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# IFDC *report*

An update on the work and progress of IFDC

The Importance of  
Fertilizer Deep Placement

2SCALE Promotes  
Public-Private Partnerships

FTF-USAID-ATT Project in Ghana

IFDC Field Training Activities in 2012

Land-Grant Colleges: A Quiet Legacy



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IFDC is a public international organization, governed by a board of directors with representation from developed and developing countries. The nonprofit Center is supported by various bilateral and multilateral aid agencies, private foundations and national governments. IFDC focuses on increasing and sustaining food security and agricultural productivity in developing countries through the development and transfer of effective and environmentally sound crop nutrient technology and agribusiness expertise.

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# FDP

Fertilizer  
Deep  
Placement



# Fertilizer Deep Placement

**T**he global population is expected to increase from more than 7 billion today to 9.2 billion by 2050, creating enormous challenges as the world's farmers work to provide adequate quantities of nutritious food. Farmers in a number of developing countries are using fertilizer deep placement (FDP) technology to increase crop yields and incomes, reduce the amount of fertilizer used and lessen environmental damage to the atmosphere and water.

## What is FDP Technology?

Working with farmers (particularly in Bangladesh) for over 35 years, IFDC developed FDP as a more effective alternative to the traditional method of applying fertilizer by surface broadcasting (spreading, usually by hand) across a field or paddy. FDP is an innovative, proven fertilizer application technology that achieves average yield increases of 18 percent while reducing fertilizer use by about one-third. Compared with broadcasting, farmers using FDP have increased incremental annual incomes by more than US \$200 per hectare (ha).<sup>1</sup>

FDP consists of two key components. The first is a fertilizer 'briquette,' produced by compacting commercially available

solid fertilizers. IFDC staff designed a sturdy 'briquetter,' suitable to operating conditions in developing countries. A briquetter produces 1- to 3-gram briquettes that are much larger than conventional fertilizer granules (photographs 1-4, page 2). FDP briquettes are currently produced by more than 1,000 entrepreneurs with small-scale briquetting machines. Village-level briquetter operators sell fertilizer briquettes to farmers and fertilizer stockists. Briquettes can also be produced by commercial fertilizer manufacturing facilities.

The second key component of FDP is the placement of briquettes below the soil surface. When used to fertilize irrigated rice, briquettes are centered between four plants at a depth of 7-10 centimeters within seven days after transplanting. Placement is done either by hand or with a mechanical applicator (photographs 5-6, page 3). Thus placed, the briquette releases nitrogen (N) gradually, coinciding with the crop's requirements during the growing season.

The most widely used nitrogen fertilizer is urea, which contains 46 percent N, the highest of all solid fertilizers. While the majority of FDP activity has focused on urea briquettes to fertilize irrigated transplanted rice, blends of nitrogen, phosphorus and potassium (the three primary nutrients needed for optimum crop growth) have also been successfully compacted into briquettes to improve yields of rice and other crops. Micronutrients (critical to the health of plants and humans) also have been added successfully to briquettes under research conditions.

<sup>1</sup> Based upon 2012 prices paid by farmers for fertilizers and prices received for rice.



▲ 1) Prilled urea is poured into a briquetter. 2) A briquetter produces briquettes. 3) FDP briquettes. 4) The relative size of briquettes is shown.

## How Does FDP Work?

When urea is broadcast into flooded rice fields, a large proportion of the N is wasted – lost through runoff, volatilization (atmospheric evaporation) and nitrification/denitrification. Denitrification also produces nitrous oxide (N<sub>2</sub>O), a harmful greenhouse gas (GHG) that contributes to climate change. Additional amounts of N are converted to nitrates, which are mobile in the soil and can contaminate groundwater. Nitrogen can also pollute nearby waterways if runoff/floodwater escapes a field's containment barriers.

With FDP, urea is deep-placed into the soil, where the majority remains in the form of ammonium, which is much less mobile than nitrates. As a consequence, more N is available to the crop throughout its growth cycle. Therefore, losses to the atmosphere, groundwater and waterways are drastically reduced. Only about 4 percent of the N is lost to the environment, compared with about 35 percent when N is applied via broadcasting (Figure 1, page 3). FDP dramatically improves a crop's absorption of N – two-thirds is absorbed by the rice grain and straw (post-harvest residue), compared with one-third when the broadcast application method is used (Figure 2, page 4).

## Labor Needed for FDP

While deep-placing briquettes is more labor-intensive than broadcasting, FDP is done only once, but broadcasting urea is commonly done two or even three times per season. However, IFDC, several research institutes and private sector entrepreneurs are working to perfect mechanical

applicators that will decrease the labor needed to deep-place briquettes. Fewer weeds grow when FDP is used, decreasing weeding labor and often offsetting additional application labor. Finally, IFDC research and farmer results validate that FDP technology produces higher average rice yields than broadcasting, which requires additional high-cost urea per ha. Any increased labor costs are more than compensated for by farmers' savings on fertilizer, decreased weeding costs and increased rice yields.

## Benefits of FDP

- **For Farmers:** FDP decreases production costs (because an average of 33 percent less fertilizer is used), increases yield (an average of 15 to 18 percent, depending upon the crop and season), increases incomes and improves household food security. In rice cropping systems, farmers achieve additional yield increases averaging 800 kilograms (kg)/ha. While the gross margin achieved depends upon many factors (including fertilizer and crop prices), Bangladeshi rice farmers using FDP have gross margins that exceed \$200/ha.<sup>2</sup>
- **For Entrepreneurs/Dealers:** FDP provides profitable business opportunities and contributes to local economic development. In Bangladesh, net returns to dealers who manufacture briquettes average about \$1 per 50-kg bag, or about \$20/metric ton (mt). In the first year of operation, most achieve sales of more than 60 mt.
- **For the National Economy:** FDP increases rural employment and crop production, decreases fertilizer

<sup>2</sup> Annual incomes in Bangladesh average \$848.

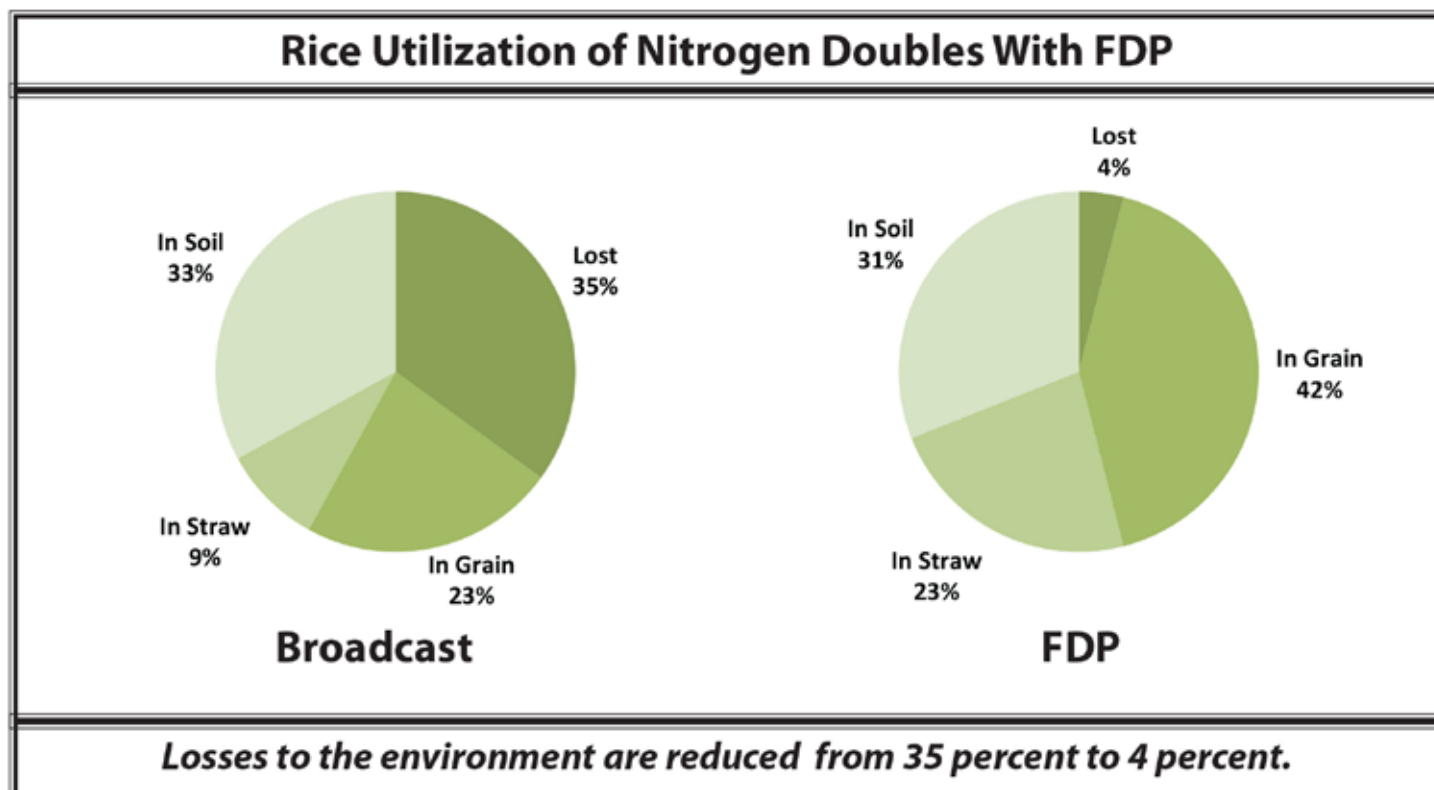


▲ 5) Farmers hand-place fertilizer briquettes in a rice paddy. 6) A farmer uses a mechanical applicator to deep-place briquettes.

use (and, therefore, the cost of government fertilizer subsidies), increases food security, reduces rice imports and increases the gross domestic product.

- **For the Environment:** FDP reduces N volatilization and emissions of harmful GHGs, as well as groundwater and waterway contamination. Because FDP doubles N utilization, the fuel required to produce urea is decreased by 50 percent, also reducing GHGs.

Figure 1



## Rice: The Essential Food for Nearly Half the World

Rice is *the* staple food crop for more than 3 billion people and is cultivated in over 100 countries on six continents. Rice provides employment for over 1 billion people in southern and southeastern Asia, as well as in other developing regions of the world. Farmers who also consume their rice harvests constitute the bulk of the world's population that lives in poverty. More than 90 percent of all rice is grown in Asia, where half of the global population and 80 percent of the world's poor are concentrated.

China, India and Indonesia grow the most rice. Much smaller Bangladesh is the world's fourth-largest rice producer; farmers there produced nearly 32 million metric tons (mmt) in 2010 on 11.36 million ha. In contrast, Sub-Saharan Africa (SSA) – with a land area of 23.6 million square kilometers (nearly 200 times larger than Bangladesh) produced only 21.5 mmt of rice on 10 million ha in 2010. Nonetheless, African rice production has risen 31 percent in the past 10 years. In fact, rice has become the second most important cereal crop in SSA.

### FDP and Rice Production

- Increases yields by 15-18 percent compared with fertilizer broadcasting.
- Reduces urea expenditures by about one-third.
- Improves grain quality, which may generate higher market prices.
- Ensures nitrogen availability throughout the growing season, resulting in fewer applications of fertilizer.
- Decreases N losses from volatilization, nitrification and denitrification (GHG emissions) and N contamination of floodwater runoff.
- Encourages better water management and line transplanting. Thus, weeding is easier and less labor-intensive. The cost of hired weeding labor is reduced by 25-35 percent.
- Rice straw contains more nitrogen and therefore is a better livestock feed.

Figure 2



## Benefits for Bangladesh

Working with its local and national partners, IFDC introduced FDP and other improved agricultural management practices in Bangladesh in the mid-1980s, generating significant agronomic, economic and environmental benefits. Currently, more than 2.5 million Bangladeshi farmers are using FDP (Figure 3, page 5), and its use is being expanded to an additional 1 million farmers across the country.

FDP has helped Bangladesh improve food security as well. With two crops per year, FDP provides an additional 4.9 persons with their annual rice needs per ha. In 2012, the increased value of rice was \$176.22 million, the value of incremental sales was \$48.69 million and the Government of Bangladesh saved more than \$29 million in fertilizer purchases and subsidies.

## Into Africa: FDP Brings Hope for Dramatically Increased Yields

The African continent ranks eighth in global paddy rice production (with the majority grown in West Africa). Rice has become the staple food for millions of Africans and is a major part of the diets of many others. However, even though African production has increased at an annual rate of 6 percent, Africa remains a net importer of rice. Domestically grown supplies simply have been inadequate to keep pace with rising demand.

Population pressure on Africa's arable land forces smallholder farmers to farm on marginal lands with infertile soil and to use cultivated land more intensively. Intensive farming is beneficial, but because fertilizer prices are much higher in Africa than the rest of the world, mineral fertilizer use is low and soil nutrients are being depleted. Consequently, yields are well below their potential and food production has not matched population growth in many African countries, resulting in chronic food insecurity.

IFDC began its African FDP initiative in 2009, targeting 13 countries across the continent (Figure 4, page 5). The objective is to use a market-driven approach to significantly increase rice yields through the use of FDP, hybrid rice varieties and improved water management practices. Initial results indicate increased net incomes for smallholder farmers, a reduced need for costly fertilizers and imported rice and decreased environmental damage.

To date, Burkina Faso, Niger and Nigeria have generated the best results. As in Bangladesh, FDP's advantages are proven. Rice yields with FDP (compared with broadcasting) average 30 percent more (an additional 1.2 mt/ha). In double cropping systems (two rice crops per year), farmers are realizing about \$400 in additional annual income per ha than farmers using traditional practices.



Figure 3

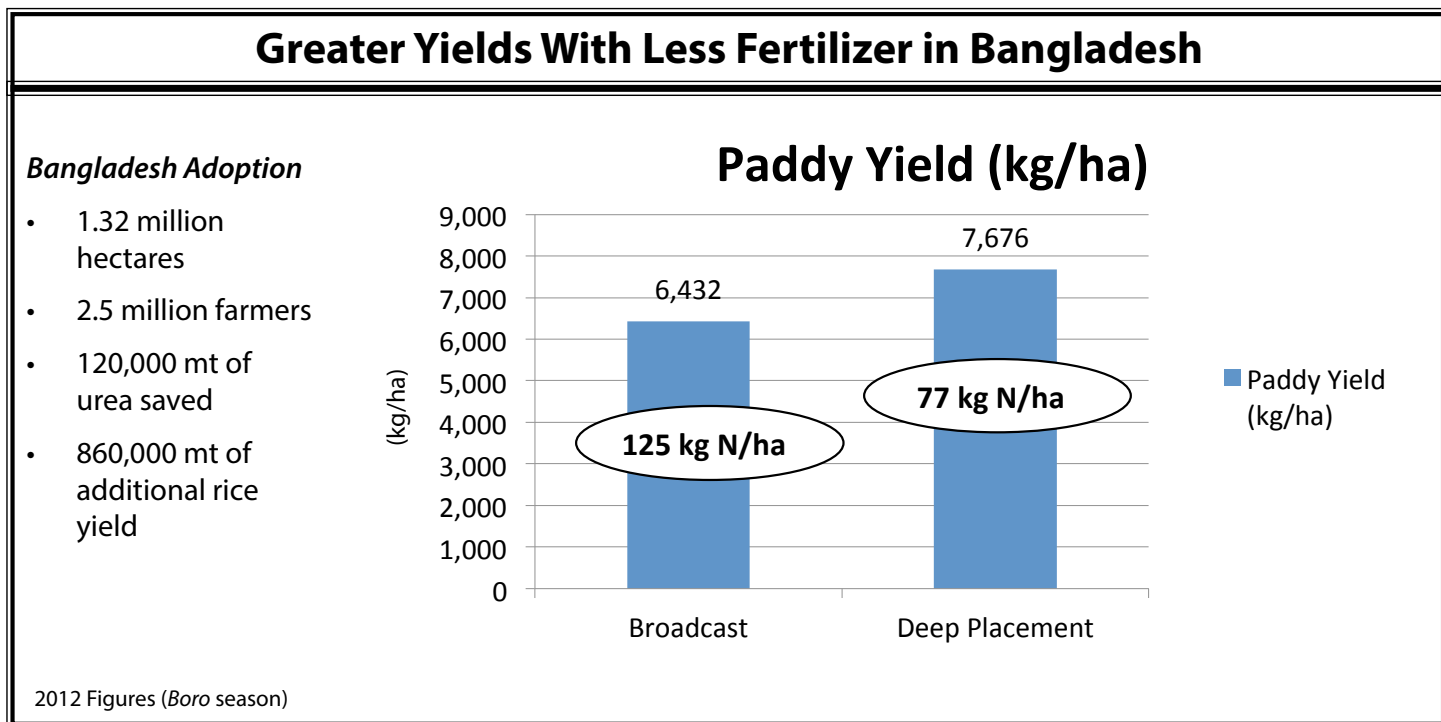
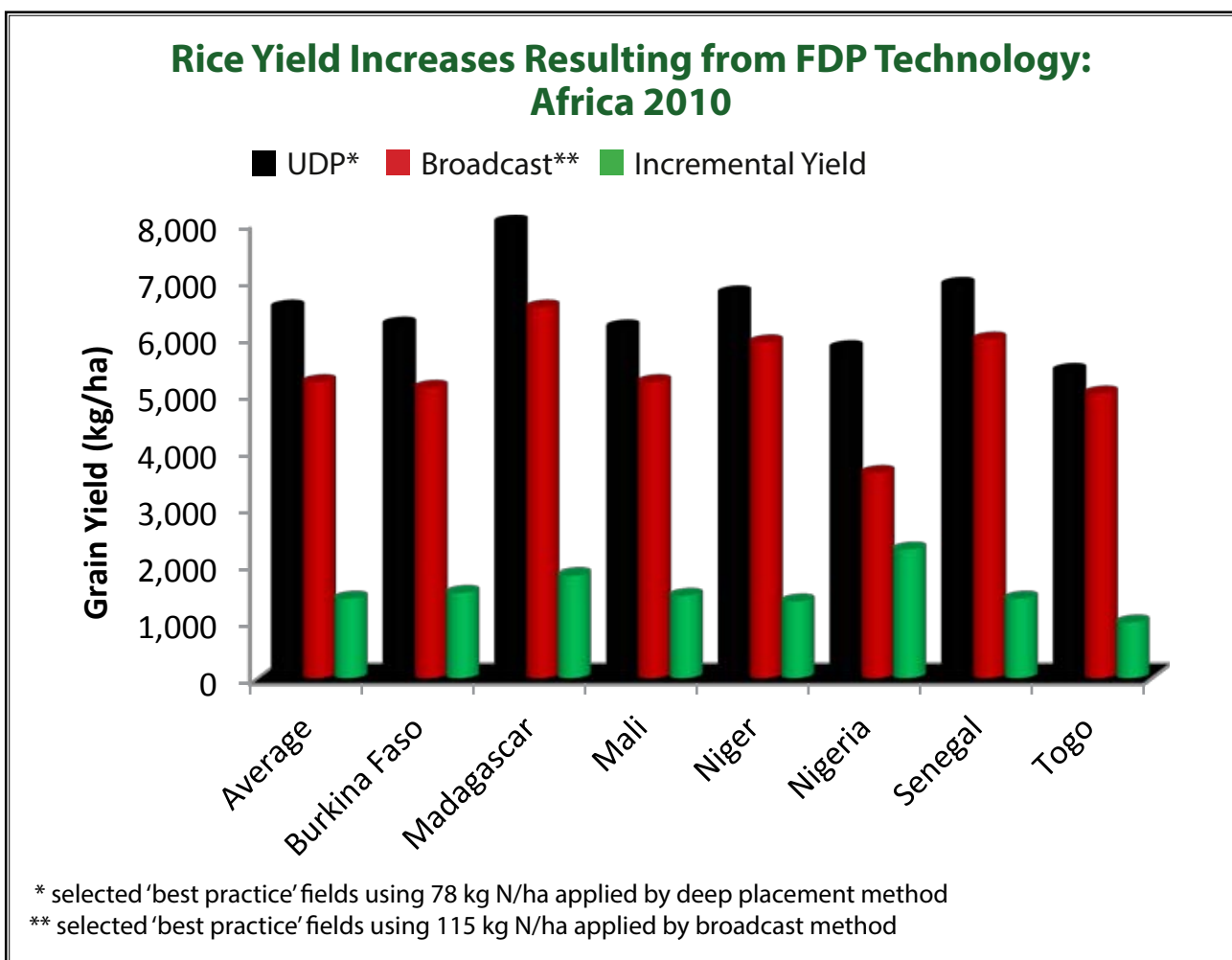


Figure 4





Moving forward, FDP is anticipated to generate the following benefits in SSA:

- Irrigated rice yields will increase from the current average of 2.1 mt/ha (farmer practice) to 6-7 mt/ha.
- Fertilizer efficiency in irrigated rice will increase from the current average of about 30 percent to 50-60 percent.
- Incomes of participating resource-poor rice farmers will increase as much as 25 percent.
- Local entrepreneurs will invest in and profit from the production and sale of FDP briquettes.

## FDP Use in Other Crops

While FDP has been used most widely on rice, initial field trials indicate that the technology is well-suited to vegetable and cereal crops (including sorghum, maize and wheat) that are dependent on N for full growth, as well as other crops such as sunflowers. In Bangladesh, 15-20 percent increases in maize yields have been achieved with FDP, while farmers use 15-20 percent less N. FDP's viability is being evaluated in wheat production in Ethiopia, and farmers and researchers in a number of countries are using FDP to grow vegetables and other high-value crops.

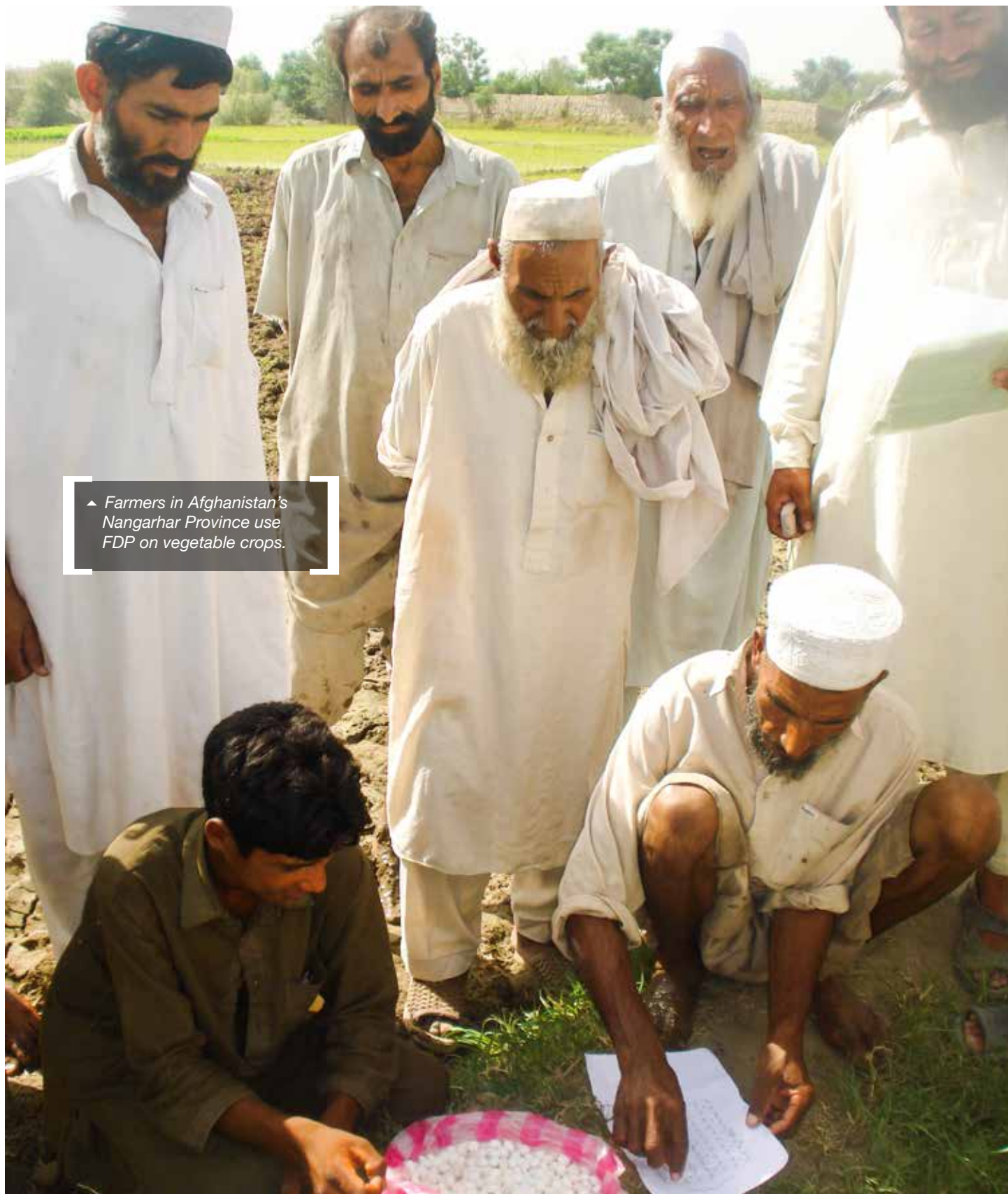
Because FDP briquettes have a consistent weight, smallholder farmers can provide relatively precise amounts of primary nutrients according to crop demand. FDP also has the potential to address secondary and micronutrient deficiencies, now recognized as a serious yield constraint (and human health issue). Additional nutrient incorporation into briquettes could further improve the economic and health benefits of fertilizer investments.

IFDC is conducting extensive research to validate FDP's agronomic performance and economic returns in various cropping systems. Ongoing collaboration with national agricultural research organizations is also a staple of FDP testing and validation. IFDC's links with Ministries of Agriculture have helped to efficiently and effectively navigate the public sector legal framework that applies to fertilizers.



## The Next Steps for FDP

FDP is a field-tested technology that increases crop yields, uses less fertilizer and decreases environmental damage. While the progress made to date is encouraging (particularly in Bangladesh with irrigated transplanted rice), the potential for FDP expansion remains immense. Research by IFDC and other organizations is underway to evaluate FDP's potential on a variety of crops, and the technology is being used and evaluated in about 20 countries in Asia, Latin America and Africa.



▲ Farmers in Afghanistan's Nangarhar Province use FDP on vegetable crops.

# AAP I Gross Margin Survey: FDP's Yield and Financial Benefits Proven

Gross margin surveys of smallholder farmers were conducted by Accelerating Agriculture Productivity Improvement (AAP I) project staff during the 2012 *Aman* growing season. These surveys continue to show significant upward trends in farmers' yields and gross margins using FDP compared with broadcast urea in rice cultivation. AAP I is funded by the U.S. Agency for International Development (USAID).

## Gross Margin Comparisons of FDP and Broadcast Urea

The most recent survey revealed that the average gross margin per ha using FDP technology was Taka (Tk) 22,089 (about \$273), while the average gross margin using broadcast urea was Tk 5,745 (about \$71). These results translate into a significant 284 percent gross margin increase because of the use of FDP technology (see table below).

## Consequences and Calculation of Gross Margins

For rice, the gross margin/ha is a measure of net income for that farm activity and an important Feed the Future (FTF) indicator of progress. An improvement in gross margin reflects an increase in a farmer's net income and profitability, leading to improved financial circumstances and reduced poverty. Consequently, an upward trend confirms that using FDP is a viable option for sustainable food production and food security.

AAP I used USAID's definition for calculating gross margin: "the difference between the total sale value of rice and the

cost of producing the rice (excluding family labor) divided by the total number of units (ha) in production." In accordance with the FTF indicator definition and guidelines provided by USAID, the gross margin is calculated first in financial terms, then by measuring the difference between earned revenue from the sale of paddy (rice) and straw and the costs incurred in production.

## Data Selection and Collection

AAP I initiated the gross margin surveys beginning with the *Aman* 2011 growing season and followed up in *Aman* 2012. Data was collected from both FDP and broadcast plots. The 52 *upazilas* (political sub-districts) surveyed were purposely selected from among those where FDP is used on more than 35,000 ha. The areas included 45 *upazilas* in FTF-focus districts while seven *upazilas* were in the Mymensingh and Sherpur districts.

The 2012 survey included 383 farmers from a randomly selected representative sample in AAP I project areas. The farmers were interviewed about several different topics – amount of land cultivated, cost of inputs (e.g., seed, irrigation, fertilizers and pesticides), hired labor and land rent, quantity of paddy and sale price of paddy.

## Weighted Average Gross Margin

As shown in the table below, the average total revenue/ha from the use of FDP technology was 27 percent higher than the average total revenue/ha from the use of broadcast urea. The benefit-cost ratio (BCR) of the FDP plot was 1.34, while the BCR of the broadcast urea plot was 1.09. The farmers are realizing a return of Tk 1.34 on average per Tk invested in rice production with FDP.

Weighted Average Gross Margin for All Sample Farmers in <i>Aman</i> 2012 (Tk/ha)		
Item	FDP	Broadcast Urea
Total revenue	87,308 Tk	68,949 Tk
Total cost	65,218 Tk	63,204 Tk
Gross margin	22,090 Tk	5,745 Tk
Gross margin in US \$	\$273	\$71
Gross margin (percent)	34%	9%
Benefit-cost ratio	1.34	1.09



# Bangladesh Agricultural Training Institutes to Teach FDP Technology



▲ FDP will be taught in the agriculture diploma course syllabus to fourth semester agriculture students.

The Syllabus Preparation subcommittee of the Technical Education Board (TEB) of Bangladesh approved the inclusion of FDP technology in the Plant Nutrition and Fertilizer Management course in the Agriculture Diploma Course Syllabus. The subcommittee's decision validates the relevance and value of the technology and will help sustain and diffuse FDP in Bangladesh.

Plant Nutrition and Fertilizer Management is taught to fourth semester agriculture diploma students. Current students are being taught about FDP technology from both theoretical and practical perspectives during the May-September 2013 semester of the current session. As a result, agriculture diploma students from 14 government Agricultural Training Institutes (ATIs) and 142 private ATIs will gain understanding and knowledge of the yield-increasing, cost-saving and environmentally friendly FDP technology. The first group of these students will enter the job market in 2015. They will begin impacting Bangladesh's agriculture sector in a similar manner to the nearly 6,100 students who received diplomas in the 2011-2012 session.

The AAPI project sought the inclusion of FDP technology in the agricultural diploma course syllabus, and two AAPI senior officers, Dr. Shaharuk Ahmad and Md. Iqbal Hoque, worked with the ATIs and the TEB. Ahmad and Hoque jointly prepared study materials on FDP for TEB consideration. The director of training of the Department of Agricultural Extension (DAE), Abdul Kuddus, also played a pivotal role in this effort. The TEB's Syllabus Preparation subcommittee made the final decision. As members of the

subcommittee, Md. Tauhadul Islam, ATI senior instructor in Faridpur; Dr. A. Razzak of the Department of Agriculture Chemistry of Sher-E-Bangla Agriculture University; Md. Shadat Hossain, TEB diploma curriculum specialist; and AKM Shamsuzaman, TEB system analyst, were in favor of including FDP.

ATI diploma graduates' knowledge of FDP will contribute significantly to sustaining and diffusing the technology. The graduates typically join the DAE as sub-assistant agriculture officers (SAAOs) and as field officers in many agriculture projects and programs implemented by donors, the government and local non-governmental organizations (NGOs). The SAAOs implement and monitor agriculture programs with farmers at the block level. Their education, knowledge and cooperation are important to the success of government and development organizations' agricultural activities.

A considerable portion of AAPI project resources has been dedicated to FDP training and awareness-building among SAAOs. Now, with FDP technology included in the syllabus, there will be less need for AAPI to educate new SAAOs about FDP. However, AAPI staff will remain involved in organizing occasional motivational events.

To assist FDP education sustainability at the ATIs, AAPI has initiated training of trainers (ToT) programs for the instructors of both government and private ATIs. The ToT programs included 310 instructors at 155 ATIs as of May 2013. The fourth semester diploma students of the current session are being taught FDP technology under the Plant Nutrition and Fertilizer Management course by these trained instructors.

# Fertilizer Deep Placement Continues to Improve Lives in Bangladesh



▲ *Jahanara Begum and her husband, Nur Alam, in their briquette shop with customers.*

Jahanara Begum and her husband, Nur Alam, live in the village of Dohalia in Nalitabari *upazila* in central Bangladesh's Sherpur District.

In 2001, Alam went into business as a trader at the Naljora Bazaar in Nalitabari. He funded the business with Tk 200,000 (\$3,846) borrowed from the Krishi Bank, which specializes in agriculture sector loans. Alam sold diesel fuel, seed, pesticides and machinery parts. Through 2010, his annual sales averaged Tk 200,000-250,000, with a net profit of Tk 50,000-60,000. It was a struggle for Alam to maintain his family on that amount of income.

They began to change their lives for the better in 2011. Alam registered as a fertilizer retailer and in June 2011, Begum attended an AAPI training program where she learned about FDP technology and urea briquetting machines. Following the training, she and her husband discussed purchasing a machine through AAPI when it was offering a 75 percent discount. (The price of briquette machines was discounted by AAPI to help diffuse the FDP technology more rapidly.) He agreed and contacted AAPI field monitoring officer (FMO) Abu Bakar Siddique to learn more about producing and selling urea briquettes. In October 2011, the Alam family bought a briquetting machine from AAPI for Tk 38,000 (\$465). Then in 2012, Alam was granted a seed dealership by the Bangladesh Agricultural Development Corporation.

Begum and Alam became successful briquette producers, and the business changed their lifestyle. Begum explained, "In 2010, we depended on the income of our small business and the production from 0.70 ha of land owned by Nur's

father. We were unable to provide our daughters with their basic food and educational needs. Luxury items were out of the question. However, we always talked about ways to improve our family's conditions."

During the 2011-2012 *Boro* season, the couple started to market urea briquettes by conducting meetings with block irrigation managers and other potential buyers. In addition, they established a labor group to deep-place briquettes in their farmer-customers' fields.

Alam said, "When we recommended that farmers deep-place the fertilizer instead of broadcasting it, the farmers asked us to provide skilled labor to show them how to deep-place correctly. After considering the request, I hired eight laborers and trained them with the help of the AAPI FMO. My initiative produced very good results.

In 2011, I sold 85 mt of urea briquettes for deep placement. In 2012, we more than doubled our sales to 200 mt because of the demonstrations by the labor group."

Begum and Alam began increasing briquette production and developed new strategies for *Boro* season 2013. They trained 20 FDP laborers, established a demonstration plot on their land and started advertising in nearby bazaars and blocks. They also arranged meetings with irrigation managers, conducted regular meetings with farmers and distributed publicity leaflets in the community.

Each day, Alam held a meeting with farmers and his laborers to schedule briquette deep placement in the farmers' fields. He also rented several vans to deliver briquettes to the farmers.

Such initiatives motivated more farmers to use FDP, and demand was high during the 2013 *Boro* season. Begum said, "We produced and sold 300 mt of briquettes. The net profit was around Tk 210,000 [\$2,688] or Tk 0.70 per kilogram. We bought 0.60 hectares of land and leased another two hectares to grow more rice. In addition, we could pay the cost of our daughters' education [approximately Tk 15,000 per month]. Our operating capital has increased from the initial Tk 200,000 to between Tk 1,000,000 and Tk 1,200,000 (\$12,804-\$15,365)." Alam is now looking forward to becoming an authorized fertilizer dealer of the Bangladesh Chemical Industries Corporation.

The couple not only produces briquettes for sale, they also use them on their own land. This year they are expecting a very good yield from their rice fields. Alam has shared his strategy with other small businesses in Nalitabari *upazila*. He also invites farmers to his shop for tea and explains the benefits of FDP.



# Improved Harvests in Bakshi

Land in southern Bangladesh that once remained fallow in winter has been transformed into a sea of green. Smallholder and marginal farmers whose families existed on subsistence agriculture never imagined that farming could transform their lives. Now they are excited about the income derived from cultivating crops year-round for both consumption and sale.

“It is a radical change,” said Dilip Kumar Mistri, a leading farmer in Nazirpur *upazila*, in the southern district of Pirojpur.

Farming in Bakshi village in Nazirpur *upazila* first gained momentum when IFDC, through the AAPI project, introduced FDP technology and agricultural best practices and also helped farmers find better seeds for potatoes and BINA-7 – a short-duration, fast-growing rice variety. Following a participatory rural appraisal (PRA), AAPI is helping Bakshi become a model village.

Another farmer, Provash Mistri, said that under the traditional cropping system, he could grow only 15 maunds (1 maund = 37.3242 kg) of rice per year. “Fifteen maunds was only enough to feed my family for six months,” he said. “Now we have enough for the whole year, and I even have surplus rice to sell.” He also said that the vegetables he now grows are a reliable supply of food for his family and that he sells any surplus vegetables for good prices in the marketplace. The vegetables include potatoes, maize, green chilies, okra and eggplant. He also grows sunflowers and bitter gourd. He used the FDP technology to grow all of these crops.

FDP involves the insertion of large (1.8 to 2.7 grams) urea briquettes into the plant’s root zone after transplanting. Nitrogen losses are significantly reduced with this technology compared with the conventional method of broadcasting fertilizer into the paddy water.

## Advantages of FDP Compared with Broadcast Urea in Maize Production, as Identified by Bangladeshi Farmers

- FDP requires approximately 30–40 percent less urea compared with broadcast urea.
- A single FDP application, rather than multiple applications of broadcast urea, saves labor costs.
- Initial growth is stronger. Stems are stronger and leaves are deeper green.
- Maturity (i.e., cob formation stage) occurs 10–12 days earlier.
- Applying broadcast urea at a stage of 16 leaves requires special care for proper placement in the maize field.
- There is less weed and pest infestation.
- The final cob size is larger.

The FDP technology, pioneered by IFDC, reduces the amount of urea fertilizer needed for irrigated and rain-fed paddy crops (and vegetable crops) by as much as 40 percent and at the same time increases yields by as much as 20 to 40 percent.

“The financial constraints that I had earlier are now over because of the assistance in farm activities,” Provash Mistri said, giving much of the credit to IFDC and the Bangladesh DAE for the improvement.



▲ A maize farmer shows part of his healthy crop that was grown using FDP technology.

Mistri is not alone in his new-found success. With the assistance of the AAPI project, cropping intensity has increased between 250 and 400 percent per year on most farms in Bakshi. Farmers grow high-yielding or hybrid rice varieties during the *Aus* and *Aman* seasons. During *Boro* season, some farmers grow rice, but most grow vegetables and winter crops.

Maize and sunflowers can be intercropped with potatoes, meaning that farmers can almost simultaneously plant potatoes and maize or potatoes and sunflowers next to each other and harvest the two crops in a single season. With FDP, the maize yield is 60 maunds/ha and the sunflower seed yield is 30 maunds/ha, which is about 20 percent higher than the yield when urea is applied to crops by the traditional broadcast method.

Young farmer Bipul Majumder said that last year farmers of Bakshi village used FDP on 30 percent of the land, but this winter season almost 99 percent of 94 ha of land in the village was cultivated using FDP technology. There are even some landless farmers who are improving their lives by sharecropping or leasing land to grow crops using the FDP technologies.

Dilip Kumar Mistri said, “Since Bakshi was named a model village, all the village farmers are in a competitive mood to do their best in farming and show others that they deserve to be a model.”

# EDF II Distributes Agricultural Machinery to 14 Kyrgyz Seed Farms

In close cooperation with the Government of Kyrgyzstan (GoK), USAID presented agricultural equipment to representatives of 14 Kyrgyz seed farms as part of the Economic Development Fund (EDF) II Program. The financial assistance is helping to develop a sustainable seed industry in the country. The participating seed farms will help to ensure that the domestic market's needs for high-quality seed are met while also expanding opportunities for export to regional and international markets. Under the program, 94 pieces of agricultural machinery, including tractors, combine harvesters, plows and seed cleaners, were delivered to seed farms throughout the Kyrgyz Republic. The program was jointly designed by USAID and the GoK and is being implemented by IFDC and the Ministry of Agriculture and Land Reclamation (MoALR).

On February 27, equipment was presented to seed farms from southern Kyrgyzstan at the Central Square in Osh. Prime Minister Jantoro Satybaldiev, Minister of Agriculture and Land Reclamation Chyngysbek Uzakbaev and USAID Kyrgyz Republic Deputy Director Lawrence Held attended the ceremony. Representatives of five seed farms in southern Kyrgyzstan selected as beneficiaries under the EDF Phase II seed program received certificates from the MoALR.

On February 28, a second ceremony was held at the warehouse of the Atalyk Group in Novopokrovka village. Newly acquired agricultural equipment was displayed at the event and demonstrated for event participants. Minister Uzakbaev and USAID Kyrgyz

Republic Mission Director Carey Gordon attended the ceremony.

Gordon emphasized the importance of the EDF Phase II program and noted that it represented the most significant support to the Kyrgyz seed sector in the last 20 years. "This second phase will assist the seed industry and will impact over 180,000 farmers in rural Kyrgyzstan while also improving export potential for Kyrgyz seed enterprises," Gordon said.

On behalf of the GoK, Minister Uzakbaev expressed gratitude to USAID for supporting Kyrgyzstan's agriculture sector. "We believe that new modern equipment will help us double the productivity of the agriculture sector in the country," said Minister Uzakbaev. He expressed his hopes that this activity would set a foundation for sustainable development.

Representatives of nine seed farms received certificates from the Ministry at the second event. Turatbek Ukubaev, the head of Eldan Seed Farm, expressed gratitude to USAID and the GoK on behalf of other seed farm beneficiaries of EDF Phase II. Ukubaev emphasized the hard work carried out by the USAID Kyrgyz Agro-Input Enterprise Development (KAED) project in making the program successful.

Local government representatives noted that the new farm machinery offers opportunities for the Kyrgyz people to further increase productivity in the agriculture sector.



▲ Berdibek Ismailbekov (left), head of Kushu-Ata seed farm, receives his certificate from Kyrgyz Minister of Agriculture and Land Reclamation Chyngysbek Uzakbaev. Looking on is USAID Mission Director to Kyrgyzstan Carey Gordon (center).



# Dairy Farm Becomes a Technology Transfer Center in Kyrgyzstan



▲ *Mamatjalil Tokurov, a beneficiary from southern Kyrgyzstan, more than doubled his corn yields.*

Veterinarian Mamatjalil Tokurov owns Cholponai Farm in Karasuu *rayon* (district) in southern Kyrgyzstan. For many years he used outdated feed production techniques and low-quality feed for his herd. Milk production was low and the farm was not profitable. Tokurov planted local varieties of corn for feed and harvested only 7 mt/ha, which was not enough feed for his entire herd.

In 2003, Tokurov attended a training organized by the USAID KAED project, implemented by IFDC, and learned about improved farm management. Since then he has become a regular participant at project field days and trainings. In 2010, Tokurov joined USAID's Global Development Alliance (GDA) Program that promotes domestic production of corn for animal feed. He planted high-yielding *Pioneer* corn hybrids and increased his acreage. In 2012, Tokurov harvested a record yield of 15 mt/ha of corn on 6 ha. He processed the entire harvest into cattle feed.

Tokurov also learned to combine crop cultivation and livestock breeding. He now owns 50 head of cattle, including 20 dairy cows. The USAID KAED project helped him adopt modern feeding techniques and improve feeding rations for his herd. He now uses protein-rich corn-based feed. In addition, USAID helped to equip the farm with a modern water supply system, and IFDC project staff introduced improved management practices and veterinary services. As a result, the weight of the animals and milk production increased by 30 to 50 percent and the health of the cattle improved significantly. Artificial insemination services were enhanced on the farm.

Currently, Cholponai Farm serves as an artificial insemination point for cattle in southern Kyrgyzstan. Tokurov encouraged other farmers in the region to use artificial insemination on their farms. He cooperated with other livestock farmers and local authorities and organized a second artificial insemination point in a neighboring village.

Because of the introduction of innovative techniques and the support provided by the USAID KAED project, this ordinary farm was gradually transformed into a technology transfer center (TTC). In 2012, Cholponai Farm was chosen by the Kyrgyz Republic's MoALR as a venue for conducting a three-day training for 80 participants on modern and effective methods of artificial insemination.

"During KAED trainings I learned how to increase my corn yields. I now understand that a combination of effective management and balanced feeding rations can increase cattle production. I also want to share my knowledge with other farmers in my region. I hope together we can improve agriculture here in southern Kyrgyzstan," Tokurov said.

**The USAID KAED trainings taught me how to increase production on my farm. This year I harvested a record yield of 15 metric tons per hectare. I am very proud of myself and very grateful to the KAED project and IFDC.**

– Mamatjalil Tokurov

# Successful International Agricultural Exhibition Held in Tajikistan

U.S. Ambassador to Tajikistan Susan Elliott, Tajik Deputy Prime Minister Murodali Alimardon and Khatlon Regional Chairman Ghaibullo Afzal officially opened the second USAID agricultural inputs fair – the International Agro-Expo Khatlon-2013 – in Qurghonteppa, Tajikistan, March 1. The fair brought together farmers, agribusinesses, financial institutions and international and domestic agro-dealers to facilitate business relationships and promote trade. A wide range of agricultural machinery and products were displayed during the two-day fair, and participants also took part in agribusiness development workshops.

At the event, Ambassador Elliott stated, “This fair promotes collaboration between farmers and agribusiness. It facilitates business ties between local and international input suppliers and will increase agricultural production in Khatlon. Finally, this Expo will increase farmers’ awareness of existing high-quality products.”



The Productive Agriculture Project is one of the many assistance projects made possible by USAID. Since 1992, USAID has invested over \$1 billion in programs and humanitarian aid to improve the standard of living for the people of Tajikistan through support to its democratic institutions, agriculture, healthcare, education and economic growth.

The USAID Productive Agriculture in Tajikistan project is targeting strategic development of commercial non-cotton agriculture in Tajikistan. As a USAID FTF initiative project, activities are linked with farmers located in the 12 districts of western Khatlon Province. The project is increasing the productivity of traditional agricultural crops and strengthening the capacity and profitability of private sector agribusinesses. The Intensify Farm Productivity (IFP) component of the project is being implemented by IFDC. IFP is increasing crop and beef production along with market-driven opportunities to improve farmers’ living standards through increased income.

A value chain approach is used, which works from markets back to farmers and targets commercial

businesses critical to supporting the overall project goal of increasing income opportunities for farms. The first project objective is market development – identifying and promoting products in high demand, catalyzing investments in the infrastructure necessary to add value as products are brought to market, facilitating the inter-business linkages that will move products from farms to market and enabling access to the financing necessary for sustainable industry growth. The second objective is increasing agriculture productivity. This is done by increasing the supply of certified agricultural inputs, improving the policy environment for registering inputs in the country, ensuring farmers have the production knowledge they need to successfully utilize these inputs and encouraging investments by the farmers in the machinery needed to efficiently produce healthy crops.

▲ (Left to right) U.S. Ambassador Susan Elliott, Tajik Deputy Prime Minister Murodali Alimardon and Khatlon Regional Chairman Ghaibullo Afzal opened USAID’s “International Agro-Expo Khatlon-2013” in Qurghonteppa, Tajikistan.



# Tajikistan Increases Exports and Farm Profits Through Cold Storage Technology



▲ *The USAID Productive Agriculture in Tajikistan project helped build a cold storage facility that prolongs the shelf life of apricots and improves export opportunities.*

Tajikistan is a major global producer of apricots, with over 40,000 ha under cultivation in the country's northern region. Entrepreneur Ashurov Pulod has been exporting apricots from Tajikistan's Asht District for more than 20 years, but he consistently encountered barriers to business growth. In particular, his inability to adequately cool and store apricots limited the amount that Pulod could purchase from area farms and resulted in losses from spoilage while he waited for buyers with refrigerated trucks. Buyers often face lengthy delays due to poor transportation infrastructure and customs procedures.

In 2009, Pulod was awarded a grant by the USAID Productive Agriculture in Tajikistan project to build a state-of-the-art cold storage pack house, the first of its kind in the country. Pulod invested 66 percent of the required funds, while the project provided the balance of the capital and technical assistance to build a pack house, with the capacity to cool and store 200 mt of fresh apricots for export. The cold storage facility was completed in time for the next apricot harvest.

In addition to investing in the pack house, Pulod created an open joint stock company, which includes investments from eight apricot farms. Partial ownership of the company by these farms provides them the opportunity for increased profits

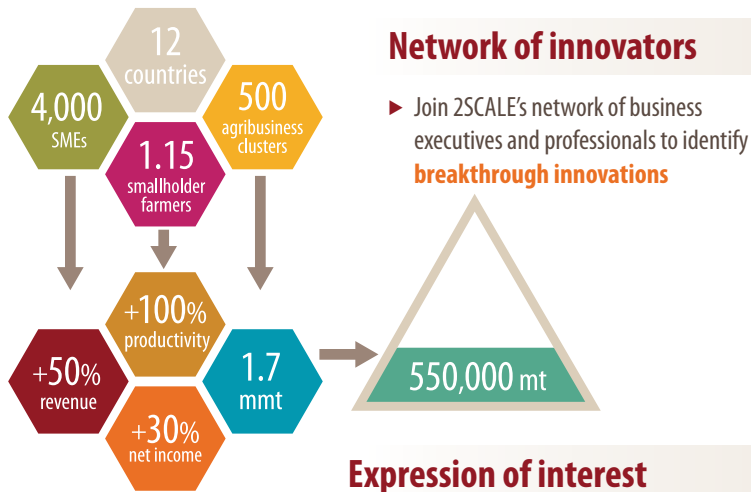
from the value chain, and the reliable product supply provides increased stability for the company.

Since opening the pack house, Pulod has increased his volume of fresh apricot exports by 74 percent and has been able to provide sorting and packing jobs for 50 women. The increased product quality due to the cooling also allows Pulod to expand export opportunities to the European market, which has stricter quality standards than Russia and other countries in central Asia.

The opening of the cold storage facility made national news and also attracted three entrepreneurs from the southern region of Khatlon who were interested in building similar facilities. Project staff members plan to work closely with these entrepreneurs to expand this successful model to the less-developed southern districts. Pulod plans to provide support for expansion of the business model because of the benefits he has gained from his facility. "Due to the support of the USAID Productive Agriculture Project, my export capacity has increased and I have the ability to provide more jobs in my district. I can also support local farms by purchasing a larger volume of apricots without fear of spoilage. All of this improves lives in my community. I greatly appreciate the support of the project in improving business opportunities in this area of Tajikistan," Pulod said.

# Get involved

## 2SCALE



2SCALE consortium:



Supported by:





# 2SCALE Promotes Public-Private Partnerships

**F**ollowing a business meeting in Utrecht on April 10, private firms in the Netherlands are expected to participate and expand their investments with African partners through the Toward Sustainable Clusters in Agribusiness through Learning in Entrepreneurship (2SCALE) project. The meeting attracted over 80 participants including Lilianne Ploumen, Minister for Foreign Trade and Development Cooperation; members of two ‘top-sector’ boards mandated by the Dutch government to stimulate private investment in high-priority sectors of the economy; and a range of private firms, from medium-scale to multi-national.

“Local small and medium enterprises [SMEs] are increasingly involved in African agriculture and agribusiness,” Minister Ploumen said. “The Dutch private sector should encourage this growth, and link with these SMEs for mutual benefit. The 2SCALE project offers a platform to build such partnerships. I hope 2SCALE will show how business and development can go hand in hand. And I look forward to visiting examples of successful partnerships developed by the project.”

Dr. Amit Roy, president and chief executive officer of IFDC, is optimistic that these relationships will grow. “Africa



▲ *Lilianne Ploumen, Minister for Foreign Trade and Development Cooperation, highlights the importance of synergistic partnerships between the Dutch private sector and African SMEs.*

offers huge opportunities for investment, particularly in the agro-industry,” he said. “2SCALE offers access to markets and suppliers in nine countries, detailed local knowledge, trained and organized community-level networks and buy-in from government ministries in each country.”

The meeting included a series of roundtable discussions at which participants identified specific agribusiness opportunities in four areas – potatoes, horticulture, agro- logistics and livestock/dairy/poultry. For example, several

firms expressed interest in aquaculture. Most participants understood 2SCALE's role in facilitating innovation and there were a number of ideas discussed including cold storage and flash-freezing of fish using solar panels as an energy source. University students are testing this idea on a small scale, freezing catfish in Nigeria. In addition, Fleuren & Nooijen BV currently has operations in Nigeria and Kenya. The Dutch company wants to expand its fingerlings supply, feed and training operations in Africa and 2SCALE may provide needed assistance. Other companies were interested in supplying incubators, climate control machinery and other equipment for poultry hatcheries.

One company head commented, "We can smell the business opportunities in Africa – but we don't know where to start." Several firms are considering 2SCALE partnerships to provide market information as well as linkages with aggregators and other value chain actors. SMEs are particularly keen to engage with 2SCALE, because they lack the resources and experience to identify reliable local partners.

A number of Dutch firms are already part of this unique project, which stresses innovative partnerships to link

local and global entrepreneurship and to increase food and nutrition security. Others are evaluating the advantages and risks of investing in Africa, the added value of public-private partnerships (PPPs) and their entry strategies. For example, following the meeting, 2SCALE staff met with representatives of Incotec Group BV, a leading company in the field of seed enhancement technologies. Incotec expressed interest in partnering with 2SCALE to develop low-cost seed treatment equipment that could be distributed to agro-dealers. Such equipment could dramatically reduce the losses caused by seed-borne pests and diseases.

According to Dr. Arno Maatman, 2SCALE project coordinator, the meeting was beneficial. "We hope that the presentations made today, along with the discussions in the roundtables and in side meetings, will lead to additional PPPs. There are great opportunities for companies of all sizes and from many agriculture sub-sectors to partner with 2SCALE and generate benefits for themselves, smallholder farmers and other members of the agricultural value chain in Africa."



▲ At the 2SCALE business meeting there were roundtable discussions on a number of topics including open innovation, food brands and base-of-the-pyramid markets.

**Seeking to significantly impact rural livelihoods across SSA, 2SCALE is implemented by a consortium of three partners – IFDC, Base of the Pyramid Innovation Centre (BoP Inc.) and the International Centre for development oriented Research in Agriculture (ICRA).**



# Potato clusters 2SCALE



**African potato-producing countries gain in productivity and profitability**



- ▶ Which farming innovations can boost yields of potato cultivation?
- ▶ Can smallholders expand in processing and add value?
- ▶ What are the trends in potato consumption?



2SCALE consortium:



Supported by:



# Livestock 2SCALE



**In Africa demand for quality and affordable meat, dairy and poultry exceeds supply**



- ▶ Which new extension service models can boost milk production?
- ▶ What housing technologies can upgrade local poultry clusters?
- ▶ How can animal feed formulas be brought to backyard animal husbandry?



2SCALE consortium:



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# Agri-logistics 2SCALE



**Smart investments in agri-logistics positively affect food prices and supply**



- ▶ How to upgrade transport and logistics services in fresh food chains?
- ▶ What small-scale storage solutions can be brought to the farm gate?
- ▶ Can IT-enabled supply chain management reduce food losses?



2SCALE consortium:



Supported by:



# Open innovation 2SCALE



**Food security requires breakthrough innovations, led by businesses**



- ▶ What is the potential of innovative trading mechanisms in food supply?
- ▶ How to engineer farming and processing tools for a low-resource environment.
- ▶ How can we scale-up the dissemination of Good Agricultural Practices?



2SCALE consortium:



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◀ *These posters (as well as the poster on page 16) feature key aspects of the 2SCALE project.*

# 2SCALE: Initial Progress Highlights



▲ A dairy cluster promotional campaign is aimed at Fulani communities in Nigeria.

During its first six months, the 2SCALE project established operations in nine countries. In June 2012, the Netherlands Ministry of Foreign Affairs' Directorate-General for International Cooperation (DGIS) awarded the five-year project to a consortium of IFDC, BoP and ICRA. 2SCALE's budget is being supported by DGIS (50 percent) and 50 percent is expected to come from private sector partners through PPPs with local, national and international companies. 2SCALE builds on a portfolio of agribusiness clusters (ABCs) developed by the From Thousands to Millions (1000s+) project (2006-2011) and continued during a bridging project (AAA-Bridge, 2011-2012). Both projects were DGIS initiatives led by IFDC.

2SCALE is both an acronym and a concept. The project plans to create as many as 500 viable ABCs linking smallholder farmers with agro-enterprises to scale out the

ABC approach. Viable ABCs are supported through capacity strengthening, market linkages and access to information and credit. But this will happen only when cluster (and targeted value chain) participants co-invest in the process.

## Consortium Spirit

Each 2SCALE partner brings unique strengths: IFDC's capacity to facilitate entrepreneurship from the grassroots upward (local network-cluster-value chain-policy); BoP Inc.'s brokering skills, linking the project with Dutch private firms and bringing in innovation in base-of-the-pyramid (BoP) marketing; and ICRA's experience in training and interactive learning.

As the project began, staff training workshops were organized to develop a collective understanding of IFDC's Competitive Agricultural Systems and Enterprises (CASE) approach and to discuss the next steps in the development of ABCs.

## Target Countries

2SCALE is active in eight Dutch partner countries – Benin, Ethiopia, Ghana, Kenya, Mali, Mozambique, South Sudan and Uganda. It also focuses on Nigeria due to its importance in West Africa's agricultural markets and its agribusiness potential. 2SCALE ABCs also operate in Burkina Faso, Niger and

Togo. However, project support in these three countries will be phased out by May 2014.

## Collaborating with Embassies to Generate Country Plans

IFDC country representatives and 2SCALE regional coordinators and cluster advisors met with key staff of the embassies of the Kingdom of the Netherlands (EKN) in the nine focus countries to introduce 2SCALE, explore possibilities for greater collaboration and to ensure that the project is aligned with other EKN initiatives. In consultation with the EKNs, country plans were finalized in 2012. Specific industry targets and entry points for 2SCALE were identified in each country (e.g., the food processing industry in Uganda and the dairy sector in Nigeria). This process ensured 2SCALE will work in synergy with, and add value to, initiatives proposed in the EKN strategic plans for 2012-2015.

## Roadmaps for PPPs

PPPs are at the heart of 2SCALE. There are two types of partnerships that 2SCALE activities will focus on: value chain PPPs with 'lead firms' that directly or indirectly serve or source from smallholder farmers; and agribusiness cluster



PPPs initiated by a local business champion (a farmer-based organization [FBO] or cooperative, processor, trader or retailer) in collaboration with other cluster participants and 2SCALE.

For each PPP, 2SCALE has developed a ‘roadmap’ that outlines PPP development and documentation; the methods to be used to monitor implementation of the PPP; and specifically how contributions from private sector partners and public funding sources will be measured and monitored.

## Development and Scaling of ABCs

2SCALE has a common definition of the steps involved: generating business ideas, brokering relationships with potential lead firms, developing and finally implementing ABC and/or value chain action plans. While the process has been defined, there are important differences in ABC portfolio development between regions, and between countries in each region. West Africa builds on an existing ABC portfolio, whereas in East and southern Africa, staff members are developing an ABC portfolio from scratch. In Kenya, Nigeria and Uganda, more emphasis is being placed on value chain PPPs, including lead firms. In West Africa, after an in-depth appraisal of the performance of existing ABCs, support is being given to the 155 most promising ABCs. Of these, 75 are in the non-focus countries of Burkina Faso, Niger and Togo, so 2SCALE activities will be phased out (although it is hoped that the majority of ABCs are sustainable).

2SCALE staff organized a call for business ideas in each focus country. Over 550 business ideas were received, and selecting the best ideas and developing cluster action plans began in November 2012. In November and December, diagnostic and design (D&D) workshops were organized for selected business champions and targeted ABC partners in Benin, Ghana, Kenya, Nigeria and South Sudan.

## Partnering with Lead Firms

Inventories of agro-food enterprises were completed in 2012 in the eight Dutch partner countries. These inventories focused on large-scale and medium- and small-scale enterprises (LSEs, MSEs and SSEs), including regional African as well as Dutch or Dutch/African enterprises. 2SCALE staff visited a number of pre-selected companies (usually selected in consultation with EKNs and national business associations/networks) to solicit their participation. Following these visits, 2SCALE received expressions of interest from several African (and a few Dutch/international) companies, which are being pursued in order to develop value chain PPPs.

In the Netherlands, 2SCALE relies on BoP Inc. to identify private sector partners. Partnerships have materialized with three LSEs: FrieslandCampina (focused on a dairy development program in Nigeria) and Rijk Zwaan and East West Seed, which focus on quality seeds and farmer training for vegetable clusters (initially in Benin, Ghana, Kenya and Nigeria). In Kenya, the partnership with Rijk Zwaan will also serve BoP markets through integrated supply chains for processed products. In order to identify and engage in an efficient way, collaboration agreements were defined with Dutch private sector platform organizations with specific emphases on Africa and the agro-food sector. In line with emerging industry priorities in each country, the emphasis is to identify private sector partners in specific sectors such as horticulture, agro- logistics and retail (see article on pages 16-19).

## Serving BoP Markets

In 2012, BoP Inc. developed a BoP market research methodology for the project. This research will guide ABC participants to capture new markets among BoP consumers by improving logistics and other channel operations and through value addition. Research began in Kenya for rice, potatoes and vegetables and in Ghana for soybeans and soy-based products, citrus and vegetables. Research on BoP markets is carried out in collaboration with private firms such as Kenya-based Research Solutions Africa.

## Facilitating Innovation

2SCALE will promote the generation, use and dissemination of innovations – technical, organizational and institutional – that trigger and sustain competitive strategy. Innovations may, and hopefully will, originate from within the ABCs and value chains through collective learning and action. Other innovations may involve

- ▼ *Fulani women in the Fasola ABC fill milk containers for collection.*





▲ Members of an ABC in Togo roast soybeans.

adapting ideas and practices being used elsewhere to the conditions and requirements within ABCs and/or value chains. 2SCALE will also facilitate innovations in policy networks, such as new institutional arrangements to improve governance.

During 2012, 2SCALE began identifying innovations that might be relevant to existing and emerging ABCs. Project

staff visited selected ABCs in West Africa to inventory innovative solutions. The main focus was on agricultural productivity and on-farm post-harvest technologies, but attention was also given to institutional arrangements including cluster- and chain-financing arrangements and risk management (insurance) programs.

## Strengthening the Capacity of Cluster Partners

Three training programs on CASE were organized for 2SCALE staff. The training was designed around concrete examples of ABCs (participants visited these ABCs and later analyzed their performance) and video materials. The videos were largely based on examples from 1000s+. 2SCALE capacity strengthening staff designed and co-implemented a series of D&D workshops, and produced guidelines for facilitators and learning modules for cluster advisors.

An inventory of relevant business support services (BSS) was completed in eight countries and some BSS were also consulted to identify potential agribusiness trainers, who in turn will provide training to the local BSS that support ABCs. An outline of a capacity strengthening program to assist BSS (and individual agribusiness coaches) was developed as well.

## Improving the Business Environment

2SCALE assessed the information and financing needs of existing ABCs in priority sectors in West Africa. In East and southern Africa, interviews were held with participants from emerging ABCs at D&D workshops and with other industry stakeholders. 2SCALE also supported the expansion of the Regional Agricultural Input Market Information and Transparency System (AMITSA) in both regions. AMITSA currently covers nine countries, seven of which are 2SCALE focus countries (see article on pages 46-49). In 2013, AMITSA operations will expand to the two remaining focus countries (Ethiopia and South Sudan).

# Minister Ploumen Visits *Girumwete Dukere* Rice Cooperative in Burundi

On the morning of February 7, members of the *Girumwete Dukere* agricultural cooperative, which focuses on rice production and processing, gathered at their headquarters in Burundi's Bubanza Province, north of the capital of Bujumbura. Lilianne Ploumen, Minister of Foreign Trade and Development

Cooperation of the Netherlands, visited their cooperative as part of her mission to the Great Lakes Region of Central Africa.

Explaining her two-day visit to Burundi to boost bilateral relations, Ploumen said, "I have come to discuss with the Burundian people how to boost existing cooperation



sectors and to make field visits to assess projects financed by the Netherlands.” After meeting three Burundian ministers, she explained to journalists that the Netherlands supports Burundi in the defense and security, food security,



▲ Ministers Kayitesi (left) and Ploumen (right) visit a rice field cultivated by the Girumwete Dukere agricultural cooperative.

reproductive health and renewable energy sectors. “In these times, aid and trade go together,” she commented. “Through aid from the developed world, many countries that were poor have built a real middle class and have become serious trading partners. That benefits those countries and is also good for the Netherlands,” Ploumen stated. “The combination of aid and trade generates positive results.”

Ploumen’s visit to *Girumwete Dukere* was one of many stops during her weeklong trip to Burundi, the Democratic Republic of Congo (DRC) and Rwanda. She focused on Dutch efforts in security, humanitarian aid, human rights, democracy and social and economic development. “I wanted to hear from those involved how they see the region’s problems,” the Minister stated. In addition to political meetings with government ministers in the three countries, Ploumen also met representatives of development organizations and their beneficiaries, the United Nations (UN), human rights defenders and entrepreneurs.

*Girumwete Dukere* was formed in 2000 and focuses on rice production. The cooperative is part of *la confederation des Associations des Producteurs Agricoles pour le Développement*, or CAPAD. With more than 20,000 members, CAPAD is one of the largest cooperatives in the Great Lakes Region. CAPAD receives support from IFDC, Oxfam Novib and Agriterria. IFDC has worked with CAPAD for several years (first in the CATALIST project and now through its successor, CATALIST-2).

According to CAPAD Chairwoman Odette Ntirambepa, much of the cooperative’s progress has been made possible because of the assistance provided by these three organizations. Members told Ploumen and Odette Kayitesi,

the Burundian Minister of Agriculture and Livestock, that they had learned to use FDP to grow more rice. They also explained that with a briquetting machine provided by IFDC, they can produce their own fertilizer briquettes, which are deep-placed near the rice plants’ roots (instead of being broadcast on the fields). They have reduced the quantity of fertilizer they use in the field, so they are generating more revenue from the additional rice while saving money by using less fertilizer.

After a short overview on rice production, one of CAPAD’s members told the ministers that he is very proud of his field, because it is clearly greener than surrounding fields due to the use of fertilizer briquettes. “With best practices like planting in a line and using briquettes, we use 30 kilograms of seeds per hectare, while before, we were using between 40 and 50 kilograms.” Because of integrated soil fertility management (ISFM) trials and training on rice production conducted by CAPAD and IFDC between 2007 and 2012, the average yield has increased from 4 mt/ha to 6.2 mt/ha. With the introduction of FDP, the average yield has now increased to 7.5 mt/ha.

Minister Ploumen was very impressed with the progress that has been made because of the training and better use of resources. However, she also emphasized the importance of building a strong cooperative. “I hope that next time I visit you, I will find many strong women like Chairwoman Odette and many strong men as well,” she said.

Despite the progress made, the cooperative is still facing some serious challenges, such as high fertilizer prices, high interest rates on bank loans and a lack of high-yielding seeds that would allow them to harvest twice a year. Through the CATALIST-2 project, IFDC is assisting CAPAD to solve these problems by linking the cooperative to financial institutions that loan funds at a more favorable rate and also by providing training and information on improved seeds. In addition, IFDC has a key role in the Government of Burundi’s new fertilizer subsidy program that seeks to solve the problems of high fertilizer prices and the lack of availability of fertilizers in the country. Both CATALIST-2 and the subsidy program are supported with funding from DGIS.

Even though more work must be done, the improvements over the last 10 years at CAPAD have been transformational. In its first few years of existence, members of CAPAD harvested about 2 mt/ha of rice and had little or no access to credit. Now, after learning best agricultural practices from IFDC, Oxfam Novib and Agriterria, the farmers use ISFM and FDP effectively. Today, they produce 7.5 mt/ha and are gaining access to credit and loans from microfinance institutions through the inventory credit system, which IFDC introduced in the region during the first CATALIST project.



▲ Farmers remove the husks from maize during a farmer field day in Ghana.



# IFDC and Partners Begin FTF-USAID- ATT Project in Ghana

**T**he FTF-USAID Agricultural Technology Transfer (FTF-USAID-ATT) project in northern Ghana has been awarded to IFDC and its partners – the Ghana Agricultural Associations Business & Information Centre (GAABIC), the College of Agriculture and Life Sciences of Iowa State University (ISU) and the Centre for Development Innovation of Wageningen University & Research Centre (WUR-CDI).

The IFDC-led consortium will work with other USAID-funded projects in Ghana to achieve the project goal of increasing the competitiveness of the maize, rice and soybean value chains, which will foster broad-based and sustained economic growth in northern Ghana. By increasing smallholder farmer adoption of comprehensive, productivity-improving agricultural technologies (products, processes and practices) in these value chains, household incomes are improved and poverty and food insecurity are reduced.

## Focus on the Development, Release and Dissemination of Seeds, Fertilizers and ISFM

The project's strategic objective is to increase the availability and use of agricultural technologies to improve and sustain productivity. Three key elements are necessary to attain FTF-USAID-ATT's strategic objectives: increased capacity of the

private sector to develop and disseminate improved seed and ISFM technologies; increased efficiency and transparency of government functions to support seed, fertilizer and ISFM technology development, release and dissemination; and increased efficiency of targeted agricultural research to develop, release and communicate technologies that support sustainable agricultural productivity.

The consortium will focus on the three main project components – developing the seed sector, improving soil fertility management and increasing research capacity and effectiveness. These components will allow the project to assist multiple partners and collaborators to overcome the constraints that currently inhibit growth and development of agricultural productivity and increased food security in northern Ghana.

Consortium members have extensive experience working in northern Ghana on agricultural technologies in the targeted value chains, as well as the relevant technical expertise, local knowledge and experience to work successfully with targeted stakeholders to achieve the FTF-USAID-ATT project's strategic objectives.

## Improving the Seed Sector

The need for government engagement with the private sector is evident in the seed sector. Ghana is in need of effective government agencies that manage a rules-based system to ensure that improved seeds are genuine and that



than the sale of individual inputs. This is in their long-term interest; it will help farmers achieve productivity increases, since the agro-dealers' profitability is tied to the profitability of their farmer-customers.

GAABIC and its member organizations will play a very important cross-cutting role in organizational capacity building of seed companies and agro-dealers (members and non-members alike) involving communications, workshops, training programs, business and market planning and advocacy.

## Soil Fertility Improvements Are Critical

Improving soil fertility is critical to spurring growth for the targeted commodities in the project intervention zone. To help achieve this goal, FTF-USAID-ATT will promote the judicious use of mineral fertilizers in combination with locally available organic soil amendments (straw, compost, fallow legumes) as well as phosphate rock, lime, conservation agriculture and best agronomic practices. Scientifically valid methods to reverse the nutrient depletion and the low productive capacity of the soils in northern Ghana are available but must be promoted through education and training. The project will further develop the capacity of the Savanna Agricultural Research Institute (SARI) and other stakeholders to implement research and scaling out approaches and to develop or use decision support tools (DSTs). The project will use a range of DSTs including soil and plant analysis, diagnostic trials with local stakeholders, socio-economic analysis of organic input availability, etc. ISFM options will include 'à la carte' fertilizer recommendations to respond to the diversity of circumstances that farmers face.

users of these improved technologies can be confident that their investments will result in performance. These agencies will contribute to improving agricultural productivity by producing or approving the importation of early generation seeds and regulating seed certification. Relevant government agencies will be trained to interact with their clients through greater involvement of farmers and agribusinesses (food processors, agro-dealers, marketing enterprises, feed manufacturers, seed companies, etc.) in the variety selection process. Through these linkages, the project team will address current deficiencies including developing systems to forecast variety-differentiated seed market demand, production of a seed catalog, as well as improving the technical and managerial capability of the seed companies. Project staff will also work with research-extension linkages committees and the National Varietal Release Committee to streamline the varietal release process.

WUR-CDI will focus on seed industry improvement, particularly the interface between research institutions and commercial companies and the commercialization process.

The project team will use a range of interventions that will strengthen the Ghanaian seed and fertilizer industry through improved market information systems (MIS) that facilitate two-way flows of information between private sector companies, agro-dealers, business service providers, marketing entities and farmers.

Agro-dealers are important participants in the seed industry, not only because of their role as direct sellers of seed but also because they sell the fertilizer, crop protection products (CPPs), equipment, tools and other products necessary to achieve the genetic potential of high-yielding seeds. They are also an important source of information on agricultural best practices, but for agricultural production to increase, they must expand the services that they offer to their customers. The project will work with agro-dealers to service high-productivity technology packages rather

IFDC will assist private sector stakeholders to advocate for increased investment in ISFM research and enabling government policies and services including: increased attention and more focused research regarding





soil fertility issues; inspection and quality control of soil fertility, seed and other technological products; and targeted agricultural extension. As in the seed sector, market information, extension of information and best practices and public policy advocacy are all involved in expanding the use of soil fertility technologies.

### Support for Research

To improve their research capacity, SARI and other research entities in Ghana will receive customized support to make their work more relevant and effective. This approach requires two primary components – strengthening the research process and outreach/communications. Starting with a needs assessment and analysis, project staff will identify all those who develop and supply information related to maize, rice and soybean crops. The SARI team will then receive information technology training (primarily geographic information systems [GIS] and modeling) to enable them to deal with complex issues and offer general recommendations. Genetically engineered (GE) seed poses a unique set of challenges because of public perceptions (which are often at odds with the science).

ISU will focus on assisting research institutions (particularly SARI) to improve their research protocols to make them more responsive to end-user needs, more focused on applied research and more streamlined to move technologies faster into the commercialization phase. ISU will also provide direct assistance on the genetic improvement of maize and soybean crops and will be the lead external consultant on matters of biotechnology and biosafety. Communications activities to educate the public on the science and risks associated with biotechnology will be part of the support to SARI. ISU also will provide training to SARI staff members to enhance their capacity to carry out rigorous science-based and inclusive risk assessments.



### Results Will Drive Progress

IFDC expects to increase yields for maize, rice and soybeans by at least 100 percent, 55 percent and 40 percent, respectively, through the use and application of nine newly released seed varieties and 20 new soil fertility technologies or management practices. The project will target a minimum of 250 agro-dealers in northern Ghana. Through them, an estimated 100,000 farmers and processors will apply these productivity-enhancing technologies and practices. Technical capacity building

training will be provided to 160 Ghanaian researchers and scientists, the majority of whom will be involved in the set-up and monitoring of over 270 field trials – 48 will be on GE products to increase the knowledge of more than 4,000 farmers and processors on biotechnology options for agricultural development.

The project team is committed to: private sector development and PPPs; cultivating the leadership of progressive and dynamic firms; facilitating demand-driven technologies and innovations; and technical and organizational capacity building.

### Other Aspects of FTF-USAID-ATT

A competitive small grants fund will be included in FTF-USAID-ATT. The grants will be used to provide funding to public, private or civil society applicants for agricultural technology research or capacity building activities that directly contribute to the achievement of the project. Cross-cutting issues such as gender mainstreaming and women’s participation (not only in crop production and marketing but also in the downstream links of the marketing chain) will be implemented in project activities. Reducing the incidence of child labor and associated practices used in agricultural production will be emphasized. In addition, the project will focus on environmental protection and sustainability.

- ◀ (Opposite top): Fertilizer is sold in small bags at a market in the Northern Region of Ghana.
- ◀ (Opposite bottom): Weighing bags of fertilizer at a market in the Northern Region of Ghana.
- ▲ Rice sold at the Makola Market in Ghana.

# PRODIB: Progress Continues in Burkina Faso

**The Professionalization of Agro-Input Dealers in Burkina Faso (PRODIB) project is being implemented by IFDC and the Association of Wholesalers and Retailers of Agro-Inputs (AGRODIA). It is funded by the Alliance for a Green Revolution in Africa (AGRA) for a period of three years (February 2011 through January 2014).**

In collaboration with AGRODIA, the PRODIB project is improving the availability, accessibility and affordability of quality agro-inputs – fertilizer, improved seeds and CPPs – to rural smallholder farmers. Nearly 272,000 farmers in Burkina Faso now have improved access to agro-inputs. In the first two years of the project, the amount of certified seeds sold by agro-dealers (3,108 mt) is more than three times the target amount and the fertilizer now sold (67,167 mt) is more than double the target.

To date, the project has also provided training, organizational development and institutional capacity building to 747 agro-dealers and 74 seed producers. PRODIB is fostering a functional network of agro-dealers, and improving their professionalism should help boost the incomes of as many as 375,000 smallholder farmers by project-end.

## Overcoming Major Constraints

PRODIB is reducing obstacles that constrain the development of the Burkinabè agro-input market: non-supportive policy environments; inadequate human capital; limited access to finance and market information; poor enforcement of regulatory systems; inadequate support for technology transfer efforts; and the high transportation costs smallholder farmers incur to obtain agro-inputs and deliver surplus crops to markets.

## PRODIB's Five Components

Despite these obstacles, PRODIB made significant progress during 2012 and is positioned to build on its success. Project staff will continue to focus on five key components:

### Capacity Building

A critical factor in agro-dealer capacity building is effective training. PRODIB has developed training materials and collaborated with AGRODIA to transfer information about FDP technology, the use of quality seed and safe handling of fertilizers and CPPs. PRODIB and AGRODIA instruct agro-dealers in sales and marketing, business skills, financial

management, logistics planning and legislation affecting agriculture. A special mission focused on the agro-input sales cycle based on seasonality, enabling agro-dealers to negotiate waves of credit at appropriate times in the agricultural cycle.

PRODIB is helping AGRODIA members create linkages with input suppliers and extend their retail networks to reach more farmers. Frequent field demonstrations allow agro-dealers to share information and establish links with smallholder farmers, input suppliers, inspectors, government representatives and other stakeholders.

### Institutional Strengthening

It is believed that as new agro-dealers start businesses or existing agro-dealers open additional stores, the distances smallholder farmers must travel for agro-inputs will decrease (making such purchases less difficult and time-consuming). Eighty-five new agro-dealer shops have opened in rural areas in the first two years of the project. The average distance that farmers must travel to purchase agro-inputs has been reduced from 27 kilometers (km) to 20 km due to agro-dealer expansion.

AGRODIA has made strides in operational efficiency, and personnel changes strengthened its management. Board meetings are held on a regular basis to assess activities, monitor internal lending, discuss partnerships and develop business opportunities. Member interest is apparent in AGRODIA's production of overview brochures and newsletters and national media coverage of field demonstrations and training. In addition, as AGRODIA's membership grows, membership fees and dues will increase its financial resources and breadth of services.

AGRODIA continues to strengthen its position as a trade association that is consulted by the government regarding agricultural policies. AGRODIA is also developing agro-input vouchers as part of a Ministry of Agriculture and Water project.

### Access to Credit

Access to credit enables smallholder farmers to purchase agro-inputs and facilitates agro-dealers' ability to acquire



▲ *PRODIB conducts one of 112 farmer field days and farmer-to-farmer exchanges.*

and sell the inputs. Working with the Bank of Africa (BoA), PRODIB negotiated more than \$437,000 in loans with favorable interest rates for 72 agro-dealers to date. More loans are expected in the near-term.

BoA produces monthly loan monitoring reports, and monthly meetings are held among representatives of IFDC, AGRODIA and BoA to review the status of loan repayments. PRODIB is facilitating increased loan access for agro-dealer business development. Better financed, trained and certified agro-dealers provide farmer-customers with more information, training and service.

### Technology Transfer

A number of field demonstrations during the dry seasons and farmer field schools (FFS) were held during the first two years of the project. Three TTCs were opened and 112 field days and farmer-to-farmer exchanges were organized. More than 6,700 farmers visited the 117 project-sponsored demonstration plots.

PRODIB and AGRODIA facilitate the farmer-to-farmer exchanges, which offer learning and social opportunities for smallholder farmers and members of FBOs. Typical themes include crop production techniques, seed quality, soil deficiency problems and crop diseases. Exchanges often go beyond planned themes to include input supply problems, marketing issues and the need for seed renewal. The exchanges offer opportunities for inter-farmer cooperation and result in the trading of information between farmers and FBOs.

In addition, field days provide opportunities for activities at the TTCs. Attendees include local FBO members, agro-dealers, local officials, provincial directors of agriculture and representatives of input and seed suppliers such as *Neema Agricole du Faso*.

### Planning for Year 3

During its third year, PRODIB staff members are focused on the following priorities:

- Defining a detailed plan of activities and finances.
- Producing an expanded agro-dealer directory.
- Developing a strategy for loan repayment and transfer of responsibility for credit management to AGRODIA.
- Finalizing the protocol to obtain agro-dealer licenses.
- Collaborating with AGRODIA to further improve the quality, accessibility and supply of agro-inputs.
- Supporting AGRODIA's strategy development to mobilize internal resources through contributions and dues.
- Leveraging project achievements and producing materials to capitalize on major themes.



# USAID WACIP Supports Improvements in Ginning Systems in the C-4 Countries



▲ Containers of seed cotton. ▶ (Opposite): A view inside SOFITEX's Banfora 2 gin.

The U.S. government supports the cotton sector in West and Central Africa through the USAID West Africa Cotton Improvement Program (USAID WACIP). The program covers Benin, Burkina Faso, Chad and Mali, commonly known as the Cotton Four (C-4) countries, plus Senegal. The project, which began in 2006, is implemented by IFDC.

USAID WACIP is helping to increase smallholder farmers' incomes in cotton-growing areas, as well as increasing the value of cotton processed by industrial and artisanal processors (and therefore contributing to increases in their incomes) in the C-4 countries. Specifically for ginners, the project's intervention has been focused on helping companies transform their cotton ginning losses into profits through productive investments with short-term, high-value economic returns. USAID WACIP conducted thorough site-specific ginning efficiency diagnostics of key gins in the C-4. Specific actions to improve the efficiency of the existing ginning systems were identified.

Cotton grown in the region is ginned by companies that have plants that use similar equipment. The commercial ginning return (percentage of fiber relative to the cotton seed) is between 41 and 43 percent and is the highest yield in the world. While most of the ginning equipment is more than 75 years old, it remains in good operating condition. However, some of the operative parts are located in open-air rooms, so cotton dust is a source of air pollution and a potential human health hazard.

## Pilot Gins Improve Productivity

A competitive tender was launched to select pilot gins for a PPP through joint investment packages that included: the installation of ginning humidification equipment accompanied by training programs on environmental and human health concerns; the mitigation of fire hazards; the implementation of ginning management software to measure the quantitative impact of these improvements; and the dissemination of information relating to the importance of the ginning investment packages and of the program results to other ginning companies in the region.



USAID WACIP worked with its partner in Benin, *Coton et Industries du Monde, Expertise et Services Afrique* (COTIMES), to design and launch a program to improve the efficiency of the pilot ginning systems. The improvements were focused to yield a higher volume of better quality, lower-cost cotton fiber. Following site-specific efficiency diagnostics, COTIMES identified inadequate equipment and plant maintenance and the need to better train plant personnel. As the diagnostic recommended, a regional training workshop was organized in Ségou, Mali, in 2009 for technical and managerial personnel from the pilot gins. The training focused on improving decision-making processes, quality control instruments and maintenance of humidification equipment.

Following the training, COTIMES worked with the competitively selected gins to develop investment plans. Three gins benefited from the investment packages – Vélingara of SODEFITEX/Senegal, N'Dali of ICA-GIE/Benin and Banfora 2 of SOFITEX/Burkina Faso. The investments varied due to the particular configuration of each gin, but all investments involved a contribution to purchase state-of-the-art humidification equipment.

The main activities undertaken by the gins were: (1) the ginning efficiency diagnostic; (2) the installation of ginning humidification equipment; (3) the installation of humidification control equipment and software at various stages of the ginning process, and the configuration of this equipment with the ginning management software; (4) an accounting software package at the SODEFITEX plant; and (5) training of plant staff on the mitigation of environmental, human health and fire hazards.

The results have been extraordinary because they show that it is possible to recoup all of the investments in one ginning campaign. The following improvements generated the most productive results: the automated adjustment of the humidity of seed cotton and cotton fiber during the ginning process generated a gain in fiber yield and lint length; the production of this high-quality lint increased between 16 and 29 percent at the Senegal and Benin plants, leading to increased fiber prices; an increase of 2-3 kg per bale in the average weight of bales of cotton fiber resulted in a decrease in energy consumption and packaging; and integrated management systems and the training of plant staff resulted in a saving of more than 15,000 man-hours.

The improvements in technical equipment and in staff training helped increase annual revenue of Vélingara and ICA-GIE gins by 175 million FCFA (nearly \$350,000). At the Vélingara plant, the increase was 11,509 FCFA (about \$23) per ton of fiber compared with the previous crop year of 2008-2009. Results at the Banfora 2 SOFITEX plant for 2012-2013 have not yet been fully compiled but are expected to be similar.

## Environmental Improvements

At the Banfora 2 ginning facility, one of the major problems identified by SOFITEX was the environmental pollution caused by the airborne release of fine cotton particles escaping from the dust chamber. To mitigate the pollution and risk to human health, USAID WACIP contributed to the installation of a misting system above the



dust chamber, which prevents the vast majority of particles from escaping. After only three days of operation, the system's results were so effective that the industrial director of SOFITEX, Vincent de Paul Segda, decided to equip the company's other ginning facilities with misting systems. A number of residents living near the Banfora 2 plant were pleased with the environmental improvements and visited the plant to express their appreciation to Bernard Konaté, the plant manager.

To broadly disseminate information relating to the importance of the ginning investment packages and to present the results of these investments, USAID WACIP and SOFITEX organized "Open Days for Cotton Ginning" on March 26-27 in Bobo Dioulasso and Banfora, Burkina Faso.



- ▲ A Sahara Lite humidifier.
- ▲ SOFITEX's industrial director, Vincent de Paul Segda (middle), with the chief of plant, Ouatarra Moussa (on his right), and a technician, visiting the plant.
- ▶ A steamroller for the humidification of cotton fiber.



# USAID WACIP Artisanal Textile Exhibit



To meet a USAID WACIP objective of increasing artisans' revenue in West Africa, the project conducts artisanal activities with its technical implementing partner, Aid to Artisans (ATA). Artisans have received technical assistance from ATA since 2007.

Providing further support, USAID WACIP organized its first Artisanal Textile Exhibition in Benin (which was held March 22-24 in Cotonou). Artisanal enterprises from Benin, Burkina Faso and Chad participated. The Artisanal Textile Exhibition featured handmade home décor and fashion product collections.

The exhibition showcased the work to new regional markets and strengthened the artisans' ability to independently develop new textile products. This will eventually lead to the creation of new sustainable market links and generate sales opportunities for the artisans beyond the life of USAID WACIP. The exhibition provided unique business opportunities for the enterprises to increase their incomes and consequently improve their livelihoods.

Since the inception of USAID WACIP, more than 700 new cotton products have been developed by the artisans, generating more than \$1 million in sales in local, regional and international markets.



▲ Artisanal products are displayed at the USAID WACIP Artisanal Textiles Exhibition.

# Natural Resource Management in West Africa Improves Soil and Crop Yields

IFDC's Natural Resource Management (NRM) staff members conduct research to increase the efficiency of fertilizer use and to develop crop nutrient technologies that improve soil fertility while protecting the environment. The NRM team also encourages strategic, participatory and holistic approaches to foster innovation that develops effective, profitable and environmentally viable NRM technology options and societal practices.

Currently, NRM staff members in IFDC's North and West Africa Division (NWAFD) are focused on three technologies being implemented in the division – drip irrigation (used in conjunction with FDP), mucuna fallowing and contour bunding.

Each of these technologies is extremely important in West Africa, where managing natural resources through proper water management, efficient fertilizer use and land management is imperative to increasing crop yields and sustaining agricultural productivity.

In many West African countries, raising vegetable crops during the off-season is a common practice to help generate additional food and income. However, water scarcity, intensive labor and poor soil and water management habits impede farmers' success. Drip irrigation combined with FDP is helping farmers improve their yields while decreasing the difficulty of work and reducing water and soil waste. Currently being implemented by NRM staff in three countries (Burkina Faso, Ghana and Togo), the technology is improving tomato, pepper and okra yields by 50 to 100 percent, increasing water use efficiency by at least 40 percent and preventing soil degradation.

In most African agricultural production systems, there is an increasing concern regarding organic matter scarcity, which is associated with low soil productivity. By inter-planting mucuna with maize in the dry season and letting it grow during the wet season, weeds are smothered. Mucuna also helps improve soil fertility by replacing lost nitrogen and conserving the soil's moisture. The process, called mucuna fallowing, is a cost-effective method to enrich soils with organic matter in order to revive its fertility, doubling primary crop yields while improving fertilizer efficiency. This approach, designed for and implemented in coastal areas of West Africa, works well in agro-ecosystems with a bimodal rainfall pattern.

Erosion and inefficient use of water resources impede agricultural production in many African countries. A landscaping technique called contour bunding can help alleviate these impediments. Contour bunding consists of building earthen embankments across the slope of the land, following the land's contour as closely as possible. A series of bunds divides the area into strips of land, creating a barrier to the flow of water runoff, conserving both soil and water. Since land degradation and desertification are constant threats in West Africa, saving up to 162 mt/ha of soil through contour bunding helps maintain sustainable farms. Contour bunding enables farmers to more easily manage soil fertility and water use.





- ◀ *(Opposite page): A mucuna fallow crop replenishes lost nutrients in the soil.*
- ▲ *(Above top): A farmer displays tomatoes from his drip irrigation plot. Blue drip irrigation (Chapin) buckets are seen in the background.*
- ▲ *(Above right): Contour bunds impede water runoff and erosion, conserving both soil and water and enabling farmers to sustain their farmland.*
- ◀ *(Left): A farmer tends his crop with help from a drip irrigation container (background) and irrigation hoses that run the length of the crop rows.*

# QUEFTS Helps Determine Optimal Fertilizer Blends for Specific Soils



▲ Dr. Benjamin Ahiabor (second from left) of SARI and three farmers at Savelugu, Ghana, display harvested cassava roots.

Soil fertility decline and low rates of fertilizer use are major causes for sub-optimum crop productivity in SSA. Cassava, widely grown as a primary food crop, is no exception. Even in good soil, cassava yields can suffer when farmers, because of lack of knowledge or access, use fertilizer blends that do not match their soils' needs. To enhance cassava production systems in West Africa, field research was conducted in Benin, Ghana and Togo by IFDC's NRM team in coordination with SARI, the Soil Research Institute, the Center for Agricultural Research and Benin's National Institute for Agricultural Research. The study, "Site-Specific Fertilizer Recommendations for Cassava Production in West Africa," used decision support systems to develop site-specific fertilizer recommendations to improve nutrient management in cassava production systems.

The study, funded by DGIS, USAID and the International Fund for Agricultural Development, began in 2007 when NRM and institute researchers diagnosed soil fertility for the three climate zones that traverse Benin, Ghana and Togo.

To determine appropriate fertilizer recommendations for each soil type, the team needed to develop calibration parameters for Quantitative Evaluation of the Fertility of Tropical Soils (QUEFTS). QUEFTS is a static model used to develop site-specific fertilizer mix rates by measuring crop uptake of nutrients against the indigenous supply of nutrients.

By conducting a fertilizer trial, the team evaluated the indigenous supply capacity of each soil and cassava's response to increasing rates of fertilizers. The evaluation revealed that cassava responds to different mixes of fertilizer from one soil to another and from one location to another, emphasizing the importance of site-specific recommendations. The evaluation did show, however, that potassium (K) and N were the most important fertilizers to apply for optimum cassava production in areas where only cassava is being cropped, while phosphorus (P) should supplement N and K where maize-cassava intercropping systems are in place.

After calibration, the QUEFTS model was used to formulate site-specific fertilizer rates for each pilot zone, evaluate the effectiveness of the specific fertilizer rates and select the most optimal rates to be disseminated in West Africa. Within Benin, Ghana and Togo, there are three major climatic zones in which cassava production is widespread:



the Forest Zone, the Guinean Zone and the Sudano-Guinean Zone (see map below). Test plots were established in Kumasi (southern Ghana) in the Forest Zone, Davié and Adingnigon (South Benin) in the Guinean Zone and Nyankpala (northern Ghana) in the Sudano-Guinean Zone and involved three main soil types: Ferralsols at the Davié and Adingnigon sites, Acrisols at the Kumasi site and Gleyi-ferric Lixisol at the Nyankpala site. Ten combinations of NPK rates were tested per pilot site for cassava cropping in Benin and Ghana and both cassava cropping and maize-cassava intercropping in Togo.





The tests indicated that cassava responded differently to each type of fertilizer, depending on the soil type and location. This allowed the team to suggest the most effective and economical options for each site. For example, in southern Togo, while cassava responded best –

more than two-fold the performance of the absolute control without fertilizer – to NPK 60:25:120 and NPK 100:40:150 for the cassava system and NPK 110:35:125 and NPK 200:55:155 for the maize-cassava intercropping system, NPK 60:25:120 was suggested as the most profitable option for farmers.

Currently, 13 villages are involved in the dissemination process, which includes participatory learning modules on fertilizers, identification of nutrient deficiencies, soil fertility indicators and crop performance indicators. The learning modules are conducted at demonstration plots to facilitate the adoption of recommended rates of fertilizer use. The NRM team plans to reach a larger number of farmers through FFS and exchange visits involving neighboring villagers, agro-dealers and other stakeholders.



▲ Four climatic zones intersect Ghana, Togo and Benin

- |  |                            |   |                |
|--|----------------------------|---|----------------|
|  | Sahelo-Sudanian: Semi-Arid |  | Guinean: Humid |
|  | Sudano-Guinean: Sub-Humid  |  | Forest: Humid  |

# CFC-KIT Focuses on Sesame Production and Marketing in Mali



- ▲ *The CFC-KIT project is developing sesame agribusiness clusters and value chains in Mali, as well as addressing sesame impurities to improve quality, so that farmers can increase their profits by exporting products such as these bottles of sesame oil.*

The political and security crises that engulfed Mali during the second half of 2012 caused IFDC to halt its activities. Despite the turmoil, however, progress was achieved in a number of areas: intensified training at FFS; impressive gains in yields; advances in quality; expanded capacity of smallholder farmers in business, finance and marketing; and organization formation and cooperation.

## More Training, Reduced Costs

Sesame production is a potentially lucrative business in Mali, and one in which smallholder farmers and others in the sesame value chain are willing to invest. IFDC's focus on improving sesame production and marketing comprises the Development of Sesame Production and Processing for Export from the Mali (CFC-KIT) component of IFDC's Grassroots Development of Agribusiness Clusters in Mali (DEBPEA) project. DEBPEA is designed to reinforce and expand agricultural development in Mali. Funding for the CFC-KIT project is provided by the Common Fund for Commodities (CFC) and the Netherlands' Royal Tropical Institute (KIT). KIT also monitors activities and contributes to the implementation of project management tools. To learn how to improve quality and increase yields, farmers attend workshops and field training in seeding,

cultivating and harvesting techniques. Attendance in IFDC-sponsored training sessions in 2012 exceeded projections by 11 percent (2,780 trained/2,500 projected). Of the smallholder farmers trained, 147 attended FFS, which will expand over time due to their success.

FFS training has become more practical, efficient and less expensive. The cost of training a single farmer dropped by 76 percent, from 40,000 FCFA, or almost \$85 in 2011, to 9,000 FCFA (or about \$18) in 2012. In part, this is due to more time spent in field sessions and less time in training rooms. Attesting to the growing perception of the value of FFS training, six new FFS were funded by smallholder farmers themselves, and four were funded by the Syngenta Foundation's Capacity Building for Sustainable Agriculture (PRECAD) project.

## Cost-Saving Innovations

In one FFS lesson, a seed drill – a sowing device that precisely positions seeds at a targeted depth in the soil and then covers them – was demonstrated. The seed drill used in this demonstration has an 11-hole disc to plant sesame seeds mixed with organic manure. Compared with the customary broadcast seeding employed by many smallholder farmers, drill seeding requires approximately 50 percent less seed and increases plant germination and emergence. It is also considerably less time-consuming – it takes only one day to



sow 1 ha using a seed drill, compared with four days by hand. Seed drills make planting easier, faster and less expensive.

## Impressive Gains in Cultivation and Yields

With broader awareness of the profit potential of sesame and news of growing yields, sesame farming is expanding. At 11 agricultural business centers (*Pôles d'Enterprises Agricoles*, or PEAs) surveyed, the number of farmers involved in sesame cultivation increased by approximately 18 percent, from 7,619 in 2011 to 8,959 in 2012. The area planted increased from 7,645 ha to 10,409 ha, and the area planted per farmer increased by 16 percent, from 1.17 ha to 1.36 ha. When IFDC was forced to suspend its activities in Mali, projected 2012 yields were estimated to be 4,157 kg/ha, compared with recorded 2011 yields of 2,625 kg/ha – a projected growth rate of more than 58 percent.

These results stem from changes such as ‘respect for the agricultural calendar,’ which includes scheduling the beginning of field training to coincide with the beginning of the planting season. The agricultural calendar is also a factor in farmers’ access to fertilizer. Demonstration plots are convincing farmers that organic and inorganic fertilizers help to significantly improve yields. However, there is not enough manure for farmers to rely solely on organic fertilizer, and during the time when fertilizer is generally available (July and August), it is too expensive for many smallholder farmers. CFC-KIT project staff

Development of stronger quality control measures to meet the demands of sesame processors and exporters is an ongoing endeavor. Cleaning equipment (e.g., sieves and sieve covers) is in place at 14 collection centers, and members of four sesame farmer unions are being trained on the equipment.

While there is a demand for sesame in general (whether fertilized by mineral or organic fertilizers), there is a growing demand for organic sesame. However, a critical need related to quality, demand and pricing is fair trade certification of organic sesame. Certification assures buyers that the sesame has not been genetically modified, does not contain genetically modified processing agents, has not been cultivated with chemical fertilizers or been adulterated through contact with conventional sesame. These conditions are verified through ‘traceability’ and ‘identity preservation,’ which enable farmers and processors to guarantee that organic sesame has been adequately isolated from non-organic sesame.

The current lack of certification in many areas of Mali means that organic sesame is often sold at the same price as non-organic sesame. This decreases farmers’ and agro-dealers’ revenues and profits.

The experience of organic sesame farmers in Mali’s *Federation des Guireyaawes* is useful for growers of non-certified organic sesame elsewhere in Mali. There, organic sesame farmers organized themselves to reduce the cost of gaining certification and securing the “Organic Sesame Mali” label. The certification process included

# To learn how to improve quality and increase yields, farmers attend workshops and field training in seeding, cultivating and harvesting techniques.

members recommended that if FBOs, cooperatives or unions would use their financial resources to purchase fertilizer in bulk from suppliers prior to the growing season, they could then open their own agro-dealer shops and sell fertilizers to their farmer-members.

Additional practices such as the use of improved seed, awareness of the importance and timing of crop maintenance and single-row planting – a technique in which seeds are planted in rows separated with uncultivated soil for access – were also cited.

## Quality Awareness and Organic Certification

Creating awareness among smallholder farmers of the impact of quality on sesame exporting is a vital concern.

development of a market survey, a business plan and a traceability system – that is, a map that depicts the areas in which organic sesame is produced. The existence of the traceability system will facilitate the certification process for organic sesame across the country.

## Business, Finance and Organizational Cooperation

Beyond agricultural training, the educational needs of smallholder farmers and other businesses involved in sesame production include marketing, accounting and finance. In workshops organized by PEAs, members learn to develop business plans, understand credit institutions’ criteria to grant loans, identify funding sources and negotiate loans. In one such workshop, 80 percent of business plans prepared by participants were funded, and



▲ A Malian farmer harvests sesame for processing.

others received favorable opinions from the National Bank for Agricultural Development.

More attention is being paid to the benefits of cooperation among smallholder farmers and others in the sesame value chain. For example, a formalized partnership negotiated between IFDC and Oikocredit will provide smallholder farmers with credit to purchase agro-inputs and other necessities. Similarly, a partnership has been developed with the Netherlands Inter-church Organization for Development Cooperation to provide sesame cleaning equipment that will elevate product quality.

Bundling is a prime example of establishing cooperation among smallholder farmers and other stakeholders. An estimated 50 percent of *Organisation des Producteurs/Paysannes* (producers’ organizations, which are similar to FBOs and cooperatives) associated with PEAs practice bundling – the formal or informal collaboration of farmers and purchasers of identical or complementary products. This practice gives smallholder farmers negotiating clout for seed, fertilizer and other inputs, as well as influence in setting sesame market prices.

The number of smallholder sesame farmers forming cooperatives is growing rapidly, due in large part to the formation of new PEAs and increasing membership in existing PEAs. To facilitate the creation of new PEAs, a digital map identifying the locations of existing PEAs was developed. It is being updated with contact information and addresses. In

addition, information sessions about cooperatives are held in areas where farmers are not yet organized.

## Challenges Ahead

Based on experiences in prior seasons, a number of specific challenges have been identified:

- Begin all training sessions at the appropriate time of year (generally in June) to make them more practical and useful.
- Synchronize all activities to the agricultural calendar.
- Ensure more regular use of integrated pest management (IPM).
- Strengthen the capacity of cooperatives to improve seed and fertilizer access.
- Take steps necessary to gain certification of organic sesame throughout Mali.





# The Quality of Fertilizer Traded in West Africa: Evidence for Stronger Controls



▲ An IFDC study on fertilizer quality in West Africa found that while overall evidence of adulterated products is low, NPK fertilizers blended in the region are more likely to be of poor quality than imported compound products.

## Increased Fertilizer Use Is Needed to Achieve a Green Revolution in Africa

For the foreseeable future, agriculture will remain the backbone of economic growth in most West African countries. Therefore, any viable and sustainable economic development in these countries must be driven by agricultural development. However, because of poor soils, erratic rainfall and technological constraints, agricultural productivity is low, which makes it difficult to meet the demand for food for an ever-growing, increasingly urbanized population.

Historically, the response to increased food demand has been to expand the area cultivated. This extensification has contributed to progressive land degradation, which negatively affects soil quality and agricultural productivity and poses serious risks to the environment (because nutrients extracted from the soils by crops are not adequately replenished).

Fertilizer use in West Africa is among the lowest in the world. Total regional fertilizer consumption is estimated to be about 1.5 mmt per year. Fertilizers are primarily used on cash crops, and less than 8-9 kg of fertilizer nutrients are used per ha annually.

The Food and Agriculture Organization (FAO) of the UN estimates that the average fertilizer application rate

should increase from 8-9 kg/ha/year to 23 kg/ha/year by 2015 to meet the 6 percent growth in annual agricultural production target that was set by the Comprehensive Africa Agriculture Development Programme (CAADP).

## Fertilizer Quality Control Needs to be Strengthened

Several West African countries liberalized fertilizer importation and distribution without appropriate controls, leading to regional product quality problems. These could impede efforts to boost agricultural productivity and to restore or maintain soil fertility. There are few systematic studies on the quality of fertilizers marketed in West Africa; IFDC conducted the most recent in 1995. It showed that although the physical attributes of marketed fertilizers are generally acceptable, 43 percent of the products were nutrient-deficient and 58 percent were deficient in weight. The IFDC study attributed these problems to the absence of legal frameworks or their ineffective application.

These issues persist and, consequently, the percentage of poor quality fertilizers traded in West Africa is too high. These quality problems (and significant environmental hazards) will increase if the market continues growing without effective controls. Conversely, only quality products will enable farmers to maximize the returns from their investments and encourage them to expand the use of fertilizers.

Faced with the challenge of improving the quality of fertilizers traded in West Africa, the Economic Community of West African States (ECOWAS) and the West Africa Economic and Monetary Union (UEMOA) joined to develop a regional legal framework for their control. The main purpose of this still-developing framework is to safeguard the interests of farmers against nutrient deficiencies, adulteration, misleading claims and short weight, as well as to contribute to the creation of an enabling environment for private sector investment in the fertilizer industry. Its adoption is part of the implementation of the regional fertilizer strategy adopted in 2006.

## New Findings on the Quality of Fertilizers Traded in West Africa

To evaluate the effectiveness of the framework when it is implemented, ECOWAS and UEMOA initiated a study in 2012 to assess the quality of fertilizer traded in West Africa as well as factors influencing fertilizer quality.

**The sampling methodology consisted of two steps. The first focused on obtaining a random sample of five to 10 percent of the fertilizer dealers in each country. The second step was the collection of random samples of fertilizers from each of the warehouses or shops included in the sample.**

“The Quality of Fertilizer Traded in West Africa: Evidence for Stronger Control Organized at the Regional Level” was funded by DGIS and implemented through the Marketing Inputs Regionally (MIR) Plus project. The study was conducted by IFDC’s Dr. Joaquin Sanabria (scientist-biometrician), Dr. Georges Dimithe (MIR Plus project leader) and Emmanuel K.M. Alognikou (MIR Plus fertilizer policy expert). The study serves as a baseline assessment of fertilizer quality in West Africa.

Trained inspectors from the national fertilizer regulatory services in five West African countries – Côte d’Ivoire, Ghana, Nigeria, Senegal and Togo – assisted with the study. The sampling methodology consisted of two steps. The first focused on obtaining a random sample of five to 10 percent of the fertilizer dealers in each country. The second step was the collection of random samples of fertilizers from each of the warehouses or shops included in the sample.

Fertilizer sampling and collection were conducted following an agreed-upon protocol. In addition, standardized questionnaires were used to record conditions of storage, physical attributes of fertilizers and characteristics of markets and dealers.

Virtually all fertilizer used in the region is imported. The fertilizers collected were either imported bulk fertilizers that were then blended in the region or imported compound products. A total of 2,028 fertilizer samples were collected from 827 locations in the five countries. The distribution of the samples represents the relative importance of different fertilizer products in the countries. Urea and the NPK 15:15:15 blend were the only products collected from all five countries. Urea, the compound NPK 15:15:15, the compound NPK 16:16:16, the compound NPK 23:10:5, the blend NPK 15:15:15 and ammonium sulfate (AS) account for 79 percent of the samples collected.

The chemical analyses of the fertilizer samples focused on determining the content of primary nutrients (total N, available P and soluble K). Statistical analyses were applied to data on nutrient content, physical attributes and characteristics of markets, dealers and storage conditions to determine the quality of the different fertilizer products and to associate fertilizer quality with market and dealer characteristics. To be meaningful, the nutrient content compliance was analyzed statistically only for the fertilizer products that had at least 23 samples (93 percent of all samples collected). Nutrient content compliance was assessed based on newly adopted ECOWAS standards.

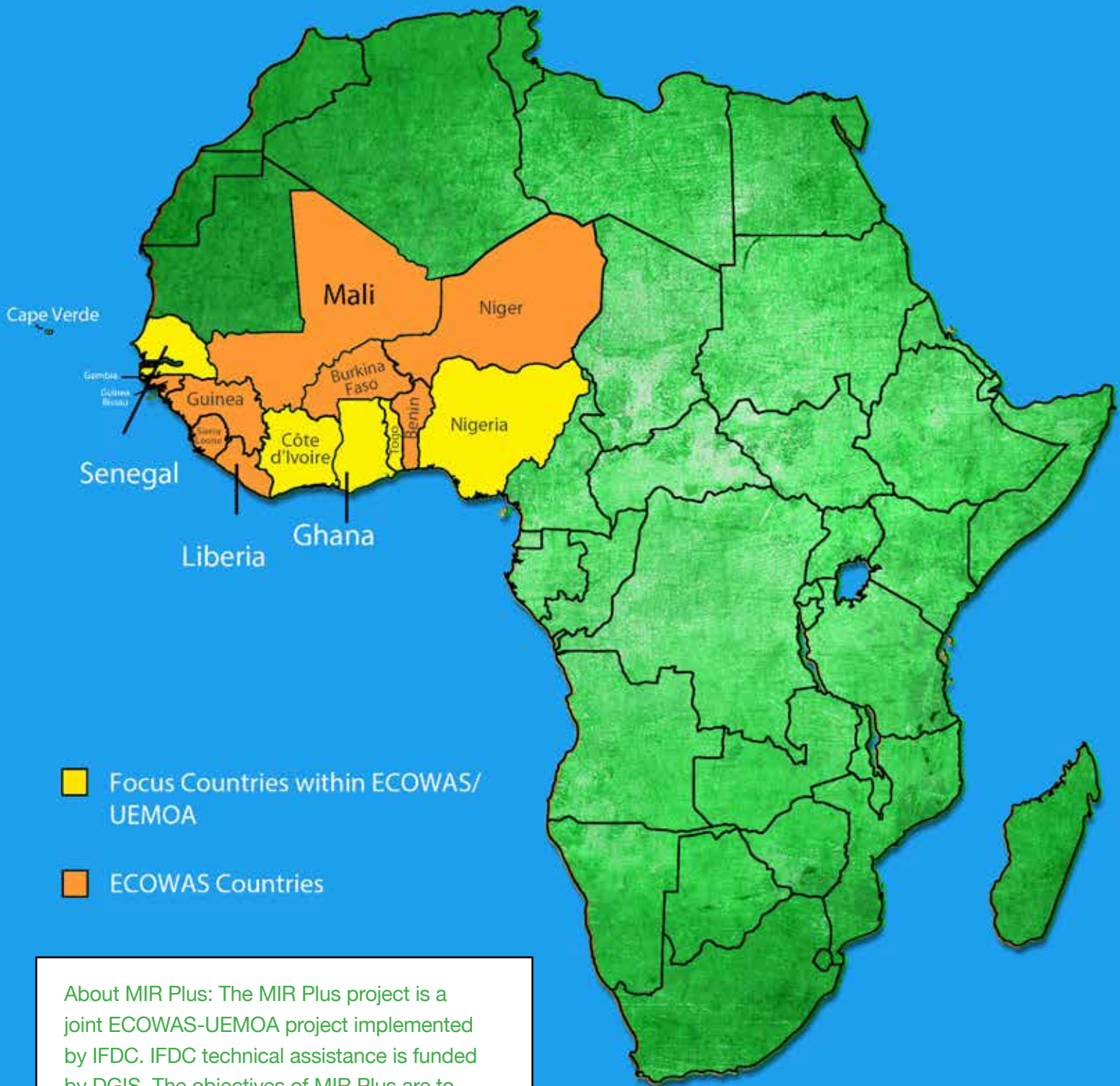
**The study’s key findings can be summarized as follows:**

### Poor Quality Is Most Severe in Blends

The chemical analyses conducted show that NPK fertilizers blended in the region present the most frequent and severe cases of poor quality compared with compounds. More specifically, 51 percent of 15:15:15 blend samples were



# Fertilizer Sampling in Five Focus Countries Within ECOWAS/UEMOA



- Focus Countries within ECOWAS/ UEMOA
- ECOWAS Countries

About MIR Plus: The MIR Plus project is a joint ECOWAS-UEMOA project implemented by IFDC. IFDC technical assistance is funded by DGIS. The objectives of MIR Plus are to facilitate the development of a regional agro-input market in West Africa and to support the implementation of regional agricultural policies.



▲ *Phosphate rock sample from Senegal.*

out of compliance with newly adopted ECOWAS tolerance limits for nutrient content deviations. Similarly, 86 percent of blended 20:10:10 samples, 12 percent of blended 6:20:10 samples, 96 percent of blended 15:10:10 samples, 31 percent of Asaase Wura (0:22:18+9CaO+7S+5MgO; a special blend for cocoa in Ghana) samples and 26 percent of Cocoa Feed (0:30:20) samples failed to meet the ECOWAS quality standards.

In contrast, only 4 percent of the urea, 10 percent of compound 15:15:15, 16 percent of AS (21:0:0+24S), 15 percent of compound 16:16:16, 1 percent of compound 23:10:5 samples and 4 percent of Sulfan (24:0:0+6S) failed to meet ECOWAS quality standards. While the proportion of non-compliant compound product samples is lower than blended products, the proportion is still high for imported products.

Of the single superphosphate (SSP) samples collected in Nigeria, 70 percent contained no P<sub>2</sub>O<sub>5</sub> and instead were comprised primarily of quartz. Chemical and X-ray analyses indicate that the samples came from spurious materials without fertilizer characteristics that were commercialized as SSP.

### Country-to-Country Comparisons Show Varying Product Quality

Comparisons made among Côte d'Ivoire, Ghana and Togo for blended 15:15:15 and among Ghana, Nigeria and Togo for compound 15:15:15 show large variances between countries. The overall out-of-nutrient content compliance for the blended 15:15:15 was highest in Côte d'Ivoire (87 percent), followed by Ghana (42 percent) and Togo (6 percent). For compound 15:15:15, the overall out-of-nutrient content compliance was much lower – Nigeria (16 percent), Ghana (10 percent) and Togo (3 percent).

The low proportion of non-compliance observed in Togo may be because Togo has low variability in importation sources and a relatively simple distribution chain due to government control of importation and distribution.

### Nutrient Deficiencies in Blends Are Not Simply an Issue of Segregation

Analysis indicated that the primary reason for nutrient deficiencies in Asaase Wura is the uneven distribution of nutrients inside the bags caused by granule segregation. Nutrient content deficiencies in half of the 15:15:15 blend, two-thirds of the Cocoa Feed and one-third of the 6:20:10 blend samples are also attributed to segregation of the fertilizer components used.

The effect of segregation in the products with the highest proportion of non-compliant samples (15:10:10 and 20:10:10) is found to be minimal; instead, the lack of nutrient compliance in these products is mainly explained by insufficient nutrients in the blend manufacture. The high probability associated with segregation assessment in some blended fertilizer products suggests that a large proportion of the nutrient-deficient cases can be avoided by using fertilizers of uniform granule size to manufacture these blends and utilizing appropriate equipment and procedures.

### Evidence of Adulterated Products Is Low

While trained inspectors reported evidence of adulteration in 23 percent of the samples from Côte d'Ivoire, only 3.4 percent of the samples from Nigeria showed adulteration. The only cases of completely proven adulteration were the SSP samples from Nigeria that had no P<sub>2</sub>O<sub>5</sub> content. This result also confirms the finding of the 1995 IFDC assessment. Even though there is a perception of rampant counterfeit or adulterated fertilizers in West African markets, this perception is not supported by the findings of either study.

### Short Weight Fertilizer Bags Are Common

While adulteration was not found to be a major problem, short weight was. An analysis of 1,055 fertilizer bags collected in the five countries indicates that in 41 percent of the samples, the bag weight does not comply with the ECOWAS tolerance limit in Nigeria, 28 percent in Côte d'Ivoire, 13 percent in Senegal, 12 percent in Ghana and 7 percent in Togo. Possible reasons for underweight bags are poor process control or deliberate acts of underweighting.

### Market Characteristics Are Associated with the Quality of Products

Statistically significant association between market characteristics and fertilizer quality categories ('good' or 'bad') was found only for 15:15:15 blends, likely because there is enough variability in the samples collected between the two categories. Interestingly, rural markets are associated



with a significantly higher percentage (87.5) of good quality fertilizer than the urban markets (56.5 percent). Statistical analysis results also showed that permanent markets tend to have a significantly higher percentage of good quality 15:15:15 blends than periodic markets. Similarly, markets with a high concentration of dealers tend to have a significantly higher percentage of good quality products than isolated agro-dealers.

### Licensing and Knowledge of Fertilizers Matter

Agro-dealer characteristics and statistical analysis performed on the blended samples and compounds reveal that agro-dealers with “good knowledge about fertilizers” are more likely to sell a higher percentage of good quality products. Similarly, those dealers with a license to sell fertilizer are more likely to sell a higher percentage of good quality fertilizers than non-licensed ones. In addition, the analysis also indicates that agro-dealers that predominantly sell fertilizer to large-scale farmers are more likely to sell a higher percentage of good quality products than the agro-dealers who sell fertilizer mainly to smallholder farmers.

### Physical Attributes Are Linked to Product Quality

The presence of impurities and fillers was not analyzed statistically due to lack of variability in the data collected by the sampling teams. The qualitative assessment of granule integrity (presence of fine particles and dust) indicated that all the blended fertilizers had at least 50 percent of the samples classified at medium- or high-level categories for the presence of fine particles. The 15:10:10 blend also had a dust presence of 80 percent at the high category. Among the compound fertilizers, 16:16:16, 15:15:15, 23:10:5 and Sulfan also had more than 50 percent of the samples classified in the categories of medium and high for the presence of fine particles.

Granule integrity was poorer for compound 15:15:15 than for the blended 15:15:15. The frequent and severe granule degradation can result from excessive manipulation of the fertilizer bags due to their manual handling. There is also a clear indication that complex distribution chains (Nigeria and Ghana) present a higher frequency and severity of granular degradation than simple distribution chains (Togo).

As expected, the study found a strong correlation between high moisture levels and high caking levels, both for the blended fertilizers and the compound fertilizers. The importance of appropriate bagging

was underscored by findings in Senegal where 41 percent of bags did not have plastic inner lining, and 61 percent of samples presented medium to high levels of urea caking.

### Implementing the ECOWAS System

The study results clearly suggest that implementing the ECOWAS fertilizer regulatory system effectively is likely to ensure that products supplied to the market meet high-quality standards. The ECOWAS system imposes mandatory licensing of agro-dealers as well as inspection, sampling and analysis of fertilizers at importation points and along the distribution chain.

### Addressing the Quality Challenges of Blends Is Needed

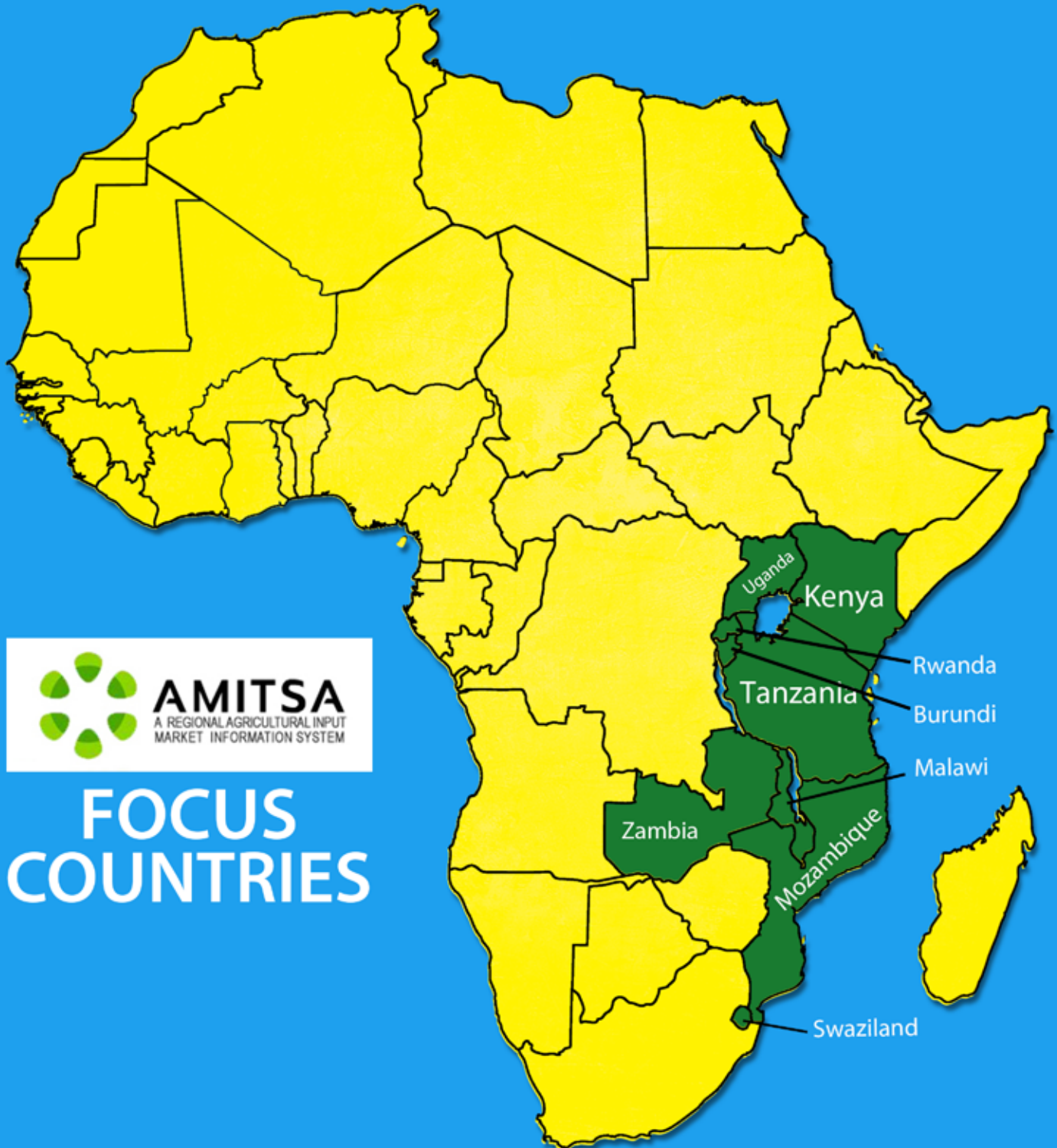
Blends show the most frequent and severe cases of poor quality. It is imperative to identify the origin of their quality problems and to propose appropriate solutions. In addition, there is a clear need to enhance the manufacturing knowledge and equipment of those manufacturing blends.

### Building Agro-Dealers' Capacity

The study results also suggest the need to train agro-dealers on the physical and chemical properties of fertilizers and appropriate fertilizer handling and storage. Doing so will reduce the effect of physical attributes of fertilizer on product quality.

- ▼ *Workers unload bags of fertilizer from a ship at the port of Tema, Ghana. Most fertilizer used in West Africa is imported.*





# FOCUS COUNTRIES



# AMITSA Upgrades Platform & Services

**T**he overall use of agro-inputs – organic and mineral fertilizers, quality seeds of superior varieties and CPPs – in SSA is extremely low, and fertilizer use rates continue to average below 8 kg/ha. The majority of these agro-inputs are applied at larger farms on cash crops, which means that smallholder farmers' use of agro-inputs on food crops is even lower than the average. Among the major constraints to the increased use of agro-inputs in East and southern Africa is the lack of general market information about these products.

Launched in 2010 to provide timely data and information on agricultural input markets in East and southern Africa, AMITSA was developed as an information technology (IT) decision support tool to increase the use of fertilizer and contribute to the region's food security.

The web- and mobile phone-based AMITSA system utilizes both private and public sector agro-input stakeholders to collect and process market data and information, such as the prevailing wholesale prices of the most common fertilizers, seeds and CPPs. Agro-dealers, the primary users of AMITSA, can then compare the prices of inputs from different distributors, negotiate with suppliers for better prices and obtain information that better serves their

farmer-customers. This new type of 'informed buying' is bringing down the cost of farming near participating agro-dealers and attracting more smallholder farmers to the less expensive agro-inputs. The countries currently utilizing AMITSA are Burundi, Kenya, Malawi, Mozambique, Rwanda, Swaziland, Tanzania, Uganda and Zambia.

## A New Platform Brings Critical Information to the Cell Phone

In late 2012, AMITSA deployed a new, more versatile platform called mFarms. The mFarms platform not only facilitates information-sharing but also surveys data collection, monitoring and evaluation (M&E), supply chain management and other DSTs.

Deployed simultaneously in the nine target countries, mFarms also provided the opportunity to launch various applications such as the Market Information Platform for Agro-Dealers (MIPAD) and a back-end data management system for M&E, processing, validating and reporting. Under the previous platform, data collection and entry into the AMITSA database were restricted to Internet connections, which can be highly unreliable in many parts of SSA. The MIPAD application utilizes more dependable mobile phone service connections to ease the collection of price data on inputs and other database updates. And because mFarms utilizes a cellular platform, short message service (SMS) is becoming an increasingly

critical tool to keep agro-dealers informed. In the second half of 2012, more than 600,000 SMS messages were sent through the new platform, providing price and market updates to participating agro-dealers.

To complement the launch of the new mFarms platform and the MIPAD application, aggressive training is being employed by AMITSA staff. In tandem with the platform launch, ToT sessions on the use of mFarms were conducted for 17 participants from nine countries. These trainers subsequently trained 83 agro-dealers in Kenya, Rwanda and Uganda and continue their training efforts today. In March, two additional trainings were conducted in Zambia (18 agro-dealers) and Malawi (22 agro-dealers) to equip them with the new MIPAD application. These trainings were funded by various IFDC projects in the division.

In addition to the changes to the IT platform, the AMITSA website is equipped with several new features. Users can now download product catalogs containing detailed technical information on fertilizers and CPPs, and website-based data is continuously refined and updated. AMITSA is also partnering with other organizations to share this information more widely; AMITSA information is now distributed by the Kenya Ministry of Agriculture (MoA) and by the Ugandan MIS providers FARMGAIN and FIT. AMITSA is a collaboration among IFDC, the East Africa Community (EAC) and the Common Market for Eastern and Southern Africa (COMESA). AMITSA provides support to several IFDC projects, including 2SCALE, Privatization of Rwanda’s Fertilizer Import and Distribution System (PReFER), Rwanda Agro-Dealer Development (RADD) and USAID NAFKA in Tanzania, as well as to MEA Ltd., a private fertilizer company in Kenya.



▲ AGROSA agro-dealer Immaculee Uwurukundo (center) trains on the AMITSA platform with other agro-dealers.

## Information Equals Success for Agro-Dealers: A Case Study

AGROSA Ltd. is a Rwandan retailer that deals in agro-inputs and veterinary products. AGROSA began operations in 1998 in the town of Butare, Huye District, in Rwanda's Southern Province.

"Previously, I didn't have the right information, so I wasn't able to negotiate with my suppliers," said Immaculee Uwurukundo, AGROSA's marketing officer. "Thanks to AMITSA, now I know the prevailing prices in almost every major town in Rwanda. I can negotiate better deals with suppliers, and therefore offer lower prices to my customers. As a result, our sales have increased substantially."

Although the nation is transitioning to full privatization of its fertilizer market, the Government of Rwanda (GoR) continues to set prices for maize and wheat seed, and for planting and top-dressing fertilizers until the transition is complete. In addition, maize and wheat farmers receive vouchers that enable them to buy these agro-inputs at 50 percent of the retail price, an additional challenge for agro-dealers. The prices of other seeds, CPPs and veterinary products, however, continue to be determined by market forces.

IFDC introduced AMITSA in Rwanda in 2010. The system enables agro-dealers to send and receive prices through various channels, and to access information collected from markets across East and southern Africa. Every month, Uwurukundo (along with other agro-dealers across the region) sends the wholesale costs of various agro-inputs in her shop to AMITSA. She receives messages showing prices in different East African countries 20 days later; the price reports are also published on AMITSA's website. Uwurukundo uses this information to select the distributors that can supply her with agro-inputs at the best prices. "This system of sharing information for the entire region makes running my business much easier," she said.

Uwurukundo recalls the beginning of AMITSA in 2010, when it employed the Excel system. "That system was difficult to use for many agro-dealers who were not computer literate," she noted. In 2011, a web- and mobile phone-based platform was introduced; now that platform has been replaced with the more versatile mFarms platform utilizing the MIPAD application. Uwurukundo is pleased with the platform change. "It is cheap, quick and very easy to use, via my mobile phone," she said.

Across Rwanda, 22 agro-dealers in four provinces and in the capital city of Kigali are using the MIPAD application to send and receive market information. AMITSA is working with a number of partners to scale out MIPAD to more agro-dealers, providing them with accurate and up-to-date information through technology that is affordable and easy to use.

The screenshot displays the AMITSA website interface. At the top, there is a navigation bar with links for Home, Data, Markets, Media, and About us. Below the navigation bar, there is a search bar and a "Welcome to AMITSA" message. The main content area is divided into several sections:

- Input Prices:** A table showing the latest retail prices for various fertilizers and seeds across different countries. The table is organized into three main categories: Fertilizers, Seeds, and Pesticides. Each category has a sub-table with columns for different countries (Burundi, Kenya, Malawi, Mozambique, Rwanda, Swaziland, Tanzania, Uganda) and rows for specific products.
- Latest Publications:** A list of recent publications, including "Fertilizer Deep Placement" and "AMITSA REGIONAL monthly price report FEB 2013 (MIN)".
- News:** A section with recent news items, such as "Rwanda: MINAGRI signed MoU with Private Fertilizer Suppliers" and "Uganda: We Do Not Need GMOs - Ugandan Farmers".
- Latest Events:** A section with upcoming events, such as "Developing Private Sector Agro-input Markets - Designing and Implementing Targeted Subsidy Programs".
- Latest Blogs:** A section with recent blog posts, such as "Agro dealer of the Month: Uwurukundo Immaculee, AGROSA It, Butare, Rwanda".

- ▲ The AMITSA website features monthly agro-input prices, news, events, publications and technical information.

# RADD Helped Professionalize the Agro-Input Market in Rwanda



- ▲ A RADD technology transfer officer advises agro-dealers in Buruhukiro, Nyamagabe District, about organizing farmer field schools on their demonstration plots.

Since 2010, the percentage of Rwandans living in poverty has decreased by 20 percent, while the per capita gross domestic product (GDP) has nearly doubled since 2005-2006.<sup>1</sup> And while agricultural growth helps impoverished Rwandans rise out of poverty and supports and strengthens Rwanda's economy, growing more food on more land leads to a greater demand for agro-inputs. Over the past five years, agro-input usage in Rwanda has increased nearly four-fold, threatening supply shortages. Because Rwanda is a landlocked country, importing agro-inputs from one of the East African ports is expensive and time-consuming. When seeds, fertilizers and CPPs are unavailable or unaffordable, farmers and agro-dealers alike suffer. This weakens important agricultural value chain linkages, impeding both public and private economic growth. In response to the increased need for agro-inputs, IFDC's RADD project built, strengthened and professionalized networks of agro-input importers

and agro-dealers as a key component of the GoR Agricultural Development Strategy and its Crop Intensification Program (CIP).

Funded by AGRA, the RADD project was implemented from January 2010 to May 2013 in partnership with the Ministry of Agriculture and Animal Resources (MINAGRI) and in collaboration with other IFDC projects and the GoR. RADD trained over 1,000 agro-dealers in technical knowledge and business management, increased access to additional supplies of better agro-inputs for agro-dealers, provided technical support for the creation of over 400 demonstration plots and developed more than 30 district agro-dealer cooperatives that will in turn help form a federation of agro-dealers.

RADD worked in collaboration with IFDC's CATALIST, COMESA Regional Agricultural Inputs Program (COMRAP) and PReFER projects in Rwanda to achieve its goals. CATALIST laid the groundwork to connect farmers to markets and RADD augmented the approach in conjunction with COMRAP and PReFER, connecting agro-dealers to credit and inventory sources and offering the agro-dealers technical education on business management techniques. All trained agro-dealers received a temporary license from MINAGRI, allowing them to sell agro-inputs in Rwanda. RADD staff members completed a survey of

<sup>1</sup> Third Integrated Household Living Conditions Survey, National Institute of Statistics of Rwanda (NISR)



1,149 agro-dealers' premises and trained agro-dealers on agro-input price intelligence using MIPAD in collaboration with AMITSA and the CATALIST-2 project.

As part of the professionalization process, RADD also linked Rwandan agro-dealers with local agro-input suppliers who were linked to larger suppliers. The RADD project built the capacity of local input suppliers in their dealings with trustworthy large suppliers, port agents, transporters and clearing agencies in Nairobi, Dar es Salaam and Mombasa and enhanced their skills on port operations because of the need to import agro-inputs from overseas. Some suppliers, such as Seedco, have since opened agencies in Rwanda while others have in-country representatives.

In addition to the technical information given to agro-dealers, RADD staff members educated financial institutions' managers, loan, credit and risk analyzers and underwriters on agro-input-related technical knowledge to equip them with the skills to properly analyze agro-dealers' loan applications. The combination of technical training given to both agro-dealers and financial institution staff improves agro-dealers' access to finance and enables them to better provide farmers with the correct type and appropriate amount of inputs.

RADD staff members also provided assistance to agro-dealers, establishing demonstration plots each season in order to make their businesses more sustainable and to help educate their farmer-customers. Agro-dealers who established demonstration plots are increasing sales to farmers who also learned from FFS, which provide an opportunity for agro-dealers to market their products while providing information and enhancing their relationships with customers. Demonstration plots established by agro-dealers are estimated to have benefited almost 234,000 farmers working about 164,000 ha. The RADD project created a database of 885 agro-dealers and a geo-referenced map of agro-dealers' shops in Rwanda. This map facilitated a report on demonstration plot maps, soil analysis results and data collection. The available maps and soil characteristics will be used by a national fertilizer recommendation project that is funded by AGRA's Soil Health Program and implemented by the Rwanda Agricultural Board.

After three years of RADD project implementation, the GoR, through MINAGRI, recognizes the role of agro-dealers in agricultural development and has increased fertilizer importation, supplies of improved seeds and the number of private sector sales points. As the agro-dealer accreditation process moves forward, MINAGRI will provide additional assistance. The project team hopes that a second phase of the project (RADD II) will begin soon and will continue to expand the work started by RADD.



▲ A team of Rwandan agro-input suppliers visit the Port of Dar es Salaam, Tanzania.

# AIMS III Begins Work in Mozambique



▲ A Mozambican family stands in front of its healthy crop.

## Shifting Farmers from Subsistence Farming to Commercial Agriculture

Agricultural Input Markets Strengthening (AIMS) III is an integrated program focused on the development and transfer of agricultural technology to benefit Mozambique's smallholder farmers. This will be accomplished through the introduction of IFDC's Commercialized Sustainable Farming Systems (CSFS) solution and by continuing to build competitive markets and improving agro-dealer networks.

Funded by USAID, AIMS III began in the fourth quarter of 2012 and is a continuation of the AIMS and AIMS II programs (also funded by USAID), which ran from 2006 to 2009 and 2009 to 2012, respectively. Key project components are technology transfer and extension support, increased production of improved seeds, more conducive policy environments, better public R&D capacities and continued support to build a skilled private agriculture sector to achieve sustainable targets in food security and agricultural development.

Based on its expertise and experience since the initiation of AIMS in 2006, IFDC will strengthen the capacities of public sector partners – particularly the *Instituto de Investigação Agrária de Moçambique* (Mozambique Institute for Agrarian Research, or IIAM), National Directorate of Agricultural Extension (DNEA) and the Platform for Agricultural Research and Innovation in Mozambique (PIAIT) – to develop and transfer CSFS best practices to improve the profitability of smallholder agriculture. In addition, IFDC will continue to strengthen private sector capacities to develop viable agro-input and output markets and will assist the Government of the Republic of Mozambique (GRM), its MoA and partners

to develop policies and legislation needed for economic growth led by the agriculture sector (with particular attention to fertilizers).

Cooperation will continue among all R&D partners to undertake capacity building, technology generation and transfer, policy reform, improved access to finance and empowerment of smallholder farmers. The outcomes of this cooperation will lead to sustainable agricultural and economic growth, contribute to national and regional food security and enhance Mozambique's natural resource base. AIMS III will provide technical and policy support to PIAIT partners so that improved technologies can be deployed to a range of agribusiness clusters. AIMS III will also work with USAID's FTF and Multi-Year Assistance Program (MYAP) initiatives, other development partners and targeted agro-processors working along the Beira and Nacala corridors.

## CSFS Focuses on Farmers' Profits

CSFS retains the integration of improved seeds, mineral nutrients and organic inputs that characterize IFDC's ISFM solution, but evaluates all input and management options on a cost/benefit basis to optimize profits rather than focusing on agronomic efficiency. CSFS also considers management options that are not explicit under ISFM, such as conservation agriculture. CSFS also considers the costs and benefits of risk reduction strategies, an important consideration in commercially oriented farming systems in which investments and risks are greater than in subsistence systems. Again, the goal of USAID, GRM and IFDC is to help move farmers from subsistence farming to commercial agriculture in order to improve the country's food security and improve the lives of the farmers and their families.



“Disseminating CSFS technologies and an adequate supply of agro-inputs are crucial for Mozambique to experience a Green Revolution and achieve its food production and agricultural growth targets,” stated AIMS III Chief of Party and IFDC Country Representative Alexander Fernando. “A key to the adoption of these technologies is linkage to profitable markets so that farmers are able to invest in farms and soils.”

## AIMS III Program Components

The activities of the AIMS III program are grouped into five program components:

1. Transfer of CSFS technologies – Training of staff and partners in new technologies began. These include application of CPPs and the initiation of technology transfer activities using a CSFS approach. AIMS III staff members are working with partners to initiate 90 demonstration plots in the Beira and Nacala corridors. These demonstrate the cultivation of cassava, soybeans, pigeon peas, sesame, maize and beans with minimum tillage, CPP application and fertilizer blends.
2. Support to business development service (BDS) providers – Under AIMS III, IFDC seeks to continue to strengthen the agro-input value chain, but will remove itself from direct agro-dealer development activities and instead focus on developing the capacity of local BDS providers. Therefore, through consultancy contracts for key staff in the bridging period, IFDC is providing support to AgriMerc ODS as it takes over, continues and expands agro-dealer development activities.
3. Policy reforms and regulations for the agro-input sector – The AIMS III policy advisor participated in the preparation of Mozambique’s first fertilizer regulations, which are scheduled to be approved by the government in 2013.
4. Strengthening MIS – Agro-dealer training on data collection for AMITSA was held in April.
5. Expansion of the agro-input voucher program begun during AIMS II – IFDC is participating in the design and development of a proposed voucher program. If funded, it will be a five-year project encompassing 100,000 vouchers in 45 districts of six provinces in the Beira and Nacala corridors.



▲ *AIMS III is an integrated program focused on the development and transfer of agricultural technology to benefit Mozambique’s smallholder farmers.*

# CATALIST-Uganda Collects Samples to Help Restore Soil Health

Soil degradation is a primary cause of low agricultural productivity and the resulting low income of so many smallholder farmers. Many of these farmers remain trapped in a poverty cycle, ‘mining’ their soils of nutrients and producing below average yields, with little marketable surplus. With an increasing population and increasingly smaller farms, growth in agricultural production in Uganda will require a substantial increase in productivity per land unit. Therefore, use of organic and inorganic fertilizers must increase.

To help break the poverty cycle, CATALIST-Uganda had 1,200 soil samples collected for an analysis of soil acidity and fertility. The samples were collected from three project areas – the Lango sub-region in the Northern Region (600 samples), Eastern Region (300 samples) and the southern area of the Western Region (300 samples). The samples were collected by a Kenya-based laboratory services firm.

Using the results of the analysis, CATALIST-Uganda staff will be able to recommend specific fertilizer formulations needed to restore the lost soil nutrients in the regions.





(Opposite left): Selecting a sampling point in a field previously used to grow sunflowers in Ogur sub-county in Uganda's Northern Region; (Opposite right): Using an auger to collect a soil sample at the first sampling point in a cassava field in Apac District, Northern Region; (Top left): Collecting soil at the second sampling point in Ogur sub-county, Northern Region; (Top right): Collecting soil at the third sampling point in Ogur sub-county, Northern Region; (Bottom left): Mixing soil collected from 12 different sampling points to create a composite soil sample from the Northern Region of Uganda; (Bottom right): The composite soil sample will be bagged, labeled and transported for analysis.

# CATALIST-Uganda Trains Lead Farmers

During March, the CATALIST-Uganda project conducted training of more than 100 lead farmers and extension staff in commercialized sustainable farming methods in Uganda's Eastern and Northern regions. In the Eastern Region, the training took place in Tororo District and centered on rice. Training in the Northern Region took place in Lira District and focused on oilseeds (sunflowers and soybeans).

Across Uganda and East Africa, farmers have used traditional farming methods for generations that do not emphasize soil management and usually result in poor crop yields and insufficient family incomes. This method of farming is not sustainable and cannot produce enough to support the farmers or improve the region's agriculture sector or economy.

CATALIST-Uganda staff members carried out farmer group assessment exercises and key farmer groups were selected to take part in the initial phase of training. Participants attended both classroom and practical sessions on: how fertilizers and herbicides work and why they are important in commercial agriculture; safe handling and application of fertilizers and herbicides; the use of FDP in rice production; establishment/management of nurseries to grow crop seedlings; the use, layout and set-up management of demonstration fields; correct crop spacing; and minimum tillage.

Project staff then led the lead farmers and extension staff through practical demonstrations on the sustainable farming practices that can help farmers increase yields, decrease production costs, decrease post-harvest losses and improve post-harvest quality.

In the Eastern Region, lead farmers and extension staff from the local governments of Bugiri, Butaleja, Mbale and Tororo districts participated. Ofwono Justin Andrew, Magola sub-county National Agriculture Advisory Services coordinator, said, "We have had classroom trainings on some of the same material previously, but had never experienced practical illustrations that made it easy for one to practice what has been learned." He emphasized, "This training has created hope and enthusiasm; our farmers cannot wait to practice the farming methods taught by CATALIST-Uganda."

In the Northern Region, lead farmers and staff members from the Alito Joint Christian Farmers Group (AJCFG) participated in the four-day training. According to Okwang Christopher of the AJCFG, "The training was one of the most interesting and effective I have ever attended. Most of the farmers who participated in the training were overwhelmed by what CATALIST-Uganda taught them and they promised to use the skills and techniques learned – particularly minimum tillage, fertilizer application and line planting."

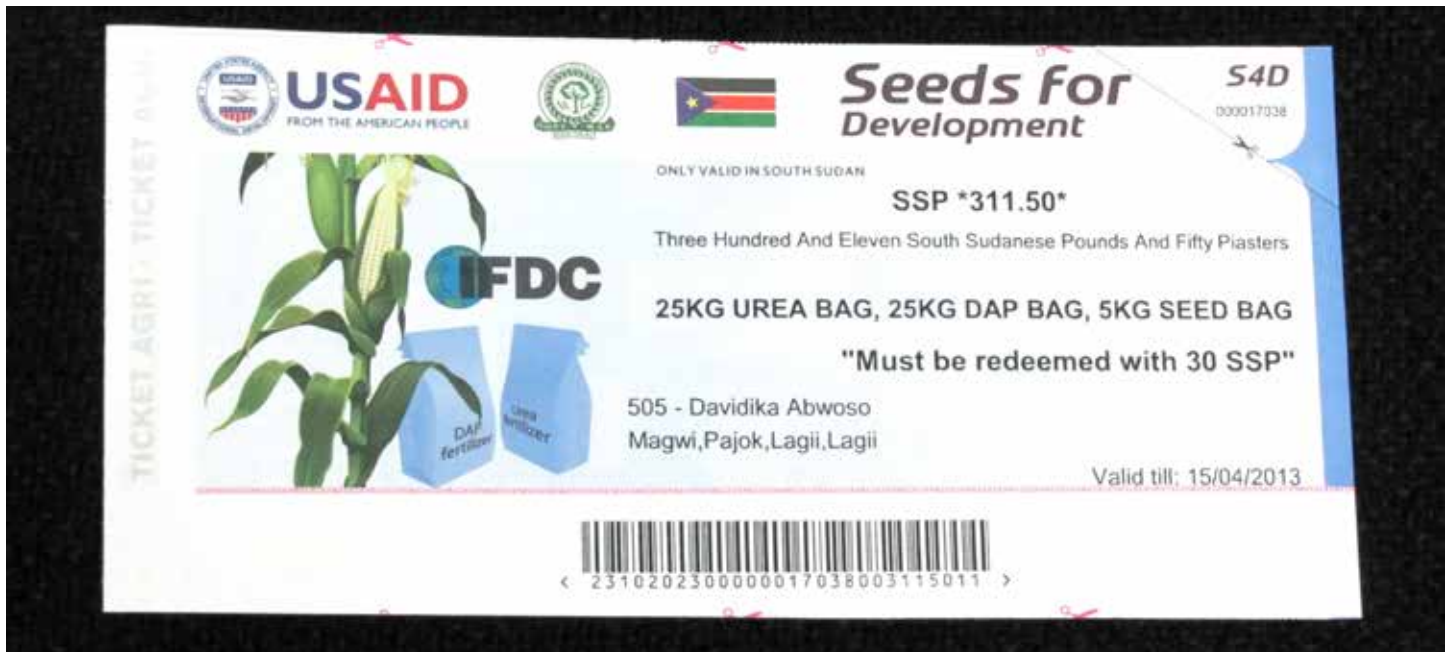




*(Opposite left): A participant demonstrating even application of herbicides during the lead farmers' training in Eastern Uganda; (Opposite right): A participant shares the instructions for herbicide use with participants during herbicide application training; (Top left): A participant using a stick as a measurement tool during the demonstration plot practical exercise; (Top right): Demonstration plot setup and line planting practical sessions during lead farmer training exercise; (Bottom left): A participant demonstrating even application of herbicides during the lead farmers' training in Eastern Uganda; (Bottom right): Demonstration plot layout during the lead farmer training.*



# USAID S4D Program: Transforming Agriculture in South Sudan



▲ USAID Seeds for Development voucher.

Five million people in South Sudan suffer from food insecurity – although the country has the potential to become a major grain exporter. The most effective way to increase food production is to increase crop yields by using modern agricultural inputs. For example, average fertilizer use in South Sudan is 4 kg/ha, compared with the average of about 8 kg/ha in SSA and the 200 kg/ha recommended by FAO.

The USAID Seeds for Development (S4D) program, modeled on earlier successful IFDC projects in Africa, is helping to stimulate agro-input use using vouchers to introduce fertilizers and high-yielding seed varieties into traditional farming systems. Subsidized prices and a transparent distribution mechanism encourage farmers to use (and entrepreneurs to trade in) these and other agro-inputs.

The first S4D voucher program was launched in July 2012. The results were encouraging, and the program was fine-tuned for its second season, which began in March 2013. This time the results were not simply encouraging but beyond expectation.

In the first season, 4,000 farmers were targeted. Vouchers were distributed to 3,855 farmers and redeemed by nearly 2,900 farmers. In the second season, 15,374 farmers

registered for the program – nearly double the target of 8,000. Vouchers were distributed to 14,351 farmers. With farmers eager to buy the subsidized inputs, nearly all the seed and fertilizer stocks were distributed by the end of April.

## How the Program Worked

The voucher program focused on six counties in South Sudan's Eastern and Central Equatoria states. The target areas are all within the country's Greenbelt Zone, where reliable rainfall and relatively good soils create the potential for large increases in crop yields.

S4D used community meetings, *'ngutu lo longiyo* (traditional town-criers) and radio programs broadcast in February to encourage farmers to register for the program. Participants in the radio programs included South Sudan's Minister of Agriculture, Mark Akio Ukinbul, and Directors General-Agriculture for two states.

Registered farmers received vouchers, which they used to buy inputs at subsidized prices from nearby agro-dealers. The agro-dealers were part of the program as well, receiving financial incentives, logistical support and training to promote the use of agro-inputs and advise farmers on how to use them correctly.

In 2013, 56 agro-dealers were involved (up from 22 last year). Most were farmers themselves, and also operated

a small business – most commonly a general store – in a project community. This ensured that no farmer needed to travel more than three or four miles to buy inputs; most had to travel less than half a mile.

Farmers received two vouchers each, and chose to redeem one or both. Each voucher could be used to buy inputs sufficient for half a *feddan* (0.21 ha) – 25 kg of diammonium phosphate (DAP), 25 kg of urea and 5 kg of hybrid maize seed (varieties Longe 6H and 10H, both produced by private firms in Uganda). The inputs were not free; farmers had to pay 30 South Sudanese pounds (about \$9.50) per voucher redeemed. This was roughly 10 percent of the value of the inputs.

In each county, farmer registration and voucher distribution were handled jointly by S4D project staff and community leaders. Voucher redemption (purchase of inputs) was managed by local agro-dealers, with project staff helping to monitor and record the flow of material.

## Have Yields Increased?

Detailed impact assessments will be conducted after the next harvest. But after the first season, farmers reported yield increases ranging from 50 to nearly 300 percent. For the typical smallholder farmer, maize yields increased from 7-8 bags per *feddan* to 12 bags per *feddan*. The more skilled farmers, who earlier harvested 10-15 bags per *feddan*, harvested 26 bags on average. Almost every farmer involved in the first season re-registered for the second and plans to expand the area planted with maize significantly.

Field trials conducted by another USAID project (USAID FARM) suggest even higher yields are possible – and even likely, as farmers gain experience with fertilizers. In the trials, the combination of hybrid seeds and fertilizer gave yields 200-300 percent higher than traditional farmer practice.

## Battling Misconceptions

Training and education were critical. Farmers received intensive hands-on training on crop management, input use and safe handling methods. Technical advice was

available from project staff during registration, voucher redemption and at farmer field days. The project also established 56 demonstration plots where farmers could see for themselves the benefits of fertilizer application, and the difference between traditional seeds and hybrids.

Agro-dealers were trained on product use so that they could advise farmers on correct rates and methods of application. They were also trained on proper warehouse management and storage methods, as well as basic business management, accounting and record-keeping. Most *bomas* (a group of villages) in the project area also hosted demonstration plots, so agro-dealers were also trained on basic agronomy and data collection.

Government extension agents had a number of misperceptions about fertilizers – that they damage the soil, or even cause cancer. To help dispel these misperceptions and create the country's first cadre of trained staff who could promote modern inputs, 58 government extension staff also received training on technical issues.

## Next Steps

“It hasn't been easy,” admits project manager Denis Tiren. “Hybrid seeds and especially fertilizer are new to South Sudan, so we had to convince not only farmers but also the staff of government agencies.”

But two successful seasons laid a solid foundation. Smallholder farmers have successfully used fertilizers and hybrid seeds, and yields have increased by 100 percent or more. Government agencies, including local extension staff, are now committed to promoting agro-input use. And a network of agro-dealers has been created and trained to manage future input distribution programs.

Seeds for Development was intended as a pilot project to demonstrate that voucher programs could work even in areas with limited infrastructure and no tradition of market-oriented agriculture. The project ends in July 2013, leaving behind farmers eager for more inputs, and entrepreneurs able and willing to supply them.

**I usually harvest 8 to 10 bags per *feddan*. With this new seed and fertilizer, I harvested 18 bags... I had only two vouchers – if they allowed me, I would have taken four vouchers and paid the money, because I know how much I will get.**

– Paul Lomo, farmer in Lasu Payam, Yei County, Central Equatoria State

# Phosphate Efficiency Initiative

The IFDC Phosphate Efficiency Initiative is an ongoing institutional effort to explore the most efficient use of phosphate – in its many fertilizer forms – in plant growth and development. On a regular basis, IFDC greenhouse experiments compare the effectiveness of various forms of phosphate fertilizers on plant growth in a number of soil types. The effort utilizes a wide range of plant species and varieties and focuses on maximizing the amount of available P.

## Phosphate Effectiveness on Canola



## Studying P Availability on Lettuce



- ▲ *This greenhouse experiment studies the effectiveness of P from different phosphate rock sources on canola and compares the results with the use of triple superphosphate (TSP) on a separate set of canola plants.*
- ◀ *In this experiment, different types of water-soluble phosphates – conventional and recycled – are compared to determine P availability at all stages of lettuce growth, with lettuce harvests at five, seven and nine weeks after planting. In the foreground is the ‘check,’ a lettuce plant with all nutrients except P applied to the soil; the other two plants received appropriate amounts of P in addition to other nutrients. This demonstrates the necessity of phosphorus for healthy plant growth.*



# Bangladesh Partners Trained to Operate GHG Measurement Equipment



Scientists from Bangladesh recently visited IFDC headquarters to be trained in the operation of gas collection chambers designed to measure the amount of N<sub>2</sub>O and nitric oxide (NO) released from the soil during rice production. It is estimated that rice farming is responsible for 9 to 13 percent of global GHG emissions.

Designed and constructed by IFDC, the GHG chambers will be set up on paddy fields at partner research organizations, including the Bangladesh Rice Research Institute (BRRI) and Bangladesh Agricultural University (BAU). Determining the amount of GHG emitted will help research institutions develop programs that address climate change issues and introduce improved management practices. Data collected from the GHG chambers will also be used to quantify the benefits of using FDP technology, which increases nitrogen use efficiency because most of the fertilizer's nitrogen

stays in the soil, close to the plant's roots instead of volatilizing into the atmosphere as a GHG or leaching into groundwater.

Funded by USAID, this research is being implemented through a new 'climate-smart' component of IFDC's AAPI project in Bangladesh.



- ◀ (Left and top right): The GHG measurement chambers take continuous long-term measurements of N<sub>2</sub>O and NO released during rice production.
- ▲ (Bottom right): Posing among the prototype gas collection chambers that have been duplicated for use in Bangladesh are Ron Smith, senior technician of IFDC greenhouse services; Dr. Rick Austin, IFDC consultant; Dr. Md. Abdus Satter, IFDC local environmental specialist; Azmul Huda, Ph.D. student, Department of Soil Science, BAU; and S.M. Mofijul Islam, BRRI soil scientist.

# Dr. Prem Bindraban Appointed Executive Director of VFRC



▲ *Dr. Prem Bindraban*

Dr. Amit H. Roy, IFDC president and chief executive officer, and Dr. Jimmy Cheek, chancellor of the University of Tennessee, Knoxville (UTK), and chairman of the Virtual Fertilizer Research Center (VFRC) board of advisors, announced that Dr. Prem Bindraban was appointed executive director of the VFRC. Bindraban began his duties on June 15 and is based in the VFRC office in Washington, D.C.

Created as a semi-autonomous unit of IFDC in 2010, the VFRC is a research initiative to foster the creation of the next generation of fertilizers and production technologies to help feed the world's growing population and provide sustainable food security. The VFRC is comprised of the work of multiple research institutions cooperating to advance a unified research agenda. A global initiative, the VFRC is governed by a 13-member board of advisors. The board represents a broad spectrum of prominent international

leaders in the public and private sectors who are experts in the fields of agriculture, fertilizer, food security, sustainable development, soil science and international philanthropy. "The VFRC came into existence because of the vision and effort of Dr. Amit Roy," stated Cheek. "Sanjib Choudhuri, the VFRC's first executive director, helped establish the organization, broadly disseminated information about it and oversaw the first grants to spur creation of the next generation of fertilizers. Now, Prem Bindraban is working with Amit and the VFRC board to expand the organization's efforts and help fulfill its mission and purpose."

According to FAO, about 1.2 billion people in developing countries lack enough food to maintain a healthy and productive lifestyle. This is more than the combined populations of North America and the European Union. No 'new' efficient fertilizer has been developed in the last 25 years that is affordable for use on food crops in developing countries. New technologies and improved practices need to be developed so that fertilizers become more affordable, efficient and environmentally friendly – while making nutrients available when crops need them most.

The VFRC was created because of the challenges smallholder farmers in developing regions face as they attempt to increase crop yields – often on soils that are nutrient-deficient. The vast majority of fertilizers were developed for temperate climates – not the tropical and sub-tropical climates of the developing regions. Fertilizers and fertilizer production technologies must be modified to work more efficiently in those climates. To enable smallholder farmers to intensify their agricultural production, new 'smart' fertilizers are required, as well as precision fertilization techniques with a regional prioritization.

"The need for innovative fertilizer products and technologies to ensure sustainable food security is a global issue and therefore requires global solutions. This is why the work of the VFRC is so vital," Roy said. "Prem Bindraban has more than 20 years of experience focused on providing science-based information on international food security. With his expertise in global development issues, he is an excellent choice to lead this global initiative."

The VFRC is partnering with universities, public and private research laboratories, the global fertilizer and agribusiness industries and individual scientists and entrepreneurs. The VFRC brings together leading scientific, business and government minds in fertilizer research and commercialization programs focused on increasing food production while using fewer resources and reducing the environmental impact of fertilizer.



“After serving for more than two decades at my alma mater, Wageningen University and Research Centre [WUR] in the Netherlands, with secondments to the International Rice Research Institute [IRRI] and International Maize and Wheat Improvement Center [CIMMYT], and the past four years at ISRIC World Soil Information, the VFRC gives me the opportunity to make a more tangible contribution to sustaining food security,” Bindraban stated. “Moreover, while the VFRC has made progress, global development issues remain. We have no time to waste in moving forward.”

Bindraban served as the director of ISRIC at WUR from 2009 until joining the VFRC. He was also a lecturer at the University of Amsterdam and leader of international

research at Agrosystems Research PRI at WUR from 2008 until joining the VFRC. Bindraban served as a professor in crop modeling at the University of São Paulo (Brazil) from 2008 to 2010 and head of the Natural Resources unit of WUR’s Plant Research International from 2000 to 2008. He also served as a researcher at CIMMYT from 1993 to 1996 and at IRRI in 1991.

Bindraban participated in the Management Development Program at WUR from 2001 to 2004, earned an Executive MBA from European University in the Netherlands in 2000, a doctorate from WUR in 1997 and a master’s degree in tropical crop science from Wageningen Agricultural University in 1990.

## Board Members Discuss VFRC Mission and Vision in Video Interview Series

During its 2012 annual meeting, the VFRC board of advisors discussed the first VFRC research grants that were awarded in the pursuit of rapidly developed, efficient and affordable fertilizer technology to serve the world’s smallholder farmers. During that time, the board members in attendance also made themselves available for interviews conducted by the IFDC Office of Communications.

“We think it is important in this early stage of the VFRC’s efforts that the public is able to hear directly from its board members,” said Dr. Jimmy Cheek. “The board is comprised of experts from a variety of disciplines – academia, research institutes, NGOs, government development agencies and international agricultural producer organizations, among others. They all have slightly different perspectives on increasing agricultural production, and that diversity shows through in the interview series.”

The videos have been added to the VFRC and IFDC websites ([www.vfrc.org](http://www.vfrc.org) and [www.ifdc.org](http://www.ifdc.org)). The first set to appear included key comments by Dr. Cheek; Dr. Rudy Rabbinge, chairman of the VFRC Science Committee and former chair of the Science Council of the Consultative Group on International Agricultural Research (CGIAR); and Sanjib Choudhuri (VFRC executive director, 2011-2013).

According to Rabbinge, the VFRC’s embrace of technology as a tool to connect thought leaders, researchers, the private sector and entrepreneurs is the reason that the VFRC will be successful. “Most of the fertilizers in use around the world today were developed by the Tennessee Valley Authority [TVA] scientists and

researchers in Muscle Shoals, Alabama, USA. That 20<sup>th</sup> century model – of concentrating staff in one location – does not work as well now. So the VFRC is using the Internet and other technologies to create a 21<sup>st</sup> century virtual community working both separately and together to develop the next generation of fertilizers.”

“We know from a number of studies over the last five years that online videos represent the single greatest form of social media consumption,” said Dr. Amit Roy, president and CEO of IFDC and founder of the VFRC. “Beyond that, we also know that ‘competition’ for viewers’ attention continues to increase, which means that we have to get to the point quickly in a way that still leaves a lasting impression.”

But creating lasting impressions is a difficult task in today’s media world. In an age where many websites are still rooted in heavy blocks of text to convey messages, communications specialists are seeking ever-more creative ways to package information. “Infographics, videos, interactive website elements, photo essays – all of them, quite honestly, are more engaging than 500 words on any given page of a website,” said Cheek. “Granted, written information is still important in many contexts, but it can’t be the driving force of a website today.”

The VFRC website, just as the Center itself, is evolving as it continues to refine its focus. “The interview series is just the beginning of what will soon be a number of creative avenues to get the VFRC message into the mainstream,” added Roy. “We have to disseminate our information in ways that match today’s media consumption habits, because the VFRC’s mission and the good that it is doing are too important to be lost in the digital media landscape.”

The Center has also posted interviews with:

- Dr. Marco Ferroni, member of the VFRC Science Committee and executive director of the Syngenta Foundation for Sustainable Agriculture.
- Assétou Kanouté, member of the VFRC Commercialization Committee and assistant professor at the Polytechnic Institute for Rural and Applied Research at the University of Mali.
- Luc Maene, member of the VFRC Commercialization Committee and former director general of the International Fertilizer Industry Association (IFA).
- Peter McPherson, member of the VFRC Executive Committee, chairman of the IFDC board of directors and president of the Association of Public and Land-grant Universities (APLU).
- The Honorable Professor Ruth Oniang'o, member of the VFRC Executive Committee and chair of the Sasakawa Africa Association.
- Dr. Renfang Shen, member of the VFRC Science Committee and director general of the Institute of Soil Science of the Chinese Academy of Sciences.
- Dr. A.K. Singh, VFRC board member and deputy director general of the Natural Resource Management Division of the Indian Council of Agricultural Research.
- Ajay Vashee, member of the VFRC Science Committee and former president of the International Federation of Agricultural Producers.

The screenshot shows the VFRC website interface. At the top, there is a logo for VFRC with the tagline "Research and development to nourish the soil and feed the world". Below the logo is a navigation menu with links: Home, About, Blueprint, Research, Media/Information, Video Gallery, and Contact. A search bar is located on the right side of the header.

The main content area features a video gallery section titled "Video Gallery" with two items: "Video Interviews" and "Primary Nutrients in Plant Growth Video Series". Below this is a large video player for an interview with Sanjib Choudhuri. The video player shows a progress bar at 05:55 and includes controls for play, volume, and HD quality. The video title is "Interview with Sanjib Choudhuri".

Below the video player, there are three smaller video thumbnails with captions and descriptions:

- Interview with Sanjib Choudhuri**: In this 6-minute interview, Sanjib Choudhuri, executive director of the VFRC (2011-2013) discusses the complexities of global food security and the purpose of the VFRC.
- Interview with Dr. Jimmy Cheek**: Dr. Jimmy Cheek, chairman of the VFRC board of advisors and Chancellor of the University of Tennessee, Knoxville, discusses the role universities will play in fertilizer technology development coordinated by the VFRC.
- Interview with Dr. Roelof (Rudy) Rabbinge**: Dr. Rudy Rabbinge, chairman of the VFRC Science Committee, discusses levels of R&D investment in various commercial sectors and reducing the amount of time that fertilizer technology takes to move from the lab to the farmer.

At the bottom of the page, there is a copyright notice: "Copyright © VFRC • All rights reserved • 1331 H Street, NW, 11th Floor • Washington D.C. 20005, U.S.A • United States". A "View Sitemap" button is located in the bottom right corner.



# IFDC Field Training Activities in 2012

During 2012, the number of field training participants increased by 17 percent (from 644,302 to 753,065). The proportion of women trained in 2012 also increased from 32 percent to 34 percent, the highest female representation in the last four years. In addition to key target groups (trainers, agro-dealers and smallholder farmers), some projects extended their training to others in the agricultural value chain – produce buyers, processors and consumers.

## Training Programs by Country and Project in 2012 Compared with 2011

IFDC Projects	2011				2012				Progress (+/-)
	# Training Programs	# of 2011 Participants			# Training Programs	# of 2012 Participants			
		Women	Men	Total		Women	Men	Total	
<b>EAD</b>	<b>6,625</b>	<b>56,223</b>	<b>208,010</b>	<b>264,233</b>	<b>7,613</b>	<b>100,159</b>	<b>203,098</b>	<b>303,257</b>	<b>15%</b>
Bangladesh (AAPI)	6,502	54,881	203,923	258,804	7,469	98,736	198,939	297,675	15%
Kyrgyzstan (KAED)	70	1,116	2,651	3,767	85	1,312	3,023	4,335	15%
Tajikistan (PRO-APT)	53	226	1,436	1,662	59	111	1,136	1,247	-25%
<b>ESAFD</b>	<b>4,280</b>	<b>92,715</b>	<b>90,332</b>	<b>183,047</b>	<b>775</b>	<b>66,508</b>	<b>81,735</b>	<b>148,243</b>	<b>-19%</b>
Central Africa (CATALIST-2)	4,073	83,665	75,509	159,174	590	61,575	72,387	133,962	-16%
Central Africa (SEW)	139	3,133	5,878	9,011	125	2,310	4,144	6,454	-28%
Ethiopia (AGP-AMDe)					6	532	2,156	2,688	
Mozambique (MADD-2011/AIMS II & III-2012)	9	3,476	4,164	7,640	4	1,331	1,916	3,247	-58%
Rwanda (RADD)	36	271	627	898	11	111	207	318	-65%
South Sudan (S4D)					19	34	266	300	
Tanzania (NAFAKA)					15	563	578	1,141	
ESAFD (2SCALE)					5	52	81	133	
Kenya, Uganda, Tanzania (EADN)	23	2,170	4,154	6,324					
<b>NWAFD</b>	<b>2,961</b>	<b>58,772</b>	<b>138,250</b>	<b>197,022</b>	<b>4,411</b>	<b>91,766</b>	<b>209,799</b>	<b>301,565</b>	<b>53%</b>
Benin (Non-Cotton Crops Productivity)	16	574	1,657	2,231	12	344	1,367	1,711	-23%
Burkina Faso (PRODIB)	7	26	364	390	12	28	428	456	17%
Ghana (MCC/CDFO, GADD, FTM, AVCMP-2011/FTM, AVCMP-2012)	59	3,995	5,702	9,697	48	6,910	12,716	19,626	202%
MALI (DEB-PEA, Sesame/Kit)	68	10,864	6,638	17,502	172	4,930	9,027	13,957	-20%
Nigeria (NADS, GFSR/BTM2, Cassava <sup>+</sup> -2011/BTM2, Cassava <sup>+</sup> -2012)	76	598	2,318	2,916	36	855	3,568	4,423	52%
West Africa (AAA-Bridge-2011/2SCALE-2012)	64	1,151	2,230	3,381	41	524	1,363	1,887	-44%
West Africa (NRM-related projects)	58	1,512	4,124	5,636	22	1,684	9,618	11,302	101%
USAID WACIP	2,560	29,914	85,338	115,252	3,332	53,988	96,041	150,029	30%
West Africa (MIR Plus)	53	10,138	29,879	40,017	706	22,501	47,012	69,513	74%
West Africa – Burkina Faso, Côte d'Ivoire, Mali (PPCC)	24	0	9,577	9,577	30	2	28,659	28,661	199%
<b>Total</b>	<b>13,866</b>	<b>207,710</b>	<b>436,592</b>	<b>644,302</b>	<b>12,799</b>	<b>258,433</b>	<b>494,632</b>	<b>753,065</b>	<b>17%</b>
		32%	68%			34%	66%		

# Making Agro-Input ‘Smart Subsidy’ Programs More Effective in SSA

Agro-input subsidies are growing in popularity in SSA. Subsidies are intended to improve access to agro-inputs, raise farm incomes, improve household and national food security and increase private sector participation in agro-input markets. However, many previous agro-input subsidy programs have not been as successful as planned. Many strained national budgets have distorted the agro-input markets by crowding out the private sector. Over the past 20 years, however, IFDC has implemented a number of successful subsidy programs that directed fertilizer and seed to farmers most in need, helped develop private sector agro-dealers and did not harm national budgets. At IFDC’s recent international training program on “Developing Private Sector Agro-Input Markets: Designing and Implementing Targeted Input Subsidies,” IFDC staff provided information to attendees on what have been termed ‘smart subsidies.’ The training took place April 8-12 at the IFDC East and Southern Africa Division in Nairobi, Kenya.

For nearly 40 years, IFDC has been conducting research and providing training and technical assistance to strengthen agro-input markets in the developing world. IFDC has introduced successful, market-friendly and targeted subsidy programs that have helped develop sustainable and competitive private sector distribution systems while promoting smallholder farmers’ interests. This training was based on lessons learned and best practices from IFDC and partner organizations in Asia, Eastern Europe and SSA. Success stories from different countries were showcased and case studies assisted attendees to build realistic models for use in their own countries.



▲ Participants visit a grain warehouse in Kenya's Nakuru District.

## Key Steps to Achieve Successful Subsidy Programs

The objectives of the training were to improve participants’ technical knowledge of the design and operations of smart subsidy programs; discuss the effectiveness and impact of market-friendly interventions instead of direct subsidies, which tend to destabilize the market; analyze the success factors of well-designed voucher programs; explore security measures used to prevent fraud and voucher program abuse; review and apply the best practices and lessons learned from well-functioning voucher programs to their country-specific situations in order to improve agro-input accessibility for smallholder farmers; and identify exit strategies to ensure the long-term, responsible involvement of the private sector in the procurement and distribution of agro-inputs.

To reach those objectives, the program was organized into five areas. The first set the stage for the program by taking participants through an expression of their expectations, an overview of the training, an introduction to IFDC activities in East Africa, a keynote speech by the Kenya director of agriculture, Humphrey Maina Mwangi, and the smart subsidy conceptual framework and implementation parameters. The second was a discussion of lessons learned from implementing subsidy programs in eight African countries. The third was a field trip that took participants to Kenya’s Nakuru District, 110 miles



from Nairobi, to visit farmers who have benefited from a subsidy program and a grain warehouse where the farmers store their harvests. Participants were exposed to how an agro-input subsidy program is implemented at the grassroots level and subsequent post-harvest activities.

After two days of presentations and question-and-answer sessions and a one-day field trip, four experts with a variety of backgrounds and opinions discussed implementation of a voucher program and actively engaged the participants in debate and discussion in the fourth area. Finally, the last area offered an opportunity for the participants to apply the lessons learned from the four previous steps to a case study in which participants were asked to prepare a strategy and an implementation plan for a voucher program covering one year of typically required activities.

Throughout the program, particularly during the case study, it became clear that a successful agro-input subsidy

## Subsidies are intended to improve access to agro-inputs, raise farm incomes, improve household and national food security and increase private sector participation in agro-input markets.

program must: set clear objectives and define an exit strategy from the very beginning; select farmers who do not already apply agro-inputs but could afford them once a subsidy is removed; target specific agro-climatic zones and crops where farmers generate high returns on their agro-input investments; and support the existing private input supply networks instead of crowding them out.

The training program was attended by 36 participants (including three women) from 12 countries: Burundi, DRC, Ghana, Kenya, Malawi, Nigeria, Rwanda, Somalia, South Sudan, Swaziland, Tanzania and Zambia. The majority (53 percent) were public officials representing their agriculture ministries (including two ministers, one director general and several directors). The remaining participants were representatives of international development agencies (39 percent) and the private sector (8 percent). Due to the large number of French-speaking participants, simultaneous translation was provided. During the week, 14 invited expert speakers (five from the public sector, five from the private sector and four from international development agencies) shared their extensive knowledge and experience with the group.

On their post-program evaluations, 81 percent of participants indicated the overall program was “very good” to “excellent” in technical delivery, program

content, methodology and administration. Representative comments from the evaluations include:

- “The course was very good, and I hope to attend another course on fertilizer use, policy development/regulations or any other related program on fertilizer here or elsewhere.” – Mariano Mangu, Director of Environment, South Sudan
- “I enjoyed the program, and I look forward to attending future relevant trainings.” – Chola Mfula, SNV, Zambia

Based on the success of the Nairobi program, it was recommended that this same training be offered in West Africa during the first quarter of 2014.



◀ Participants visit the site of a farmer group in the Nakuru District of Kenya; the group's farmers are direct beneficiaries of an agro-input subsidy program.



▲ One of many outreach efforts of the APLU Africa-U.S. Higher Education Initiative is the partnership between Ohio State University (OSU) and the Université Gaston Berger (UGB) in Senegal. OSU and UGB are establishing agro-ecology programs and an R&D center at UGB, with a focus on sustainable development of dryland agriculture and the food export industry of northern Senegal. UGB is adopting the land-grant university mission of teaching, outreach and research and is offering a two-year associate degree in agriculture. Pictured: UGB faculty members visit OSU Agricultural Technical Institute.



# Land-Grant Colleges: A Quiet Legacy

## *National and International Agricultural Research, Extension, Education and Development*

### Higher Education in the 1800s: Not for the Rural Class

Higher education enrollment in the U.S. in the mid-19th century was largely limited to America's wealthy. When the federal Office of Education began collecting education data in 1869, only 63,000 students attended higher education institutions in the U.S., which amounted to about one percent of the 18- to 24-year-old population.

It was clear to proponents that higher education must be made more widely accessible in order to create the opportunity for greater personal and social advancement in the rural working class. It was a national economic concern as well – 48 percent of the population was involved in agriculture, and farmers represented 58 percent of the labor force, working on over two million farms.

### The First Land-Grant College: Michigan State University

As early as 1850, the concern over rural higher education took root in a tangible way. The State of Michigan sought educational innovations. Among other directives, the new Michigan Constitution of 1850 called for the creation of a state land-grant "agricultural school." The school would offer a less classical curriculum, and it would be funded through the granting of state lands to pay for the institution's construction and operation.



▲ *The Agricultural College of the State of Michigan (now Michigan State University), circa 1857.*

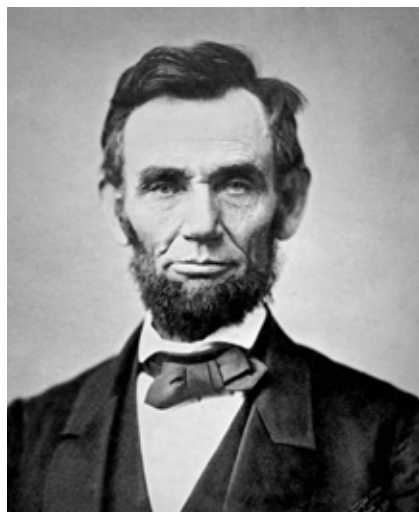
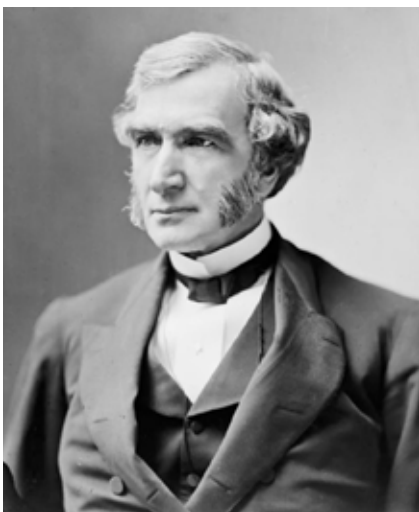
Five years later, in February 1855, Michigan Governor Kinsley S. Bingham signed the bill establishing the Agricultural College of the State of Michigan, the nation's first land-grant institution. Classes began on May 13, 1857, with five faculty members and 63 male students.

The college's first president, Joseph R. Williams, designed a curriculum that required more scientific study than virtually any undergraduate institution of the era. Despite Williams' innovations and his defense of education for the masses, the State Board of Education opposed his curriculum, forced Williams' resignation in 1859 and reduced the curriculum to a two-year vocational program.

In 1860, Williams became acting lieutenant governor and used that brief period of power to secure the passage of the state's Reorganization Act of 1861. The law gave the college a four-year curriculum and the power to grant master's degrees. Under the act, the newly created State Board of Agriculture assumed authority over the operation of the institution. The college was renamed the State Agricultural College, and is known today as Michigan State University (MSU). Although Williams died that same year, he laid the foundation for future generations and inspired U.S. Representative Justin Smith Morrill of Vermont to champion the cause at the national level.

## The Morrill Act: A Defining Moment for U.S. Education

Representative Morrill understood the negative impacts that a lack of access to higher education could have on a primarily rural agrarian society. In 1857, Morrill introduced a federal land-grant bill to fund a system of industrial colleges, one in each state, clearly using the Agricultural College of the State of Michigan as a model for his national plan. The U.S. Congress passed the Morrill Act in 1859, but it was vetoed by President James Buchanan. In 1861, Morrill resubmitted the act with the amendment that the proposed institutions would teach military tactics in addition to engineering and agriculture. Aided by the recent secession of many southern states that did not support the plan, this reconfigured Morrill Act was signed into law by President Abraham Lincoln on July 2, 1862.



▲ *The Morrill Act of 1862 was written by Representative Justin Smith Morrill and was signed into law by President Abraham Lincoln on July 2.*

The Morrill Act clearly stated as its purpose to provide education that favored the rural heritage of agriculture with “the endowment, support and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic

arts, in such manner as the legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.”

However, due to the Civil War, the U.S. Government had little money to divert to the support of new state-run land-grant colleges. But what it did have was federal land – a lot of it, scattered across each of the existing 34 states. Morrill's funding solution was brilliantly simple and was likely aided by the Michigan example. The government provided land grants of 30,000 acres to every senator and congressman, allowing the more populous states to receive more land. The required acreage necessary to build each college was set aside while the remaining land was sold as needed by the states to fund the construction and operation of each college.

In later legislation such as the Hatch Act of 1887, direct federal grant funds were apportioned to each state to establish an agricultural experiment station in connection with each land-grant institution. The Second Morrill Act was also passed in 1887, providing additional college endowments for the inclusion of institutions for black students, leading to the creation of 17 historically black land-grant colleges.

## The APLU: A Common Agenda

As the number of land-grant colleges grew, under new legislation or with the addition of new states to the Union, organization of the network of institutions became a critical factor. In 1887, member-colleges were formed into the Association of American Agricultural Colleges. Over the years, new institutions were added, divergent associations were merged and association names were changed. In 1945, permanent headquarters were established in Washington, D.C. Ten years later, the association began preparations for a merger with the National Association of State Universities and the State Universities Association (non-land-grant state universities). In 1963, the completed merger formally created the National Association of State Universities and Land-grant Colleges (NASULGC), a name that the association held until 2009, when the new name, Association of Public and Land-grant Universities (APLU), was adopted.

## APLU's President Reflects on the Morrill Act and MSU

In 2012, the 150th anniversary of the Morrill Act was celebrated. As the first official land-grant college under the law, Michigan State University had just as much reason to celebrate. For Peter McPherson, APLU president since 2005, the milestone held special meaning.



▲ Young McPherson (third from left, circled) contends for the blue ribbon with his cow at the 4-H County Fair.

“This was a very personal anniversary for me. I was brought up in the land-grant tradition,” McPherson said. “Michigan State was ever-present when I was a child. I grew up on a farm and was active in 4-H, a Michigan State program. Michigan State’s Cooperative Extension program was a visible presence in our community,” he recalled.

McPherson’s career has been spent in service through educational, humanitarian and agricultural development efforts. As a young man, he enlisted in the Peace Corps, a time that he says “was the defining experience of my life,” helping him to understand the importance of encouraging people to be actively involved in developing solutions to their issues. Following a number of notable private sector positions, he was called to serve his government. From 1981 to 1987, McPherson served as the administrator of USAID and was instrumental in the U.S. effort to provide famine relief in Africa, helping save millions of lives. In 1987, he was appointed deputy secretary of the U.S. Department of the Treasury with a focus on international trade and tax law.



▲ USAID Administrator McPherson presents President Ronald Reagan with a ceremonial check for \$28 million of unused funds at the end of the 1981 fiscal year.

In 1993, McPherson was appointed president of Michigan State University, where he revised the university’s mission statement to reflect his idea of the effectiveness of people as solutions: “Michigan State University is a research-intensive, land-grant university of international scope where people matter.” The simple concept built upon the philosophical foundation laid by an earlier revolutionary MSU president, John Hannah (see article on page 75).



▲ MSU President McPherson with his wife, Joanne.

“My grandfather was on the board of Michigan State, my parents attended Michigan State and my seven brothers and sisters and I graduated from the university,” noted McPherson. “Coming home to be president of Michigan State had a special meaning for me.”

During his 11-year tenure as MSU president, McPherson took a temporary leave to serve as the director of Economic Policy for the Office of Reconstruction and Humanitarian Assistance in Iraq. There, he helped establish a central bank and a new currency. As founding co-chair of the Partnership to Cut Hunger and Poverty in Africa and chair of the board of Harvest Plus, McPherson supports global efforts to alleviate poverty, malnutrition and starvation.

But perhaps most notable is the legacy that he is creating as president of the APLU. McPherson encourages dedication to excellence in learning, discovery and engagement and continues to lead the ‘globalization’ of the land-grant concept, establishing various initiatives that focus on the transfer of knowledge to developing nations. As an extension of this outreach, McPherson has served as chair of the IFDC board of directors since 2004, and for nearly a decade has strengthened the links between the international agricultural development community and land-grant institutions.



▲ IFDC Board Chair McPherson stands with Board Member Rhoda Peace Tumusiime, Commissioner for Rural Economy and Agriculture at the African Union, and IFDC President and CEO Dr. Amit Roy at a recent board meeting.

## Going Global: APLU and Land-Grants Called to Serve

Following World War II, the U.S. found itself in a Cold War struggle with the Soviet Union, a clandestine battle that would decide the world's prevailing social and political structures. As the war raged in the shadows, President Harry S. Truman and his advisors devised a public tool to promote democracy. The administration believed that an international technical assistance program could be the primary means to win the “hearts and minds” of the developing world, bolstering the argument for free market societies. By sharing U.S. expertise in various fields (particularly agriculture, industry and health), Truman believed that the U.S. could help “Third World” nations along their national development paths, raise living standards and show that democracy and capitalism could provide for the welfare of the individual.

In his inaugural speech in 1949, Truman expounded on this foreign policy. Outlining his fourth objective, later known as the Point-Four Program, Truman noted that while the nation's “material resources are limited,” its “imponderable resources in technical knowledge are constantly growing and are inexhaustible.” Truman urged the nation to “embark on a bold new program for making

the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas.” Ten days later, a new committee was established within the Department of State – the Technical Assistance Group, an agency that just over a decade later would evolve into USAID.

From the inception of the foreign policy program, land-grant universities were envisioned as the ‘army’ that would support these knowledge-sharing efforts. Advancing the idea, Henry Bennett, head of the new Point-Four Program, urged then-chairman of the APLU (and later a founder of IFDC), John Hannah, to use the financial support of the Point-Four Program to build agricultural colleges in developing countries. “In short order, land-grant universities were helping build colleges in Africa, Asia and Latin America,” noted McPherson.



▲ President Harry S. Truman delivers his 1949 inaugural address in which he introduces the Point-Four Program, a foreign assistance effort that would share U.S. expertise in agriculture, industry and health with developing nations.

Since that time, land-grant and state colleges and universities, through funding from government agencies such as USAID, have used their “inexhaustible” resources – the knowledge and skills of the brightest young minds in the U.S. – to stimulate technological development nationally, and share those advancements with developing nations around the globe.

Over the last five decades, the APLU has been the voice of that development and subsequent outreach, supporting this vision of global knowledge-sharing under various initiatives. “One of the biggest challenges we face globally is the need to double food production by 2050 to feed the world's growing population,” said McPherson. “Former U.S. Defense Secretary Robert Gates gave the keynote address at the APLU annual meeting last year and made it clear that this goal is possible only with the commitment and deep involvement of the U.S. land-grant university system,” he added.



▲ Secretary of State George Shultz cuts USAID's 25th anniversary cake. The cake's size, according to Administrator McPherson, represents the small budget allocated for USAID activities. Photo: USAID.

The APLU's current international efforts are manifested in the USAID-funded Africa-U.S. Higher Education Initiative and the APLU Commission on International Initiatives, two programs that seek to alleviate global hunger and poverty by building and bolstering technical knowledge and skills in developing countries.

“These initiatives are part of a long-term commitment to helping developing countries create the human capacity and technology necessary for them to solve problems and create economic opportunity,” said McPherson. “Land-grant universities must partner with developing nations,



▲ McPherson visits Mississippi State University, a land-grant college, with current USAID Administrator Rajiv Shah (right), to learn about a variety of cashew-based products developed by the university in partnership with Costco and the World Food Programme to fight child malnutrition.

institutions and peoples. They can help create new technology in agriculture, engineering and many other fields, and will be vital in helping build human resources.”

As part of the Africa-U.S. Higher Education Initiative, supported by long-term institutional partnerships between African and U.S. institutions, universities such as MSU, Virginia Polytechnic Institute and State University (Virginia Tech) and Princeton University are currently partnering with universities and learning centers in countries such as Kenya, Malawi and Uganda. “This important initiative continues to illustrate the enormous unmet need for higher education partnerships in Africa,” said McPherson. “We see this as just the beginning – this is an ongoing campaign to accomplish much more in engaging higher education institutions in Africa.”

## A Legacy of National and Global Social Advancement

The initiatives of the APLU – past and present, domestic and foreign – pay tribute to the visions of Williams, Morrill, Truman, Hannah, McPherson and countless others over the past 150 years who believed that more widely accessible education and agricultural development could secure not only national human and market advances but also transform societies around the world.

For more than 125 years, the APLU, in its many iterations, has been the driving force in organizing the research, advocacy and outreach in agricultural science and education efforts of these land-grants. APLU institutions enroll more than 3.5 million undergraduate students and 1.1 million graduate students, employ more than 645,000 faculty members and conduct nearly two-thirds of all federally funded academic research, totaling more than \$34 billion annually. They have produced “much of our modern society, including the Internet, GPS and large-scale integrated circuits,” according to McPherson in a recent letter to the U.S. Congress.

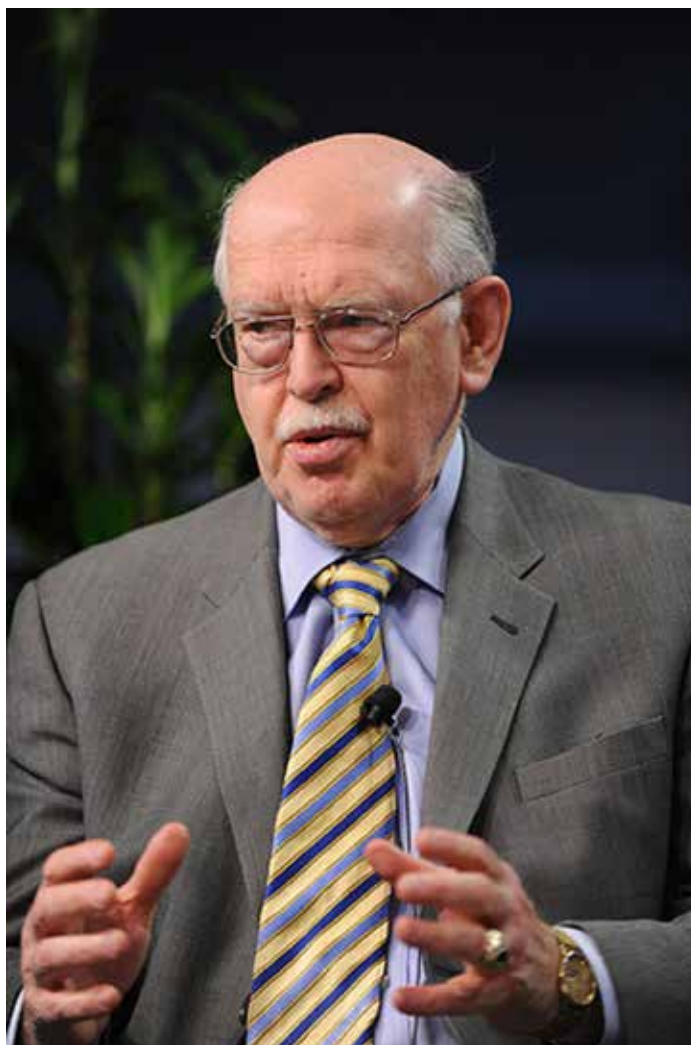
Because of this higher education model, research advances are not relegated to the university classrooms and laboratories from which these ideas are born. They do not languish on a blackboard or computer. Concepts and creations are brought to life and pushed enthusiastically into the world for the greater good – implemented by institutions of higher learning that continue to respond to President Truman's call to “make available to peace-loving peoples the benefits of our store of technical knowledge in order to help *them* realize *their*



- ▲ On October 28, 2011, the Center for Strategic and International Studies and its president, John Hamre (center), hosted USAID Administrator Dr. Rajiv Shah (second from right) and former administrators McPherson (left), Henrietta Fore (second from left), Andrew Natsios (right) and Brian Atwood (by video) for a celebratory discussion commemorating 50 years of progress and partnership.
- ▲ McPherson was a featured expert at the event, “U.S. Global Development Policy in the 21st Century: Implications for Reform,” in March 2010.

aspirations for a better life.” These institutions do, in fact, “weave a world fabric of international security and growing prosperity.”

The “imponderable resources” manifested in the nation’s knowledge capacity are constantly growing and evolving through the federal funding of land-grant and state universities and colleges. As such, land-grant colleges continue to provide invaluable material support in the advancement of our global society. “Land-grant universities through their education, research and extension have been vital in agricultural development – in the U.S. and globally – as drivers of innovation and as partners with governments and the private sector. It is a wonderful history but, of course, we have challenges and opportunities for the future of the country and the world,” concluded McPherson.



**Note: The leaders of two land-grant universities – Dr. Jimmy Cheek, chancellor of the University of Tennessee, and Dr. Steven Leath, president of Iowa State University – are members of the IFDC board of directors.**



# John A. Hannah: Co-Founder of IFDC and First Chairman of the IFDC Board



John A. Hannah was a mentor of sorts to Peter McPherson; the connection between the two dates back to a time when McPherson's father served on the Michigan State University board of trustees while Hannah was president of the university. Their careers, though decades apart, followed the same path;

Hannah and McPherson both served as the president of MSU, administrator of USAID and leaders of the APLU (Hannah as long-serving board chair and McPherson as the current president).

“He was a good man, a man with vision, a pragmatic problem-solver who took enormous risks that made great sense,” said McPherson of Hannah. Only a man with a vision could have transformed MSU from a regional agricultural college into a respected national research institution. Over the 28 years of his presidency, the longest of any MSU president, Hannah more than doubled the enrollment and used the college's special position as a land-grant university to its advantage in becoming a leading research facility. Hannah advised McPherson that, “the only thing that matters is people.”



Having served as the first chairman of the U.S. Commission on Civil Rights – where he worked to end voting rights resistance and laid the foundation for the Civil Rights Acts of 1960 and 1964 – Hannah lived the advice he gave to McPherson.

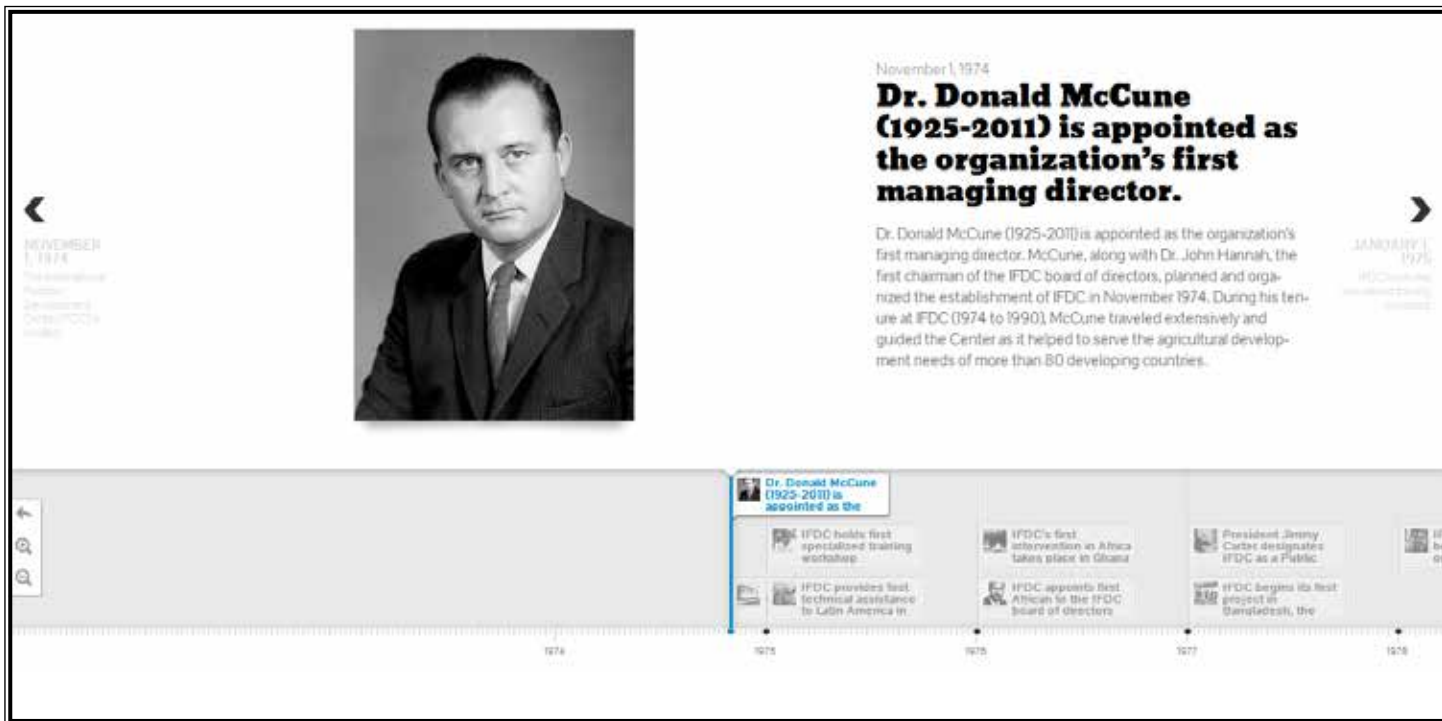
In the early 1970s, Hannah was an integral force in the creation of IFDC. As co-founder and first chairman of IFDC's board of directors, Hannah helped to lead the Center for more than 15 years before his death in 1991.

“John Hannah's vast influence can still be seen today,” said Dr. Amit Roy, president and CEO of IFDC, “not just in the way that IFDC approaches international agricultural development, but it can be seen at MSU and in other research universities that followed that model. It can be seen at the APLU and USAID as well. His influence and legacy are everywhere.”



- ▶ *Hannah's career included such positions as president of MSU, APLU board chair, executive director of the UN's World Food Council and co-founder and first board chair of IFDC.*
- ◀ *Hannah (center facing camera) reviews plans for the permanent IFDC campus with fellow board members in 1975.*
- ▲ *A statue on the campus of MSU commemorates the progressive changes that Hannah brought to the university.*

# IFDC Launches History Timeline on Facebook and the IFDC Website



▲ The interactive timeline allows visitors to explore milestones and key events across IFDC’s nearly 40-year history.

On June 10th, IFDC launched a special timeline feature on its Facebook page that traces the history of the Center back to its founding in 1974. The history timeline makes use of the large library of photography taken by IFDC staff members over the years, as well as program and project reports and significant events over nearly four decades.

IFDC’s utilization of the timeline allows Facebook ‘fans’ to visually experience the history of the organization. “This is the first of several steps we will take as we prepare to commemorate IFDC’s 40th anniversary next year,” said Dr. Amit Roy, president and CEO of IFDC. “The Center’s history and these significant milestones have never before been gathered together in such an interesting and informative way.”

The timeline’s scope expands beyond Facebook into other digital media domains such as the IFDC website ([www.ifdc.org](http://www.ifdc.org)), where the timeline and associated

information also debuted on June 10. As it evolves, the timeline will grow to include many of IFDC’s past and current activities – highlighting milestones, little-known facts, nostalgic moments and other interesting pieces of the Center’s history – such as the fact that IFDC provided fertilizer for a NASA shuttle mission in 1995.

“I think that having a better understanding of IFDC’s history is an important decision-making tool for our international development partners and private industry clients,” said Roy. “By sharing this information, the relationships will be stronger, and there are more opportunities for successful partnerships.”

To access the IFDC timeline on Facebook, log in to your Facebook account, search for IFDC and “Like” the page. The timeline will appear at the right-hand side of the page, allowing you to select a decade or specific year to view. To access the timeline on the IFDC website, go to: [www.ifdc.org/About/History](http://www.ifdc.org/About/History).



# World Environment Day 2013



The United Nations Environment Programme (UNEP) began celebrating World Environment Day on June 5, 1972, at a conference in Stockholm, Sweden. Since then, World Environment Day has been celebrated every year on June 5<sup>th</sup>. World Environment Day has become a major vehicle for the UN to raise international awareness of the environment and to stimulate political action for the global situation.

Mongolia hosted this year's World Environment Day. The 2013 theme revolved around the global issue of food security. The current world population is more than 7 billion people. By 2050, that number is expected to increase to more than 9 billion. According to FAO, one in every seven people in the world go to bed hungry and more than 20,000 children under the age of five die daily from malnutrition. At the same time, it is estimated that every year, 1.3 billion mt of food are wasted – equivalent to the amount of food produced annually in the whole of SSA. To help raise awareness of food waste, World Environment Day's theme was "Think•Eat•Save." UNEP wants everyone to THINK about what they EAT and help SAVE the environment.

Food waste and loss can be the result of many things. However, wasting food not only contributes to the hunger problem, it also leads to a wasteful use of pesticides and fertilizers. Food waste also unnecessarily uses fuel (transporting food that is ultimately not eaten) and creates the problem of what to do with rotting food. Transportation

fuels release GHG and other pollutants into the air, and rotting food produces methane, contributing to global warming.

In support of a healthier environment, IFDC has been implementing projects that promote environmental stewardship. For example, through its AAPI project, IFDC research is helping to quantify GHG emissions, particularly N<sub>2</sub>O that results from lowland rice farming in Bangladesh. The project is promoting the environmental benefits of using FDP technology. The project is also helping to build Bangladesh's national capacity to incorporate climate change activities into developmental programs.

Inefficient fertilizer use in rice farming increases N<sub>2</sub>O and NO emissions. Nearly 85 percent of Bangladesh's agricultural land is planted with rice; globally, irrigated rice farming is responsible for about 9 to 13 percent of GHG emissions. Also, the runoff of excess nitrogen and phosphorus can cause environmental problems for wetland and coastal areas.

Using GHG chambers, AAPI staff members are evaluating N<sub>2</sub>O and NO emission rates and how resource-efficient technologies such as FDP decrease emissions and increase crop production (see related article on page 61). The GHG chambers take continuous, long-term measurements of the amount of N<sub>2</sub>O and NO released from the soil during rice production and also during the non-rice/fallow period. The AAPI project is disseminating FDP technology to over 1 million ha involving 2.5 million farmers in Bangladesh. Interest in the FDP technology is growing in other rice-producing countries of Southeast Asia (Cambodia, India and Vietnam), as well as across Africa.

However, FDP technology is labor-intensive because fertilizer briquettes are hand-placed near the root zone of rice plants. This problem has delayed widespread farmer adoption. To alleviate this issue, the AAPI project is partnering with universities in Bangladesh to develop a mechanical applicator for FDP. FDP reduces the amount of fertilizer used and reduces atmospheric and water pollution. IFDC is working to ensure the future of well-fed and healthy future generations in Bangladesh and across the developing world.

Source: <http://www.unep.org/wed/>

# IFDC Recognizes World Day to Combat Desertification and Drought



IFDC recognizes that water conservation plays a crucial role in creating successful agricultural value chains as well as protecting and cultivating farmland. According to the 2012 UN Water Development Report, agriculture accounts for at least 70 percent of global freshwater use; in some developing countries, agriculture accounts for up to 90 percent of freshwater use. Often, unsustainable agricultural practices pollute freshwater sources and cause land degradation. Without proper water management techniques, many farmers waste water, exacerbating freshwater shortages around the world. In response to issues such as these, the UN General Assembly declared June 17, 1994, the “World Day to Combat Desertification and Drought” and every year since has invited nations and civil society organizations to participate and organize events to celebrate the World Day as an additional opportunity to increase awareness of drought and desertification in the drylands and discuss solutions and future safeguards for the global problem. This year’s slogan, “Don’t let our future dry up” focuses on future efforts to prevent droughts and desertification and calls for everyone to take action to promote preparedness and resilience to water scarcity, desertification and drought. Unlike many natural disasters, drought and desertification are predictable, and their effects can be abated and, in the case of desertification, reversed through careful restoration of degraded lands.

According to UN figures, only 2.5 percent of the world’s water is freshwater, and the total usable supply for ecosystems and humans is 1 percent of that. Because of climate change and other harmful factors, this supply is steadily decreasing. As water scarcity and drought increase, the possibility of negative social and economic impacts on food security, energy availability, political stability and peace increases. Currently, 168 countries claim to be affected by desertification, a process of land degradation in the drylands that affects food production and is exacerbated by drought. As such, the World Economic Forum’s 2013 Global Risk Report places decreasing water supply among the top five risks that humanity faces over the next 10 years.

In 2012, landholders in food-exporting countries and poor countries were greatly affected by drought. Smallholder farmers who live in the drylands and the landless poor in rural and developing countries were hit the hardest; malnutrition, hunger and death affected those who do not have the appropriate amount of water needed to survive. The prolonged droughts in the Horn of Africa (2011) and the Sahel (2012) resulted in humanitarian crises, leaving millions hungry and malnourished, particularly children.

The observation of World Day to Combat Desertification and Drought does not simply highlight the effects of drought and desertification, but also urges the nations and people of the world to prepare for future droughts and to





many IFDC projects in Africa and Asia to increase water usage efficiency and to help farmers prepare for future water shortages.

IFDC's KAED project is helping to rehabilitate and reclaim degraded land in Kyrgyzstan – some of which has not been used for more than 20 years. For example, after reconstructing 3.4 km of irrigation canals and installing nine water pumps, the initiative brought back into production 600 ha of degraded land, positively impacting the lives of 6,500 people.

Along with currently implemented technologies and practices, IFDC's Office of Programs is developing and promoting resource conservation management techniques to conserve water.

The 2013 World Day to Combat Desertification and Drought coincides with the UN Decade for Deserts and the Fight against Desertification (2010-2020) and the International Year of Water Cooperation (2013). More information on events and goals of the World Day can be found at: [www.unccd.int/en/programmes/Event-and-campaigns/WDCD/Pages/default.aspx](http://www.unccd.int/en/programmes/Event-and-campaigns/WDCD/Pages/default.aspx).



take measures to safeguard the population against them. On March 13, the UN Convention to Combat Desertification (UNCCD) and the World Meteorological Organization (WMO) began this year's World Day during the 'High-level Meeting on National Drought Policy' in Geneva. UNCCD Executive Secretary Luc Gnacadja expressed his goal for this year's World Day: "Droughts have devastating effects on people, on livelihoods, the economy. However, current response to drought is too little and too late. We are starting a global campaign on raising awareness by calling [global leaders] to set up policies, mechanisms and systems that will pre-empt future devastating impacts of drought ... By 17 June, when we celebrate the World Day to Combat Desertification and Drought, we want every stakeholder and community in the world to say 'never again' to drought disasters. We want every individual and every private company with the power to act and join in to build a drought-resilient society."

## IFDC Efforts to Use Water More Efficiently and Effectively

IFDC is committed to helping farmers fight the effects of drought and prevent future disasters. In Ethiopia, where drought poses a significant problem to agricultural viability, IFDC is working to aid farmers in preparing for and preventing drought by improving access to higher-quality agro-inputs – such as drought-resistant seeds – and increasing farmers' knowledge of best agricultural practices through the 2SCALE and Agricultural Growth Program - Agribusiness and Market Development (AGP-AMDe) projects. Other technologies and agricultural practices such as alternate wetting and drying, FDP, drip irrigation, fertigation and ISFM are used in



- ◀ (Opposite): A farmer displays the effects of drought on his soil. Unsustainable agricultural practices often lead to depleted soil fertility and land degradation.
- ▲ (Above left): Maize, often a subsistence crop, is not immune to the effects of desertification and drought.
- ▲ (Above right): Farmers involved in IFDC's KAED project in Kyrgyzstan prepare reclaimed land and build irrigation systems to bring the land back into cultivation.

# International Day of Cooperatives Occurs July 6



Cooperatives around the world celebrate the International Day by raising awareness of their causes in various ways, including meeting with government officials, UN agencies and other partner organizations, sponsoring cultural events to increase awareness and holding fairs, exhibits and campaigns to spread the message of the cooperative mission. Every year since 1994 when the International Day was recognized by the UN, the Secretary General issues a message regarding the theme of the day that is broadcast worldwide and translated into local languages.

▲ (Above right): Graphic courtesy of the UN (Illustration based on artwork from ©iStockphoto.com/Florea Marius Catalin).

On the first Saturday of July each year, the UN General Assembly invites all member governments, international organizations, specialized agencies and national and international cooperative organizations to join in the celebration of the International Day of Cooperatives. July 6, 2013, marks the 19<sup>th</sup> celebration recognized by the UN and the 91<sup>st</sup> celebrated by the Geneva-based International Co-operative Alliance (ICA), which first celebrated the day in 1923. Designed to increase global awareness of cooperatives and their impact on economic, social and cultural development, the International Day aims to bolster and broaden the partnerships between the international cooperative movement and supporting organizations. This year's theme, "Cooperative enterprise remains strong in times of crisis," contrasts the resiliency of cooperatives to shareholder businesses during economic trials.

According to the ICA, a cooperative is "an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically controlled enterprise." This includes a wide range of organizations that work for the mutual good of consumers and producers. They are based on the values of self-help, self-responsibility, democracy, equality, equity and solidarity and belief in the ethical values of honesty, openness, social responsibility and caring for others.

According to the ICA, cooperatives secure the livelihoods of more than 3 billion people and, in some countries, provide jobs and income for most of the population – such as Kenya, where 63 percent of the population derives its livelihood from cooperatives. Cooperatives play an active part in creating and maintaining employment worldwide and are significant economic factors in several national economies.

As such, IFDC recognizes and supports the International Day of Cooperatives, realizing that strengthening cooperatives and associations is a strong component of value chain development, bolstering not only cooperatives and associations but also other linkages along the value chain from farmers to consumers.

## IFDC Work With Cooperatives

Currently, projects that IFDC is involved in, such as AGP-AMDe, give financial and knowledge-based support to cooperatives. In addition to other objectives, AGP-AMDe builds the capacity of the cooperative sector to operate as successful agribusinesses to benefit their members and improve market competitiveness and access for smallholder farmers. The project is also transforming cooperatives in coordination with the Agricultural Transformation Agency's cooperative development strategy implemented by the Federal Cooperative Agency (FCA) and promoting private sector stakeholders to expand delivery of services along with value and volume of inputs and outputs. AGP-AMDe activities are closely aligned with the FCA initiative to strengthen primary cooperatives, multipurpose cooperatives, rural savings and credit cooperatives and cooperative unions and are recommending management improvement measures and inclusion of women in leadership positions.

The UN Secretary General's July 6 message can be found at <http://ica.coop/en/events/international-co-operative-day-2013>.



# IFDC Board of Directors/ VFRC Board of Advisors

*IFDC is governed by a board of directors while the VFRC is governed by a board of advisors. Each board has representation from both developed and developing countries. Highlights of recent board member activities include the following:*

## IFDC



**Dr. Mohamed Badraoui**, director general of Morocco's National Agronomic Research Institute, spoke during the inaugural

International American Moroccan Agricultural Sciences Conference in Rabat, Morocco. Badraoui spoke on "Promoting Research, Education and Outreach Between the INRA of Morocco and the U.S." Badraoui is a member of the Global Food Security Forum board. He has been a member of the IFDC board of directors since 2012 and serves on the board's Africa Committee.



**Margaret Catley-Carlson** has been a member of the IFDC board of directors since 2007. She chairs the Budget Committee

and is a member of the Executive and Audit committees. She is a patron of the Global Water Partnership and a member of the UN Secretary General's Advisory Board on Water and Sanitation. In March, Catley-Carlson chaired the discussion "Critical Water Connections: The Nexus, Trade and Supply Chains" at Connecting Water Resources 2013. In April, Catley-Carlson participated as a thought leader in the Bloomberg New Energy Finance Summit.



**Dr. Jimmy G. Cheek**, chancellor of UTK, was a featured speaker at a conference of public land-grant

universities at North Carolina State University, focusing on "Transforming Economies: The Role of University Innovation in Economic Growth." Cheek addressed UTK's economic development goals and initiatives as part of the APLU panel moderated by APLU President **Peter McPherson** (who also chairs the IFDC board of directors). Cheek was one of three top campus leaders asked to contribute to the discussion. He serves on the IFDC board's Nomination Committee and chairs the VFRC board of advisors.



**Dr. Josué Dioné**, principal technical adviser for policies and markets at the Technical Centre for Agricultural and

Rural Cooperation (CTA), participated in a roundtable discussion entitled "Natural Resources at Stake: Sources of Conflict or Opportunities for Sustainable Development" at the 2013 Pan-African Forum. The forum's theme was "Africa: Sources and Resources for a Culture of Peace." Dioné has been a member of the IFDC board of directors since 2011 and serves on the board's Africa Committee.



**Gerard J. Doornbos** is a member of the board of the National Water Partnership and Aqua for All. He serves on the Steering Committee for

the Netherlands National Delta Program and the Executive Committee for the European Federation of National Associations of Water and Wastewater Services. Doornbos has served as a member of the IFDC board since 2005 and as vice chairman since 2009. Doornbos participated in the signing ceremony of a Water Partnership Agreement between the Association of Regional Water Authorities in the Netherlands and Ethiopia, held at the Association of Regional Water Authorities headquarters in the Netherlands.



**Dr. Agnes M. Kalibata**, Rwanda's Minister of Agriculture and Animal Resources, chaired a meeting to promote

agriculture in the Western Province of Rwanda, encouraging attendees to "increase agricultural production as the main driver [of the economy of Rwanda] by meeting the targets assigned to each district and shift from subsistence to market-oriented agriculture." Kalibata also signed a memorandum of understanding between Rwanda and India on cooperation in water resources development and management. The cooperation will help the central-eastern African country achieve food security. Kalibata has been a member of the IFDC board of directors since 2008. She chairs the board's Africa Committee and is a member of the Executive Committee.



**Dr. Steven Leath**, president of ISU, spoke at the third annual Partnering for Growth Forum. The forum, co-hosted by the Iowa

Biotech Association and Iowa Innovation Corporation, brings together representatives from multiple biotechnology industries, including food and agriculture, industrial and environmental and healthcare and pharmaceutical. Leath joined the IFDC board of directors in 2012 and serves on the board's Budget Committee.



**Dr. Mortimer Hugh Neufville**, chairman of ACDI/VOCA, was named interim president of Coppin State University in Baltimore.

Neufville has been a member of the IFDC board of directors since 2005. He chairs the board's Nomination Committee and is a member of the Audit, Executive and Program committees.



**African Union Commissioner for Rural Economy and Agriculture H.E. Rhoda Peace Tumusiime** presented the opening remarks at the

9th CAADP Partnership Platform in Addis Ababa, Ethiopia. Tumusiime emphasized that based on experience and looking forward, agriculture is going to be at the center of Africa's next development agenda. Tumusiime joined the IFDC board of directors in 2010. She serves on the board's Africa and Budget committees.



**Dr. Vo-Tong Xuan**, rector of Tan Tao University, Vietnam, spoke at the Conference on the Global Status of Commercialized

Biotech/GM Crops in 2012. Xuan has been a member of the IFDC board of directors since 2007. He chairs the board's Program Committee and is a member of the Executive, Africa, Budget and Nomination committees.

## VFRC



**Dr. Marco Ferroni**, executive director of the Syngenta Foundation, recently launched the organization's low-cost

livestock insurance program in Kenya. According to Ferroni, this program extends the highly popular "Kilimo Salama" crop insurance initiative. The new addition protects small dairy farmers against major losses resulting from cattle deaths. The program is intended for smallholder farmers working with milk cooperatives. Ferroni has been a member of the VFRC board of advisors since 2010 and serves on the Science Committee.



**Luc Maene**, former IFA director general, gave a presentation on "Fertilizers and Agriculture: Meeting the Challenges Sustainably" at

the International Fertiliser Society spring conference in Windsor, United Kingdom, in May. Maene has been a member of the VFRC board of directors since 2010 and serves on its Commercialization Committee.



**Honorable Prof. Ruth Oniang'o**, founder and editor-in-chief of the *African Journal of Food, Agriculture, Nutrition and*

*Development*, spoke at the "International Congress Hidden Hunger 2013 – from Assessment to Solutions" at the University of Hohenheim in Stuttgart, Germany. The Congress created awareness of the global problem of hidden hunger, forwarded scientific issues to policymakers, academics, politicians and business leaders and discussed solutions to address worldwide micronutrient deficiencies. Oniang'o has been a member of the VFRC board of advisors since 2010 and serves on its Executive Committee. She previously served on the IFDC board of directors from 2002 to 2008.



**Dr. Roelof (Rudy) Rabbinge**, former chairman of the Science Council and Partnerships of the CGIAR and professor emeritus in

Sustainable Development and Food Security at Wageningen University in the Netherlands, co-chaired a session at the 11<sup>th</sup> Agricultural Science Congress at Orissa University of Agriculture in Bhubaneswar, Odisha, India. Rabbinge also participated in a panel discussing

"Achieving Excellence in Agricultural Education" during the event and spoke on "Quality Assurance in USA and Europe." Rabbinge has been a member of the VFRC board of advisors since 2010 and serves as the chair of the Science Committee and vice chair of the Executive Committee. He also served on the IFDC board of directors from 1997 to 2006 and served as the board's vice chair.



**Dr. Juergen Voegelé**, director of Agriculture and Rural Development at the World Bank, moderated a panel at the Natural Capital

Accounting Post-Rio+20 conference in Washington, D.C., hosted by the International Finance Corporation and the World Bank. The panel discussed "Natural Capital Accounting in the Public Sector." The event brought together experts from the fields of sustainable development, government, academia, international business, statistics and accounting. The focus of the event was on what has already been accomplished and what needs to happen next to develop and scale natural capital accounting models and tools in a global economy. Voegelé has been a member of the VFRC board of advisors since 2010 and serves on its Executive Committee.



# IFDC Staff News

**John Allgood**, director of the EurAsia Division, and **Dr. Upendra Singh**, principal scientist – systems modeling (soil fertility), participated in a seminar organized by the USAID's Bureau for Food Security on "Fertilizer Deep Placement Technology: A Useful Tool in Food Security Improvement." Allgood and Singh discussed two elements that characterize FDP: larger fertilizer granules and the placement of the granules below the soil surface, close to a plant's roots.

**Patrice Annequin**, senior market information specialist, **Dr. André de Jager**, director of the North and West Africa Division, and **Paul Makepeace**, senior agribusiness advisor – African Fertilizer and Agribusiness Partnership, attended the IFA annual meeting held May 20-22 in Chicago, Illinois, USA. Annequin, Makepeace and **Dr. Maria Wanzala**, senior policy economist seconded to NEPAD, participated in the *Farm Chemicals International Trade Summit* May 6-7 in Durban, South Africa. Makepeace presented a paper on "Distribution and Information Systems in Southern Africa," and Wanzala discussed "Agricultural Policies, Programs and Implementation Strategies in Southern Africa."

**Victoria Antoine**, graphic artist/web designer, and **Heather Gasaway**, graphic artist/web designer, attended the Graphics of the Americas Conference held in Orlando, Florida, USA. They participated in seminars on the "Latest Trends in Graphic and Web Design."

**Rob Groot**, director of the East and Southern Africa Division, gave a presentation at the International Fertiliser Society spring conference on "Fertilizer Market Development in Sub-Saharan Africa" in May. In April, Groot was a keynote speaker at an industry-policy-science workshop in Harare, Zimbabwe, on market-smart interventions to facilitate the availability, access and use of nutrients by smallholder farmers in eastern and southern Africa.

**Dr. Deborah Hellums**, program leader – Soil and Plant Nutrition, Office of Programs, attended the CRU International Ltd. Phosphates 2013 Conference held in Monte Carlo. More than 250 participants and exhibitors attended the conference. Hellums was a presenter and she discussed IFDC's current research efforts to improve the efficiency of phosphorus use, including 'smart' fertilizers and the opportunities for phosphate nutrient recycling. She also discussed IFDC's role in the Global TraPs initiative.

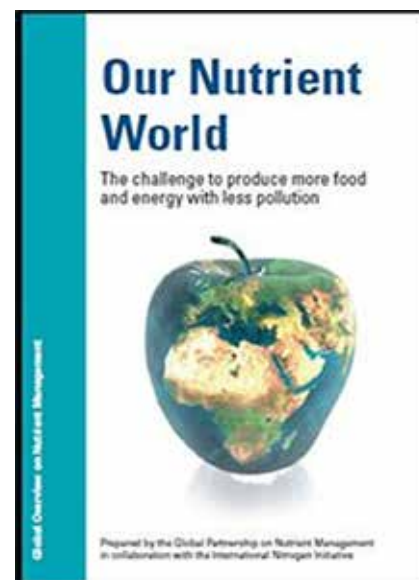
**Christopher A. James**, IFDC laboratory analyst, recently defended his master's thesis "Development of an Enzymatic Assay for Nitrification Inhibitors." His defense passed and thesis approval signatures were obtained. Committee members were University of Alabama-Huntsville professors Dr. Pam Twigg and Dr. Robert McFeeters and IFDC's **Dr. Upendra Singh**.

**Dr. Richard Jones**, agribusiness program leader for the East and Southern Africa Division, received an honorary doctorate degree (*Honoris Causa*) conferred by the Governor of Karnataka and Chancellor of the University of Agricultural Sciences, Dharwad (India) during the 26<sup>th</sup> Convocation. The honor was given because of "Jones' valuable contributions in the field of international agriculture."

**Dr. Amit Roy**, president and CEO, attended the Regional Forum of the Global Food Security Initiative held in Dakar, Senegal. Roy was also an invited speaker at the Wilton Park conference "How to create resilient agricultural systems in a world of increasing resource scarcity and climate change" held in West Sussex, England. Wilton Park is an agency of the UK's Foreign and Commonwealth Office. This conference was the fifth in a series of discussions Wilton Park has hosted on "Global food, agriculture, land use: the international policy challenges." Roy spoke during the session on "Boosting soil and plant nutrition." The *Office Chérifien des Phosphates* (OCP) invited Roy to attend the 2<sup>nd</sup> International Symposium on Innovation and Technology in the Phosphate Industry held in Agadir, Morocco. Roy also attended the 2<sup>nd</sup> Project Steering Committee meeting of the UNEP/Global Environment Facility (GEF) Global Nutrient Cycle Project held in Washington, D.C. The U.S. Department of Agriculture (USDA) hosted the meeting. While in Washington, Roy spoke to participants in USAID's Bureau for Food Security "Climate Smart Food Security" course. Roy spoke to the group about "Fertilizer Use and Applications to Enhance Adaptation to Climate Change and Reduce Emissions from Agriculture."

A new report commissioned by UNEP highlights how humans have massively altered the natural flows of nitrogen, phosphorus and other nutrients. "Our Nutrient World" was launched at the UNEP Governing Council/Global Ministerial Environment Forum in Nairobi, Kenya. The study was carried out by nearly 50 experts from 14 countries.

IFDC's **Dr. Amit Roy** and **Dr. Deborah T. Hellums** were part of the team of experts who collaborated with the lead author of the report, Professor Mark Sutton from the UK's Centre for Ecology & Hydrology.





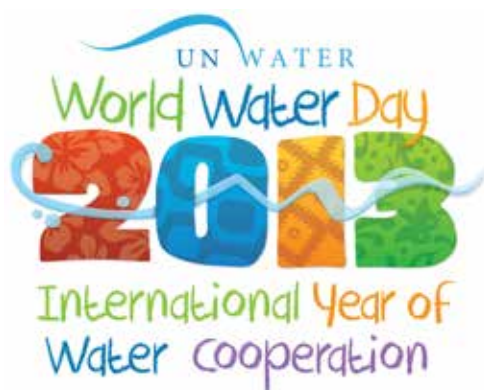
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## 2013 International Training Calendar

Training Program/Workshop/Study Tour	Dates	Location	Program Fee
Linking Farmers to Markets in Africa	July 1-5	Nairobi, Kenya	\$1,300
Technology Advances in Agricultural Production and Fertilization	August 19-30	USA (Alabama, Georgia, Illinois, Missouri, Tennessee and Washington, D.C.)	\$2,000
Phosphate Fertilizer Production Technology (with IFA)	October 7-11	Bangkok, Thailand	\$2,700
Developing and Managing Profitable Agro-Input Business Through Sustainable Value Chains	November 4-8	Ouagadougou, Burkina Faso	\$1,300
Fertilizer Value Chain – Supply System Management and Servicing Farmers' Needs	December 2-6	Kuala Lumpur, Malaysia	\$1,600