to hold the seed; and agricultural tools and materials. To increase demand and help farmers understand the value of paying for higher-quality seed, the grant also paid for radio spots promoting the use of improved seed.

7.1.5 Public Extension Support

FARM II awarded in-kind grants totaling $52,455 to County Agriculture Departments in all nine project-supported counties. Because a FARM II assessment had identified mobility and technology as the major constraints facing the CADs, the grants paid for transportation and communication supplies. In addition to providing each CAD with motorcycles, the grants also funded 40 bicycles to enable extension agents to reach their constituents. Other equipment included six printers/copiers, 60 field equipment items (e.g., gum boots, raincoats, measuring tapes), two cameras, and basic office furniture.

7.1.6 Entrepreneurship Grants

FARM II initiated this grants program by tendering an open competition and inviting proposals from South Sudanese individuals, companies, and common-interest groups that had legal standing, creative business ideas, and a commitment to entrepreneurialism. Project staff aggressively sought proposals and publicized the grant opportunity widely through newspapers and radio spots. Although 119 responses were received, most were rejected due to unclear budgets or inadequate presentation of activities. Of

the 37 applications that made the first selection cut, 16 finalists were identified for further review. The FARM II selection committee chose seven applicants to receive in-kind grants (see Table 18). The project made three awards to expand plowing services in Eastern Equatoria and three to fund grinding mill equipment for maize and cassava flour in Central Equatoria and Eastern Equatoria. The seventh supported a poultry venture in Juba County. FARM II specialists and Enterprise Inc. provided business planning support and technical assistance to all these ventures.

Table 18: FARM II Entrepreneurship Grants

Grantee	Location	Purpose	Amount
Nigoge	Katire, Eastern Equatoria	Oxen	$5,040
Adak Woo	Goloba, Eastern Equatoria	Grinding mill	$2,810
Child Initiative Support	Pageri, Eastern Equatoria	Oxen	$5,040
Gabriel Balasio	Kudo, Eastern Equatoria	Grinding mill	$2.810
Sunat	Lofus, Eastern Equatoria	Oxen	$5,040
Global Agro Ventures	Juba, Central Equatoria	Poultry venture	$10,000
Kinyiba Maradadi	Kinyiba, Central Equatoria	Grinding mill	$2,810

These grants proved to be the most challenging of FARM II's six grant initiatives. The project's experience showed that overall, entrepreneurialism remains weak in South Sudan. Very few grant applications were prepared in a business-like manner and most were not innovative. Many applicants, for example, simply requested direct support to plow their fields rather than requesting assistance to create a business that would provide this service to their communities.

One key lesson learned is that local capacity to respond to requests for proposals is very limited in South Sudan. It would have been useful to host workshops to help applicants prepare responses, but the project's abbreviated implementation schedule did not allow for this level of support. FARM II recommends significant BDS and training support for future agriculture programming in the region, including assistance with proposal writing and business planning.

7.2 GENDER

> ***"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 Idoru, Anika Youth FBO, Kendila Payam, Morobo County

Agriculture is a particularly empowering opportunity for women in the Greenbelt, who have more special needs than their male counterparts. Women are more than twice as likely to be illiterate and less likely to have decision-making authority in their households or communities. Approximately one-half of women are married by age 18[7] and the average woman will give birth to five children during her lifetime.[8] Women who are less educated and less active in their communities are less likely to know their individual rights and more likely be subjected to domestic abuse.[9] The typical responsibilities of women include farming, water and firewood collection, cooking, cleaning, childcare, and brewing beer. Women play a

[7] Global Databases, Update May 2016, www.data.unicef.org

[8] WomenforWomen International, Country Profile, South Sudan

[9] WomenforWomen International, Country Profile, South Sudan

very active role in farming, typically doing much of the tedious work, such as weeding, and manually processing harvests, such as decobbing corn or shelling groundnuts. The challenge for projects such as FARM II is to not only include women in program activities, but to target activities that will address their special needs and help transform their status in local society.

Increasing their farming productivity is a transformative experience for many women in South Sudan. Learning fundamental skills such as seed selection and basic agronomic practices greatly empowers women by giving them the opportunity to have autonomy over resources and to make economic decisions that serve their best interests and those of their families. For many women, this is a first-time experience. Once acquired, these skills can be passed on to a woman's children, both sons and daughters, for the benefit of future generations. They can provide a starting point to improve her family's condition, one step at a time.

FARM II's yield assessment showed that women in the Greenbelt can be very productive farmers, with yields that well exceed the African Continent's average, as shown in Table 19. In fact, for two of the four crops included in the end-of-project yield assessment, women proved to be more productive than men.

Table 19: Comparison of Female vs Male Productivity (kg/ha) in FARM II Yield Assessment Survey

Location/Country	Maize	Groundnuts	Beans	Cassava
Male beneficiary	4,170	2,683	3,602	42,645
Female beneficiary	4,481	2,118	1,893	42,287
Male control	3,540	1,819	1,669	35,230
Female control	3,491	1,808	2,168	46,847
African continent *	2,098	961	816	8,379

FARM II's farmer survey showed that 22 percent of farming households supported by the project are female-led and 80 percent of farming households in the Greenbelt have active spousal involvement. Of FARM II's verified 14,155 farmer beneficiaries, 5,740 were women—40.5 percent. The project delivered training directly to 2,388 women during the contract period, which represented 40.9 percent of the total number trained. Women also made up 41 percent of all farmers receiving improved seed over the past year, with 3,693 female farmers gaining access to this new technology.

Once women become economically empowered by the surpluses they produce as a result of increased productivity, they need to learn how to use their new-found resources to optimize benefits. For many women in South Sudan, this too is a transformative experience—one that many of them have not had before. Due to the high levels of illiteracy in South Sudan and women's lack of decision-making experience because of cultural norms, women have generally not been involved economic decision-making, particularly outside their households. This means that skill-building and business experience are vitally important at this stage of women's development in the Greenbelt. FARM II trained large numbers of women in production: 46.8 percent of participants in GAP training were women, as were 40.2 percent of participants in post-harvest handling training, and 40.2 percent of participants in farmer field days. The project also introduced business skills to many women in the region through training on cooperative formation (41.8 percent female); collective marketing, FaaB, and financial literacy (39.5 percent female); agricultural input supply (25 percent female); farmer-financial linkages (25.7 percent female); and farmer-trader forums (25 percent female).

FARM II helped women become increasingly involved in their communities. While leadership and decision-making still predominantly reside with men in the Greenbelt, women are engaged in community affairs and they are gaining management and governance experience. A total of 12 female cooperative leaders (28 percent) participated in the seven OCAs conducted by FARM II over the past year, suggesting that women are actively involved in the management and operations of these important intermediary organizations. Overall, 1,957 women were members of the five cooperative unions (42 percent of total membership) and 932 women were members of the two farming associations (23 percent) included in the assessment. Interestingly, more than 13 percent of respondents in FARM II's FBO assessment were women. Since those interviewed for this assessment were all organizational leaders, it is clear that some women are engaged in important roles with their community organizations.

Another area where women actively participated was the project's lead farmer program. FARM II worked with local FBOs and cooperatives to identify strong candidates to participate in this program. With their help, FARM II identified and trained 153 female farmers—19.8 percent of the total. These female lead farmers are now serving as role models for other women in their communities. They are equipped to provide production and marketing assistance, combining their technical skills with an understanding of women's special needs.

7.3 YOUTH

Similar to women, youth form an important impact group that is very important to present-day and future South Sudan. They have special needs and opportunities that require particular types of development support. While gender considerations formed a cross-cutting program element during FARM I, youth were not included as a targeted population. At the suggestion of FARM I staff during that project's last year, youth programming was included in the scope of work for FARM II. Due to the project's ambitious delivery schedule and short performance period, staff determined that FARM II's best contribution would be an assessment of youth in agriculture that could inform future agricultural programming in the Greenbelt.

Photo: Jessica Scranton for Abt Associates

A young female farmer in Yambio exemplified the type of dynamic youth that the South Sudanese agricultural sector needs to thrive.

Making Cents International, one of FARM II's subcontractors, conducted the youth in agriculture assessment in all three Equatorias. The goal was to understand the current participation of youth in the Greenbelt's agricultural value chains. Given that agriculture is the main source of jobs and livelihoods in the region, absorbing youth into the burgeoning agricultural sector is critically important for the development of a peaceful and prosperous society in South Sudan. As with women, increasing young farmers' productivity and engaging them in marketing and community organizations are key to improving their economic standing.

An interesting finding is that young people see themselves as failures if they stay in agriculture, but also see themselves as immobile, undereducated, and fit for nothing else. This finding is significant as it may be the cause of youth being disengaged from farming and moving to urban areas as soon as possible. The

assessment also found that youth are still tied to their families and that much of their urban incomes are used to purchase commodities for their families. They take their money home and still participate in farming during busy seasons such as planting and harvesting.

The assessment made several recommendations for future youth programming in agriculture in the Greenbelt. The first is that future projects should consider working with youth-only groups with both male and female members. Both FARM I and FARM II worked with a number of youth-specific groups in the project's FBO network, but did not give these groups specialized attention. Future programming could increase the number of these groups and provide them with more specialized interventions that target their youth-specific needs, such as life, financial literacy, and agriculture vocational skills. The second is that, because young people tend to be more mobile and invested in communications, future programs should consider including a communications campaign to provide positive messages about agriculture to young people, using radio and SMS. Introducing youth to higher-value agricultural markets, such as food processing and flour milling, would likely appeal to them, as would operating in such areas as animal husbandry or horticulture. The limited amount of land under cultivation in the Greenbelt is a significant barrier to youth's engagement in agriculture, because of the difficulty and expense of land clearing. Assistance with land preparation and plowing is likely to encourage and increase youth involvement in agricultural production. The assessment also recommended seeking ways to involve youth as key linkages between different elements in the value chain. They could, for example, collect and disseminate price information, aggregate smallholder produce for traders, and distribute seed to communities for seed companies. The project also addressed the topic of youth in agriculture through the policy dialogue training (see section 6.3.2).

Text Box 8: Key Findings from the FARM II Youth in Agriculture Assessment

- The FARM program maintained a youth-neutral approach, neither promoting nor blocking youth participation in project activities.
- Most youth experience is limited to subsistence agriculture. Therefore making a break with previous generations and moving from subsistence farming to farming as a business is a big step.
- Many youth are aware that they lack not only the requisite technical skills but also the basic life skills to successfully realize this change.
- Youth are more likely to engage in agriculture if the hardest tasks (land clearing and field preparation) are less labor-intensive.
- Seed multiplication represents an agricultural value chain opportunity that might be of interest to youth who have an interest in trade and in opportunities to link their villages with towns or cities.
- Youth expressed interest in other agricultural activities such as animal husbandry (especially goats and chickens), aquaculture, and vegetable production.
- Young people want to work in youth-only FBOs whose members are both male and female. They generally find it easier to trust a group rather than individual partners.
- Many youth will require foundational life skills and will need training in areas such as basic numeracy before they can move on to technical, entrepreneurship, and business skills training that combines classroom work with practical skills.
- Traders have indicated a willingness to work with youth groups that source produce or transport it to intermediary markets.

7.4 DO NO HARM

FARM II originally planned a series of trips and trainings, beginning in the first month of operations, to support a "Do No Harm" approach to agricultural development. After discussions with the mission, these plans were reduced to a week-long Do No Harm training program, which was conducted by Bauman Global LLC in Juba from September 21 to 25, 2015. Nineteen senior project staff from the Juba office and the three state program offices participated in the training, which was designed to develop a cadre of trainers who could later train many others at the state, county, and payam levels on the Do No Harm framework.

The main purpose of the Do No Harm training was to help project staff better understand the operational context of their work and recognize the impact this work had on the local contexts where they worked. The overall goal was to help them reduce any negative impact and increase the positive impact of their work in their communities, while also identifying and reducing the risks of conflict. The participants learned the seven Do Know Harm steps: 1) understand the context, 2) analyze the dividers that may cause conflict, 3) analyze the connectors that may reduce conflict, 4) analyze the intervention, 5) analyze the impact, 6) generate options, and 7) test options and redesign the work.

The training was successful, creating a pool of well-trained staff who could apply Do No Harm principles to everyday project work. They then trained state and county staff on this important subject matter.

7.5 CLIMATE-SMART AGRICULTURE, ENVIRONMENTAL COMPLIANCE, AND RESILIENCE

Climate-smart agriculture. FARM II intrinsically applied climate-smart agriculture through the project's agricultural productivity and market development programs, which helped farmers move toward a more intensive and sustainable agricultural 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 the use of 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.

While many farmers are practicing climate-smart agriculture, few understand the importance of climate-smart agriculture or the terminology behind it. For this reason, additional training to reinforce these concepts should be delivered to policy-makers and key practitioners. The Greenbelt is ripe for climate-smart advances in areas such as improved water harvesting, fertilizer use, better storage, more value addition processing, and land tenure legislation.

Environmental compliance. The project's main environmental concern was related to the distribution of a large volume of certified seed to a large number of farmers in the Greenbelt region. These seeds had been treated with Imidacloprid, Clothianidin, or Thiomethoxam (insecticides) and Thiram or Metalaxyl (fungicides), all of which had been approved by USAID. One significant concern was disposal of seed bags. Extension staff trained the FBOs to consolidate and store smaller bags inside bigger bags and encouraged them to transport the consolidated bags to the closest community health clinic for incineration. If this was not possible, the FBOs were instructed to bury the consolidated bags at least 1.5 meters under the earth on high ground, not less than 500 meters from running water.

Resilience. As discussed in the beginning of this report, given the context in South Sudan, FARM II was more than an agriculture or food security project. It was also a resiliency project that helped the rural poor increase their productivity and market their surpluses to strengthen their communities'

preparedness for potential shocks and improve their ability to withstand and overcome adversity. Over the past year, more Greenbelt farmers have increased their productive capacity, advanced their marketing acumen, and strengthened their local collective farming organizations. Targeted groups such as women and youth are increasingly becoming more integrated into local farming systems. In short, FARM II's impact on many Greenbelt communities was very significant over the past year, as these communities overcame a collapsing economy and severely weakened currency to continue making development gains for a brighter future.

Text Box 9: FARM II Interventions in the Millet, Rice, and Sesame Value Chains

Millet, rice, and sesame were introduced by FARM I in 2013 as replacements for sorghum because there was little farmer demand for the available sorghum varieties. These crops are considered to be of higher value and have more commercial market potential than sorghum. FARM II has treated millet, rice, and sesame as niche, or secondary, agriculture value chains as they primarily serve as higher-value cash crops rather than food security crops relative to the current context of South Sudan. The project distributed the following:

- 10,000 kg of Nerica 10 rice seed to serve as a resiliency crop for the wetter areas of Central and Western Equatoria. Nerica 10 is a good bird prevention variety because of its awn. It is also self-pollinating, produces yields up to 5,000 kg/ha, has good tillering ability, and suppresses weed growth.
- 8 kg of SimSim II sesame seed. Sesame is an oilseed crop with significant market potential. The SimSim II variety is resistant to lodging and has significant oil content (41 percent). It yields up to 2,000 kg/ha and has a maturity of 105 to 110 days.
- 6,000 kg of Serami II finger millet seed. Finger millet is a very nutritious cereal crop high in starch, protein, and iron. The Serami II variety is resistant to blast disease and lodging. It has a short maturity period, 80 to 90 days, and produces good yields of up to 2,000 kg/ha.

FARM II's collective marketing program primarily focused on food security crops such as maize, groundnuts, and beans. However, the project also advanced the value chain development of these three niche crops through seed distribution, land preparation, GAP training, post-harvest handling and storage, and market and business training.

Above, project extension worker Esther Kiden from Yei displays a groundnut harvest in Lasu Payam. FARM II's third-party yield assessment showed that groundnut yields for project beneficiaries were 37 percent higher than those of the control group and 250 percent higher than average groundnut yields for the African continent. FARM II-supported smallholders also saw impressive yields for maize, beans, and cassava, demonstrating the program's impact on increasing smallholder productivity in the Greenbelt.

Photo: Redento Tombe

With proper support, South Sudan's farmers have shown that they can farm themselves out of poverty.

8. Monitoring and Evaluation

FARM II established a vigorous monitoring and evaluation program not only to report on project performance, but also to learn more about the project's impact in South Sudan and to advance knowledge for further development programs in the country.

8.1 INDICATOR TRACKING

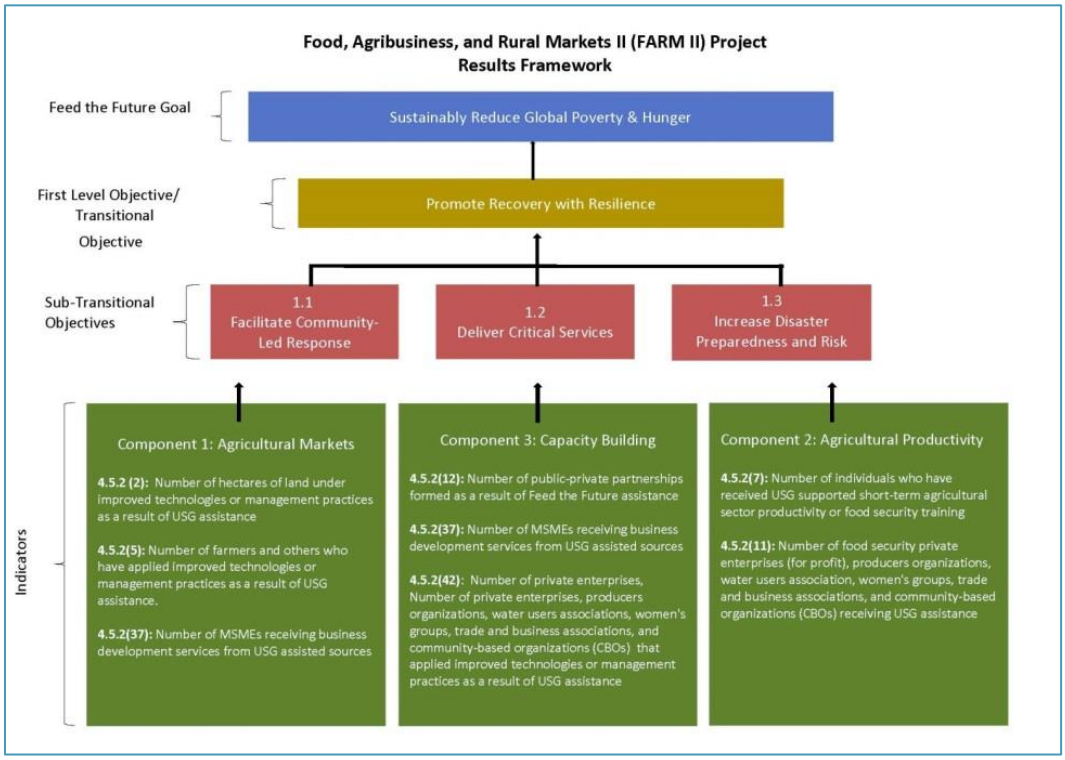
The FARM II project established 25 indicators to monitor its performance. They were based on the mission's three transitional objectives: 1) build resiliency, 2) deliver critical services, and 3) increase disaster preparedness and risk reduction. These indicators were derived from the deliverable requirements in the project's contract. A full reporting on each indicator is contained in Annex A.

8.1.1 Results Framework

FARM II's Performance Management Plan (PMP) was guided by Feed the Future's overarching goal of sustainably reducing global poverty and hunger and by USAID/South Sudan's Operational Framework Objectives. The results framework shown in Figure 7 on the following page served as the guide for all project data collection and reporting.

The photo on the left shows at least five seeds planted in the same hole, with stalks that will never fully develop. The photo on the right shows that only one seed was planted per hole. The stalk is very healthy and will produce significant amounts of maize. Planting one seed per hole was a major behavioral change for traditional smallholders in South Sudan. This practice can transform a subsistence farmer to a resilient one.

Figure 7: FARM II Results Framework



8.1.2 Feed the Future Indicators

South Sudan is a Feed the Future aligned country, and seven of the project's 25 indicators (shown in the table below) were standard Feed the Future indicators. The remaining 18 were customized indicators developed specifically for the FARM II project.

No.	Description
4.5.2(2)	Number of hectares of land under improved technologies or management practices as a result of USG assistance (RiA) (WOG)
4.5.2(5)	Number of farmers and others who have applied improved technologies or management practices as a result of USG assistance (RiA) (WOG)
4.5.2(7)	Number of individuals who have received USG supported short-term agricultural sector productivity or food security training (RiA) (WOG)
4.5.2(11)	Number of food security private enterprises (for profit), producers organizations, water users associations, women's groups, trade and business associations, and community-based organizations (CBOs) receiving USG assistance (RiA) (WOG)
4.5.2(12)	Number of public-private partnerships formed as a result of Feed the Future assistance (S)
4.5.2(37)	Number of MSMEs, including farmers, receiving business development services from USG assisted sources (S)
4.5.2(42)	Number of private enterprises, producers organizations, water users associations, women's groups, trade and business associations and community-based organizations (CBOs) that applied improved technologies or management practices as a result of USG assistance (RiA) (WOG)

8.1.3 Data Collection

Project data was captured in a variety of ways. Routine monitoring data was captured either with pencil and paper using modified or newly designed questionnaires, sign-in sheets, checklists, etc., or using CommCare, a mobile-based data collection tool that Abt successfully implemented in South Sudan. Smartphone data was collected by extension agents who had already been trained to use the data collection software. They were supported by data collection specialists.

In addition to collecting routine data, FARM II also conducted several additional evaluations. These included the OCAs carried out for five cooperative unions and two farmer associations; the yield assessments completed by the Borlaug Institute to study farmer productivity for the project's four main crops; and two supplemental surveys, one on FBOs and one on farmers, conducted by Forcier Consulting using instruments developed by the project's M&E department. All these information sources provided data for project indicator tracking and assisted efforts to assess FARM II's overall impact.

8.1.4 Data Management

Following the USAID mission's data quality assessment (DQA) and recommendations from USAID and Abt Associates, FARM II strengthened and centralized its data management, bringing in a new team to lead the project's M&E department during the final half of the contract period. The new team entered all data into protected databases and stored hard copies of raw data in the M&E office. Other project staff did not have the ability to edit or tamper with M&E data, and security was guaranteed through password protection of computers and removal of an M&E external hard drive from the office each night and every weekend. M&E staff vetted the data before and during the data entry process, and immediately addressed any discrepancies. They established clear data flow charts, which identified the people responsible and listed steps for assessing data quality.

As verification of training data was of particular concern to the DQA team, the FARM II M&E team overhauled the management of training data. To accurately track training attendance and understand the influence that the trainings had on participants' adoption of improved technologies and management practices, FARM II implemented a multi-layered DQA process. This included carefully verifying training attendance and commissioning two third-party surveys to measure the project's impact on farming practices and marketing in the Greenbelt.

8.1.5 Results Analysis

The FARM II project met or exceeded 20 of 25 indicator targets, with results that averaged 165 percent of the targets, as shown in Annex A. The project met targets in key areas such as crop productivity, land under cultivation, number of beneficiaries, organizations strengthened, commercial sales, and surpluses sold to markets outside the region.

8.1.5.1 Agriculture Markets

FARM II achieved particularly strong results in improving post-harvest techniques by reducing losses from 40 percent to 7 percent, an 82.5 percent improvement. This result was165 percent of the target. The project documented almost $2 million in farmer sales, helping 82 enterprises sell much of their produce outside the region, a result representing 410 percent of the target. Two financial products with two financial institutions were developed during the year, but the lending instruments could not be rolled out until project's end and only covered one of two harvest seasons. This program is expected to significantly expand throughout the 2016 calendar year. In all, FARM II achieved seven out of eight agriculture market indicators, with results that averaged 167.5 percent of the targets, as shown in Table 20 on the following page.

Table 20: Indicator Summary for Agriculture Markets

No	Indicator	Measurement	Target	Verified Result	Result as Percent of Target
1	Improved post-harvest techniques	Number of farmers using improved post-harvest techniques	6,246	11,749	188%
2	Reduced post-harvest losses	Percentage of produce lost after harvest (percentage of produce market worthy after harvest)	20% lost (50% reduction	7% lost (82.5% reduction)	165%
3	Increased farmer sales	U.S. dollar value of new sales	$1,725,000	$1,926,765	112%
4	Increased value-addition activity	Number of operators assisted with value addition	10	16	160%
5		Number of enterprises assisted with value addition	50	70	140%
6	Increased access to credit and financial services	Number of farmers assisted to access financial services	10,000	6,016	60%
7		Number of enterprises assisted to access financial services	20	21	105%
8	Market expansion outside Greenbelt	Number of enterprises involved in sales outside the Greenbelt	20	82	410%

8.1.5.2 Agriculture Productivity

FARM II's beneficiary farmers were, on average, 29 percent more productive than non-beneficiary farmers, and yields averaged 193 percent of the project targets. With 29,607 hectares (114.3 square miles) of land placed under cultivation with improved technologies and management practices, FARM II's result was 117 percent of the target. The project strengthened 732 FBOs (163 percent of the target) and identified and prepared 772 lead farmers (482 percent of the target) during the contract period. Women were deeply involved in the FARM II's agriculture productivity component: 153 women were trained as lead farmers (239 percent of the target) and FARM II met its target of ensuring that 20 percent of individuals trained were women. It also helped female farmers apply improved technologies and management to their farms for the first time, with a result that represented 98 percent of the target. Overall, FARM II met or exceeded six of its seven agriculture production performance targets. Results for these indicators averaged 198.8 percent of the targets, as indicated in Table 21 below.

Table 21: Indicator Summary for Agriculture Productivity

No	Indicator	Measurement	Target	Verified Result	Result as Percent of Target
1.	Yields above random control group	Maize yields above control group: kg/ha	15%	22%	147%
		Groundnut yields above control group: kg/ha	15%	37%	247%
		Bean yields above control group : kg/ha	15%	50%	333%
		Cassava yields above control group: kg/ha	15%	7%	47%
		Average increase in yields: kg/ha	15%	29%	193%
2.	Farmer groups strengthened	Number of FBOs strengthened	450	732	163%
3.	Lead farmers	Number of lead farmers trained	160	772	482%
4.		Number of female farmers trained	64	153	239%

5		Percentage of individuals trained who were women	20%	20%	100%
6.	Land cultivated using improved technologies or farming practices	Hectares under cultivation	25,128	29,607	118%
7.	Female adoption	Percentage of women who applied improved technologies and management for the first time this past year	40%	39.3%	98%

8.1.5.3 Capacity Building

As shown in Table 22 below, FARM II exceeded seven of its ten capacity building targets, with results that averaged 143.5 percent of the targets. The project's M&E team verified that FARM II provided direct training to 5,839 distinct individuals (152 percent of the target). Of these, 2,388 were women (155 percent of the target). The project organized four PPPs with private input suppliers (400 percent of the target of one) and met its goal of establishing one industry advocacy group within the contract period. The M&E team verified that FARM II helped 542 FBOs improve their technology and management capacity over the past year (136 percent of the target), and strengthened 70 enterprises (140 percent of the target) and seven NGOs (140 percent of the target). While the project was challenged to train local public extension workers because of their scarcity, it did train 129 relevant individuals (65 percent of the target), including public sector extension workers, other state and county agriculture staff, and project extension workers who can potentially be absorbed into the public sector extension system. However, FARM II was able to obtain programming agreements with 35 of 36 payam governments (97 percent of the target). Conflict in Western Equatoria and a presenter's illness limited FARM II's delivery of policy dialogue training to six out of 12 intended events (50 percent of target).

Table 22: Indicator Summary for Capacity Building

No.	Indicator	Measurement	Target	Verified Result	Result as Percent of Target
1.	Program access	Total number of farmers trained	3,833	5,839	152%
2.		Number of female farmers trained	1,533	2,388	155%
3.	Public-private partnerships	Number of public-private partnership commitments made	1	4	400%
4.	Business development services	Number of enterprises assisted	50	70	140%
5.	Improved technical or managerial capacity	Number of enterprises assisted	400	542	136%
6.	Local government engagement	Number of MOUs signed with payam government counterparts	36	35	97%
7.	Strengthened organizational capacity of NGOs	Number of cooperative unions or farmer associations assessed and strengthened	5	7	140%
8.	Industry advocacy groups established	Number of competitiveness councils established	1	1	100%
9.	State-level policy dialogue	Number of state-level policy dialogue trainings delivered	12	6	50%
10.	Strengthened extension workers	Number of private and public sector extension workers trained	200	129	65%

8.2 FARMER AND FBO ASSESSMENTS

The farmer and FBO assessments conducted by Forcier Consulting provided valuable insights into the impact of the FARM II project. A random group of 598 farmers were interviewed, representing 4 percent of FARM II's 14,155 farmer beneficiaries in all nine counties. The survey showed that the majority of FARM beneficiaries have either no education (31 percent) or little education (43 percent). The survey demonstrated that the FARM program had a significant impact on increasing farmers' productivity and overall production, which helped them to increase their business revenue. A majority of the farmers also stated that they are able to reinvest their profits into growing their farming businesses. On average, the farmers grew three to four crops. Maize, groundnuts, and cassava were the most popular. The large majority of farmers (74 percent) reported that they actively participate in FBO meetings on a weekly or monthly basis, and 95 percent stated that they share what they have learned from the project with other farmers. When asked about the biggest barriers to farming, the respondents listed lack of financial capital (43.6 percent), weather/climate (21.1 percent), and lack of improved technology (10.4 percent) as the most significant. Interestingly, only 1.7 percent of the respondents listed insecurity as their main business barrier, suggesting that agricultural development gains can be achieved in the Greenbelt despite the current security situation. This illustrates the resilience of South Sudan's local communities and their ability to achieve development gains even under less-than-optimal conditions.

Forcier Consulting interviewed leaders of 74 FBOs in all nine counties during the last month of the project, representing 10 percent of the 732 FBOs supported by FARM II. The survey showed active management and member participation in the majority of FBOs, indicating that local communities are working together in a collaborative manner for both individual and community benefit. The assessment showed that approximately 70 percent of members actively participate in their FBOs. More than 80 percent of the FBOs collect membership fees, averaging 209 SSP/year. The survey emphasized that member participation prevails in FBO decision-making: 98 percent of respondents claimed to encourage members to voice their opinions and 78 percent stated that decisions were not made without member input. Those surveyed overwhelmingly felt that their members benefit from participating in their FBO. Access to seeds and GAP training were the two advantages cited most frequently. In regards to sustainability, 85 percent of the FBO representatives believed that their organization will continue to function regardless of future project support and 62 percent felt that the FARM projects provided sufficient training support to their organizations. Approximately 40 percent of the FBOs reported that their memberships are increasing, while 32 percent reported that the size of their membership has not changed. Annex B of this report contains a more detailed summary of these surveys.

8.3 YIELD ASSESSMENT

The Borlaug Institute team that conducted the third-party assessment of smallholder productivity yields randomly selected 365 beneficiary farmers, representing 2.5 percent of FARM II's beneficiaries, and a control group of 100 farmers. A Borlaug yield assessment specialist oversaw the program, establishing protocols for the study and training the extension staff who conducted the yield assessments in the field.

As previously pointed out, the yield assessment reported very positive results for FARM II's beneficiary farmers. They well exceeded the productivity outcomes of the control group, other countries in the region, and the African continent average. The survey results showed that both male and female farmers out-performed the control group, highlighting that both genders greatly benefited from the project's interventions. The results revealed that project beneficiaries with no or little education generally out-performed their more educated counterparts, particularly for maize and groundnuts, highlighting the project's impact on this fragile segment of the population. The assessment results demonstrated FARM II's impact on the farming productivity of all age groups. While farmers over 50 years of age struggled to

produce at control group levels, their productivity still far exceeded the average productivity of neighboring countries and the African continent average. Youth (farmers under the age of 29) also proved to be productive farmers, performing at levels near those of their more experienced counterparts and well above the control group average. The results strongly suggest that improved seed technology is being spread throughout the general farming population, since many non-beneficiary farmers reported using the same seed that had been introduced by the project. Plant density information gathered in the study, combined with the overall performance of the control group, indicate that GAPs introduced by the project are being disseminated to other farmers in the region. This is a very positive outcome, suggesting that the overall impact of the FARM projects is far greater than that which could be verified by the project. Annex B includes a more thorough review of the yield assessment.

This study confirms results obtained by FARM I, which showed that the project helped farmers in the Greenbelt dramatically increase their productivity growing maize. The Borlaug study reported that maize yields increased by 535 percent in the six years since FARM I's 2010 baseline. It found that Greenbelt farmers were highly productive in growing the other three crops compared to neighboring countries and the African continent's average, and that the project's direct beneficiary farmers outperformed the non-beneficiary farmer control group.

Natale Fortunato Zingigi shows off a bicycle he was able to afford thanks to the FARM projects. His daughter Roda is now able to ride rather than walk to school, which is 11 kilometers away. Mr. Zingigi has been a FARM beneficiary for six years. The projects not only introduced him to improved seed and modern farming practices, but also gave him support to clear more land for cultivation. Proceeds from his greatly increased production have enabled him to put all his children through school, including one who is now studying science in China.

Photo: Jessica Scranton for Abt Associates

9. Findings and Recommendations

Almost 94 percent of farmers surveyed said they will continue to apply the new practices and technologies they learned from FARM, even though the project has ended.

The Greenbelt offers a unique development challenge with bountiful opportunities for advancement despite so many challenges and constraints. What makes the region so distinctive is its long history of war and neglect and the lack of precedent, infrastructure, institutions, and systems. Starting at an extraordinarily low baseline point in 2010, the FARM I and FARM II projects have gained a great deal of practical development expertise over the past six years. The project sees strong potential in the Greenbelt when the security situation stabilizes. The findings and recommendations below may be helpful for future programming in the region.

1. Continue development work in South Sudan.

Findings. While the future remains uncertain in South Sudan and the humanitarian crisis is acute, the FARM II project's yield results and farmer surveys have shown that significant development gains can be achieved even within the country's current context. FARM II's bottom-up approach to developing the capacity of farmers, farmer groups, local public sector extension providers, and private companies has created economic incentives for communities to work together to promote both individual and collective benefits. In this way the project strengthened resilience and self-reliance for many rural poor in the Greenbelt region.

Recommendation. *This model should be replicated in other parts of the Equatorias and South Sudan where local markets for farmers' produce can take hold.*

2. Scale up project interventions.

Findings. The FARM II project was able to verify that it worked with 732 FBOs during the contract period. The FBO survey showed that these organizations have an average of 27 members, meaning that the total number of direct farmer beneficiaries was 19,764. With an average family size of six, there are approximately 118,854 individuals who directly benefitted from FARM II. This total represents about 4.2 percent of the population of the Equatoria states and 1 percent of the national population.

Recommendation. *Future programs should develop strategies to broaden FARM II's achievements to reach a much larger portion of the population. Options for scaling up include geographic expansion, use of communications technologies, and further focus on strengthening intermediary organizations such as cooperative unions, who can then support farmers and farming groups in their areas.*

3. Expand geographically.

Findings. FARM II worked in 75 percent of the payams in its nine-county service area, but only 37 percent of the counties that make up the three-state Equatoria region. The project did not work in other states in South Sudan.

Recommendation. *Future programs should focus on strengthening cooperative societies and cooperative unions to further expand services in counties that have already been served by the FARM projects. For new service areas in the country where there is potential to develop markets for local producers in such values chains as grain, livestock, fish, and horticulture, future programming should initially concentrate on working with FBOs or community-based organizations as discussed in the FARM model section of this report, with movement towards collective marketing as surplus production takes hold.*

4. Use communications media to share agricultural information.

Findings. The FARM II communications assessment showed that farmers welcome the possibility of receiving agricultural extension information through radio and SMS messaging. Significant numbers have access to these technologies.

Recommendation. *Future donor programs should commit to broadcasting agricultural messages through local radio stations in the Greenbelt as a complement to other forms of service delivery.*

5. Strengthen intermediary institutions.

Findings. Intermediary institutions such as cooperative unions play a very important role in developing South Sudan's agricultural sector. They are able to aggregate harvests and access higher-paying markets, which farmers or smaller farmer groups cannot do on their own. These intermediaries can also serve as input suppliers, providing farmers with the technologies and information they need to increase their productivity. And, by helping to create interdependence through trade and economic cooperation, the cooperatives play a key role in developing civil society in South Sudan. FARM II's organizational capacity assessments of cooperative unions highlighted the need for substantial strengthening to make many of the unions sustainable and viable.

Recommendations. *Future programs in the FARM II service area should strengthen cooperative unions to help these organizations take over many of the project's interventions, using market-incentive approaches. Future programs in new locations should incorporate the cooperative union model once markets take hold.*

6. Scale up interventions to improve access to credit.

Findings. The World Food Programme's Purchase for Progress program has been unable to meet its goal of purchasing 750 MT of grain from South Sudanese suppliers to partially supply its food aid programs in South Sudan. A leading reason for this missed opportunity is that intermediary organizations are unable to pay farmers in a timely manner at the point of sale because they have poor liquidity. FARM II helped launch new financial products with two financial institutions in South Sudan. These instruments provide the intermediary organizations with working capital, which is backed by sales contracts from legitimate buyers. This infusion of working capital will flow down to smallholders through timely payment on harvest sales.

Recommendations. *While village savings and loan programs can be helpful to farmers, these interventions do not fully solve the credit problems faced by farming organizations in South Sudan. Scaling up the credit programs discussed in this report would provide powerful market incentives for farmers to further invest in production, knowing that they will receive timely payment for their surpluses. Efforts should continue to further strengthen*

intermediary organizations such as cooperative societies and cooperative unions, to make them more bankable so they can absorb additional capital flows into their local agricultural sectors.

7. Improve entrepreneurship and business skills training, relying on local BDS providers.

Findings. Approximately three-quarters of FARM II's beneficiaries had no or little education. The percentage is much higher among female farmers. FARM II's entrepreneurial grants program reflected the generally low capacity of applicants and the limited entrepreneurial experience of the rural population. With the agricultural sector currently evolving in the Greenbelt, there are many opportunities for local entrepreneurs in areas such as land preparation, crop processing, and distribution.

Recommendations. *Future agriculture programs should work to increase the business and financial literacy skills of the population at scalable levels, using local service providers and training-of-trainer programs. A longer-term commitment to an entrepreneurial grants program that includes BDS support from a local provider would provide incentives for local farming groups to improve their business planning and grant application skills. These programs should particularly target women and youth.*

8. Develop special programming for seed multiplication.

Findings. Access to improved seed technology is critical for increasing farmer productivity in South Sudan. Dependence on seed imports poses resiliency risks due to unstable supplies, exchange rate fluctuations, and crop diseases. Domestic seed production counters those risks while also offering a value-addition market opportunity for South Sudanese farmers, who can earn up to 50 percent more profit growing seed rather than general harvest crops. There is evidence that informal seed markets are taking hold in the Greenbelt region.

Recommendations. *More aggressive seed multiplication assistance should be included in future agriculture development programs. This should consist of multi-donor support in such areas as formation of a seed trade association; introduction of seed regulations, including oversight of seed imports, testing, and seed quality; seed research; institutional strengthening of public and private sector seed multiplication actors; and specialized programming that uplifts targeted populations such as women and youth.*

9. Introduce fertilizer slowly.

Findings. The strong results for smallholder productivity reflected in the Borlaug Institute yield assessment were achieved using no fertilizer or limited fertilizer. Increasing the use of appropriate fertilizer methods would further enhance smallholder production while adhering to climate-smart agriculture guidelines. The Agriculture Sector Policy Framework supported by the first FARM project and passed by Parliament in late 2012 called for a well-functioning fertilizer importation, storage, and distribution system that would enhance agricultural productivity. Unfortunately, little advancement has been made in this area since then. Use of fertilizer is a politically sensitive topic in South Sudan and, due to the devaluation of the local currency within the past year, importing chemical fertilizers is currently an unaffordable option for most farmers.

Recommendations. *Future programs should adopt a methodical, evidence-based approach to increasing fertilizer use in South Sudan. Enough time should be provided to research, train, and socialize government counterparts and beneficiaries on this important agricultural input.*

10. Develop targeted gender programming.

Findings. Female farmers applying FARM II interventions have proven that they can be as productive as men and can grow surpluses for marketing purposes. Women have also proven to be actively involved in the collective marketing process. These advances can be transformational, but women would be further empowered if their basic financial literacy and business, entrepreneurship, and leadership skills were greatly enhanced.

Recommendations. *Future programs should offer specialized training programs targeting women that would strengthen their basic business capacity. Training of trainers, lead farmer, and similar programs could reach a large number of women eager to develop these skills. Programs should also consider supporting women in high-margin segments of agricultural value chains, such as value-addition processing and seed multiplication, which can be highly advantageous for them.*

11. Develop targeted youth programming.

Findings. Agriculture is the main source of jobs and livelihoods in the Greenbelt. Attracting youth into this sector is vitally important for the development of a peaceful and prosperous South Sudan. Similar to gender strengthening, key elements for improving the economic standing of youth include increasing their productivity and engaging them in marketing and community initiatives. Many young South Sudanese are aware that they lack not only the requisite technical skills but also the basic life skills to realize their economic potential. The FARM II youth in agriculture assessment found that this population segment is interested in higher-value agricultural markets, such as food processing and flour milling, and in operating in such areas as animal husbandry or horticulture. Young people tend to be more mobile and find it easier to access information and communication channels. In addition, as evidenced by their high levels of participation in the management of their local unions, South Sudan's youth are embracing the cooperative movement.

Recommendations. *Future agriculture programming should consider working with youth-specific farming groups and providing them with specialized interventions that target their particular needs, such as life, financial literacy, and agricultural vocational skills. Future cooperative union programs should include agribusiness and leadership training specifically targeting this group and be designed to empower them to assume leadership roles in their local agricultural communities. Youth should be assisted to play key linkage roles between different elements in the value chains, for example by collecting and disseminating price information, aggregating smallholder produce for traders, or distributing seed to communities on behalf of seed companies.*

12. Follow up with additional M&E activities.

Findings. South Sudan poses a unique development challenge, almost unprecedented in the international development community. FARM II provided a great deal of information and generated many lessons learned to guide future evidenced-based approaches to improving agriculture and development in South Sudan and similar environments.

Recommendations. *More research should be done into the project's overall impact in the Greenbelt, looking at how increasing smallholder productivity and introducing collective marketing influenced commercial activity and civil society development in South Sudan. While FARM II was able to study the project's short-term impact on direct farmer beneficiaries, it was not able to study the long-term benefits for these farmers or the magnitude of the project's impact on the many indirect beneficiary farmers who gained access to new farming technologies and marketing practices through informal markets or word-of-mouth communication.*

13. Link development and humanitarian assistance.

Findings. South Sudan has a long history of receiving humanitarian assistance and will likely continue to need such support for a relatively long period of time. Local communities, however, cannot become self-reliant and resilient under this assistance model. The FARM projects have proven that development gains can be achieved in South Sudan's current context if market opportunities exist for the rural poor.

Recommendations. *In South Sudan's current context, development opportunities exist and communities can dramatically improve their resilience if accessible markets are available for local production. In these areas, development and humanitarian programs can work together to address the immediate needs of local populations and help them become self-reliant. The World Food Programme's Purchase for Progress program provides a useful model for advancing smallholder farmers in current-day South Sudan. P4P creates a short-term market for farmers, challenging their ability to produce, aggregate, and work together as a community to create the efficient value chain structures that will be needed for the country's future development.*

14. Lengthen the duration of any future contracts.

Findings. The FARM II project accomplished a great deal during its one-year contract period. However, since the first and last two-month periods of the contract were dedicated to start-up and close-out, the project only had eight months to implement the majority of its activities. Placed in the context of South Sudan, where implementation is challenging and program risks are high, the short contract period did not allow adequate time to institute sufficient depth in many program activities.

Recommendation. *Performance periods for future bridge contracts such as FARM II should be a minimum of two years. For a one-year follow-on period, USAID may wish to consider a one-year extension of an existing contract..*

15. Introduce a "Do No Harm Approach" to agricultural development.

Findings. The FARM II project planned for an early "Do No Harm" assessment and training (during the first month of the contract period), but approval issues delayed implementation until five months before field activities were completed. Project staff felt it was a valuable contribution to their methodologies for implementation, but because of the late start, "Do No Harm" could not be not satisfactorily integrated into the full FARM II program as initially intended.

Recommendations. *The "Do No Harm" approach should be integrated in all development programs in South Sudan and embedded in all activities. Conflict sensitivity should be assessed in each service area early in the planning process, with opportunities for staff training and feedback before programming and implementation begin. The goal should be to create a "Do No Harm" culture within the project team and to establish systems and processes for continued practice of this important program element. Conflict sensitivity should then be continuously monitored and evaluated for further adjustment and decision-making throughout the life of the project.*

Maad Rawendoozi (in sunglasses) of the Borlaug Institute trains project extension staff on measurement protocols for the FARM II yield assessment. The team overcame rains that made some roads inaccessible, significant drought in Eastern Equatoria, and conflict in Western Equatoria to complete this extensive survey. They assessed yields at 465 farms during the second harvest season, providing valuable information about the Greenbelt's vast agricultural potential.

Photo: Abt Associates

Annex A: Performance Indicator Tracking Table: Baseline, Targets, and Actual Results

FTF Indicators	FTF Indicator Title	FARM II No.	FARM II "deliverable" (per PMP)	Baseline	Target	Q1	Q2	Q3	Q4	Final	% Target Achieved
4.5.2 (2)	Number of hectares of land under improved technologies or management practices as a result of USG assistance	1.2.5	At least 40,000 hectares will be under new management practices or technologies (new and continuing)	14,872	25,128					29,607	118%
	Notes: **Target** of 25,128 is 40,000 (overall **deliverable** for hectares under new management practices or technologies planted by new or continuing farmers) less **baseline** of 14,872 hectares achieved under FARM 1. Based on farmer survey, which showed median hectares under cultivation per farmer as 2.52, **final result** achieved is 29,607 (2.52 ha x 11,749 [no. farmers who applied improved technologies or management practices]). See section 8.1.5.2 f this report. (As per Feed the Future Indicator 4.5.2(5).)										
4.5.2(5) (RiA)	Number of farmers and others who have applied improved technologies or management practices as a result of USG assistance.	1.1.1	At least 20,000 farmers use improved post-harvest handling techniques	13,754	6,246					11,749	188%
	Notes: **Target** of 6,246 is 20,000 (overall **deliverable** for new or continuing farmers using improved PHH techniques) less **baseline** of 13,754 achieved under FARM 1. Based on farmer survey, which showed that 83% of 598 respondents reported using improved PHH techniques under FARM II, **final result** achieved is 11,749 (83% of 14,155 farmers verified to have received direct support from FARM II). See section 5.1.2 of this report. *										
4.5.2(7)	Number of individuals who have received USG supported short-term agricultural sector productivity or food security training	1.2.1(a)	At least 20,000 farmers (8,000 women), largely as members of FBOs, receive technical assistance to increase production within approved values chains.	16,167	3,833	243	1,550	2,508	1,538	5,839	152%
			Notes: **Target** of 3,833 is 20,000 (overall **deliverable** for new or continuing farmers receiving TA to increase production) less **baseline** of 16,167 farmers who received TA under FARM 1. Per section 6.1.1 of this report, **final result** achieved is 5,839 representing the number of discrete individuals verified to have participated in at least one training during FARM II. *								
		1.2.1(b)	8,000 women (from deliverable 1.2.1)	0	1,533	104	606	982	696	2,388	155%
			Notes: **Target** of 1,533 women is 40% of overall target of 3,833 farmers for this indicator, per FARM II Indicator 1.2.1 (a). As reported in Section 7.2 of this report, a total of 2,388 discrete women were verified to have participated in at least one training during FARM II.*								

FTF Indicators	FTF Indicator Title	FARM II No.	FARM II "deliverable" (per PMP)	Baseline	Target	Q1	Q2	Q3	Q4	Final	% Target Achieved
4.5.2(11)	Number of food security private enterprises (for profit), producers organizations, water users association, women's groups, trade and business associations, and community-based organizations (CBOs) receiving USG assistance	1.2.3	At least 450 new or existing farmer organizations are developed or strengthened through increased technical and managerial capacity of leadership and improved participation and commitment of membership	0	450	291	241	128	72	732	163%
	Notes: The **final** result achieved of 732 discrete FBOs was verified to have received direct assistance under FARM II (see section 5.1.2 of this report). A total of 106 new FBOs were added to the network under FARM II; 40 of 666 FBOs from FARM I were not verified as having received direct assistance under FARM II. *										
4.5.2(12)	Number of public-private partnerships formed as a result of Feed the Future assistance	1.3.6	A public-private partnership will be facilitated and launched by the project.	0	1	0	0	2	2	4	400%
	Notes: FARM II established 4 PPPs: 1 seed multiplier, 2 financial institutions, and 1 brewery. See section 6.2.4 of this report.										
4.5.2(37)	Number of MSMEs receiving business development services from USG assisted sources	1.1.4	At least 10 operators of value-added activities (such as milling or drying) receive technical assistance to increase profits by at least 20 percent	0	10	0	0	0	16	16	160%
			Notes: Of the 70 MSMEs that received BDS training and support per FARM II Indicator #1.3.3, 16 were value-addition enterprises (4 flour makers, 1 maize processor, 4 millers, 1 cooking oil processor, 2 groundnut paste makers, and 4 flour threshing enterprises). The contract period was too short to measure profit increases. *								
		1.3.3	At least 50 micro, small, and medium existing or start-up agribusiness (to exclude agro-input suppliers already covered under Comp. 2) receive business development services to identify constraints and increase their management and technical capacity over the life of the program. These businesses may overlap with those described in Comp. 1, but services must extend beyond links to financial services and capital described there.	1	50	0	0	13	57	70	140%
			Notes: FARM II provided BDS training and support to 70 MSMEs between December 7, 2015, and March 9, 2016, as documented in Section 8.5.1.3 of report. The non-value-addition enterprises that received support primarily included FBOs, cooperative societies, block farms, and service providers. *								

FTF Indicators	FTF Indicator Title	FARM II No.	FARM II "deliverable" (per PMP)	Baseline	Target	Q1	Q2	Q3	Q4	Final	% Target Achieved
4.5.2(42)	No. private enterprises, producers organizations, water users associations, women's groups, trade and business associations, and community-based organizations that applied improved technologies or management practices as a result of USG assistance.	N/A	At least 400 new or existing farmer organizations demonstrating increased technical and managerial capacity of leadership and improved participation and commitment of membership)	0	400					542	136%
	Notes: Based on FBO survey, in which 74% of FBO respondents reported applying new technologies or management practices for the first time during the past year AND having received FARM II training, **final** target achieved is calculated as 542 (74% x verified total of 732 FBOs receiving FARM II support). See section 8.1.5.3 of report.										
CUSTOM	Reduction in percent post-harvest loss	1.1.2	Post-harvest losses reduced by at least 50% by targeted farmers	40% Loss	20% Loss (50% Reduction)					7% Loss (82.5% Reduction)	165%
	Notes: FARM II distributed 40,000 fifty-kg hermetic storage bags through cooperative unions across all three Equatoria states. As reported in Section 5.1.1.3 of report, a random sample of 60 bags assessed showed that hermetic bag use cuts post-harvest losses from 40 percent of crop volume to 7 percent, an 82.5% reduction (33% loss improvement / 40 % loss baseline = 82.5% reduction in losses). An 82.5% reduction divided by 50% target reduction resulted in exceeding target by 165%.										
CUSTOM	Increase in total sales by farmers	1.1.3	Increase total sales by farmers by at least 15% over baseline	$1,500,000 (USD)	$1,725,000 (USD)			$1,889,563 (USD)	$37,202 (USD)	$1,926,765 (USD)	112%
	Notes: Baseline of $1,500,000 established during FARM I's last year leading to a target of $1,725,000 for FARM II based on a 15% increase. Final sales of $1,926,725 based on sales contracts between FARM II-supported groups and WFP, as well as sales formally reported by individual farmers to FARM II extension workers.										
CUSTOM	Number of farmers and agricultural enterprises access financial services	1.1.5	At least 10,000 farmers and 20 agricultural enterprises actively access financial services, whether through formal financial institutions, flexible financing, or community-level associations.	0	10,000				6,016	6,016	60%
				Notes: NAFA and YAFA farming associations in Western Equatoria signed working capital loan agreements with the Cooperative Bank of South Sudan. A total of 6,016 members belong to these organizations (see section 4.5 of this report). More lending activity with other groups expected shortly after the end of FARM II's contract period.							
				0	20				21	21	105%
				Notes: Per Section 4.5 and Table 6 of this report, 21 cooperative societies, cooperative unions, farmer associations, or savings and credit cooperatives received assistance to open bank accounts through FARM II. *							
CUSTOM	Number agricultural enterprises extending operations into markets outside of the Greenbelt	1.1.6	At least 20 agricultural enterprises expanded operations into markets outside of the Greenbelt	0	20	0	0	82	0	82	410%
	Notes: As reported in section 8.1.5.1 of this report, a total of 82 FBOs have produced surpluses that are contracted for sale to WFP through larger intermediary organizations. This produce will be sold to distant markets, largely outside the Greenbelt region.										

FTF Indicators	FTF Indicator Title	FARM II No.	FARM II "deliverable" (per PMP)	Baseline	Target	Q1	Q2	Q3	Q4	Final	% Target Achieved
CUSTOM	Percent difference in production between targeted beneficiaries and control group within approved value chains	1.2.2	At least 15% greater production among FARM II beneficiaries than among a similar control group of farmers within approved value chains		Maize 15%					22%	147%
					Groundnuts 15%					37%	247%
					Beans 15%					50%	333%
					Cassava 15%					7%	47%
				Notes: As reported in Annex B of report, yield assessment overseen by Borlaug Institute measured yields of FARM II direct beneficiary farmers and of a control group of farmers who did not receive direct support from FARM II. **Final** target achieved is beneficiary farmers' yields in kg/ha compared to control group's yields in kg/ha.							
					Average: 15%					29%	193%
				Notes: This is the average of **final** targets achieved from yield assessments for maize, groundnuts, beans, and cassava.							
CUSTOM	Number 'lead farmers' mentored within each value chain	1.2.4	At least 20 'lead farmers' (8 women) are mentored within each value chain who serve as an example of best practices under the project	0	160	0	387	385	0	772	482%
				Notes: As per section 5.1.2.1 of this report, FARM II verified that 772 farmers participated in the lead farmer training program, which covered all major value chains supported by project. *							
				0	64	0	51	102	0	153	239%
				Notes: As per Section 5.1.2.1 of this report, FARM II verified that 153 women participated in the lead farmer training program, which included all major value chain supported by project. *							
CUSTOM	Number of CAEWs and PEWs with increased capacity to provide extension services	1.3.1	At least 200 CAEWs and PEWs and other public sector actors in zone of intervention have increased capacity to provide extension services and implement policy, as relevant	0	200	0	0	69	60	129	65%
	Notes: 129 extension workers and other public sector actors participated in FARM II's training programs. *										

FTF Indicators	FTF Indicator Title	FARM II No.	FARM II "deliverable" (per PMP)	Baseline	Target	Q1	Q2	Q3	Q4	Final	% Target Achieved
CUSTOM	Number of trainings for state and county-level officials on the implementation of nationally-approved agriculture, land, and business enabling/ investment promotion policies	1.3.4	At least 12 trainings are conducted over the course of the project to state- and county-level officials on the implementation of nationally approved agriculture, land, and business enabling/ investment promotion policies	0	12	0	0	0	0	6	50%
	Notes: Per section 6.3.3 of this report, FARM II delivered policy dialogue trainings on 1) youth in agriculture, 2) land management and climate-smart agriculture, 3) the roles of the local public and private sectors in agricultural development in Torit and Yei during January 2016. The Western Equatoria program was canceled due to insecurity. The standards and quality training was canceled due to illness of presenter.										
CUSTOM	Engagement with government with project activities to increase sustainability of interventions	1.3.5	Minimum of 20% of project activities must be formally agreed upon by the state and/or county authorities in form of MOUs or other written commitment	0	36	0	0	0	35	35	97%
	Notes: Per section 6.3.1 of this report, FARM II signed programming agreements with 35 of the 36 payams in the service area. The agreements are available for review.										
CUSTOM	Number of local NGOs to have organizational capacity strengthened	1.3.7	At least 5 local NGOs will be built or improved upon as measured by USAID's Organizational Capacity Assessment or other accepted tool, using the Innovative Grants Facility	0	5	0	0	5	2	7	140%
	Notes: Per section 6.2.2 of report, FARM II subcontracted a South Sudanese professional services company, the UNESCO Club, to conduct OCAs for five cooperative unions and two farmer associations using USAID-developed OCA tool. A report on the OCAs is available for review.										
CUSTOM	Establishment of Competitiveness Council	1.3.8	A functioning Competitiveness Council is established and effectively improves the dialogue between stakeholders in the agriculture sector	0	1	0	0	0	1	1	100%
	Notes: Per section 6.3.3 of report, FARM II initiated a partnership with the EAGC, WFP, and the GIZ to jointly launch a one-day "Grain Sector Stakeholders Consultative Workshop," which was held in Juba on February 11, 2016. As a result of workshop, participant formed a multi-stakeholder Competitiveness Council										

FTF Indicators	FTF Indicator Title	FARM II No.	FARM II "deliverable" (per PMP)	Baseline	Target	Q1	Q2	Q3	Q4	Final	% Target Achieved
CUSTOM	Percent project recipients are women	1.1.7	A minimum of 40% of participants of program activities under this component are women (# of women who applied improved technologies and management for the first time this past year)	0%	40%					39%	98%
			Notes: To measure the percentage of women applying at least one improved technology or management practice, FARM II counted the number of women in the end-of-project survey sample applying at least one improved technology or management practice over the past year (during FARM II) and then used the complex samples module in SPSS to determine that 39.3 percent of the FARM II beneficiaries who implemented at least one new practice in the past year were women.								
		1.2.6	A minimum of 40% of participants of program activities under this component are women (members of FBOs receiving technical assistance to increase production within approved value chains)	0%	40%	43%	39%	39%	45%	41%	103%
			Notes: Of 5,839 unique individuals trained under FARM II, 2,388 (40.9%) were women. A list of verified females trained is available for review.								
		1.3.9	A minimum of 20% of beneficiaries of program activities under this component will be women (Percentage of Lead Farmers were Women)	0%	20%	0	0%	13%	22%	20%	100%
			Notes: Per FARM II Indicator 1.2.4 above, 153 of 772 individuals trained as lead farmers were women (19.8%). A list of verified females who participated in the Lead Farmer training program is available for review.								

*A list is available for review.

Annex B: End-of-Project M&E Surveys

Almost 95 percent of farmers surveyed reported that they share what they have learned from the FARM projects with other farmers.

FARM II hired third-party assistance to measure the project's impact during the final months of the project. An independent M&E and data collection consulting firm conducted supplemental surveys at the end of the project. The purpose was to measure direct and sustainable change as a result of project activities in each of the three components. The selected firm, Forcier Consulting, carried out the survey during March 2016, the final full month of FARM II operations. Forcier is based in the U.S., but has an active office in South Sudan. Two separate surveys were completed: one assessed farmers' experiences with the project and the second assessed the capacity of project-assisted FBOs and their experiences with FARM. The Norman Borlaug Institute for International Agriculture of Texas A&M University was also subcontracted to oversee the assessment of crop yields to measure the impact of the project's productivity interventions and learn more about the region's agriculture potential.

FARMER ASSESSMENT

Forcier Consulting was able to reach 598 randomly sampled farmers—all but two of the 600 targeted for survey participation. This represented 4 percent of the 14,155 farmers included in the FARM II beneficiary list. Forcier surveyed 239 farmers in Eastern Equatoria and 232 farmers in Central Equatoria in all 12 payams served by FARM in those states (four per county, with three counties per state). In Western Equatoria, the firm reach 127 farmers in the nine payams covered by the project. Farmers in the new FARM II payams could not be surveyed due to the conflict in this state. Respondent farmers were selected in an arbitrary manner. Fifty-three percent of them were women, which emphasizes the extent of female participation in the farming sector. Approximately 22 percent of the respondents reported as female-headed households.

Table 23: Education Levels of Farmers Surveyed

Level of Education	No. Farmers	Percent of Total
None	187	31.3
Some primary school	260	43.5
Completed primary school	30	5.0
Some secondary school	78	13.0
Completed secondary school	34	5.7
Some university	3	0.5
University graduate	3	0.5
Technical or trade school	2	0.3
Religious education	1	0.2
Total	**598**	**100**

Education levels among the farmers surveyed were low. Table 23 on the previous page shows that almost three-quarters of the farmers interviewed have little or no education: 31.3 percent reported having no education, while 43.5 percent received some primary education. Only 19 percent of respondents completed or received some secondary school education. Slightly more than 1 percent continued their education past secondary school.

Farmer Participation in FBOs

The FARM II project developed and strengthened 732 FBOs in South Sudan. The project provided training and assistance to these organizations in areas such as formation, governance, and management. All farmers supported by FARM II were members of FBOs, and those surveyed were asked about their participation in these organizations. Twenty-eight percent said they hold a leadership position in their FBO, with the most prevalent positions being Secretary or Chairperson. The survey showed that the majority of FBOs have active management and member participation, reflecting that local communities are working together in a collaborative manner for both individual benefit and the common good. Over 74 percent of respondents stated that their FBOs hold either monthly or weekly meetings. Other groups meet less frequently or on an as-needed basis. Fifty-eight percent of respondents reported that they participate in collective marketing, the large majority of them through their FBO.

Gender and Household Roles

Learning about gender dynamics and the composition of farming households is very important for understanding FARM's overall impact and to guide future programming. Twenty-two percent of survey respondents said their households were headed by women. Yet over 83 percent of respondents stated that their spouse resides in the same household. It is unclear why there is a 5 percent difference between these two percentages, as men are typically considered heads of household in South Sudan. These figures may require further investigation.

Almost 80 percent of respondents reported that their spouses also farm, and 72 percent reported that their children contribute to family farming. Interestingly, 61 percent of the farmers interviewed for this study stated that they hire employees to work on their farms: 50.1 percent employ part-time workers while 30 percent have full-time workers. This shows that a significant number of farmers are operating as businesses and that growth in the agricultural sector is a significant source of job creation for the rural poor in South Sudan.

Seeds and Crops

The FARM II project supported and introduced improved seed technology for all eight target crops. Sixty-seven percent of farmers surveyed received seeds. A total of 402 survey respondents stated that they received seeds from FARM I and/or FARM II. The average number of seed varieties they received was three. The minimum number received per farmer was one; the maximum was seven. The majority received maize (82 percent) and groundnuts (70 percent). In addition, 44 percent received cassava stems, 38 percent received bean seeds, and 30 percent received sesame seeds.

Table 24 shows the crops that survey respondents harvested in the past year. These numbers include both farmers who received seeds from FARM II over the past year and project beneficiaries who did not receive seed from FARM II. Farmers

Table 24: Crops Harvested by Survey Respondents in Past Year

Crop	No. of Farmers
Maize	546
Groundnuts	458
Cassava	320
Beans	251
Sorghum	179
Sesame	179
Millet	80
Rice	24

reported growing an average of three to four crops, with maize, groundnuts, and cassava the most popular. Unsurprisingly, since maize is the most prevalent crop in the Greenbelt region, 91.5 percent of respondents reported harvesting maize during the past year. Majorities also harvested groundnuts (76.7 percent) and cassava (53.6 percent). Only one respondent reported not harvesting a crop in the past year.

Training

During the six years of FARM I and FARM II, the projects carried out extensive training for farmers in the Greenbelt. This training covered a variety of areas, including GAP, marketing, and business management. A total of 534 farmers interviewed for this survey (89 percent) received at least one type of training from FARM I or FARM II. As shown in Table 25, over 85 percent of those received GAP training, while 35 percent were trained in collective marketing and/or post-harvest handling and 10 percent in farming as a business.

Approximately one-half of the farmers interviewed for this survey reported having received training under FARM II. Participation grew, as intended, in collective marketing and farming as a business trainings. Table 26 shows a breakdown of the types of training reported by survey respondents who received at least one training under FARM II. GAP training remained the most prevalent, with 216 farmers (74 percent) receiving this type of training under FARM II. Collective marketing (23.5 percent) and post-harvest handling (17.5 percent) were also popular. Over half of the survey respondents attended a farmer field day at a FARM II demonstration site.

Table 25: Types of Training Reported by Survey Participants who Received at Least One Training Under FARM I or FARM II

Training	Frequency	Percent of Trainings	Percent of Farmers
GAP	456	54.8	85.4
Collective marketing	93	11.2	17.4
Post-harvest handling	93	11.2	17.4
Farming as a Business	52	6.3	9.7
Don't know	40	4.8	7.5
Refused to answer	24	2.9	4.5
Financial literacy	22	2.6	4.1
Crop conditioning	20	2.4	3.7
Other	18	2.2	3.4
Hermetic bags	11	1.3	2.1
Exchange visits	3	0.4	0.6
	832	**100**	**N/A**

Table 26: Types of Training Reported by Survey Participants who Received at Least One Training Under FARM II

Training	Frequency	Percent of Trainings	Percent of Farmers
GAP	216	52.6	74.0
Collective Marketing	69	16.8	23.6
Post-Harvest Handling	51	12.4	17.5
Farming as a Business	36	8.8	12.3
Financial Literacy	15	3.6	5.1
Other	11	2.7	3.8
Crop Conditioning	7	1.7	2.4
Hermetic Bag	5	1.2	1.7
Exchange Visits	1	0.2	0.3
	411	**100**	**N/A**

Barriers to Farming

The FARM projects significantly invested in training and technical assistance for FBOs, cooperatives, and other organizations. The goal was to build their capacities in marketing, business management, and access to credit. Despite this assistance, many barriers still impede farmers from

Table 27: Biggest Barriers to Farming Reported by Survey Respondents

Top Barrier Cited	No. Farmers	Percent
Lack of financial capital	261	43.6
Weather/climate	126	21.1
Lack of improved technology	62	10.4
Lack of transport	34	5.7
Other	31	5.2
Distance to markets	25	4.2
Lack of technical skill	18	3.0
Poor roads	17	2.8
Insecurity	10	1.7
Lack of buyer	10	1.7
Sickness	3	0.5
Weeds kill the crops	1	0.2
Total	**598**	**100**

growing their businesses. Table 27 shows the biggest barriers to farming as a business, as reported by surveyed farmers. The top responses were lack of financial capital (43.6 percent), weather/climate (21.1 percent), and lack of improved technology (10.4 percent). Another 17.7 percent chose responses related to transportation and logistics. Interestingly, only 1.7 percent of the respondents listed insecurity as their main barrier to business. This suggests that agriculture in the Greenbelt can continue to develop despite the current conflict situation in South Sudan.

Experiences with FARM II

The survey also asked the 598 respondents 20 questions about their experiences with the FARM II project. Surveyors read each respondent a statement and asked how much they personally agreed or disagreed with it. Five response choices ranged from "Strongly Disagree" to "Strongly Agree." Table 28 on the next page shows the farmers' responses to these questions. These results provide insight into the benefits farmers gained from participating in the FARM project.

Production. FARM's production support significantly helped smallholders change their farming practices, as indicated by the 94 percent of farmers who agreed or strongly agreed that they are now seeing the benefits of new farming practices introduced by FARM and the 85 percent who agreed or strongly agreed that these new practices have given them a better-quality harvest. The survey also showed that FARM achieved sustainable results in this area. Almost all (93 percent) of the farmers agreed or strongly agreed that they will continue to apply the improved farming practices introduced by the project, and 84 percent agreed or strongly agreed that it is easy for them to apply these practices. In addition, the FARM projects helped farmer beneficiaries increase land under cultivation: 87 percent agreed or strongly agreed that they increased their farm size since they began working with the project.

Business and marketing. The survey showed that FARM helped smallholders improve their livelihoods, with 74 percent of respondents agreeing or strongly agreeing that the project helped them increase their revenue. The FARM projects also influenced capital investment in the agricultural sector: 74 percent of the farmers agreed or strongly agreed that they are reinvesting their profits into growing their farming business. Two responses make it clear that more work is needed to improve business and marketing practices. First, 63 percent of the farmers agreed or strongly agreed that they have difficulty getting their surplus harvest to market. Secondly, while 58 percent of the farmers disagreed or strongly disagreed with the claim that collective marketing is not worthwhile, 37 percent agreed or strongly agreed with this negative statement. Resources remain a problem as well. Approximately one-half of the farmers surveyed agreed or strongly agreed that it is too expensive to apply all the practices introduced by the project and 83 percent agreed or strongly agreed that they do not have sufficient capital to operate their farms as a business. The lack of resources is also reflected by the almost 60 percent of survey respondents who agreed or strongly agreed that they use their surplus crops to feed their families. Responses towards good and transparent management remains rather mixed among farmers. While 41 percent of the respondents disagreed or strong disagreed with the statement that

bookkeeping requires too much time, 39 percent of the farmers agreed or strongly agreed with the claim. More financial literacy and business skill development training is needed in the Greenbelt.

Governance. The FARM projects helped farmers organize into FBOs and establish governance structures and systems within these community organizations. Although this was the first time many of them had worked in a civil society environment, the farmers participated actively in these organizations. The vast majority of the farmers interviewed (92 percent) stated that they often participate in FBO activities. In addition, 77 percent of respondents disagreed or strongly disagreed with the negative statement that "decisions in my FBO are made without input from members," while 96 percent of the farmers agreed or strongly agreed that their FBOs encourage all their members to voice their opinions. Almost 95 percent of the farmers reported sharing what they have learned with other farmers. This very important statistic shows that farmers are highly cooperative and that they are working with one another. This dynamic should be encouraged and built upon to further scale up agricultural extension services.

The survey also pointed out areas for strengthening future agricultural development programs. While 46 percent of the respondents responded negatively to the statement "I prefer to farm the way I always have," 35 percent agreed or strongly agreed with the statement, indicating that there is more work to be done to convince farmers of the benefits of improved technologies and practices. In addition, 91 percent of the farmers agreed or strongly agreed that they require additional information in order to apply all that they have learned from FARM. Forty-three percent of farmers surveyed agreed or strongly agreed with the statement that they have difficulty applying improved farming techniques to all crops equally.

Table 28: Farmers' Experiences with Farming, FBOs, and the FARM Projects

Question/Statement	Refused to Answer	Don't Know	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
It was easy to apply the good agricultural practices I learned in FARM trainings	0.5	2.5	5.2	5.9	1.7	41.1	**43.1**
It was too costly to apply all of the good agricultural practices I learned in FARM trainings	0.8	3.5	18.6	**24.7**	2.2	37	13.2
I require additional information in order to apply all that I have learned from FARM	0.7	0.8	1.7	4.2	1.2	39.1	**52.3**
Collective farming is not worthwhile	0.0	0.8	**30.3**	28.6	3.3	17.4	19.6
I do not have the capital I require to successfully run my farm as a business	0.0	0.2	7.9	7.7	0.8	39.1	**44.3**
I have a surplus harvest that I would like to sell, but I cannot easily get to the market	0.3	0.0	12.5	23.2	0.8	**38.3**	24.7
When I have surplus harvest, I use it to feed my family	0.0	0.2	12	22.9	5.5	29.4	**29.9**

Question/Statement	Refused to Answer	Don't Know	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
My business revenue has increased as a result of practices I learned from FARM	0.7	1.5	7.4	12.7	3.3	**43.6**	30.8
I intend to continue applying the improved farming practices I have learned	0.3	1.2	1.2	2.7	0.8	45	**48.8**
Improved farming practices have given me a better quality harvest	0.2	1.3	3.5	7.2	2	**45.8**	40
I see the benefit in applying new farming practices	0.5	1.2	1.2	2.3	1.2	**51.5**	42.1
I share information that I have learned with other farmers	0.2	0.8	0.8	2.5	0.8	42.5	**52.3**
Book keeping requires too much time	0.3	12.9	17.7	23.6	6	**25.8**	13.7
I prefer to farm the way I always have	0.3	0.3	20.9	**35.1**	8.4	18.9	16.1
I participate often in FBO activities	0.0	0.7	2.5	3.8	0.3	44.5	**48.2**
It is difficult for me to apply improved farming techniques to all crops equally	0.5	2.3	19.4	30.6	3.7	**30.9**	12.5
I am able to reinvest my profit to grow my business	1.5	1.3	7.7	12.9	2.2	**46.5**	27.9
The size of my farm has increased since I have begun working with FARM	0.2	0.5	3	6.4	2	**46.3**	41.6
My FBO encourages all members to voice their opinions	0.0	0.5	1.3	1.2	0.7	42.5	**53.8**
Decisions in my FBO are made without input from members	0.0	0.3	**43.6**	32.4	1.2	11.2	11.2

FBO ASSESSMENT

In addition to surveying farmers, Forcier Consulting randomly selected and surveyed 74 FBOs—10 percent of the 732 FBOs assisted by the FARM II project. This included 30 FBOs in Central Equatoria and 29 in Eastern Equatoria. In these states, the survey covered all 12 payams served by the FARM project (four per county, with three counties in each state). In Western Equatoria, the survey only included 16 FBOs in the nine payams that were covered by both FARM I and FARM II (three in each of the three counties). FBOs in FARM II's new payams could not be surveyed due to the conflict situation in this state.

Of the FBO representatives interviewed for this study, 86 percent were male and 13 percent were female. When taken together with the farmer survey, for which 53 percent of randomly sampled respondents were female, this result shows that although women play a vital role in the agricultural sector, farming organizations are primarily led by men.

Another finding from the study was that FBO leaders are better-educated than farmers in general. Although the majority (51 percent) of FBO representatives did not have a full primary school education, this percentage is much lower than the 74 percent of farmers interviewed who reported not having completed primary school. And 15 percent of FBO leaders received a full secondary education or higher, compared to approximately 7 percent of farmers who have this higher level of schooling.

The average age of the representatives interviewed was 41, with ages ranging from 20 to 72. Approximately 88 percent of FBO representatives interviewed held the title of Chairperson or Secretary. Other titles included Lead Farmer, Treasurer, Vice-Chairperson, or Vice-Secretary. The vast majority of representatives interviewed (96 percent) had been members of their FBOs for more than one year. The average length of membership was almost four years; most representatives had held their current FBO positions for the same length of time, showing that leadership is static rather than rotating.

FBO Membership and Structures

The membership of the FBOs surveyed ranges from 11 to 70, with an average of 27 members per group. The FBO representatives reported that approximately 70 percent of their members are active in their organization. The primary membership requirements for FBOs are to:

- be a farmer (reported by 48 FBOs)
- attend meetings (reported by 41 FBOs)
- pay membership fees (reported by 41 FBOs)
- have a field (reported by 34 FBOs)
- live or farm near the FBO (reported by 26 FBOs)

Table 29: Frequency of Membership Fee Collection

Frequency	Percent of Respondents
One-time initiation payment	31
Annual	27
Three times per year	1
Monthly	22
Other	19
Total	**100**

Table 30: Farmer Benefits from Joining FBOs, as Reported by FBOs Surveyed

Top Benefit Cited	No. FBOs	Percent
Seeds	21	28
Training	20	27
Improved farmer income	10	14
Collective marketing	9	12
Learning from other farmers	9	12
Improved storage	2	3
Collective bargaining	1	2
Improved technology	1	1
Nothing completely	1	1
Total	**74**	**100**

More than 80 percent of FBOs interviewed collect membership fees from their members. As shown in Table 29, approximately 31 percent of those require a one-time initiation fee to join the group. Approximately 27 percent require an annual payment, while 21.6 percent require monthly payments. The FBOs that collect periodic payments from their members have an average membership fee of 209 SSP.[10] Approximately 40 percent of the FBOs reported that their membership is growing, while 32 percent reported that the size of their membership has not changed.

The FBO representatives showed strong familiarity with and knowledge of their groups' structures and experiences. The representatives were quite knowledgeable about their FBOs' leadership positions. When asked which leadership positions exist in their FBOs, 70 respondents named Chairperson, 65 cited Secretary, 61 said Treasurer, and 52 named Vice-Chair. Other frequently

[10] The local market exchange rate greatly deteriorated during the contract period, beginning at approximately 4.1 SSP/$US to ending over 30 SSP/$US. Therefore, US dollar of this amount ranges from approximately $7 to $52.

identified positions included Vice-Secretary, Information Secretary, and Lead Farmer. These responses highlight the FBOs' clear organizational structures.

As shown in Table 30 on the previous page, when asked what primary benefits farmers gained from joining an FBO, the most prevalent responses were receipt of seed and training. Other common responses included income improvement, collective marketing, and learning from other farmers.

Experiences with the FARM Projects

When asked which FARM project management and marketing trainings for FBOs had been most helpful, one-third of representatives surveyed said cooperative formation. As shown in Table 31, other responses included collective marketing (almost 32 percent), enterprise financial management (12.7 percent), and governance (9.5 percent).

Table 31: Most Beneficial FARM Trainings, as Reported by FBO Representatives Surveyed

Most Beneficial Training Cited	No. FBOs	Percent
Cooperative formation	21	33.3
Collective marketing	20	31.7
Enterprise financial management	8	12.7
Governance (operations management)	6	9.5
Don't know	4	6.3
Business development services	3	4.8
Refused to answer	1	1.6
Total	**63**	**100**

The survey asked the FBO representatives 15 questions about their organizations' capacities, operations, and experiences with the FARM projects. Surveyors read each respondent a statement and asked how much they personally agreed or disagreed with it. Five response choices ranged from "Strongly Disagree" to "Strongly Agree." Table 32 on the following page shows the FBO representatives' responses to these questions. These responses provide valuable information for assessing the FARM projects' impact and for planning future agricultural programs in South Sudan.

One key finding was that the FARM projects' FBO model has proven to be a successful way to deliver extension services, as 97 percent of the respondents either agreed or strongly agreed that their members benefit from participating in their FBO. FARM's model has also been able to achieve sustainability. Eighty-five percent of the FBO representatives either agreed or strongly agreed that their organization will continue to function regardless of future project support; 62 percent felt that the project provided sufficient training support for their organization.

Governance. The project's governance work, which emphasized group participation and decision-making, was effective. Evidence of this lies in the 82 percent of representatives who either agreed or strongly agreed that their members participate equally in their FBOs, and the 98 percent who felt that their FBOs encourage members to voice their opinions. In addition, 78 percent stated that decisions are not made without member input, and 71 percent stated that access to information is not confined to important members of their FBOs. In addition, FARM's support had an impact on improving FBO management skills. Of those surveyed, 94 percent carefully keep financial records, 95 percent agreed that their FBOs have sufficient skills to operate their organizations, and 100 percent reported that their

FBOs are in good standing with their local government. The FBO model also enabled FARM to successfully facilitate the spread of farming technology and knowledge in the region, as shown by the 77 percent of FBOs representatives reported that they routinely work with other FBOs in their areas.

Marketing and expansion. Responses showed advances in the areas of marketing and expansion, but also indicated that additional support is needed in this area. Opinions on market expansion were split: 46 percent of the respondents felt that expanding into new markets is risky, while 50 percent did not. In addition, while 64 percent of the FBO representatives understood the importance of product quality for marketing purposes, 33 percent stated that they would accept poor quality produce from member farmers. It is also evident that more work is needed to improve access to credit in the agricultural sector and reinforce investment principals among FBOs. All respondents reported that their FBOs need additional tools and supplies to be successful. Seventy-four percent felt that their FBO was readily able to secure loans, suggesting that FBOs may not be fully aware of the standards they must meet to access commercial credit from local financial institutions.

Table 32: FBO Capacities, Operations, and Experiences with the FARM Projects

Question/Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Don't Know	Cumulative Percent
All FBO members participate equally	1.4	12.2	4.1	28.4	**54.1**	0.0	100
The FBO's financial records are kept carefully	0.0	5.4	0.0	45.9	**48.6**	0.0	100
The FBO's leaders have the appropriate skills to achieve its purpose	0.0	1.4	2.7	**58.1**	37.8	0.0	100
The FBO routinely works with other FBOs	6.8	14.9	1.4	**40.5**	36.5	0.0	100
The FBO is in good standing with the local government	0.0	0.0	0.0	40.5	**59.5**	0.0	100
Our members are readily able to secure loans	8.1	17.6	0.0	31.1	**43.2**	0.0	100
Our members have already benefitted from participation	1.4	1.4	0.0	**56.8**	40.5	0.0	100
The FARM project provided enough training support	14.9	17.6	4.1	**45.9**	16.2	1.4	100
Our FBO encourages all members to voice their opinions	0.0	0.0	1.4	35.1	**63.5**	0.0	100
Our FBO will continue to function regardless of future support from the FARM project	5.4	4.1	4.1	39.2	**45.9**	1.4	100
The FBO feels that expanding into new markets is very risky	23	27	4.1	**28.4**	17.6	0.0	100
If a buyer is available, the FBO will accept low quality	20.3	**44.6**	1.4	17.6	16.2	0.0	100

produce from farmers to meet the buyer's demand							
Only important people in the FBO have access to information	**39.2**	32.4	0.0	17.6	10.8	0.0	100
Our FBO requires additional tools and supplies to be successful	0.0	0.0	0.0	20.3	**79.7**	0.0	100
Decisions in my FBO are made without input from all members	**44.6**	33.8	1.4	9.5	10.8	0.0	

YIELD ASSESSMENT SUMMARY

Increasing harvest yields is the project's most important indicator for measuring the impact it has had on farmers and their resiliency in South Sudan. Quadrupling or quintupling smallholder productivity not only frees these farmers from humanitarian assistance, it allows them to grow surpluses to sell in the market and encourages them to invest in their farming businesses. It brings these farmers into a societal framework as they become participants in their local economies. This dynamic requires the farmers to become much more engaged with civil society, as they become interdependent with one another for their own self-interest and the greater good of their communities. Increasing farmer yields is an empowering opportunity for all segments of the population, providing hope and pride to the rural poor and bringing them back to their rich agricultural tradition.

Due to the difficulties inherent in assessing yields in South Sudan's very challenging environment, the first FARM project only assessed maize yields, since this is the primary crop grown in the Greenbelt. Maize was used as a proxy for all other crops and served as the main indicator for measuring the FARM's impact on beneficiary farmers' productivity levels. The project conducted an initial assessment of maize yields during its first year of operation in 2010. This assessment measured yields at 800 kg/ha. Since this result was consistent with previous maize studies carried out by other organizations, it was accepted as the project's baseline.

FARM then began conducting yield assessments for each maize harvest following the first seed distribution in 2011. Project staff oversaw and carried out yield assessments from 2011 through 2014. Government counterparts were brought into the process, as the assessments also served as a capacity development exercise that both showed stakeholders how to measure yields and demonstrated the much higher yields that can be achieved using modern interventions. By 2013, average yields grew beyond 3,000 kg/ha, and the FARM project became concerned that they were too high.

To address this concern, the FARM II project subcontracted the Norman Borlaug Institute for International Agriculture of Texas A&M University to conduct a more independent yield assessment. A Borlaug Institute yield assessment specialist made three trips to South Sudan during the course of FARM II to study the project's activities. He worked with project staff, traveled to field sites, developed assessment protocols, and trained project extension workers to conduct yield assessments in farmers' fields. FARM II also expanded the yield assessment activity beyond maize to include groundnuts, cassava, and beans.

Project extension workers conducted yield assessments in December 2015 and January 2016, when crops from the second 2015 planting season were harvested. The project carried out the assessment in six of FARM II's nine counties: three each in Eastern Equatoria and Central Equatoria. Violence in

Western Equatoria prevented the team from completing yield assessments in this state. The assessments targeted 450 project-supported farmers, combined with a control group of 239 farmers who did not receive direct FARM support. The project was unable to reach all the targeted farmers for several reasons: rains at the time of data collection made roads inaccessible, a significant drought in Eastern Equatoria caused some farmers to lose their harvests, and some farmers harvested their crops before their yields could be assessed. These constraints limited data collection to 365 FARM II beneficiary farmers (including 151 female farmers) and 100 control group farmers (including 51 females). The final number of project beneficiaries whose crops were assessed represented more than 2.5 percent of the 14,155 farmers on FARM II's beneficiary list. All farmers—both those in the FARM II group and those in the control group—were randomly selected for the study. Table 33 shows the distribution of beneficiary and control group farmers who participated in the yield assessment study.

Table 33: Distribution of Farmers Included in the Yield Assessment Study (No. of Farmers)

County	Maize		Groundnuts		Beans		Cassava		Total		Total
	FARM	Control	FARM	Control	FARM	Control	FARM	Control	FARM	Control	
Kajo-Keji	21	13	13	7	13	9	6	4	53	33	**86**
Morobo	27	11	18	8	18	8	13	6	76	33	**109**
Yei	25	10	13	10	2	1	11	6	51	27	**78**
CES Total	**73**	**34**	**44**	**25**	**33**	**18**	**30**	**16**	**180**	**93**	**273**
Ikwoto	20	0	24	0	24	3	4	2	72	5	**77**
Magwi	41	0	14	0	17	0	7	0	79	2	**79**
Torit	21	0	4	0	4	0	5	2	34	0	**36**
EES Total	**82**	**0**	**42**	**0**	**45**	**3**	**16**	**4**	**185**	**7**	**192**
Total	**155**	**34**	**86**	**25**	**78**	**21**	**46**	**20**	**365**	**100**	**465**

The overall results of the yield assessments were relatively high. Yield results are not only contingent on the adoption of the improved seeds and application of good agronomic practices introduced by the project, but are also highly dependent on the amount of rainfall and the quality and nutrient levels of cultivated land. Yield measurements are affected by how closely project field extension workers adhered to the protocols established by the Borlaug Institute. Since assessments for groundnuts, beans, and cassava had not been previously conducted, the project recommends additional annual yield assessments for these crops to cross-check and validate the finding in this study. It is important to note that although very little fertilizer is currently being used in South Sudan, much of the land used for this study has lain fallow for many years and is therefore highly rich in nutrients. Continual use of this land over several years will decrease fertility levels, making the land less productive as time passes.

The yield assessment results for FARM II's four major crops are briefly analyzed below, followed by a discussion of results by gender, age, surveyed farmers' education levels, and location.

Crop-Specific Results

Maize

The average maize yield for FARM II beneficiary farmers participating in the assessment was 4,274 kg/ha. This is significantly higher than the average yield achieved by farmers in the control group, which was 3,510 kg/ha. The 22 percent gap between the beneficiary and control group yields can largely be attributed to the impact of improved seed and GAP training that the beneficiary farmers received from the project. All beneficiary farmers used the Longe 5 seed variety distributed by the project. In the control group, only 62 percent of farmers planted Longe 5 seed. During field visits, the Borlaug assessment specialist conducting the survey observed incorrect practices (largely among non-beneficiary farmers) such as scattered planting of maize seed and planting more than one seed per hole. These practices can reduce yields, as uniform plant distribution is one of the fundamental factors needed to achieve an optimal yield.

The Borlaug Institute's assessment results show that smallholder yields for the 2015 season were 4,274 kg/ha—a 535 percent increase over the 2010 baseline. Research has shown that the Longe 5 maize variety introduced by FARM has potential yields up to approximately 6,000 kg/ha under optimal growing conditions. As shown in the assessment, therefore, FARM II-supported farmers have reached 71 percent of the maximum potential for this seed variety.

An additional positive finding of the study is that the knowledge and technology introduced by the project is spreading to non-beneficiary farmers. Evidence of this was in the average yields for farmers in the control group, which were well above both the 2010 baseline of 800 kg/ha and the African continent average of 2,098 kg/ha. The assessment also suggests that informal markets are being formed for modern seed technology, as 62 percent of the control group farmers planted Longe 5 seed.

Groundnuts

The average yield for FARM II's beneficiary farmers was 2,487 kg/ha, which is 37 percent higher than the control group farmers' average yield of 1,814 kg/ha. Interestingly, the average plant density for the control group (165,867 plants/ha) was 37 percent higher than the beneficiary groups' average of 120,651 plants/ha. The red beauty variety distributed by the project was planted by 90 percent of farmers in the beneficiary group compared to 36 percent of farmers in the control group.

Assessment results show that FARM II had a significant impact on increasing beneficiary farmers' groundnut productivity. In addition to the seed, the fact that the beneficiary farmers' lower plant density generated higher yields also shows that GAPs were adopted. It is important to note that project beneficiaries out-performed average groundnut yields for the African continent by 250 percent and were not much lower than the 2,598 kg/ha yields achieved in Kenya.

Beans

The yield assessment showed that the project's beneficiary farmers, whose average yield for beans was 3,084 kg/ha, were 67 percent more productive than the control group, which averaged 1,856kg/ha. The beneficiary farmers achieved these results with a 36 percent lower plant density—they planted 85,344 plants/ha compared to the 115,446 plants/ha planted by the control group. All beneficiary farmers included in this survey used the improved bean variety K132, while 50 percent of the control group used this seed. The yield assessment shows that FARM II's impact on increasing smallholder productivity was greater for beans than for other crops. The project introduced beans a few years later than the other three crops assessed, which may partially explain the greater differential.

In summary, farmers planting this crop achieved higher yields while planting fewer seeds per hectare. This result suggests the impact of FARM II's GAP training programs. Interestingly, beneficiary farmers were able to more than triple the productivity of the average farm in Africa. They well exceeded productivity yields in Kenya and Uganda. Bean yields for FARM II-supported farmers, as shown in the assessment, closely match the yields recorded for South Sudan in the website of the Statistics Division of the Food and Agriculture Organization of the United Nations (FAOSTAT), which suggests further investigation.

Cassava

Assessment results show little difference between cassava yields and plant density among the beneficiary and control groups. However, the real significance is that the FARM II-supported farmers grew fewer diseased crops. The study showed that 83 percent of the FARM II crop was marketable, compared to 77 percent of the control group growers' crop. The assessment also shows that cassava yields in South Sudan were outstanding compared to African continent averages, as many countries, including Uganda, are battling cassava plant infections such as Cassava Mosaic Disease and Brown Leaf Spot Disease.

Yield Comparisons with Other African Countries

Table 34 compares the crop yields calculated by the Borlaug assessment with those in neighboring countries and with the African continent more broadly as reported by FAOSTAT in 2014. Given the strong overall results shown in the yield assessment, it is apparent that the Greenbelt has the potential to become an agricultural power in the region, greatly contribute to solving the food security challenges of the country, and provide opportunities for economic advancement. This suggests that further support and long-term investment in the sector, both public and private (particularly in areas such as infrastructure, marketing systems, capacity development, and the enabling environment) would yield significant returns for the country.

Table 34: Crop Yield Comparisons by Country or Location (kg/ha)

Location/Country	Maize	Groundnuts	Beans	Cassava
Greenbelt FARM II Beneficiary	4,274	2,487	3,084	42,506
Greenbelt FARM II Control	3,510	1,814	1,856	42,052
Uganda *	2,500	700	1,300	3,300
Kenya *	1,660	2,598	585	13,471
DRC *	778	768	610	8,077
Chad*	1,260	900	1,260	10,442
South Sudan (FAO)*	964	533	3,090	1,666
African Continent*	2,098	961	816	8,379

*Data Source: FAO Website www.faostat3.fao.org

Other Learnings from Yield Assessments

Gender

Female farmers achieved higher yields for maize and cassava than their male counterparts, while male farmers achieved higher yields with groundnut and beans. Both gender groups out-performed the survey's control group. The gender disparity was widest in bean yields, 65 percent. This can be partially attributed to differences in plant density, as women planted approximately one-quarter more plants per hectare than their male counterparts, thus overcrowding their fields. The results show that both male

and female farmers can greatly benefit from using improved seed varietals and adopting good agricultural practices and that including both female and male farmers in FARM project programming was significantly empowering to both genders.

Table 35: Comparison of Smallholder Yields (kg/ha) by Gender

Gender	Maize	Groundnuts	Beans	Cassava
Beneficiary Men	4,084	2,487	3,079	40,847
Beneficiary Women	4,143	2,004	1,863	44,163
Control (Men and Women)	3,510	1,814	1,856	42,359

Education

The yield assessment indicated that 81 percent of the farmers included in the survey had no education or some education up to completion of primary school. The results shown in the table below reveal that the uneducated or those receiving no more than a primary education generally out-performed their more educated counterparts, particularly for maize and groundnuts. However, the uneducated farmers' productivity for beans and cassava dipped compared to their more educated counterparts. Interestingly, the productivity of the two higher-education groups performed at a lower level than the control groups for groundnuts and beans. The results show that GAP training can be effectively delivered to beneficiaries with no education or low levels of education using appropriate training techniques. The study also suggests that less-educated farmers may have more time or incentives to appropriately apply the GAP techniques that were introduced by FARM than their more educated counterparts.

Table 36: Farmer Education Levels and Crop Yields (kg/ha)

Education Level	Maize	Groundnuts	Beans	Cassava
Uneducated	5,690	2,527	1,532	22,474
Primary	4,062	2,413	3,017	44,563
Secondary	4,053	1,613	1,701	41,202
Above Secondary	3,936	1,209	1,375	43,820
Control	3,510	1,814	1,856	42,359

Age

The yield assessment shows that the FARM II project had an impact on increasing productivity among all age groups, as shown in Table 37. While farmers can achieve high rates of productivity from youth to middle age, the assessment suggests that productivity generally tappers off for beneficiaries after age 50. However, the assessment also shows that the productivity of maize farmers in their 50s exceeded the productivity of the control group. It is important to note that older project beneficiaries' productivity for all four crops was higher than that of like-aged farmers in the control group.

Table 37: Farmers' Ages and Crop Yields (kg/ha)

Age	Maize	Groundnuts	Beans	Cassava
20-29	3,836	2,389	3,339	36,985
30-39	4,307	2,598	2,184	48,421
40-49	3,917	2,144	3,005	48,444
50+	4,219	1,485	1,651	27,853
Unspecified	4,076	1,742	3,110	----
Control	3,510	1,814	1,856	42,359

Location

Crop yields varied considerably by location. Table 38 shows crop yields for the six counties in Eastern and Central Equatoria included in the yield assessment. The highest yields for all four crops were found in Eastern Equatoria: maize, groundnuts, and beans in Ikwoto County and cassava in Torit County. This is largely attributed to the very high results achieved in Ikwoto County. Ikwoto has higher altitudes and rainfall levels compared to the other five counties covered by the assessment, which likely explains farmers' higher levels of productivity in that county. However, Ikwoto is also the most remote county of those assessed, which poses access and security challenges that affect marketing and distribution of crops. In addition, Ikwoto had the lowest marketing index for cassava, suggesting that disease is more prevalent in this area. Central Equatoria showed the lowest yields for all four crops: maize, groundnuts, and beans in Yei County and cassava in Kajo-Keji County, which may be associated with lower soil fertility and rainfall.

Table 38: Yields (kg/ha) by Crop and Location

Location	Maize	Groundnuts	Beans	Cassava
Central Equatoria State				
Morobo	4,315	2,377	1,675	40,043
Kajo-Keji	4,322	2,275	1,480	30,823
Yei	3,591	1,282	1,066	45,998
Subtotal	4,048	1,975	1,532	39,446
Eastern Equatoria State				
Magwi	4,191	2,196	N/A	51,066
Torit	3,736	N/A	N/A	53,859
Ikwoto	6,052	3,477	4,138	48,306
Subtotal	**4,265**	**3,198**	**4,138**	**50,479**