

IFDC *report*

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An update on the work and progress of IFDC

IFDC: 35 Years of Partnerships in Bangladesh

Long-Term FDP Use: Increased Soil Quality?

2SCALE Agribusiness Clusters in Kenya

Launch of USAID West Africa Fertilizer Program

CATALIST-Uganda Officially Begins



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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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Frequently Used Acronyms:

African Fertilizer and Agribusiness Partnership (AFAP) • agribusiness clusters (ABCs) • alternate wetting and drying (AWD) • chief of party (CoP) • Common Market for Eastern and Southern Africa (COMESA) • Comprehensive Africa Agriculture Development Programme (CAADP) • crop protection products (CPPs) • farmer-based organizations (FBOs) • Feed the Future (FTF) • fertilizer deep placement (FDP) • Global Water Partnership (GWP) • hectares (ha) • high-yielding variety (HYV) • International Fertilizer Industry Association (IFA) • kilograms (kg) • kilometers (km) • Memorandum of Understanding (MoU) • metric tons (mt) • Ministry of Agriculture (MoA) • non-governmental organizations (NGOs) • public-private partnerships (PPPs) • Sub-Saharan Africa (SSA) • U.S. Agency for International Development (USAID) • urea deep placement (UDP) • Virtual Fertilizer Research Center (VFRC)



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Bangladesh

At a Glance

- **Location:** southern Asia, bordering the Bay of Bengal between Burma and India
- **Total Land Mass Area:** 143,998 sq km
- **Climate:** Tropical
- **Winter Season:** October-March
- **Summer Season:** March-June
- **Monsoon Season:** June-October
- **Cultivated Crops:** 55% of country's total land area
- **Permanent Crops:** 3% of country's total land area (fruit- and nut-bearing trees)
- **Population:** 156 million (about 1,083 people per sq km)
- **Environmental Issues:** soil degradation, erosion and water pollution
- **Living in Poverty:** 36% of population
- **Single Most Important Crop:** rice
- **Other Agricultural Products:** jute, tea, wheat, sugarcane, potatoes, tobacco, pulses, oilseeds, spices, fruit, beef, milk and poultry



In 1947, the former British colony of India was partitioned into the nations of India and Pakistan. Pakistan consisted of two 'wings,' one west of India and the other to the east. The eastern section of Pakistan comprised the eastern portion of Bengal and the former Sylhet district of Assam and was known until 1947 as East Bengal. At that time, it became known as East Pakistan.

Pakistan's two provinces, which differed considerably in natural setting, economy and historical background, were separated from each other by the nation of India and a distance of more than 1,000 miles. The East Pakistanis, who comprised 56 percent of the total population of Pakistan, were unhappy under a government centered in West Pakistan. Efforts

over the years to secure increased economic benefits and political reforms proved unsuccessful, and serious conflicts broke out in 1968 and 1969.

Due to political and economic imbalances between the two areas of Pakistan (as well as ethnic, cultural and linguistic differences), agitation grew in East Pakistan. The movement for greater autonomy gained momentum in the general elections held in December 1970. Governmental attempts to forestall the autonomy bid led to general strikes and non-payment of taxes in East Pakistan and finally to civil war on March 25, 1971. The next day, Bangladesh's independence was proclaimed. During the months of conflict that followed, an estimated three million Bengalis were killed in

Bangladesh and another 10 million fled into India. India allied itself with Bangladesh and, during a two-week war (December 3-16, 1971), defeated the Pakistani forces in the east. In April 1972, the national government of Bangladesh was established.

Bangladesh was gradually recognized by most of the world's nations. It joined the Commonwealth of Nations in 1972 and was admitted to the United Nations in 1974.

After independence, the new nation endured famine, natural disasters and widespread poverty, as well as political turmoil and military coups. The restoration of democracy in 1991 has been followed by relative calm and economic progress.



IFDC: In Bangladesh for 35 Years

IFDC has been working with the nation of Bangladesh, its Ministry of Agriculture (MoA), farmers, agro-dealers, research institutions, the fertilizer industry and entrepreneurs since 1975 – just four years after the nation came into existence. IFDC established its first office in Bangladesh in 1978 and has been working on agricultural development projects there continuously for 35 years.

Throughout 2013, IFDC will commemorate its activities in Bangladesh in the *IFDC Report* and through other communications vehicles. We are proud of the work IFDC has done in Bangladesh in conjunction with the Government of Bangladesh (GoB), its ministries and people. We are heartened by the progress the nation and its citizens have achieved.

IFDC's work in Bangladesh began in earnest with several projects funded by the U.S. Agency for International Development (USAID). The Fertilizer Distribution Improvement (FDI) project was implemented to assist the Bangladesh Agricultural Development Corporation (BADC). The FDI project

served BADC in many ways, including helping to improve the agency's fertilizer warehousing, transportation and distribution systems. IFDC then conducted a fertilizer equity study for the GoB, which determined that collectively, Bangladesh's smallholder farmers purchased the majority of the fertilizer used in the country. FDI-II helped to privatize fertilizer marketing in Bangladesh and was the prototype fertilizer market development project that has been adapted and used in a number of other IFDC projects around the world.

The IFDC work described briefly above and profiled in the following article helped set the stage for further IFDC activities in Bangladesh that continued to support the GoB and its Ministry of Agriculture's (MoA) pursuit of improved agriculture sector performance. IFDC's work on value chain development through the USAID-funded Agro-based Industries and Technology Development (ATDP) project contributed to improved productivity, value chain development and trade expansion in poultry and high-value crops.

A series of activities to support the introduction and expansion of fertilizer deep placement (FDP) technology were then underwritten by the International Fund for Agricultural Development (IFAD). Support from the GoB and USAID have provided momentum since then to diffuse the FDP technology across Bangladesh.

The following article is adapted from “A Future of Hope,” a 1994 video¹ made about IFDC’s early efforts in Bangladesh and the improvements that occurred in the country’s agricultural sector because of IFDC projects that have been funded and supported by the GoB, a number of its key ministries (including the MoA and its Department of Agricultural Extension [DAE]) and USAID. Unquestionably, the efforts of Bangladesh’s smallholder farmers, agro-dealers and other members of the agricultural value chain must be recognized as well.

¹ Data cited in the article is from 1994 and has not been updated. Titles of those quoted in the article are also from 1994.

Bangladesh’s Quiet Revolution

Bangladesh – land of a proud and ancient culture – was one of the world’s youngest nations when IFDC first began working there. Astride the largest deltaic plain on Earth, Bangladesh is a land of incredible natural wealth – rich in soil, climate and rainfall. Perhaps its greatest single resource, though, is an industrious and enterprising population. In less than a generation, the people of Bangladesh overcame the scourge of floods; the devastation of cyclones; the crush of poverty, hunger and malnutrition; and the ravages of a bloody revolution to gain their independence. What followed independence was a “quiet” revolution that involved Bangladeshis working to build better lives for themselves and their families and building a future of hope for their nation.

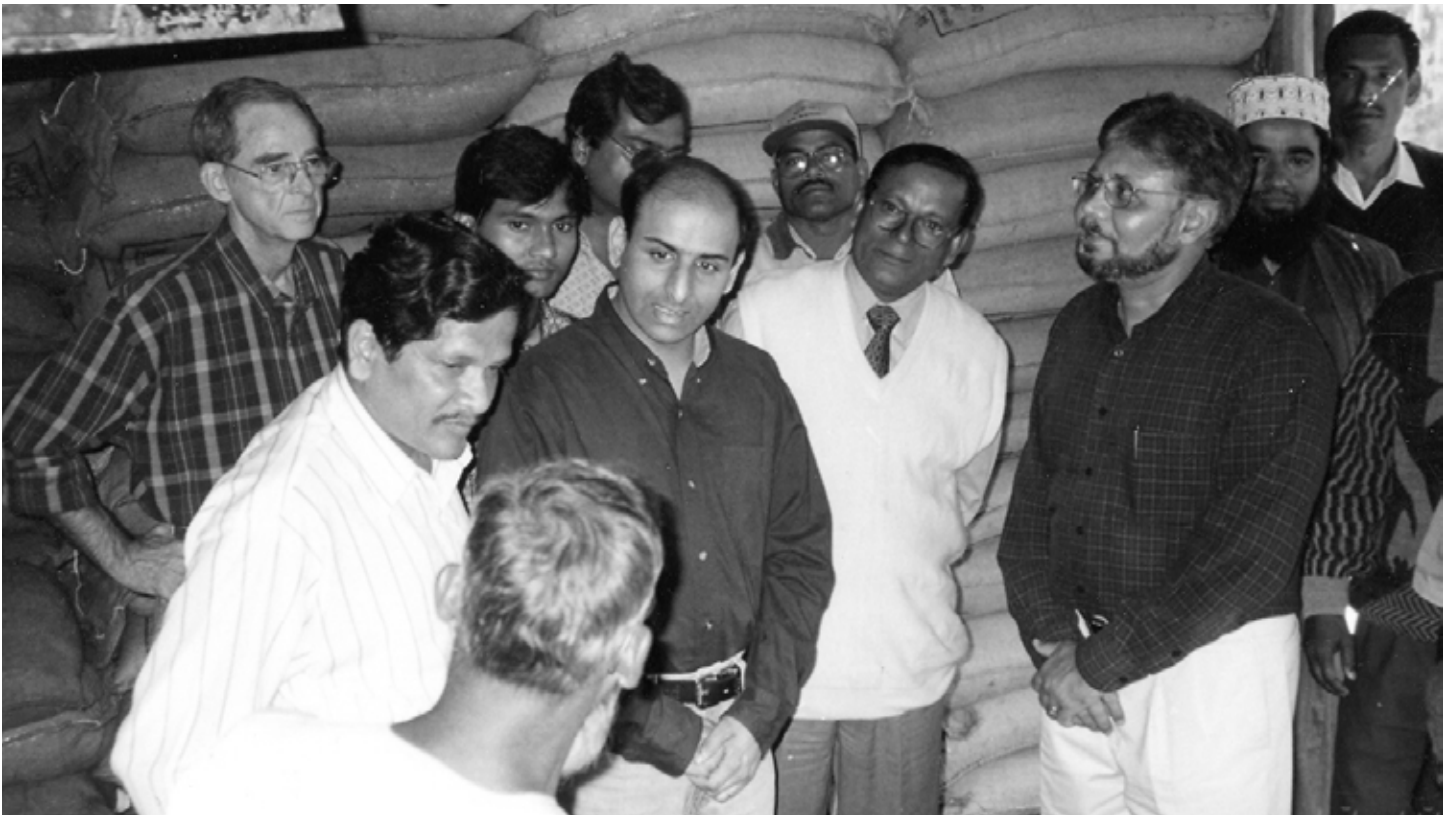
This future of hope has not come easily or quickly for Bangladesh. Natural disasters still occur, and emerging from the poverty and starvation that were endemic throughout the country was an accomplishment that few thought possible. It took commitment, vision, courage and, most of all, hard work.

Thanks to those virtues, food security generally has been achieved for most Bangladeshis instead of the chronic food deficits they previously suffered. How did this shift occur? Former Additional Secretary of the Bangladesh MoA and former Secretary of the Ministry of Food Irshadul Huq said, “It happened primarily because the fertilizer supply was privatized and fertilizer became available at competitive prices, resulting in its increased use and a quantum increase in food production.”

Agriculture is the engine that drives the economy of Bangladesh. Eighty percent of its population and roughly half of its gross domestic product (GDP) depend on agriculture. Fertilizer is a critical input for increasing food production. Recognizing this, the BADC was established in 1961 to distribute fertilizers. BADC helped to introduce fertilizer use in Bangladesh. But as the market expanded and the cost of fertilizer subsidies became a burden on the national budget, efforts were initiated to increase efficiency in the fertilizer delivery system. Therefore in 1978, the GoB, in a radically different approach, began looking to the private sector.

“As in many developing countries, fertilizer distribution started in the public sector, because there was no market and





▲ IFDC's Dr. Ray Diamond (far left, back row), IFAD's Dr. Shantanu Mathur (left center, dark shirt) and Dr. Amit Roy (third from right) inspect bags of fertilizer with Bangladeshi officials during the Adopting Nutrient Management Technologies (ANMAT) project (1999 - 2007).

the market had to be developed,” stated A. Samad, former chairman of both BADC and the Bangladesh Fertilizer Association (BFA). “As the market gradually developed, the private sector option became viable. However, there were many hesitations. Some were due to political objectives – socialism is good; fertilizer should stay in the public sector. Some people were fearful that bringing in the private sector might cause harm to the farmers. And some people in the public sector itself didn’t want a change, because it threatened their jobs,” Samad explained.

Move to Privatization

“The Government of Bangladesh joined forces with USAID and IFDC to initiate the FDI project in 1977,” noted Deputy Director of the USAID Office of Food and Agriculture in Dhaka, Helen Gunther. “Each party understood its role and what the objectives were and what all parties were trying to achieve. A level of trust developed, and because of that trust, FDI-II was allowed to go forward with privatization efforts that were just beginning when FDI ended.”

Prior to and during FDI, fertilizer importation, distribution and pricing were still controlled by government agencies. Under FDI, private enterprise began to take part in the system. Policy reforms cleared the way for private agro-dealers and retailers to enter the fertilizer market.

“The FDI project was purely and simply an attempt to improve the fertilizer distribution system,” said USAID

FDI-II Project Officer Larry Paulson. “Fertilizer was entirely under the control of a government parastatal – BADC. A number of warehouses were built; fertilizer was imported. FDI probably established the limits of what a public monopoly could do in fertilizer distribution. By the end of that project in the mid-1980s, only the most local level of distribution was freed from BADC’s directives.” Educational programs focused on improving efficiency in fertilizer marketing and use. This was an essential component of the FDI project. It directly complemented the government’s policy reforms and, importantly, the educational work of the DAE. The results proved that the government was on the right track. During the six years of FDI, fertilizer sales increased by 55 percent. During this same period, fertilizer consumption on a worldwide basis increased by only 25 percent. On that premise, again supported by USAID funding and technical expertise from IFDC, the government boldly pushed forward with FDI-II.

“The FDI-II program began in March 1987,” said John Allgood, IFDC’s FDI-II chief of party. (Allgood is now director of IFDC’s EurAsia Division; please see an interview with Allgood on page 16.) “FDI-II’s primary focus was to increase agricultural production in Bangladesh. The main approach to achieving the project objectives was to increase private sector investment in fertilizer marketing.”

FDI-II's Four Main Components

Allgood explained, “The first component was policy reform, which was needed to establish an environment that was conducive to private sector investment. The second component was technology transfer to encourage improved use of fertilizers and improved fertilizer management practices. The third component was agricultural credit. FDI-II was designed to establish such a credit system within the commercial banking system. USAID provided the initial financing for the system, providing credit to fertilizer traders. The fourth component, which I think is probably as critical as any component, was the management information system. It was essential that we provide accurate and timely information to the government and to the private sector on fertilizer supply and demand in the country and fertilizer prices in all corners of the country.”

The FDI-II project has been successful. The private sector share of fertilizer marketing increased from nothing when the project began to 100 percent today. Aggregate fertilizer sales have soared by 70 percent during FDI-II – an annual compound growth rate of about 8 percent.

K.M. Rabbani, former Secretary of the MoA and former Principal Secretary to the Prime Minister, explained, “Well, as you know, the government has been trying to promote the economic development of the country through free market mechanisms and development of the private sector. In line with that policy, FDI-II has transformed the fertilizer trade in the country from the public sector to the private sector, which has resulted in a large number of private sector dealers, traders and shopkeepers dealing in fertilizer, resulting in increased use by the farmers that, in turn, has given us record production of agricultural crops, particularly rice. We have become self-sufficient in rice and this is largely due to this increased use of fertilizer.”

It is clear that the progress made under FDI-II in promoting increased fertilizer use complemented the work being done by the MoA in increasing the agricultural area under irrigation and the expansion of the use of high-yielding varieties (HYV) of seed – key factors in Bangladesh’s achieving self-sufficiency in rice production.

Since FDI-II began in 1987, the Bangladesh fertilizer market has blossomed. It now includes some 215 importers, 1,400 distributors, 13,000 dealers and more than 112,000 retailers – each category showing phenomenal growth.





We are proud
of the work
IFDC has done
in Bangladesh,
and heartened
by the ...



progress the nation
of Bangladesh and
its citizens have
achieved.



Huq explained, “The privatization of fertilizer has opened up opportunities for entrepreneurs at various phases of the fertilizer business to enter various areas of the business – transportation, importation, handling, storage, delivery, marketing, etc. Many enterprising people want to succeed at these businesses, and they have brought with them their business acumen and efficiency and thereby ensured that the fertilizer is available to the farmers at the appropriate time. And they have made fertilizer available at a much more competitive price.”

Private Enterprise Benefits

The benefits of private enterprise include both jobs and higher income. Today, fertilizer marketing employs more than 170,000 Bangladeshis with an annual estimated income of \$34 million. For the farmer, privatization has meant both competitive prices and improved availability. In real terms, despite the removal of government subsidies, the farm-level price of fertilizers has actually gone down since FDI-II began – a testimony to the efficiency of the private sector and intense market competition.

Rappahn Mia, a farmer from Kalikachi village, confirms the prices he pays for fertilizer now are competitive with those paid before government subsidies were removed. His neighbor, Sofiat Ali, adds that he is able to get fertilizer in any form he chooses from an agro-dealer in a nearby village, a tremendous improvement from years gone by.

While only about two-thirds of Bangladeshi farmers were using fertilizers at the beginning of the FDI projects, today virtually all farmers use fertilizer. And 80 percent are able to purchase fertilizers from retail agro-dealer shops within five kilometers (km) of their farms. During FDI-II, fertilizer use increased from 67 kilograms per hectare (kg/ha) to 113 kg/ha. Perhaps the greatest windfall of all from privatization has been for the GoB. During FDI-II, the government saved an estimated \$119 million from privatization of the fertilizer business, including subsidy removal.

However, the benefits of FDI-II cannot be measured simply in dollars. The FDI-II project offered education and training to more than 11,000 Bangladeshis in some 238 fertilizer workshop sessions. This capacity-building component of the project will be a key to extending and continuing the benefits of a free and open fertilizer market.

Another major component of FDI-II was providing technical assistance to improve and strengthen the capabilities of banks in providing funds to finance a fertilizer dealer credit program and fertilizer imports. The USAID seed money provided to get this program started was the key to its subsequent success.

Deputy Governor of the Bank of Bangladesh Kamal Uddin said, “When the FDI-II project started, there was a scarcity of capital within the bank. The USAID funds, when made available to the commercial banks, assisted a great deal, helping to expand private commercial lending. I think it was a very good program. In fact, it was the program that first started the privatization program on fertilizer. Before that, everything was under the central government command system so it was very successful.”

Finally, among the benefits of privatization, the private sector handles 100 percent of fertilizers. This system costs less than under the formerly subsidized government-run system. In fact, savings over the former system are estimated to be \$16 per metric ton (mt) for triple superphosphate (TSP) and nearly \$12/mt for muriate of potash (MoP). These savings are passed along to farmers. The accomplishments of the FDI and FDI-II projects can be credited in large measure to the courageous policy changes implemented by the GoB.

Echoed Samad, “Oh yes, it was a courageous move and the government faced a lot of opposition from political parties and from the academic circle as well.”

Paulson explained further, “It has taken a series of bold officials in agriculture, but also in other parts of the government, to make these changes occur.”

Challenges Remain

While FDI-II has made tremendous strides helping Bangladesh feed itself, it is not yet time to rest. The fertilizer market in Bangladesh is working well. Fertilizers are adequately available throughout the country. Prices



reflect intense competition among the fertilizer dealers, and farmers have improved their use of fertilizers. Clearly, the MoA's plan has yielded great benefits in terms of improved efficiency in the distribution and use of fertilizers.

However, it is important to remember that the market as it exists today – open, freely competitive and growing as farmers improve their use of fertilizers – is still young. The potential remains for further improvement in fertilizer marketing and use. Reaching that potential will require the continued attention of the government, donors, banks and the private sector. The free flow of information on marketing supply and demand is a key to continued success. The newly formed BFA can step forward to play this key role as the activities of FDI-II come to a close.

It is important that the fertilizer dealers develop a stronger customer orientation and provide farmers with pertinent information on fertilizer use technology. The banking system is now actively serving the financial needs of fertilizer importers and distributors, and all evidence indicates that the banking community will continue to fill this critical need. Increased efficiency in loan processing and recovery will certainly occur, and efforts to ensure this are essential. The donor community in Bangladesh has been a key to reforms. The donors must continue to support the government policy of establishing a market economy by ensuring that donor-financed fertilizers be channeled through the private sector. Finally, it is essential that the government maintain the consistency it has demonstrated in terms of fertilizer pricing, importation and distribution. The government's role has slowly changed to one of monitoring market conditions, establishing a fertilizer regulatory system, increasing farmer education programs and ensuring that open, unrestricted competition prevails.

Additional Secretary of the MoA, Azad Ruhul Amin, summarized the point, stating “I

think that the role of the government will gradually change – mainly to regulate the fertilizer trade so that no level of the system is out of balance and to ensure that the farmers also have the opportunity to purchase their agro-inputs from a variety of sources and at competitive prices.”

Bangladesh has earned the respect of the world for the incredible advances it has made in food production, largely because of improvements in its fertilizer distribution system. But there is much yet to be done. The challenge for Bangladesh today is to stay the course, continuing its march toward a future of hope.





▲ *A Bangladeshi farmer deep-places urea briquettes by hand.*



Long-Term FDP Use: Increased Soil Quality?

First introduced in Bangladesh in 1985, fertilizer deep placement (FDP) has slowly gained momentum as the preferred fertilization method on over one million ha of rice per year, increasing the livelihoods of more than 1.8 million farmers and providing food security for an additional 2.7 million Bangladeshis.

Most of the FDP activity in Bangladesh is the deep placement (7-10 centimeters below the soil surface) of urea briquettes near the plants' root zones (urea deep placement, or UDP). FDP/UDP are well-documented as superior nutrient delivery systems compared with the traditional method of broadcasting prilled urea. However, because of the technology's sporadic adoption across the country over the past three decades, it has been difficult to document UDP's long-term effect on soil quality, particularly its regenerative fertility.

A recent investigation in Tangail District of Central Bangladesh by scientists from the Accelerating Agriculture Productivity Improvement in Bangladesh (AAPI) project revealed that a group of progressive farmers has used UDP in rice fields continually for the past 20 years. The 'discovery' of the farmers, located in the villages of Chala Atia in Delduar *upazila* (sub-district) and Bhabanipur in Kalihati *upazila*, came as a surprise to AAPI staff because UDP technology had not been actively

promoted in these areas for years. Project experts, keen to capitalize on the unique opportunity, immediately began collecting as much scientific data as possible on the long-term effects of sustained UDP use on the quality and characteristics of the soils.

Within the Tangail area, the major cropping pattern begins with the irrigated *Boro* season; fields are then left fallow (uncropped) until the transplanted *Aman* season in the wet summer. The farmers interviewed explained that rice yields increased 20-25 percent when the UDP technology was used, compared with the traditional broadcast method. The dominant land type is characterized as medium to high in soil organic matter, and soil textures range from silt loam to silty clay.

Thirty soil samples were collected from sites with and without the long-term use of UDP technology. The samples were analyzed by the Bangladesh Soil Research Development Institute (SRDI), which followed standard testing procedures. The results showed that, in the topsoil organic matter, total nitrogen (N) and cation exchange capacity (CEC) were elevated in UDP plots compared with the broadcast urea plots. CEC is the ability of negative ions in the soil to attract and hold positively charged ions. If a soil's CEC is high, the quantity of soil organic matter will be high, depending on soil pH, and an abundance of nutrients will be available to plants, increasing soil fertility and productivity.

Comparative Analytical Data of Soil Samples Collected from UDP and Broadcast Urea Plots in Tangail District

No. of soil samples per fertilizer method	Depth in cm	Land characteristics	pH		OM (%)		N (%)	
			UDP	Bdcast	UDP	Bdcast	UDP	Bdcast
5	0-10	<ul style="list-style-type: none"> • Medium-high soil quality • Flooded by rain water 25-30 cm • 2-3 month duration 	6.7-7.9	6.3-7.6	2.42-3.43	1.01-2.35	0.18-0.26	0.05-0.20
5	11-30		7.5-8.0	6.9-7.8	0.87-2.42	1.08-1.55	0.08-0.14	0.08-0.14
5	31-60		8.0-8.3	7.2-8.1	1.0-1.14	0.74-1.55	0.07-1.0	0.04-1.00

Bdcast = broadcast; OM = organic matter; N = total nitrogen. Total nitrogen was measured using the Kjeldahl method. Organic matter was determined using the wet oxidation method (a form of hydrothermal treatment that determines soil carbon content).

Soil Organic Matter

The organic matter status in soils is generally derived using the wet oxidation process, a form of hydrothermal treatment of a soil sample to determine the organic carbon (C) content. Higher C content in a soil implies a greater amount of microorganisms, a contributing factor in improved soil fertility. The organic matter status in the topsoils of broadcast urea-applied plots ranged from 1.01 to 2.35 percent; but in the case of the UDP plots, organic matter status was higher, varying from 2.42 to 3.43 percent. It is assumed that better management and the efficient use of N fertilizer led to higher total biomass and a larger number of tillers (the number of shoots growing from the base of the plant) produced in UDP plots. Decomposition of a larger volume of crop residue may also be responsible for producing more soil organic matter; this is significant because cereal crops pull critical nutrients from the soil and hold them in the shoots and leaves. By allowing this unused crop material to decompose on site, the majority of nutrients are returned to the soil while encouraging biotic activity.

Soil Nitrogen

Total soil N in the topsoils of broadcast urea-applied plots ranged from 0.05 to 0.20 percent; but in the case of the UDP plots, soil N ranged from 0.18 to 0.26 percent. The amount of total N remaining in the soil was relatively higher in UDP plots than broadcast urea plots. It is assumed that after deep placement of the urea briquettes, N begins to move from the concentrated site to the surrounding soil by diffusion. As a result of this process, there is more opportunity created for the ammonium form of N (NH_4) to be fixed at the exchange sites of clay and negatively charged soil particles known as colloids.

These colloids absorb and release ions in the cation exchange process, attracting and holding positively charged ions such as calcium, magnesium, potassium and zinc in the soil solution. Colloids largely determine the physical and chemical properties of a soil because they are responsible for holding these nutrients in place and absorbing water molecules to their surfaces. Coupled with organic matter, the NH_4 remains in the topsoil, held by colloidal attraction, rather than leaching into the subsoil.

Nutrient-Holding Capacity

CEC in the topsoils of broadcast urea plots ranged from 16.8 centimoles per kilogram (cmol/kg) to 20.8 cmol/kg. In the case of UDP plots, CEC was 17.6 cmol/kg to 22.4 cmol/kg. Soil texture (the relative proportion of sand, silt and clay particles) relates directly to a soil's CEC. The topsoil texture in UDP plots ranged from silty clay loam to silty clay, while in the case of broadcast urea plots, it ranged from silt loam to silty clay, indicating greater amounts of beneficial clay in the UDP plots. Higher clay content and organic matter in UDP plots may be responsible for both the higher CEC and higher amounts of N.

More Studies to be Done

According to AAPI scientists, the soil sampling was part of a preliminary investigation. They suggest that a more systematic, scientific investigation is warranted to validate initial findings. In the meantime, the smallholder farmers in Chala Atia and Bhabanipur villages will continue to use UDP technology on their fertile soils for greater rice yields.



Eggplant Demonstration Yields Encourage More Farmers to Use FDP



▲ FDP produces 20 to 40 percent greater yields and uses less urea in rice and vegetables than broadcasting urea.

The use of FDP technology in rice continues to gain momentum within the AAPI project area. Pioneered by IFDC and known locally as *Guti urea*, FDP reduces the amount of urea fertilizer needed for irrigated and rain-fed paddy crops by as much as 40 percent and, at the same time, increases yields by 20 to 40 percent.

Designed to replace prilled urea that is broadcast, FDP technology reduces the overall use of urea by 30 percent through the insertion of large (1.8 to 2.7 grams) urea briquettes into the rice root zone after transplanting. Nitrogen losses are significantly reduced with this technology, compared to the conventional method of broadcasting fertilizer onto the soil and into the paddy water. Some farmers in the AAPI project area have begun applying the FDP technology to the cultivation of fruits and vegetables as well. AAPI conducted several demonstrations in conjunction with farmers in Bangladesh to show the use and results of FDP in vegetable production.

Kulsum Bibi and her husband Harun work together in their small vegetable field growing eggplant, cabbage and tomatoes in the dry *Boro* season and rice in the rainy *Aman* season. AAPI selected the couple's land as a demonstration plot because the couple was willing to share results and knowledge with

neighbors. The eggplant demonstration, intended to inspire local farmers to adopt FDP technology, showcased the lower cost of production and higher crop yield using the FDP fertilization method.

To prepare for the demonstration, Kulsum Bibi attended an orientation and training session at Barisal where she learned procedures for properly cultivating eggplant and methods of using FDP and balanced fertilizer, as well as the objectives and importance of the demonstration. The orientation session paid off and the demonstration produced both agricultural and social successes. Bibi's yield using FDP increased 31 percent compared with the control plot, which used the broadcast method. Neighboring farmers found the demonstration informative, because none of them had used this technology before and knew nothing of the methods or benefits of using it. Bibi's neighbors were impressed by the increased yield and the high quality of the eggplant produced in the FDP plot. As a result of the demonstration's success and Bibi's cooperation, 60 percent of the farmers in the area plan to use FDP to grow cabbage, tomatoes, chili peppers, watermelons and eggplant. These crops have already proven to be responsive to FDP.

According to a survey of the farmers who came to the demonstration, Bibi's eggplant plot helped to successfully spread the goals of AAPI. The farmers in her area who came to the demonstration and plan to implement FDP technology will experience increased yields and better-quality vegetables, leading to higher incomes while using less fertilizer. Women find that adopting FDP technology increases their opportunities to participate in the farming process (thus helping to meet AAPI's goal of 20 percent female participation). The local economy will also be strengthened as more and more farmers embrace this fertilization technique. FDP use on vegetables has improved the lives of involved farmers in Bangladesh. With the adoption of the technology for crops in addition to rice, farmers are experiencing higher crop yields during both *Boro* and *Aman* seasons, encouraging them to invest in a technology that is not only more efficient than broadcasting prilled urea but also is better for the environment.

FDP Creates Jobs in Bangladesh



▲ Hashem Rozdar Ali has increased his income working in a briquette production facility and has learned how to improve the yield of his own rice crop with urea briquettes.

Hashem Rozdar Ali had been an under-employed farm laborer in Bangladesh until he began working at a small-scale urea briquette production shop. He is a sharecropper who was growing rice on 66 decimals of land in Shahpur village of Chuadanga Sadar *upazila* and formerly hired out as a laborer to others when times were lean. However, the middle-aged laborer found farm work only four months each year.

With the rice he grew on his land, Ali could supply food for his five-member family for only six months of each year. For the rest of the year, he had to work as a laborer for others, but the labor

demand, on average, was no more than 10 days per month. He only earned *Taka* (Tk) 2,000 (US \$25), which was not enough to provide for the family. (The average annual income in Bangladesh is Tk 66,283 [\$848], according to the 2012 Bangladesh Economic Survey.) “What to do? I had no alternative job, and so we lived in hardship,” he said, sitting on the handmade carpet of palm leaves on the porch of his clay house.

But late last year, things started to change. His uncle, Mujibur Rahman, a fertilizer dealer, bought a briquetting machine through IFDC’s AAPI project to produce urea briquettes. FDP and the production of briquettes are technologies being promoted by IFDC and the DAE to enhance agricultural productivity and lower production costs of rice and other crops.

“My cousin Liton called me and asked if I would operate the briquetting machine,” Ali said, adding that it was a good chance for him to earn extra money. He still has his own work in the field and also responds to calls for day laborers. During the rest of the time, he works at the shop, Biswas Traders. He now has steady work and additional income. Ali earns Tk 15 (\$0.18) for each 50-kg bag

of urea briquettes he produces. On average, he and his partner produce 30 bags of briquettes a day. This means he earns more than Tk 200 (\$2.46) a day from the shop. “Sometimes I work as a laborer in the field until noon and then go to work at the briquette shop in the afternoon. On such days, I earn Tk 400,” Ali said, adding that from *Boro* season of 2011-2012 until this *Aman* season, he worked at the shop more than 40 days, which helped him earn an additional Tk 2,000 (\$25).

This additional work has doubled Ali’s cash income and has had a very positive effect on his family. With the extra income, he has leased an additional 50 decimals of land, and he is able to purchase more fertilizers and seeds. He cultivated *Aman* rice in his



new field this season. “Cultivating additional land ensures food for my family for at least three more months,” the hardworking Ali said.

Currently, urea briquettes are produced seasonally, during periods of rice transplantation in the three seasons of *Boro*, *Aman* and *Aus*. But recently, farmers have begun using briquettes on vegetables and other crops. If this trend increases, the briquetting machines will be in operation year-round. “If that is so, I will have work throughout the year,” Ali said. He is one of hundreds of laborers earning extra income by working in briquette shops.

According to a census conducted by AAPI in April 2012, there were 1.67 jobs per briquette business. In the last four years, IFDC has assisted rural entrepreneurs in 22 districts to purchase 1,065 briquette machines at a 75 percent price discount (in order to increase the spread of the technology).

That is approximately 1,780 new jobs that have been created during that period. For many rural farm laborers, landless sharecroppers and rickshaw van drivers, these briquette machines have provided opportunities to make a better living.

Delwar Hossain, a rickshaw van driver from Yadavpur village in Meherpur, has also increased his income through briquette production. The 65-year-old usually earns Tk 150-200 (\$2-\$2.50) per day, but when he started working at the briquette shop of fertilizer retailer Golam Kibria in June 2012, his earnings rose. On the days he worked at the briquette shop, in addition to driving the rickshaw van, his daily income was about Tk 300 (\$4). During *Aus* and *Aman* seasons, he worked around 40 days at the business in addition to driving the van, and that helped his family immensely. “My wife is sick. With the extra income I was able to buy her medicine and some more nutritious food,” he said.

FDP technology, pioneered by IFDC, reduces the amount of urea fertilizer needed for irrigated and rain-fed paddy crops by as much as 40 percent and at the same time increases yields by 20 to 40 percent. FDP involves the insertion of large (1.8 to 2.7 grams) briquettes into the rice root zone after transplanting. Nitrogen losses and environmental pollution are significantly reduced compared with the conventional method of broadcasting fertilizer into paddy water.

Farmer Promotes Self-Sufficiency as a Key to Overcoming Poverty

Humayun Kabir is considered by many local farmers around Tapashidanga village in Jessore *upazila* to be an icon in farming innovation. Kabir believes his work is more than simply farming. After leaving his profitable timber-trading business in 2008, Kabir leased slightly more than 1 ha of land and bought two cows, beginning what he considers to be a more satisfying life. For Kabir, a meaningful life is defined by work that requires creativity and innovation and serves his people and his nation.

At 46, he has a wife, three daughters and a son, all of whom Kabir considers ‘employees’ of his farm. Driven by passion and dedication to those in his community, Kabir has found success in his farming venture, producing more than 240 maunds (over 9,000 kg) of paddy rice and nearly 100 mt of urea briquettes annually and 15-20 kg of milk daily. The harvests feed his family, and the surplus is sold to customers. While the money is important, Kabir is thankful for the benefits of producing his own food. “When I was a businessman, I had money – but not food that was produced by my own hands. Now food for my family is ensured, and I can also earn from it.” Kabir achieved success for himself and his family by becoming involved in the AAPI project and working hard to be self-sufficient.





When he first began farming, Kabir used the traditional fertilization technique of broadcasting prilled urea. Now, with the help and training of his local agriculture office and AAPI, Kabir produces 25 percent more maunds of paddy using FDP.

After seeing the technology's effectiveness, Kabir wanted not only to use it but to also make urea briquettes. Soon he was able to buy his own briquetting machine, allowing him to cut costs and increase his income. Kabir also has trained some laborers on the application of urea briquettes. They have become so efficient that the farmers are hiring them and paying more than the usual wages due to their skills. "FDP is not only reducing production costs and increasing yields, but it is also creating jobs and raising workers' incomes," he said.

By growing more rice, Kabir can feed his family, his two cows and their two calves and still have enough rice to sell to his customers. Kabir continues to add to his enterprise and finds ways to cut costs without lowering quality. For example, he learned that he could use semi-powdered rice to feed his cows. Producing his own cattle feed lowered his monthly feed costs by 30 percent and increased the quality and control as well. "I make quality feed for my cows," said Kabir. "This was one of my objectives when I started growing rice." Kabir boasts that his cows are happy, healthy and produce plenty of milk. Overall, the cows have been his best investment. In addition to consuming and selling the cows' milk, he uses their manure as cooking fuel and to replenish nutrients in his fields between seasons.

Always looking for ways to help his neighbors while also making a living, Kabir sells his milk directly to them instead of to traders. Some traders are simply trying to make money, but Kabir wants his customers to enjoy a nutritious product. "My cows give quality milk," Kabir said. "If I sell the milk to traders, they will mix it with lower-quality milk or water. Because I sell my milk to individuals, they get the best-tasting milk. If I produce milk at a low cost, my customers benefit."

Kabir cultivates three rice crops a year, a process that depletes the soil of many of its nutrients. In addition to using FDP technology, Kabir applies the cow manure to replenish some nutrients in the soil since the field does not lie fallow. Keeping the soil healthy is part of the bigger picture of what Kabir is trying to do. "We have to take care of everybody and everything around us." Kabir takes this responsibility seriously, going so far as

to lease additional plots of land to give demonstrations to other farmers and show the benefits of using FDP.

Last *Aman* season, Kabir leased 132 decimals of land (a little more than 1 ha) to demonstrate the FDP process and its benefits in rice production. His investment was a success, encouraging dozens of farmers to invest in FDP technology. Because of this success, Kabir wants to continue establishing demonstration plots. "I am now looking for another field to prepare an FDP demonstration plot. This will not only increase rice production but also briquette sales," Kabir commented.

Kabir continues to look for new ways to use his existing resources to improve his family's circumstances and is determined to have a more self-sufficient farm. He plans to produce greater quantities of the cost-effective rice powder for himself and others. Self-sufficiency means more to Kabir than simply increasing his earnings. He believes self-sufficient living could help Bangladesh rise out of poverty. "If everybody thought this way, there would be no unemployment or food shortages in Bangladesh. We would not be a poor nation."



◀ (Opposite): USAID Agreement Officer's Technical Representative Aniruddha Roy (left) listens as Humayun Kabir explains the benefits of making cattle feed from rice powder.

▲ Cows have been Kabir's best investment.

Director of EurAsia Division Discusses IFDC's Work in Bangladesh and Globally



▲ John Allgood, EurAsia Division Director.

You have spent your entire career at IFDC. What led you to pursue international agricultural development work? When I first joined IFDC in 1975, I was a recent university graduate. IFDC had just started up and it was big news. I had other opportunities, but the IFDC mission at that time of “helping to feed the world” made an impression. In the first couple of years after joining IFDC, there were a lot of positives that kept me here – the highly professional and competent staff, travel opportunities throughout the world and interesting assignments. And over the years, I have been able to work in a number of different areas in IFDC, from technical to administration, which really added to the challenge and interest. Having the opportunity to be directly involved in improving the lives of others and to see first-hand the impact of our work has been very satisfying.

What are the major changes you have seen in IFDC as an organization since you were hired? Some of the most significant changes have been our shift in program priorities (from when IFDC was established), changes in our strategic approach to development of agricultural markets and the geographic expansion of programs. We

now have offices in 20 or so countries in Asia and Africa, as well as Washington, D.C. In the beginning, we shared office space with TVA's National Fertilizer Development Center, so it's been quite a change. As IFDC has expanded geographically and in the scope of its activities, the Center has increasingly adopted a collaborative approach – working with and through national agricultural research organizations, developing and linking with farmer-based organizations [FBOs] and associations and developing public-private partnerships [PPPs]. And that collaborative approach has really helped to generate local stakeholder support and ownership in our work. It also helps to leverage our funds for development and provides a foundation for capacity building, which is so important to the sustainability of progress.

Much of your work has focused in Asia and Eurasia. Describe the progress that you have seen over the past 35 years in agriculture development, technology introduction and improved farmer income in Bangladesh. Bangladesh achieved independence in 1971 and struggled for many years to improve rice production, yet the country remained dependent on foreign aid for enough food. IFDC began working there full-time in 1978 with educational programs to help farmers improve yields through the proper use of improved seed and fertilizer. Later, our focus expanded to building a fertilizer market that would provide farmers improved access to fertilizers. Those interventions paid huge dividends. With the strong support of the Government of Bangladesh and the hard work of the farmers, Bangladesh achieved rice self-sufficiency in the early 1990s. The growth in rice production during 1987-94 paralleled the growth in fertilizer use; it increased by an average rate of over 8.5 percent per annum. In the past two decades, IFDC has continued to play a role in supporting improved agriculture sector performance in Bangladesh – supporting crop diversification, agro-processing and trade improvement. And most recently, the rapid diffusion of FDP, and particularly UDP technology, is having an immediate impact on improving food security, farmer incomes and the national budget. UDP technology is now used on more than 800,000 hectares of rice.

How has FDP changed agriculture in Bangladesh? What are your thoughts about its spread to other countries? FDP is a simple, resource-efficient technology that yields extraordinary benefits. Improved efficiency fertilizer products often involve substantial costs to achieve the improvement in performance efficiency. That's not the case for FDP/UDP. The incremental cost to make fertilizer briquettes is insignificant. The benefits from FDP use when



compared to broadcasting urea are really remarkable. During the past two years in Bangladesh, farmers using FDP have averaged yield increases of 15 to 18 percent while using about one-third less fertilizer. FDP clearly provides a win-win situation.

FDP technology diffusion is in the very earliest stages. Following years of testing and performance validation and a recent aggressive promotional campaign, annual use of fertilizer briquettes in Bangladesh is now between 100,000

context. A number of Albanians who joined the IFDC staff, including Dr. Hqmet Demiri and Dr. Ylli Bicoku, were key to formulating a strategic approach that included formation of the Albanian Fertilizer and Agricultural Inputs Dealers Association. To this day the association continues as the industry's representative organization.

What are your thoughts about IFDC's role in improving agriculture in Kyrgyzstan and Tajikistan? We're playing an important role in both countries. Change is occurring,

As we've expanded geographically and in the scope of activities, we've increasingly adapted a collaborative approach to implementing activities – working with and through national agricultural research organizations, developing and linking with farmer-based organizations and associations and developing public-private partnerships.

– John Allgood, Director of IFDC's EurAsia Division

and 150,000 metric tons [mt], equivalent to less than 5 percent of the Bangladesh market. A lot more needs to be done. Beyond Bangladesh, there are definitely great potential and growing interest in Asia, Africa and, to a more limited extent, in Central America and some Caribbean countries. With a concerted effort, FDP markets will continue to expand.

Regarding IFDC's work in Albania, would you comment about what you saw during the transition from a controlled economy to a market economy? Describe Albania's increased agricultural productivity, as well as the impact of technology introduction and trade. My involvement in Albania occurred after most of the key activities were well underway. The early IFDC intervention team – Ray Diamond, Tom Thompson, Claude Freeman, Chan Sieben, Jim Kelly and others – went in soon after the Communist era when circumstances were very difficult. The level of development was low; there were power outages, food shortages and so on. Our team quickly engaged and achieved results rapidly in the development of the fertilizer market and agribusiness in a broader

particularly in terms of technology introduction and business linkage development. We're assisting with some of the technology improvements – improved seed, fertilizers and crop protection products [CPPs] are being introduced in Kyrgyzstan, as well as very significant improvements to agriculture mechanization and value-added agro-processing. We recently initiated work that will support improved performance in the livestock sector. This is also true in Tajikistan, but to a lesser extent. We're working to improve agro-dealer networks and services, which will lay a foundation for improved farmer access to technologies and advisory services. Referring to our collaborative approach, a PPP has been established in Kyrgyzstan with international suppliers of agricultural inputs, which has helped to leverage our resources and increase sustainability. And, recently our work to rehabilitate degraded agricultural lands (which has yielded good results) was fortified through a PPP to extend the effort.

Even though funding for agricultural development has varied over the years, agriculture remains the major contributor to the gross domestic product and



the major employer in most developing countries. What is the role of agriculture in these countries going forward? In the regions where IFDC is involved – many of the world’s poorest countries and some emerging from conflict – agriculture will remain a key sector. With the globalization of markets, changes are providing new areas of opportunity. Population pressure and economic development in a broader sense will impact dietary demands. The effects of climate change are already having an impact in some areas. The pressure to achieve sustainable agriculture systems throughout the world will continue.

How has the role of women in agriculture changed during the past three decades? It has changed and continues to change in a positive way. Women have long been involved in post-harvest activities. Head-of-household women and others are more engaged in field activities. We also see more women involved in input supply systems – building careers as agro-dealers and participating in agro-processing enterprises. We believe that empowering

▲ *(From left) John Allgood, director of IFDC’s EurAsia Division, attends a field event with Richard Greene, USAID mission director to Bangladesh, and Paul Weisenfeld, assistant to the administrator of USAID’s Bureau of Food Security.*

women is a key to poverty alleviation. We make every effort to involve women in development. That wasn’t the case 30 years ago; it is a critically important area where we hope to continue to make progress.

There are many factors that impact productivity and constrain improved performance. What are the major impediments to improving agricultural productivity in the developing countries in



which IFDC works, and how best can those be alleviated? Generally, low productivity can be linked to low levels of investment – in farmer education, in technologies that contribute to sustainable yield increases and in agriculture input and output markets. Underperforming markets are a key impediment to improved productivity. With increasing population pressure on agricultural resources and the impacts of climate change, there is a great urgency to alleviate constraints and we are working on many – from policy-related constraints to improving farmer knowledge and strengthening markets.

IFDC was formerly a well-kept secret as a global leader in promoting agricultural development. Do you think IFDC is now on the international development radar? If so, what do you think are the reasons for the change? Our global visibility has improved, and a number of factors have contributed. Of course, the primary reason is the work done over nearly four decades by the IFDC staff worldwide. It has been consistent and of high quality and we've employed the collaborative approach that really generates participation by stakeholders. Promotion has been a key – through the work of staff and the IFDC website and elsewhere and, of course, IFDC staff participation in conferences and various meetings worldwide. The Africa Fertilizer Summit, which resulted in the *Abuja Declaration*

on *Fertilizers*, is an example of an event that brought IFDC to the forefront. And unfortunate events such as the 2007-2008 food/fertilizer price increases created a heightened awareness of how fragile global food security really is and the role that fertilizer plays in food security.

IFDC is currently involved in a number of PPPs. How will PPPs make a difference in helping agriculture to become more sustainable? Public-private partnerships leverage resources through partner buy-ins and support sustainability. They also bring access to new technologies and open up trade opportunities. A great example of that is the good work by IFDC's Kyrgyzstan Agro-Input Enterprise Development [KAED] team where a PPP is generating positive changes; it will outlive our presence and be a key to sustainability of results achieved.

What changes do you see ahead for IFDC? I don't see dramatic changes on the horizon. The current internal re-organization is intended to yield improved efficiencies in IFDC's operations at many levels and the Virtual Fertilizer Research Center [VFRC], which is expected to yield advances in fertilizer technologies, will have an impact. We are planning to expand activities in Asia and the growth of our activities in Africa has really been dramatic and is impacting smallholder farmers in those areas in which we work. Increasing links with the private sector will occur and is important to sustained development. We have established a reasonably good track record of building local capacity. That will intensify, through local partnerships that will further contribute to sustainable development.



◀ Long-time IFDC employee, Mofizul Islam (left), AAPI senior agriculture specialist, shows healthy cauliflower plants to John Allgood and dignitaries visiting a demonstration field.

KAED Promotes Growth of Kyrgyzstan's Poultry Sector

The poultry sector in Kyrgyzstan is in its infancy, but it has significant potential to create jobs and income in rural areas, particularly in southern Kyrgyzstan. Farmers recognize the income potential of a viable poultry sector, but key elements required for industry development have been missing. One critical element is access to high-quality, reasonably priced feed from a reliable source. Currently, imported soybean meal is expensive due to transportation and customs charges. Therefore, development of a domestic supply of competitively priced soybean meal is vital to the success of a sustainable poultry industry in Kyrgyzstan.

Feed Production is Key to Poultry Sector Development

The production of quality poultry feed and edible oil from soybeans in Kyrgyzstan is taking place (albeit in limited quantities). USAID-funded studies conducted by IFDC concluded that soybeans, sunflowers and corn can provide both feed and oil and would have comparative advantages for Kyrgyzstan. The potential market for protein feed (soy meal) to support Kyrgyzstan's fast-growing poultry and

beef industries is estimated at 140,000 mt per year and is valued at approximately \$50 million.

IFDC has demonstrated over the past several years that soybeans grow well throughout Kyrgyzstan and that ample land is available for planting. However, Kyrgyz farmers do not cultivate soybeans because they cannot use the 'beans' without processing (removal of oil and other components through extrusion). Therefore, to stimulate the market and encourage farmers to grow soybeans, the KAED project provided an initial quantity of soybean seeds to farmers in southern Kyrgyzstan two years ago and helped fund extruders with partner feed mills. Soybean meal now is being promoted among millers and end users.

Kyrgyz farmers are increasingly interested in poultry as a means to supplement income. They can compete with imported eggs and significantly increase net incomes, even on a small scale (500 to 1,000 laying hens) if they purchase good stock and quality feed and adopt recommended poultry management practices.

Public-Private Partnerships

In 2001, USAID and IFDC embraced a new approach to partnerships that encourages direct collaboration with the private sector. The move was driven by the recognition that the private sector was making significant contributions to international development in developing countries. Embracing this approach, IFDC and a local company





Oasis Agro has already invested more than \$500,000 in land, equipment and training for poultry farmers. Plans are to invest another \$200,000 in 2013 to upgrade the capacity of its feed mill, soybean storage facilities and poultry incubators. Oasis Agro is also improving the curriculum of its poultry school. Following the Oasis Agro model, two medium-scale and 135 small-scale poultry farms were established last year in southern Kyrgyzstan. Their productivity, income and employment generation are benefiting the region.

The Oasis Agro poultry project near Osh (the largest city in southern Kyrgyzstan) has weathered regional political turmoil and is making a valuable contribution to the economy by enabling farmers to increase their incomes – and help meet local market demand for eggs by producing and selling high-quality laying hens and feed.

KAED is assisting Oasis Agro to stimulate the demand for high-quality protein-based poultry feed through multiple farm demonstrations of proper feed rations that feature best practices in soybean post-harvest techniques, processing and feeding of chickens. These demonstrations are critical to increase demand for quality poultry

feed and retain the trust and confidence of the farmers so they will continue to supply soybeans at fair market prices.

The challenge for small farmers is to recognize the importance of the strict specifications of the formulated and balanced feed required by the hens. Even though some hens are capable of producing 320 eggs annually, many only produce 60 to 70 percent of their laying capacity because even if there is an abundance of feed, it will not maximize growth and production if it is not part of a balanced formula.

Meanwhile, the escalation in feed prices is creating new challenges for the poultry industry, making the adoption of modern balanced feed rations more important than ever. When one grain component is unavailable or too expensive to use, it can be replaced in chicken feed as long as caloric and nutritional needs are met.

It is important for poultry farmers to understand some of the characteristics of an alternative grain component to make proper feeding decisions that are economically viable. It is estimated that approximately 17,750 mt of corn, 20,000 mt of wheat and 21,880 mt of barley are currently being purchased. This demand by the poultry sector represents an excellent opportunity for farmers in the region to increase production of crops such as corn, barley, sunflowers and soybeans to supply raw ingredients for the poultry markets.

created by U.S. entrepreneurs – Oasis Agro, LLC – formed a PPP in 2010 to promote poultry and high-value feed crops. The PPP involved the cultivation of 600 ha of soybeans and the production of 900 mt of processed soybean meal, which helped generate \$540,000 for farmers and processors.

Both KAED and Oasis Agro provided training and other technical assistance to 1,000 soybean farmers. In addition, Oasis Agro sold the meal at a subsidized price to farmers willing to start poultry businesses.

Oasis trained 175 farmers in southern Kyrgyzstan in 2012. All of them have started small-scale poultry businesses producing fresh eggs for the domestic market. Oasis Agro plans to train 350 more farmers in poultry management in 2013. Fresh eggs are important because they decrease imports, are a significant income generator for small farmers and provide consumers with needed dietary protein.

- ◀ *(Opposite): Cages purchased by Oasis Agro with the support of KAED.*
- ▶ *The USAID KAED project helped Asilidin Nasiridinov improve his poultry farm management skills and increase his income.*

Proper Breeds Generate Success

There are only four farms producing young laying hens in Kyrgyzstan that are popular among farmers. These are Oasis Agro and the Ak-Orgo Agro cooperative in the south, and Natural Agro (a sister company of Oasis Agro) and Tian Shan Mission Society in the north. Small farmers generally obtain three-month-old vaccinated hens from these farms. The farms also provide formulated poultry feed to farmers. With direct support from KAED through small-scale grants, two poultry farms in the south recently began producing hens to respond to an increased demand for live birds.

There is only one laying hen parent breeding farm in Kyrgyzstan today; the 3-T Farm produces Hy-Line Brown layers for the poultry industry. The farm produces day-old chicks for medium and large poultry farms and for its own poultry farm. With KAED support, Oasis Agro plans to develop a parent breeding farm by the end of 2013.

Natural Agro plans to support the establishment of small-scale poultry farms in northern Kyrgyzstan through trainings and by providing the farms with laying hens, along with the development of a parent breeding farm. It is expected that with the support of KAED and Natural Agro, the number of small-scale poultry farms will increase by 150 percent in southern Kyrgyzstan and nearly 750 percent in northern Kyrgyzstan by the end of 2013.

Impressive Results through KAED Support

As a direct result of the support of the USAID KAED project, the poultry sector is growing rapidly. Poultry farms are divided into three groups in Kyrgyzstan: small farms that have up to 5,000 laying hens; medium-scale farms of 5,000 to 20,000 hens; and large operations that have more than 20,000 hens but fewer than 150,000. A few very large farms have more than 150,000 hens. Of 497 poultry farms, more than 90 percent are located in southern Kyrgyzstan. The majority of the farms are small, use household labor and do not generate enough revenue to hire employees.

While most of the poultry farms are located in southern Kyrgyzstan, the country's three largest poultry farms (accounting for approximately 84 percent of total commercial poultry) are in Chui and Issyk-Kul *oblasts* (provinces) in the northern part of the country. These farms each have between 150,000 and 300,000 birds. With the support of KAED, Oasis Agro established a new poultry school in Kant (northern Kyrgyzstan) to train poultry growers in the region.

As a result of sector growth, total egg consumption during the last two years was about 425 million eggs (or 80 eggs

per person per year) compared with 25 eggs per person per year in 2008 when KAED first addressed the issue of poultry feed. However, domestic production of fresh eggs accounts for only 62 percent of the Kyrgyz market. The remaining eggs are imported from Russia and China. Kyrgyz poultry growers realize the sector's potential for future domestic growth and even the potential to export eggs to neighboring countries such as Uzbekistan. According to reports from the Kyrgyz MoA, approximately 76.4 million eggs were produced in the first quarter of 2012. Egg production is projected to exceed 300 million in 2013.

The greatest competition for market share is between local producers and eggs imported from the Russian Federation, which provides subsidies for feed expenses to its poultry industry, leading to lower production costs. However, Kyrgyzstan's larger poultry farms have been able to successfully compete with imported eggs by establishing their brands and sales networks in northern Kyrgyzstan. The largest egg producer, Ak-Kuu, also has established a distribution network in the urban areas of southern Kyrgyzstan.

Oasis Agro reported a 30 percent share of the egg market in the south in 2011 compared to 10 percent in 2009. Many other successful poultry farms were established (particularly in southern Kyrgyzstan), patterned on the Oasis Agro model. Because of the project's success in Kyrgyzstan, talks with private sector partners have already begun in an effort to expand the program to other central Asian countries.

A Look Forward

The private sector has always had a significant role in development, but PPPs are becoming an increasingly important part of sustainable development.

The PPP with Oasis Agro was designed to combine the assets and experience of strategic partners and to leverage their capital, investments, creativity, access to markets and skills to solve complex problems facing the poultry sector in Kyrgyzstan.

The continued partnership between KAED and Oasis Agro is a result of persistent efforts to attract international companies to the relatively small Kyrgyz market. The partnership has already proven to be a mutually beneficial and effective relationship that will expand during 2013.

Such alliances serve as prime examples of how PPPs can address food security issues through increased agricultural productivity. IFDC hopes its successes will serve as an example for others in the region and lead to new public-private initiatives that help address ongoing food security needs.



Developing a Successful Poultry Business



▲ *Nasiridinov's wife helps with the 15,000 young chicks in their poultry operation.*

In 2001, Asilidin Nasiridinov opened a small poultry farm in Aravan *rayon* (district) in the Osh *oblast* of southern Kyrgyzstan. Due to his lack of capital, he began by using one room in his three-room house for egg production. Nasiridinov had 1,000 laying hens of the Hy-Line Brown breed and a feed-mixing room. However, the hens' egg yields only reached 75 percent of anticipated production. The poultry farmer faced numerous problems, including the lack of high-protein feed and mineral supplements, inadequate space for the laying hens and a lack of knowledge of proper poultry management.

In 2010, Nasiridinov's farm was chosen as a poultry demonstration farm by the USAID KAED project. With project support, improved feeding techniques (including rations with high-protein content, vitamin and mineral supplements), adoption of quality breeds, proper poultry management and quality control were introduced on the farm. Sanitary conditions and water quality also were substantially improved.

With these improvements, the hens' egg production increased – as did Nasiridinov's income. From his profits, he purchased a chicken house near his home for additional space to grow laying hens. The farm was gradually transformed into a mechanized poultry farm for as many as 21,000 laying hens and has facilities to raise three-month old hens. Subsequently, Nasiridinov purchased 15,000 day-old chicks and raised them until they were three-month laying hens that he then sold to other poultry farmers in southern Kyrgyzstan.

Thanks to the support of KAED, Nasiridinov has continued to expand his business. The farm is now one of the largest poultry businesses in southern Kyrgyzstan. Egg production increased by 10 percent and reached 90 percent of the 2012 target, while losses were held to only 0.5 percent.

With the technical assistance and information he received from KAED, Nasiridinov has a better understanding of the importance and proper use of improved feed rations. He has learned that the easiest and most cost-effective way to improve yields of laying hens is to improve the quality of feed. "This experience opened my eyes about poultry management. I plan to grow soybeans and produce soybean meal; this will help to reduce the cost of feed. I want to procure a parental line of laying hens, raise them on my farm and then sell them to other poultry farmers. My main goal is to develop the poultry business in southern Kyrgyzstan," Nasiridinov stated. He is a good example of a successful, business-oriented farmer who can make a major impact on the entire farming community in southern Kyrgyzstan.

The KAED project provides farmers with training and access to key business resources in the feed and poultry sub-sectors. More than 1,600 mt of high-quality soy-based feed was produced and sold to poultry farmers in 2012. As a result of project activities and support, the domestic market share of egg sales in the country increased in 2012 and nearly doubled in two years.

USAID Productive Agriculture Project in Tajikistan Distributes Tractors



- ▲ The USAID Productive Agriculture Project distributed 50 tractors to farms in the 12 western districts of Tajikistan's Khatlon region, a target area for USAID's Feed the Future initiative.

The USAID Productive Agriculture Project and administrative officials of the Khatlon region of Tajikistan hosted an event in Qurghonteppa to celebrate the purchase of more than 50 tractors by farms in the 12 western districts of the Khatlon region, the target area for the USAID Feed the Future (FTF) initiative. U.S. Ambassador Susan Elliott and Khatlon Regional Chairman Gaibullo Afzal opened the event and presented 10 *dehkan*¹ farms with the keys to their new tractors. The event was attended by representatives of financial institutions, agricultural implement dealers and district and municipality authorities, as well as many of the farmers who have worked with the project.

The USAID Productive Agriculture Project, collaborating with Imon International and Eskhata Bank, used a

¹ In Tajikistan, *dehkan* farms are mid-sized smallholder farms that are legally and physically distinct from household plots. *Dehkan* farms cultivate more than 60 percent of agricultural land in Tajikistan, averaging about 20 ha in size (compared to less than 2 ha in household plots). *Dehkan* farms concentrate on crop production (cotton, wheat and vegetables).

financing mechanism enabling farmers to access two-year loans for the purchase of tractors. Tractors were bought from the Madadi Tursunzoda farm machinery dealership with a combination of cash and credit. In addition, the project provided a grant of about 20 percent of the total cost of each tractor.

Access to machinery is essential for efficient and profitable agricultural production on *dehkan* farms. A 2010 study by the International Finance Corporation using data from 2008 found that the number of tractors in Tajikistan had fallen to 43 percent of the 1991 level. The goal of the USAID Productive Agriculture Project's machinery credit program is to create a financing mechanism through leading financial institutions that enables farms to finance their machinery needs. The tractor purchase program celebrated at the event is an expansion of a successful 2011 pilot program between the project and two other financial institutions, AgroInvestBank and Arvand.

Farmers purchasing tractors are also working with the project to improve the production of winter onions in western Khatlon. The project is also working to extend access to credit for machinery purchases to smaller farms involved in orchard, vineyard and hothouse vegetable production in this same part of the region.



Greenhouses Generate Increased Competition and Income

Use of modern greenhouse technology is allowing Tajik farmers to harvest fruits and vegetables in late winter and early spring when the produce can bring a premium price in local markets. Greenhouses are rare in Tajikistan; those that do exist are constructed with very basic materials, or they have deteriorated and are no longer usable. The poor state of greenhouses prevents Tajik farmers from growing enough early vegetables to meet domestic demand and makes it extremely difficult for them to compete with imported products. As a result, the farmers miss critical opportunities to earn income from high-value produce.

When Tajikistan was part of the Soviet Union, private farm chairman Fozilov Aslam grew lemons in greenhouses on 0.81 ha. After independence, he did not have the financial resources or technical expertise to maintain his greenhouses. The lack of investment and maintenance significantly reduced the efficiency of the structures. In order to rebuild these important sources of revenue, Aslam applied to the USAID Productive Agriculture Project to support the reconstruction of his greenhouses.

After a competitive selection process, Aslam was awarded a grant from the project to rehabilitate his greenhouses. Granted 30 percent of the funds needed for reconstruction, he invested his own money to cover the remaining 70 percent. With the financial assistance of the USAID Productive Agriculture Project, Aslam installed energy-efficient coal heating systems that allow the greenhouses



to function in areas where electricity and gas power systems are not reliable.

With USAID assistance, the new heating systems were installed in December 2011, allowing him to plant tomatoes and cucumbers for the 2012 early vegetable season. During 2012, Aslam sold 5.5 mt of tomatoes and 2 mt of cucumbers, increasing his farm's income by more than 50 percent over the previous year. With the increased profits, he has invested in a combine harvester and begun to reconstruct two additional greenhouses, which will also contribute to a sustainable increase in his income in the years to come.

Expressing his thanks to the USAID Productive Agriculture Project staff, Aslam said, "The greenhouse reconstruction project needs to be expanded to show Tajik farmers how they can effectively use every piece of their land to increase their profits."



▲ Staff of the USAID Productive Agriculture Project in Tajikistan observe an early tomato demonstration plot in a recently refurbished greenhouse. Left to right are Lola Ukumatshoeva, project finance manager and procurement specialist, and Sabohatullo Muzaffarov, senior agriculture specialist.

◀ Tajik farmer Fozilov Aslam admires healthy tomatoes grown in his refurbished greenhouse.



▲ *The 2SCALE project wants to help small-scale potato farmers double their yields.*



Potatoes for Profit in Kenya

The first 2SCALE agribusiness clusters in East Africa were launched in December 2012. Farmers in Kenya's Meru County, located in the foothills of Mount Kenya, are establishing three clusters to grow high-quality potatoes to sell to a Nairobi-based processor.

The clusters, comprised of over 800 farmers in the communities of Kibirechia, Timau and Kisima, will receive technical backup and initial funding from the project but are expected to become financially independent by December 2013. A business support team contracted by 2SCALE will work closely with the farmers, providing training and year-round monitoring of crop management, marketing and agribusiness management. Farmer training on fertilizer top-dressing and pesticide use was completed in December. Training on accounting and financial management began in January 2013, with weekly sessions continuing over a three- to four-month period.

2SCALE has brought together a range of partners to ensure that all requirements (market, seeds, fertilizer, extension, credit) are in place. The partners include: Equity Bank (a large private sector bank that offers agriculture sector lending); the Syngenta Foundation for Sustainable Agriculture (SFSA), which will provide crop insurance; training and extension experts; and seed, fertilizer and agrochemical suppliers.

Peter Mwangi, an ABC member, is optimistic. "If I could grow only one crop, it would be potatoes," he said. "And once this cluster gets going, I am sure many more will join."

Why Potatoes?

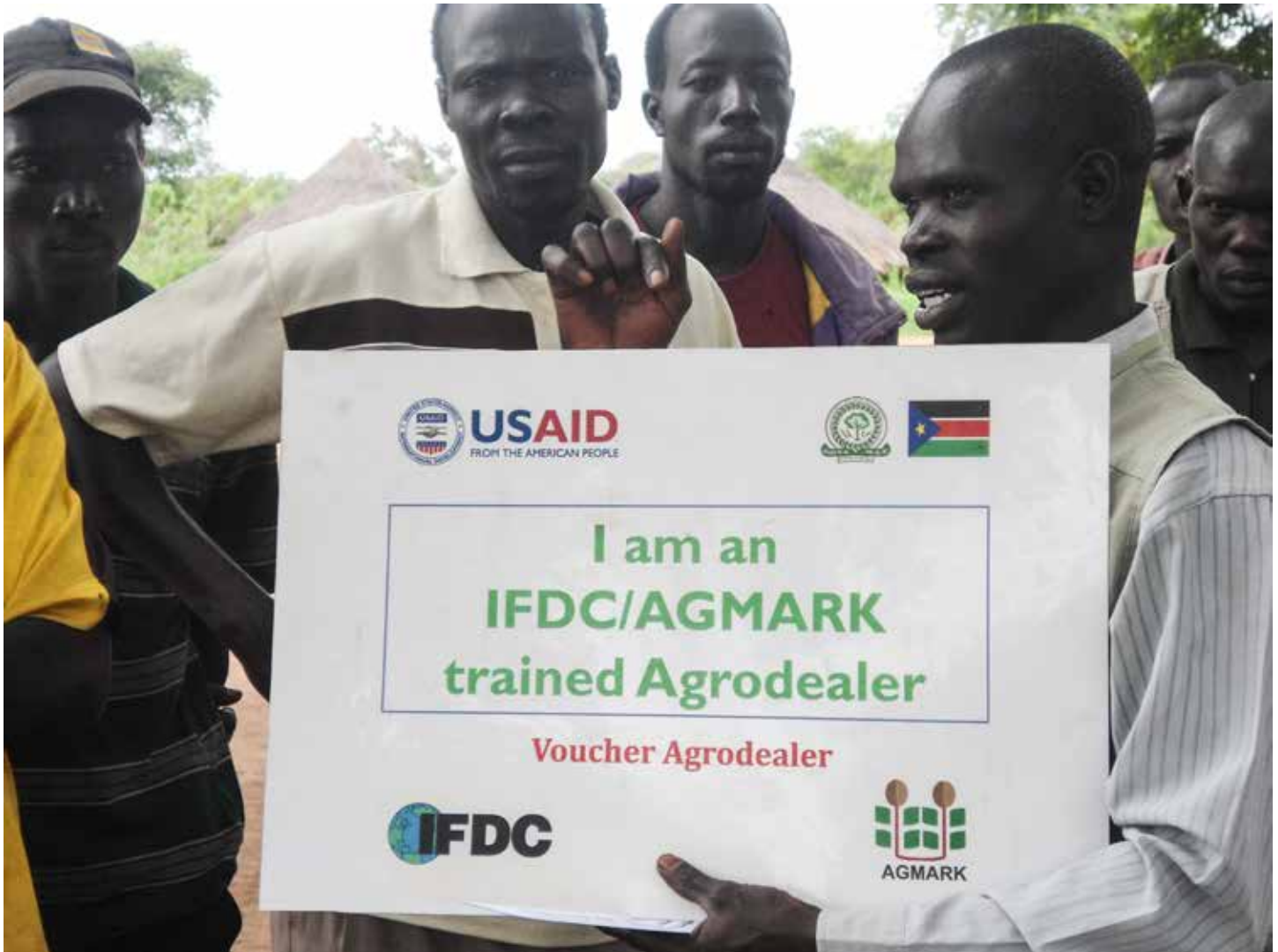
Meru is one of Kenya's largest potato production areas, with a strong and growing market. But currently it is traders, rather than farmers, who benefit most. In Meru County, the 2SCALE project is focusing on small-scale potato growers, who typically grow potatoes without irrigation on 0.25-0.50-ha plots. The project will help the farmers double their yields through improved production methods, and increase their incomes by one-third by linking them directly to an assured market.

Yields, currently around 12 mt/ha, could be substantially increased with new varieties, fertilizer use and improved crop management. However, the potato farmers face a number of challenges. Their crops are vulnerable to diseases (particularly blight) and worms known as nematodes. Farm-gate prices fluctuate widely – farmers receive anywhere from 1,500 Kenyan shillings (KSh) to 4,500 KSh per bag, depending on the season. Storage facilities are limited, forcing farmers to sell soon after the harvest when prices are lowest.

Forming an ABC can overcome many of these problems. A cluster can provide farmers a stable market and fairer prices.



Improving Fertilizer Markets Through Voucher Programs



▲ Farmers who receive vouchers in South Sudan are linked to trained agro-dealers.

Most smallholder farmers in Sub-Saharan Africa (SSA) cannot access or afford fertilizer because they live in rural areas with few agro-dealers, poor infrastructure and lack access to credit. Fertilizer costs are exacerbated by long and often dysfunctional supply chains, and fertilizer markets face inefficiencies at multiple levels. Constraints include policies that restrict competitive private sector participation in the market and underdeveloped distribution networks, as well as insufficient infrastructure at various points in the chain.

To improve fertilizer markets and farmers' access to affordable fertilizers, IFDC assists national and state governments in the implementation and improvement of voucher and subsidy programs. From the 1960s to the 1980s, traditional fertilizer subsidy programs implemented by African governments were characterized by government importation and distribution of fertilizer. Subsidized fertilizer was sold by state-owned companies, but often delivered too late in the planting season to be used effectively. The programs were untargeted and did not reach smallholder farmers who most needed the support. The programs were also ineffective and costly. Governments now recognize the need to develop market-friendly subsidies that promote pro-poor growth without hindering the growth of private sector markets.



delivery of fertilizers via the private sector, specific targeting of farmers who most need assistance and a clear exit strategy.

IFDC has implemented voucher programs in Afghanistan, Albania, Ghana, Kyrgyzstan, Malawi, Mozambique, Nigeria, Rwanda, South Sudan and Tajikistan. The following are examples of current and recent IFDC voucher/subsidy programs.

Nigeria Voucher Program

Historically, subsidized fertilizer in Nigeria has failed to reach smallholder farmers. To solve that problem and ensure that fertilizer would reach targeted beneficiaries, the federal and state governments of Nigeria requested IFDC's help in leading a large-scale voucher program in Kano and Taraba states during 2009 in collaboration with the National Program for Food Security. Due to its success, an expanded 2010 program was implemented in Bauchi, Kano, Kwara and Taraba states. During the 2009 and 2010 programs, nearly 200,000 smallholder farmers were able to purchase fertilizer using vouchers.

IFDC's "Smart Subsidies"

IFDC's approach is to implement smart subsidies – voucher programs that help farmers obtain inputs while increasing business for rural agro-dealers and improving supply chains.

"Fertilizer vouchers were first used by IFDC in 2002 to provide support to 200,000 targeted farmers in Afghanistan," said Ian Gregory, IFDC agribusiness market development specialist. "Today, an estimated 1.5 million smallholder farmers in numerous countries have received access to agro-inputs as a result of IFDC-designed voucher and subsidy programs. These programs are geared toward developing competitive markets for inputs."

IFDC voucher programs are designed specifically for a country's particular circumstances and implemented either as sustainable market development or emergency marketing. The advantage of such programs is that they address the immediate need by assisting targeted farmers and the long-term need by strengthening the private sector. An integral component of the programs is the provision of training to both the recipient farmers and agro-dealers. "Agro-dealers are trained to introduce new technologies and teach their farmer-customers how to correctly use inputs," Gregory said. "This sets farmers on the road to increased productivity – the route out of the poverty trap." Other key characteristics include security measures,

In 2011, more than 51,000 farmers in Taraba State received fertilizer through a voucher program. About 90 percent of targeted farmers received subsidized fertilizer. The private sector competed to deliver quality fertilizers to farmers by creating direct linkages from suppliers to distributors and from distributors to local agro-dealers.

"Since IFDC began this program in Taraba, our rural farmers have been full of thanks," said Danbaba Suntai, governor of Taraba State. The voucher program was funded by USAID and the Taraba State government.





A similar program was implemented in Taraba State in 2012 in collaboration with fertilizer suppliers Springfield and Notore and the Federal Ministry of Agriculture and Rural Development (FMARD). Each of nearly 40,000 farmers was able to access two 50-kg bags of discounted fertilizer from the private sector. Phone numbers and identification numbers for more than 30,000 farmers were collected, enabling them to participate in the 2013 program using their mobile phones.

three Equatoria states. Each farmer received subsidized vouchers to purchase inputs sufficient for 1 *feddan* (about 1 acre). Three-fourths of the farmers redeemed their vouchers, and a total of 289 mt of fertilizer and 29 mt of hybrid maize seed were distributed. Nearly 3,000 farmers have been linked with agro-dealers in their *payams* (districts) to date. The program is being scaled up to reach at least 8,000 farmers in 2013.

Today, an estimated 1.5 million smallholder farmers in numerous countries have received access to agro-inputs as a result of IFDC-designed voucher and subsidy programs. These programs are geared toward developing competitive markets for inputs.

– Ian Gregory, IFDC Agribusiness Market Development Specialist

IFDC is continuing to work with USAID and FMARD to expand the voucher program to reach more farmers. According to Akinwunmi Adesina, Minister of Agriculture and Rural Development, “The National Council in Nigeria ... has called for the voucher program to be scaled up across the whole country.”

USAID Seeds for Development

South Sudan imports more than 80 percent of its food – but has huge untapped agricultural potential. Funded by USAID and the Howard G. Buffett Foundation, the USAID Seeds for Development project is helping South Sudan successfully introduce agro-inputs (particularly hybrid seed and fertilizer) and promote their proper use to increase agricultural production and productivity. The project is implemented by IFDC and the Alliance for a Green Revolution in Africa (AGRA).

South Sudan’s first-ever distribution of fertilizer was through a subsidized pilot program in July-August 2012 that distributed vouchers to nearly 2,900 farmers in the



◀ (Opposite left): Farmers redeemed vouchers for fertilizer in Afghanistan.

◀ (Opposite right): Farmers (left) provide proof of identification to receive paper vouchers.

▲ Members of the Ngakoyi Farmers Group line up to receive vouchers in South Sudan.



▲ *Dr. Kofi Debrah, USAID WAFFP chief of party, welcomes Sharon Cromer, USAID/West Africa acting mission director, to the podium at the USAID WAFFP launch.*



USAID West Africa Fertilizer Program Launched

USAID's West Africa Fertilizer Program (USAID WAFP) was officially launched on November 15, 2012, in Accra, Ghana. More than 200 people attended the event to learn more about the program and discuss its goals, objectives and timeline. Farmers, agro-dealers and staff of private sector fertilizer companies from across the region mingled with staff members of the Ministries of Agriculture of Ghana, Liberia, Côte d'Ivoire and Senegal. Representatives of the Economic Community of West African States (ECOWAS), AGRA, African Fertilizer and Agribusiness Partnership (AFAP), Permanent Interstate Committee for Drought Control in the Sahel (CILSS), West and Central African Council for Agricultural Research and Development (CORAF), USAID and others spoke at the event.

USAID WAFP seeks to significantly increase food security and reduce poverty and hunger in West Africa. The program will increase the regional availability and use of appropriate and affordable fertilizers through: an increased regional supply and distribution of fertilizers by the private sector; increased knowledge and use

of improved agricultural technologies and methods; improved efficiency of regional market transactions; and an improved enabling environment for fertilizer policy and regulatory framework development.

Implemented by IFDC, this five-year program will have an impact across ECOWAS. Country-specific interventions will target the USAID FTF focus countries of Ghana, Liberia, Mali and Senegal.

In his remarks to attendees, Dr. Kofi Debrah, USAID WAFP chief of party (CoP), stated, "The ECOWAS countries, the United States, IFDC and many others agree that increasing the use of fertilizers is critical to raising agricultural productivity and reducing hunger, poverty and under-nutrition." He commented that the program will help blunt "huge food import bills" (for example, 40 percent of rice consumed in West Africa is imported) and "contribute to the decrease in regional poverty and hunger."

Acting Mission Director of USAID/West Africa, Sharon Cromer stated, "It is with great pride and hope that I speak about the USAID West Africa Fertilizer Program. This program is a true partnership aimed at increasing soil fertility and, therefore, improving the productivity of agriculture in West Africa."

She continued, "USAID has supported the Comprehensive Africa Agriculture Development Programme [CAADP]

throughout Africa. Here in West Africa, we support the implementation of ECOWAP – the regional CAADP investment plan. The USAID West Africa Fertilizer Program is a significant investment by the U.S. government [USG] and forms part of the Presidential Initiative on Global Food Security, which is known as Feed the Future. In line with CAADP, Feed the Future recognizes that increasing agricultural productivity is the best way to reduce poverty and create broad-based economic growth in West Africa.”

Continuing her remarks, Cromer said, “Similar to the multi-sector solutions needed to eradicate hunger, fertilizer requires a multi-sector, broad-based approach. There is consensus regionally on the diverse problems that make fertilizer expensive and hard to access. What is needed to move forward is a commitment to work together – especially the public and private sector – on the complex incremental steps that reduce regulatory, market, trade, transportation, quality and information barriers.”

In conclusion, Cromer stated, “We are fortunate in West Africa to have strong regional institutions such as ECOWAS, CILSS and CORAF. We have confidence in IFDC’s 25-year history of working in Africa on soil fertility. We strongly encourage everyone here to partner together in tangible, action-oriented ways to leverage our joint efforts to improve soil fertility in West Africa.”



Dr. André de Jager, director of IFDC’s North and West Africa Division (NWAFD), said, “A concerted effort in West Africa to increase the availability of appropriate and affordable fertilizers is highly relevant and urgent. However, USAID WAFP can only play an initiating and facilitating role. The majority of activities must be implemented and the results achieved by those involved in the value chain itself and the policymakers who must create an enabling environment for change and improvement.”

De Jager went on to say, “Constraints on agriculture are manifold and, therefore, the use of fertilizers is extremely low, particularly on subsistence crops. Constraints on both the supply-side and the demand-side need to be addressed simultaneously. In the long run, Africa will become a food exporter and the demand for fertilizers will definitely grow, but there is much work to be done!”

He concluded by stating, “I would like to thank USAID for providing IFDC and AFAP the opportunity to take up this important challenge and to work closely with our partners to make an essential contribution to increased food security in West Africa.”

West Africa Fertilizer Stakeholders’ Forum

IFDC and AFAP made a presentation on the West Africa Fertilizer Stakeholders’ Forum (WAFSF) at the 2013 Argus FMB Africa Fertilizer Conference and Exhibition. The conference was held March 13-15 in Dakar, Senegal.

A three-person panel spoke at the WAFSF session of the conference. The first speaker was a representative of the ECOWAS Commissioner for Agriculture and Rural Development. He discussed the “importance of the Forum to regional efforts to increase agricultural productivity.”

Dr. Kofi Debrah, CoP of the USAID West Africa Fertilizer Program, provided an overview of the project and its components including the policy and regulatory environment for fertilizers, market information systems (MIS), promotion of integrated soil fertility management (ISFM) and providing agro-dealers greater access to credit.

“A key goal is the establishment of the West Africa Fertilizer Stakeholders’ Forum, which will include representatives of both the public and private sectors,” Dr. Debrah remarked. “The Forum will bring together manufacturers, importers, distributors, agro-dealers, associations, bankers, representatives of FBOs, policymakers, donors and other public entities. The Forum will provide a consultative, technical and business development platform for stakeholders to develop the commercial fertilizer supply system in West Africa and also act as an incubator for the formation of the West Africa Fertilizer Trade Association.”

Pierre Brunache, Jr., AFAP’s regional director and secretary of the Forum, discussed the purpose of the Forum and Forum-related issues such as providing a platform to develop the commercial fertilizer supply system in West Africa.

A question-and-answer session followed the panel discussion and the views of attendees were collated to help provide a participatory direction and guidance to future forums.





In his remarks, King David Amoah of the Ghana Federation of Agricultural Producers (GFAP) stated, “Members of GFAP and farmers across West Africa want the USAID West Africa Fertilizer Program to succeed. We want greater access to effective fertilizers and seeds. We want to grow more food for our families and for our countries. We want to improve our lives and the lives of others, so we urge all those involved to make this program a success.”

The Chief Director of the Ghana Ministry of Food and Agriculture, Maurice Tanco Abisa-Seidu, concluded the launch program by saying, “The USAID West Africa Fertilizer Program holds great promise for the countries of West Africa. Let us work together to fulfill its objectives. If we do, our region will be stronger and more prosperous!”



- ◀ *(Opposite right): King David Amoah of the Ghana Federation of Agricultural Producers urged all those involved in USAID WAFP to make the program a success.*
- ▶ *Dr. André de Jager addresses the crowd at the official launch of USAID WAFP.*
- ▲ *Leini Lare-Sambiani, representative of the ECOWAS Commissioner for Agriculture and Rural Development, assures those in attendance of ECOWAS support to the project.*

Connecting Liberia's Value Chain Links



sugarcane and vegetables. However, Liberia is one of the poorest and most food-insecure countries in Africa. With only 3 percent of its land utilized for cultivated crops and 2 percent supporting permanent crops such as fruit and nut-bearing trees, opportunities to improve the agricultural section of the economy are enormous.

Liberia also produces cassava, a root vegetable whose tubers and leaves have multiple uses. Cassava can play an important role in rescuing smallholder farm families from hunger and poverty while improving the country's economy. Grown in many areas of Liberia, cassava has numerous advantages and applications. Costs related to its production are low; and it is robust, resilient and able to grow in the poorest soils.

Cassava: Africa's Crop of the Decade (2000-2010)

In addition to Liberia, cassava is cultivated in approximately 40 African countries, stretching through a broad belt from Senegal and Cape Verde in the northwest to Madagascar in the southeast. Approximately 70 percent of Africa's cassava output is harvested in Nigeria, the Congo and Tanzania (IFAD and FAO, 2000). The six countries that currently account for most of the cassava cultivation area are the Congo, Côte d'Ivoire, Ghana, Nigeria, Tanzania and Uganda.

Cassava is the dietary mainstay of 200 million people in SSA. Its starch content is higher than any other tuber or cereal crop, and the starch can be converted to sugars and glucose.

Unmodified and modified starch and glucose are used in the food industry as thickeners, fillers, binders and stabilizers.

Cassava is also a protein-rich staple used as an ingredient in biscuits, pasta, pastries and other food products. Recently, brewing companies have begun using cassava as an alternative or a complement to sorghum, maize and barley in beer. Its roots and leaves are also high in nutrients for farm animal feed. In addition, cassava has numerous industrial applications, including the production of glue, paper cartons, mosquito coils, ethanol, textiles, dry cell batteries and toothpaste. Acknowledging its many uses and its wide area of cultivation, the African Union declared cassava the crop of the decade (2000-2010).

The USAID Liberian Food and Enterprise Development (FED) project includes a short-term technical assistance (STTA) component to recruit and train agro-dealers and develop extension materials to promote ISFM in cultivating cassava. The broader project objectives are to improve nutrition and food security by increasing agricultural productivity and market access and building human capacity.

Endowed with abundant natural resources and a climate favorable to farming, Liberia produces a variety of agricultural products – bananas, cocoa, palm oil, rice,



The FED Challenge: Developing Value Chains

The FED approach to maximizing the financial impact of cassava on smallholder farmers and the general economy entails the development of value chains comprising micro-financing, procurement, production and market links. The STTA has initiated this process by recruiting and educating agro-dealers, trade associations and trainers who, in turn, are transferring knowledge to smallholder farmers. IFDC is also helping farmers and agro-dealers form associations and facilitating connections to credit opportunities and service providers.

The STTA is also facilitating agro-dealer training with a focus on fertilizer handling and use, including ISFM and FDP, particularly of nitrogen-based urea fertilizer; agro-chemical storage, handling and use; and starting and operating agro-input businesses.



ISFM Increases Cassava Production

For all of its advantages, cassava is not a miracle plant. It is subject to diseases and pests, does not grow as well in heavily eroded soils, and like all plants, depletes the soil of nutrients. In fact, many smallholder farmers employ annual cultivation cycles that, over time, can permanently render soil unfit for farming.

Proper fertilization is fundamental to optimal cassava production. The ISFM approach includes combining mineral fertilizers and local organic amendments such as crop residues, compost and green manure. ISFM also addresses the proper use of other agricultural inputs – seeds, CPPs and water. Smallholder farmer adoption of ISFM and other best agricultural practices promises an increasingly positive impact on cassava production in Liberia.

- ◀ *(Opposite): Cassava is a root vegetable grown in many areas of Liberia.*
- ▲ *(Above): Cassava plants are hardy, but do not grow well in heavily eroded soil.*
- ▼ *(Below): The FED project conducts a farmer field school to promote best agricultural practices for growing cassava in Liberia.*



The involvement and active participation of agro-dealers and retailers in training is a positive move toward the creation of a functioning public and private distribution system of quality agro-inputs at the grassroots level. This system will effectively deploy ISFM and UDP technologies for improved crop productivity in Liberia.

– Jean A. Nyemba, IFDC team leader – USAID FED project





Development of Extension Materials

To help smallholder farmers understand and implement ISFM and UDP in cassava cultivation, the STTA staff developed written materials and posters that address:

- Ways to conserve and manage nutrient stock.
- Best erosion control practices.
- Site selection and proper land and seed bed preparation.
- Production of disease-free cassava cuttings.
- Treatment of cassava cuttings before planting.
- Proper planting of cassava.
- Control of diseases and pests common to cassava.

Next Steps

Extension materials must be approved by a sample of smallholder farmers to ensure that messages are well-received and understood. Large posters and written materials then will be printed to support daily work with farmers. In addition, extension workers will be trained on how and when to use the materials to help farmers learn these best agricultural practices to improve productivity.

Market-Friendly Voucher Systems

Over the course of the project (2011-2016), the STTA staff will implement market-friendly voucher systems to transfer purchasing power to smallholder farmers. Vouchers are considered ‘smart subsidies’ because they either reduce the price of inputs below market cost or provide farmers with purchasing liquidity. Farmers redeem the voucher value for inputs through agro-dealers, who in turn receive payment for the redeemed vouchers. As such, voucher systems stimulate demand for inputs such as fertilizer, seeds and CPPs and facilitate a competitive input supply chain.

Funding and Collaboration

FED is implemented by DAI in collaboration with IFDC and other partners, and is funded by USAID’s FTF initiative.

◀ (Opposite): FED encourages agricultural extension support to facilitate the adoption of ISFM and FDP by Liberian farmers in their cropping systems.

▶ (Above): Workers quickly process cassava tubers because of the short shelf life from field to market.

Linking Cotton and Food Security in the Cotton-Four (C-4) Countries



In several countries of West and Central Africa, cotton is widely seen as a strategic crop for poverty reduction, food security and economic development. This drove the development and implementation of the Cotton Sector Initiative at the World Trade Organization in 2003 and is reflected in the USG response to that initiative – a cotton support project launched in 2006 (USAID West Africa Cotton Improvement Program [WACIP]). USAID WACIP targets the countries of Benin, Burkina Faso, Chad and Mali, also known as the Cotton-Four (C-4) countries, with some activities in Senegal as well.

The strategic importance of cotton also permeates these countries’ national strategies for agricultural growth and poverty reduction. Yet the cotton sector in the C-4 countries is small, not only in relation to the global market but increasingly in terms of other agricultural and non-agricultural sectors in the C-4 economies. In 2012, despite

two years of better cotton harvests, the three northern (Sahélien) members of the C-4 required international assistance to save the lives of nearly 20 million food insecure people. While chronic poverty and food insecurity are decreasing, they remain at tragically high levels in the Sahel.

National, regional and donor attention and resources are increasingly trained on acute and chronic food insecurity problems. Pressure is mounting to show that public support of the cotton value chain can deliver a greater impact on poverty reduction, food insecurity and economic growth than rechanneling that support to other agricultural investments.

In that context, the objective of an IFDC study was to identify and analyze the links between cotton and food security in the C-4 countries by: describing the role of the cotton sector in the agricultural economies of these countries; defining the extent to which the cotton sector contributes to economic growth, poverty reduction and food security in these countries; and identifying the investments needed to reinforce that role.



Cotton remains the primary cash crop in the C-4, and for many years was the largest source of export receipts. In recent years, Burkina Faso and Mali have developed their gold industries, while Chad has enjoyed an oil boom. Data from the International Monetary Fund (IMF) show that the importance of cotton as a source of export revenue has been in decline over the last two decades. In 2008-2010, cotton accounted for about 33 percent of the value of total goods exported from Benin, 22 percent from Burkina Faso and 8 percent from Mali. Cotton is so dwarfed by oil in Chad that it has declined to about 2 percent of total export revenues.

As a whole, the cotton sector remains a major employer in the C-4 economies (often the second-largest formal employer after the national governments). Across the four countries, cotton companies employ about 4,000 permanent staff and 8,000 seasonal employees. Although the figures vary considerably from year to year, about 900,000 farm units engage in cotton farming in the C-4 countries, providing employment to the seven to eight million actively farming adults in those units, and providing livelihoods to the 10 to 13 million people (including children and non-farming adults) that comprise these farming units. Cotton also provides employment to workers in the associated agro-input, transportation and transformation industries.



The report was assembled by a number of IFDC staff led by Dr. Sarah Gavian, the former CoP of the USAID WACIP project. The report is based on interviews conducted in 2011 and 2012 in each of the C-4 countries, as well as extensive use of secondary and online data and document archives.

Key Findings

At about 2 percent of world production and exports, the C-4 cotton industry is quite small in international terms. But despite production decreases in recent years, these four countries still account for nearly one-third of Africa's total cotton production.

Within the small economies of the C-4 countries, the cotton sectors are large – but not as large as they once were. A rough analysis of the value of C-4 cotton fiber in terms of world prices suggests that although highly volatile, sales could have surpassed \$1 billion/year during much of the two decades leading up to 2010 (depending on the actual price negotiated by the cotton companies). After several years of decline, cotton's value may have soared to several times that level in the last two years. While the agricultural sector accounts for 30-40 percent of the C-4 economies, cotton's share varies considerably, from a noteworthy share in Burkina Faso (20 percent) and Benin (13 percent) to a minor share in Mali (4 percent) and Chad (1 percent).



- ◀ (Opposite): Cotton farmers participate in IFDC's USAID WACIP project.
- ▲ (Above left): Harvested cotton awaits collection from a rural area in Burkina Faso.
- ▲ (Above right): A cotton farmer in Mali associated with USAID WACIP is happy with her bumper crop.

Cotton is an annual crop, grown on two to five ha in rotation with other food and cash crops. It is only grown in the wetter areas of the Sahelian countries, in the zones that are also the national ‘breadbaskets.’ But rather than competing for agricultural resources, many analysts are convinced that cotton complements production of food crops due to synergies from the agro-inputs and agricultural services the cotton companies provide to cotton farmers. Cereal production is associated positively with growing cotton. Data from Burkina Faso show yields of cereals (maize, millet and sorghum) are 31 percent higher than those in the non-cotton zone. The difference is even more pronounced for maize (54 percent), an increasingly important cash crop in this region.

were available for the IFDC analysis. Poverty and food insecurity are extremely high in these cotton economies. In that sense, producing and exporting cotton has not prevented food insecurity in the C-4 countries. However, the worst poverty and food insecurity are found outside the cotton-growing zones, often influenced by factors not directly related to agricultural production. The cotton zones, with the best agricultural land and access to agro-inputs (in particular, fertilizers), not only produce a crop that earns substantial cash revenue but also produce more than their share of food crops. Despite the low and volatile prices for cotton in recent years, cotton-producing households are less likely to be food insecure than other households. Cotton-producing households also are typically much wealthier than those that do not grow cotton.



These findings suggest that improving food security in the C-4 countries requires sustained, coordinated interventions in the agricultural sectors (which provide both food and incomes for the large number of rural poor, and food for the urban populations). It also requires ongoing attention to the pressing issues of governance and civil insecurity, as well as a host of health and nutritional interventions.

Cotton remains a core pillar of the C-4 agricultural and poverty reduction strategies (albeit more in Burkina Faso and Benin than in Mali and Chad). As noted in nearly all of the agricultural strategies reviewed, cotton is only one of many value chains that must be supported for rapid and broad-based poverty reduction. For cotton to play this role, it must be productively and efficiently farmed and accompanied by public investments. Those investments include supporting the development of cereal markets (particularly maize markets, which are responding to increased local demand) and a more general enabling environment.

Increasing the productivity of all crops can be achieved by providing affordable fertilizers and seeds, financial credit, storage options and other measures to stem post-harvest losses. Often, however, cotton sector strategy and funding streams take place outside the more global agricultural context. There are few concrete attempts to tap into the strengths of the cotton value chain to build the rest of the agricultural economy.

Conclusions

Food insecurity in the C-4 is driven by many factors, particularly the grinding rural poverty springing from the low productivity of all crops. Increasing agricultural productivity requires a blend of public and private sector investments in crop-specific value chains, as well as public sector investments in the enabling environment for all crops.

In the past, the cotton sector made major contributions to C-4 economies, employment, incomes and food supplies.

▲ *Cotton is an annual crop in the C-4 countries, grown in rotation with other food and cash crops.*

One impact of the crisis that hit the C-4 cotton sector in 2004-2005 was a major decrease in the total area planted in cotton from 2006 to 2010. Previously, maize and cotton areas and production had been closely and positively linked. In recent years, that association has weakened as: maize markets have become more important; governments are providing fertilizer subsidies to other crops; and some farmers have turned away from cotton in response to low prices, late payments for their seed cotton and high default rates on the input credits by producer organizations.

The links between cotton and food security are complex and cannot be fully identified by the data and tools that



This role has diminished, yet cotton still has a major role to play in diversifying and professionalizing the agricultural economy. Because so many people in the cotton-producing zones depend on cotton incomes, it remains a priority to direct public funds to measure that increased cotton productivity. The experiences of USAID WACIP suggest there are several ways to use investments in cotton to build a more robust agricultural economy. Crop-specific measures

have shifted from cotton to maize and other crops. As a result, cotton-growing areas and production have diminished, bringing down export revenues and employment.

At the macro level, therefore, the cotton sector is too small and inaccessible to the poorest, most food-insecure populations to have much direct influence on food security. Nevertheless, there is strong evidence that when

Cotton-producing households are less likely to be food insecure than other households. Cotton-producing households also are typically much wealthier than those that do not grow cotton.

include research on and dissemination of new technologies, management practices such as genetically modified seed, targeted fertilizer recommendations and real-time tools for managing credit for agro-inputs at the farmer level. General measures designed to benefit cotton and other crops include investments in research and extension capacity, agricultural credit mechanisms and general market infrastructure such as warehouses, ports and rural roads.

Just as smallholder farmers farm in an integrated system, policymakers should similarly evaluate the costs and benefits of investing public funds in each of the different commodities that make up the system, as well as in the enabling environment that sustains all crops. Agricultural and value chain strategies need to be more transparently debated and aligned.

The initial hypothesis of the IFDC study was that cotton makes a major contribution to food security because it provides smallholder farmers with incomes and key agricultural products and services (such as fertilizers, training, cash liquidity and risk management) that help them increase their food production. Extending the same logic, cotton was postulated to have a significant impact on the agricultural economies of the C-4 countries and, because the agricultural sectors are extremely large in these countries, on their overall economies.

The conclusion is that such links are difficult to establish convincingly at a macro level. First, the cotton sector, while not small, has shrunk considerably in the last five years. Facing low margins and poor sector management, farmers

the cotton sector is thriving, it does indeed generate wealth and food for those able to participate in cotton farming. Cotton areas serve as national breadbaskets and cotton farmers are richer than their non-cotton neighbors. Cereal yields (particularly maize) are considerably higher in the cotton zones (although this is partially due to the superior agro-climatic conditions in those zones). Cotton areas produce more food per capita than non-cotton zones.

Additionally, agricultural and economic planners pay great attention to trends in the cotton sector. The cotton value chain figures in most agricultural strategies and the IMF and other economic-focused organizations often credit or blame the performance of the cotton sector for the performance of the economy as a whole.

The opening of the FAO 2012 report on the *State of Food Insecurity in the World* is a fitting close for the IFDC study. “In order for economic growth to enhance the nutrition of the neediest, the poor must participate in the growth process and its benefits: growth needs to involve and reach the poor; the poor need to use the additional income for improving the quantity and quality of their diets and for improved health and sanitation services; and governments need to use additional public resources for public goods and services to benefit the poor and hungry.”

Smallholder cotton production in West and Central Africa, when managed profitably by farmers and cotton companies, provides opportunities to meet all three of these conditions.



▲ Diana Ware of Century Seeds participates in the trade fair, displaying high-quality seed for grain and vegetable crops.



USAID Seeds for Development Promotes Agro-Inputs

The Agricultural Trade Fair of South Sudan, held in Juba in late November 2012, was not simply the country's largest trade promotion event. It was also a platform to build private sector partnerships – the key to strong, sustainable agricultural growth in the world's newest country. Underscoring the trade fair's importance, it was opened by South Sudan's President, Salva Kiir, and attended by most of the country's federal and state ministers.

The USAID Seeds for Development project, led by IFDC and AGRA, is helping to improve food security in South Sudan by promoting the use of modern farm inputs to increase crop yields, creating a network of agribusiness entrepreneurs and developing the domestic seed industry.

In addition to its participation in the agricultural trade fair, IFDC also implemented a successful voucher program that reached nearly 2,900 farmers in 2012. "This was only the pilot phase," explained Denis Tiren, the project's monitoring and evaluation (M&E) officer. "We aim to more than double that number, reaching 8,000 farmers by March."

The private sector will be critically important to this scaling-up, which is why IFDC's participation in the Juba

trade fair was geared toward encouraging private sector representatives to not only display goods at the fair but also to explore new business opportunities with each other.

The project booth received more than 1,200 visitors – farmers, small- and large-scale agribusinesses, extension staff from government agencies and NGOs and teams from USAID and the World Bank. The booth helped showcase the project's achievements and encouraged more farmers to register for the 2013 voucher program. But more importantly, the trade fair helped bring together a broad array of private sector participants – importers, distributors, small-scale agro-dealers, banks and new investors – to strengthen existing partnerships and create new ones.

The USAID Seeds for Development project facilitated the participation of several agribusinesses: Farm Inputs Care Centre, a Ugandan firm that supplies inputs to South Sudanese distributors; three large-scale seed and fertilizer distributors from across South Sudan; and agro-dealers from Yambio and Morobo counties. IFDC shared registration costs and provided publicity materials (posters and extension booklets), staff allowances and other assistance.

Two of these firms – Farm Inputs Care Centre and Century Seeds – set up maize and sorghum demonstration plots on the trade fair grounds. The plots, visited by

several thousand farmers, showed how yields could be dramatically increased through the use of fertilizer and high-yielding varieties of seeds.

The small-scale agro-dealers planned to sell seeds and fertilizers at the trade fair, but transporting the agro-inputs was prohibitively expensive. IFDC brokered a deal with AIM Global, a large-scale distributor. AIM Global provided agro-inputs on credit from its Juba warehouse, eliminating the retailers' transportation costs; the agro-dealers sold the inputs and shared the profits with AIM Global.

Entrepreneurs certainly appreciate this kind of support, but does it contribute to development of the private sector? Potential investors are often reluctant to enter new markets like South Sudan because of costs, logistical difficulties and a lack of market information. By providing partial support and better information on market potential, investor interest could grow rapidly. For example, in 2011 IFDC provided support to two Kenyan firms, Dryland Seed and Kenya Seeds, so that they could attend the trade fair. In 2012, they returned with no external support and with a larger booth and more goods on display. Clearly, initial support from IFDC helped create new business connections and a better investment climate.



▲ IFDC's James Nyikole (left) hands out educational material to farmers and extension staff. IFDC's booth at the trade fair drew 1,200 visitors – farmers, agribusiness people, government officials, NGO staff as well as donors and policymakers.



Agro-Finance Fair Held in Rusizi, Rwanda

Farmers and Bankers Discuss Access to Finance

Rwanda's Ministry of Agriculture and Animal Resources (MINAGRI), Agri-Hub and a number of partners (including IFDC's CATALIST-2 project) organized a regional Agro-Finance Fair on December 4-5, 2012. More than 250 farmers from Burundi, the Democratic Republic of Congo (DRC) and Rwanda met in Rusizi District, in Rwanda's Western Province (near the DRC and Burundi borders), for the fair. They joined with several financial institutions to discuss the economic challenges faced by farmers and to collaborate on ideas to create greater access to credit for farmers.

Farmers in the Great Lakes Region of Central Africa face three major obstacles regarding their access to financial services: lack of sufficient knowledge about agricultural project management; lack of sufficient collateral to satisfy financial institutions' requirements to extend credit and make loans; and the scarcity of agricultural insurance companies.

To overcome these issues, farmers were advised to adopt the Government of Rwanda's (GoR) land consolidation policy and to participate in FBOs (since banks and micro-finance institutions are generally more willing to make loans to FBOs, which collectively have greater collateral than their individual farmer-members and higher repayment rates).

The inventory credit system, one of the initiatives introduced by IFDC in the region, has been warmly received as a key solution for smallholder farmers' lack of collateral. An inventory credit system allows farmers to access loans while using their harvests as a guarantee for the borrowed funds. Under the system, a farmer's harvest is stored in a warehouse or silo until the loan is repaid. In addition, governmental institutions and development organizations, including IFDC, have committed to continue strengthening farmers' financial literacy so that they can better manage their businesses.

Among other solutions, the GoR and its partners have now established a system of agricultural insurance. The insurance



- ▲ *Agro-dealers and farmers at the Rusizi (Rwanda) Agro-Finance Fair share ideas in a group discussion session. CATALIST-2 sponsored the well-attended event.*

is purchased by farmers, livestock producers and others to protect themselves against either the loss of their crops due to natural disasters, such as hail, drought or floods, or the loss of revenue due to declines in the prices of agricultural commodities. Utilization of these policies in Rwanda has shown positive results. The Government of Burundi is currently reviewing this type of insurance to determine if it should implement such a system.

Agri-Hub of Rwanda promotes farmer entrepreneurship and facilitates exchange between Agri-ProFocus professionals participating in the Agri-Hub, their Rwandan partners and other stakeholders. Agri-ProFocus Rwanda is a growing network of farmer organizations, NGOs, financial and research institutions, private and public sector organizations and international development agencies.

IFDC Launches CATALIST-Uganda



The official launch of the CATALIST-Uganda project to help strengthen Uganda’s agricultural sector was held at the Lake Victoria Hotel in Entebbe on January 31. The Honorable Tress Bucyanayandi, Ugandan Minister of Agriculture, Animal Industry and Fisheries (MAAIF), presided over the event and was joined by a number of other dignitaries and over 100 guests from across Uganda’s agricultural sector.

Drawing lessons from nearly four decades of experience in similar projects across Asia, Latin America and Africa, IFDC will seek to improve agricultural value chains and the livelihoods of smallholder farmers in Uganda. The four-

year project is supported financially by the Netherlands Ministry of Foreign Affairs through its embassy in Uganda. CATALIST-Uganda will focus on creating sustainable commercial smallholder agriculture through improved productivity and market development. IFDC will work with the Government of Uganda, participants in selected crop value chains and other stakeholders to help build Uganda’s potential as a regional foodbasket.

According to David Slane, project CoP, “a convergence of Uganda’s natural endowments and IFDC’s experience in the agro-sector provide the right ingredients for the success of the CATALIST-Uganda project. Involved farmers’ productivity and incomes are expected to increase, and they will be linked to input and output markets through improved value chains.”





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IFDC has worked in the Ugandan agricultural sector for several years. It was involved in professionalizing the nation’s agro-dealers and in seed sector development through the Extending Agro-Dealer Networks project, the Regional Agricultural Input Market Information and Transparency System (AMITSA) and Common Market for Eastern and Southern Africa’s (COMESA) Regional Agricultural Inputs Programme. These projects strengthened the Ugandan input markets and provided a stable foundation for IFDC to build upon.

CATALIST-Uganda will use tested systems to integrate cropping systems around priority commodities – Irish potatoes, cassava, oilseeds (sunflowers and soybeans) and rice – combined with an accelerated agribusiness cluster development approach appropriate for Uganda.

In addition to agricultural intensification, attention will be focused on input market development (both seeds and fertilizer), output (surplus crops) marketing, effective linkages to agribusinesses and improvement of the policy environment.

By the end of the project in 2016, expectations are that 110,000 smallholder farmers will have doubled yields, achieved a 50 percent increase in incomes and produced an annual marketable surplus of 200,000 mt of cereal equivalents. This will help increase rural incomes and trade in Uganda, as well as food security in the region.



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- ▲ 1) Minister of Agriculture, Animal Industry and Fisheries, Tress Bucyanayandi; Acting Ambassador of the Royal Embassy of The Netherlands (EKN), Marielle Geraedts; and First Secretary of the EKN, Henny Gerner, discuss the CATALIST-Uganda project.
- 2) David Slane, CATALIST-Uganda CoP, welcomes a large crowd of guests to the official launch of the project.
- 3) Marielle Geraedts provides information from the Dutch government.
- 4) The Honorable Tress Bucyanayandi presides over the event.
- 5) Launch participants discuss project objectives.
- 6) David Slane; Komayombi Bulegeya, Commissioner of Crop Protection, MAAIF; and Rob Groot, director of ESAFD, discuss the CATALIST-Uganda project.

Fighting Counterfeit CPPs in Uganda



▲ Local labeling is shown for the three brands – Dursban®, Mamba® and Roundup® – used in the pilot program.

As developing world farmers increase their use of agro-inputs (improved seed, fertilizer and CPPs), the volume of falsely labeled, adulterated and even counterfeit inputs for sale in the marketplace grows. Although not systemic by most accounts, this trend has a negative financial impact in a number of African nations.

Estimates by a group of nine eastern and southern African countries suggest that 20-50 percent of all liquid CPPs in their markets are either greatly diluted or wholly counterfeit. In extreme cases, criminals produce packaging that mimics popular products, print counterfeit labels and insert liquids that have few if any of the properties of the products they claim to be.

The Ugandan market is one of the most challenging in terms of illegal, adulterated and counterfeit agro-inputs in general and CPPs in particular. Many global manufacturers have cooperated with local officials to prosecute those involved in such illegal practices. However, these efforts generally have been time-consuming and ineffectual, making legal action an expensive and unproductive course of action. For these reasons, an increasing number of the most advanced agro-inputs are no longer available in many markets. Moreover, many smallholder farmers no longer fully trust the products that remain, and many have ceased using badly needed seeds, fertilizers and pesticides altogether due to this widespread distrust of product viability.

“As with fertilizer, the majority of CPP inspections take place at major ports, but oversight rapidly diminishes as these products move inland,” said Dr. Richard Jones, agribusiness program leader in IFDC’s East and Southern Africa Division (ESAFD). “The agencies responsible for oversight, inspection and enforcement simply lack the knowledge or manpower to effectively enforce

government regulations nationwide – if such government regulations even exist. This shortfall has created an enabling environment for illegal trafficking, but we think we’ve found an innovative way to combat it.”

Testing a Potential Solution

The solution to counterfeiting in Uganda may very well come in the form of specially marked packages (SMPs). The 2012 pilot project, funded by CropLife Africa Middle East and USAID through the Alliances for Commodity Trade in Eastern and Southern Africa (ACTESA), COMESA’s specialized agency, included the participation of the private sector brands Dursban®, Mamba® and Roundup®.

The product security program utilizes special label codes that can be verified by a mobile authentication service utilizing the short message service (SMS) feature of a cellular telephone.

“Each container has a Holospot® polymer security label combined with a barcode and scratch-off label carrying a unique container-specific number,” explained Jones. “A scratch-off coating conceals the numbers until the customer reveals the code and verifies it through the SMS process, receiving a message of authenticity within minutes,” Jones added.

Both SMS messaging and the scratch-off technology are popular in Africa, which gave developers of the pilot confidence that the security system would quickly be adopted





by Ugandan farmers. Organizers obtained security labels for 30,000 one-liter containers of CPPs (10,000 for each brand) in order to quantitatively assess the effectiveness of the program.

Prior to distribution of the specially marked CPPs to agro-dealers, IFDC established a pre-pilot baseline, monitoring the normal sales patterns of 85 agro-dealers during the primary growing season (March through May). The pilot project then was implemented during the secondary growing season (August through November) – a season that averages roughly half the normal CPP consumption of the primary season.



The pilot was supported by a concurrent three-month promotional campaign that included an innovative video screened in villages, radio jingles in several local languages, leaflets and SMS messages to area farmers. IFDC's campaign efforts were supported by a network of community volunteers organized by the Grameen Foundation.

Unexpected Results

Sales tracking during the pilot season confirmed that brands sold with SMPs, referred to by organizers as “Verified Brands,” nearly doubled their market shares. This success was considered even more remarkable because the Verified Brands have a retail price nearly double the price of competing brands that do not have security or authentication features.

“What is truly impressive is that the 20,000 SMPs of Mamba® and Roundup®, which represent an entire year’s sales volume for these brands, were sold out within six weeks of the launch,” said Jones. “Many of the participating dealers were unable to satisfy customer demand.”

It is generally accepted by those involved with the project that the potential market share of SMPs was underestimated.

According to Jones, the Verified Brands concept, supported with a strong promotional campaign, clearly has the potential to achieve a much larger market share gain (or share recovery) if continued for a longer period.

“If smallholder farmers have made the choice to spend hard-earned money to improve their productivity and crop yields, they shouldn’t be punished by counterfeiters for making that decision,” added Jones. “With continued support from the Uganda MoA, the Uganda National Agro-Input Dealers Association, partners and the manufacturing community, we believe the program will continue to be very successful in fulfilling its mandate.”

- ◀ (Opposite bottom): The round CropLife security label prominently features a scratch-off area. At the lower left of the label is the Holospot® security chip. The chip contains various laser-inscribed security features.
- ▲ A typical Ugandan agro-dealership is well stocked during the major cropping season.

AGP-AMDe Serves as a ‘Pillar’ for Agricultural Success in Ethiopia



▲ Farmers review a wheat demonstration plot in Ethiopia.

Ethiopia’s agriculture industry accounts for nearly half of the country’s GDP and 90 percent of the country’s foreign exchange earnings. Fortunately, Ethiopia has excellent resources such as ample land, generous water resources and enough farmers and workers to support the country’s agriculture-based economy. An opportunity exists to increase the marketability of the country’s agricultural products on a large and small scale. As a top-10 producer of many of Africa’s crops (and known specifically for the unique qualities of some of them), Ethiopia’s agricultural environment is one that enables farmers to produce large quantities of quality agricultural products. Even though the country has a comparative advantage in production of crops such as maize, wheat, sesame, honey, coffee and chickpeas, farmers are often not able to take competitive advantage of the market because

of inefficient production and poor marketing techniques. IFDC is working to improve these conditions as a sub-contractor to ACDI/VOCA on the Agricultural Growth Program-Agribusiness and Market Development (AGP-AMDe) Project.

Project implementation began in 2011. AGP-AMDe (pronounced *ahmd*, meaning “pillar of my home” in Amharic, Ethiopia’s primary language) is funded by USAID under the U.S. Government’s FTF initiative. AGP-AMDe is reducing hunger and poverty by helping build agro-input supply and distribution systems and facilitating farmers’ access to and use of agro-inputs. The project is also helping improve the productivity and competitiveness of value chains that offer income opportunities for rural households.

AGP-AMDe targets both farmers and agro-dealers to coordinate activities, ensuring that priorities and objectives are shared to avoid duplication of efforts. The agricultural value chain approach allows participants to work together to create market opportunities and overcome shared obstacles. This market-led approach



builds cooperation among stakeholders with divergent interests, quickens the pace of development and ensures the sustainability of results.

IFDC's responsibilities in the project fall under two of the four 'pillars' of AGP-AMDe – improve the competitiveness of selected value chains and the enabling environment for these value chains. IFDC is conducting an examination of the agro-input sector to provide a roadmap for its development and to guide interventions, ensuring an effective supply response to help mitigate risks at the market level and supporting the development of private sector agribusiness capacity to produce and market seeds.

In 2012, IFDC's AGP-AMDe efforts reached stakeholders in four targeted regions of Ethiopia – Amhara, Oromia, SNNP (Southern Nations, Nationalities and People's) and Tigray. During October-December 2012, IFDC worked with stakeholders in the four regions: promoting the improved availability of high-quality seed with several seed farms and cooperatives; conducting multi-nutrient fertilizer demonstrations; supervising farmer field days on the demonstration plots; and harvesting and collecting data from the plots to share with stakeholders.

IFDC's most effective efforts have been the farmer field days at the demonstration plots. Nearly 1,100 farmers attended the 10 field days conducted in the four regions. Best practices for wheat, maize and sesame cultivation were

featured; these value chain targets rank among the top-10 in Africa. AGP-AMDe also targets chickpeas, coffee and honey value chains. All IFDC projects seek to empower women farmers; AGP-AMDe's field days culminated in a special field day in the Tigray Region for 62 women farmers that focused on the wheat value chain. This field day sought to enhance women's participation, enabling them to view the results from demonstration plots and to share experiences on the use of project technologies.

IFDC's AGP-AMDe activities focus on the reduction of hunger and poverty by improving the competitiveness and enabling environment of the selected value chains and by providing assistance to cooperatives, unions, agro-dealers and traders to help them become effective service providers.

Through 2015, IFDC will continue to contribute to AGP-AMDe's goals by helping federal cooperative units (FCUs) better estimate fertilizer and seed needs and by supporting four selected FCUs in the establishment of fertilizer blending plants to market multi-nutrient fertilizers. Along with this effort, IFDC will continue to educate farmers on effective fertilizer and cultivation processes for targeted value chain crops through field days and demonstration plots. The project will also provide access to and education on agro-inputs and bolster FCUs by improving their capacity to supply and market products in order to make agro-inputs more available and affordable for rural farmers.



▲ *Wheat field in Tigray, Ethiopia. Photo credit: Jenny Nelson, Cornell University.*

NAFAKA Boosts Maize and Rice Value Chains in Tanzania



The five-year Tanzania Staples Value Chain (NAFAKA) project is part of USAID's FTF initiative. ACDI/VOCA is the prime contractor and IFDC serves as a sub-contractor, providing input supply and market development services. NAFKA is working to foster sustainable economic growth to reduce poverty and hunger by improving the competitiveness and productivity of smallholder-based maize and rice value chains. The project is facilitating improved domestic and regional trade and expanding the benefits generated by the growth of the maize and rice sub-sectors. These efforts will increase benefits to women and youth and enhance rural household nutrition by promoting women-focused value chain development and improved diets.

Currently, IFDC's NAFKA activities are focused on the Mvomero and Kilombero districts in Tanzania's Morogoro Region. These areas experienced drought throughout much of the fourth quarter of 2012. Because the drought halted most agricultural field activity, project staff focused on preparing farmers for the coming season, informing them about irrigation management and production techniques and establishing new FBOs.

Agro-Input Value Chain Improvements

IFDC is also working to improve agro-dealer capacity and to increase local production of quality seeds. To increase agro-dealer capacity, IFDC staff members researched best practices for inputs and chemicals for adaptation to the conditions in Tanzania and assessed agro-dealer practices. They also trained agro-dealers in technical and business skills, identified credit and consignment opportunities and facilitated the development of agro-dealer strategy plans. Staff members also established ISFM demonstration plots and selected lead farmers.

Quality inputs were distributed to project farmers by IFDC staff members in a timely manner and issues of input accessibility and prices were clarified. Meetings were held in 14 villages (with 439 farmers) in the Mvomero District to introduce NAFKA and to discuss the use of quality inputs. In October IFDC staff met in Ifakara with 32 agro-dealers to discuss ways to improve input use. Project leaders also met with 14 ACDI/VOCA-approved agro-dealers to discuss their willingness to establish demonstration plots with input supply companies. In December, IFDC developed training modules for agro-dealers who will provide services to the Mvomero and Kilombero demonstration plots.

To increase local production of quality seeds, IFDC's NAFKA staff identified and supported local production farms and associations and assessed their performance in producing quality declared seed (QDS). Quality standards were developed for seed production, processing and storage to train farmers to meet national and international standards. IFDC staff then facilitated linkages between fertilizer suppliers, agro-dealers and association and extension officers.

A collaborative business plan with Tanzania Seed Company International (Tanseed) was finalized. The Tanzanian Official Seed Certification Institute tested samples of the rice cultivar TXD 306 that was harvested from Mvomero and Kilombero for germination and purity. The approved



seed list for maize and rice was developed for 2012-2013, and the request for procurement of rice, maize and sorghum seed was submitted to the Agricultural Seed Agency. Twelve producers of QDS seed for 2012-2013 were identified, and the seeds were procured. Eighteen farmers (including nine women) from Kiteto, Kongwa and Mvomero attended training of trainers (ToT) sessions. These farmers will train other farmers on quality seed production, establishment of demonstration plots and identification of counterfeit inputs, among other farming practices. Also, to promote FDP, 1.0 mt each of 1.8-gram and 2.7-gram urea briquettes were procured, and the initial administrative work to procure an FDP briquette was completed.

Assisting Farmers to Improve Yields

The Uwawakuda Association is an FBO near Dakawa. The association has nearly 1,000 farmer-members (about 42 percent are women). The majority cultivate 2-6 ha of paddy, while about 10 percent practice larger-scale farming on 7-12 ha. To increase the association members' yields, IFDC provided information on improved agricultural practices – particularly irrigation management in rice production. IFDC also helped develop an irrigated rice demonstration plot to show the farmers best practices. Veronica Urio, a member of the Uwawakuda Association, said, “I can see a bright future after receiving financial support and training from the project. While my typical harvests have averaged only 10 bags of rice per hectare, there is every indication that the yield this year will reach 35 bags per hectare.”

Project leaders met in October with Uwawakuda Clean Development Mechanism (CDM) officials and Farm Block leaders to discuss USAID support for the Dakawa Irrigation Scheme. (CDM creates new opportunities for Tanzanian companies and institutions to secure investment through the implementation of well-designed projects that generate carbon credits.)

However, NAFKA has faced several implementation challenges including: lack of credit facilities for agro-input purchases by both farmers and agro-dealers; lack of storage facilities for seed-producing farmers, leading to a loss of viability for many plants; lack of awareness of the benefits of using inputs; lack of a Memorandum of Understanding (MoU) with district extension

officers, which affected collaboration and the sustainability of some activities; and low yields due to drought, diseases and pest infestation.

During the first quarter of 2013, IFDC is focusing on seed production, agro-dealer development and improving irrigated rice production. Project leaders assessed the fields where QDS seed is to be planted and will map it using a global positioning system (GPS). Project leaders continue to collaborate with Tansed and the Agricultural Research Institute, Tanzania, and to follow up on a grant to produce certified rice seeds. Further distribution of information and implementation of FDP training for all maize and rice demonstration plots occurred. Other tasks included: organizing ToT on product knowledge; linking agro-dealers to associations to ensure accessibility to inputs; introducing service providers and agro-dealers to associations and demonstration activities; and developing land preparation plans for the Dakawa model.

- ◀ (Opposite): Maize seed.
- ▼ A Tanzanian agro-dealer displays his shop's inventory.





▶ *Example of a late-season potato yield.*

▶ *(Opposite): Moleen Nand works in the potato demonstration field. She and other graduate students use DSSAT modeling to predict Fiji's potato crop.*



Collaboration: IFDC and the University of the South Pacific

Visiting staff from the University of the South Pacific (USP) – Sumeet Naidu, project coordinator of the Future Climate Leaders Project; Research Fellow Viliamu Iese; and graduate students Joseph Maeke and Moleen Nand – presented a seminar to IFDC staff on “Research, Teaching and Outreach Programs of the University of the South Pacific with Emphasis on Agricultural Food Security Given the Climatic and Environmental Vulnerability of the Pacific Island Countries.” USP, with an enrollment of nearly 15,000, is one of two regional universities in the world. The seminar was held November 16, 2012, at IFDC’s Training Center in Muscle Shoals, Alabama (USA).

The graduate student-scientists are studying “Climate Change and Food Security and Vulnerability Analysis of Food Security Systems in Pacific Communities (Fiji, Solomon Islands, Tonga, Kiribati).” Using Decision Support System for Agrotechnology Transfer (DSSAT) models in their research, the students came to IFDC to work with Principal Scientist Dr. Upendra Singh, one of the co-designers of DSSAT. Singh is evaluating and calibrating the DSSAT Potato Substor model based on observed data from Fiji. The goal is for the DSSAT model to simulate

current and future climate change (maximum temperature, minimum temperature, rain and carbon dioxide) impacts on potato yields. The students are also using DSSAT models for taro, cassava and rice and are studying the impacts of the Commonwealth Scientific and Industrial Research Organization’s Climate Change Projection model. They are interested in running both DSSAT and Agricultural Production Systems sIMulator models for climate change adaptation activities.



Fertilizer Assessment: Increased Amounts Required in Ethiopia



▲ A farmer proudly displays her chickpea harvest. Photo courtesy of the Bill & Melinda Gates Foundation.

According to a recent IFDC assessment, Ethiopia must double its fertilizer use to meet the nation's Growth Transformation Plan (GTP) crop production targets by 2015 – a commitment that is aligned with the broader CAADP goals. However, meeting this target will be difficult. The number and complexity of constraints facing Ethiopia's agriculture sector are many, just as they are in many other African nations. Bottlenecks in procurement, infrastructure and logistics top the list, followed by limited credit and financial services, poor research and extension services, agro-dealer capacity and farmer training.

The IFDC assessment discusses options to bolster investment in research and extension services; strong private sector involvement in product importation, storage and distribution; the establishment of fertilizer blending facilities to increase product diversity; and a voucher program to increase product use, along with other areas of supply chain improvement.

CAADP, the agricultural program of the African Union's New Partnership for Africa's Development (AU-NEPAD), addresses policy and capacity issues across Africa's agriculture sectors. It represents African leaders' collective vision for agriculture, providing a collaborative platform for nations to clearly define agricultural growth goals. Through individual Country Investment Plans (CIPs), 34 countries, including Ethiopia, have committed to raise agricultural expenditures to at least 10 percent of national budgets and target 6 percent annual agricultural growth.

In support of these CAADP efforts, AFAP, a partnership among a number of development institutions (including IFDC), focuses on increasing agriculture market access at the regional and country levels. AFAP fosters private sector participation and investment in national and regional fertilizer value chains.

In order to help meet CAADP targets, IFDC is conducting a series of fertilizer country assessments funded by USAID. The purpose of these assessments is to estimate the fertilizer requirements needed to achieve individual country agricultural growth targets and offer policy options to ensure that these levels of fertilizer use are achieved. These assessments will be used by AFAP to identify constraints to private sector investments in the agriculture sector and to develop strategies to alleviate the constraints.

The research quantifies current use and future fertilizer requirements for up to 12 countries based on their respective CIPs, while also identifying key constraints and opportunities. The most recent report, "Ethiopia Fertilizer Assessment," provides estimates of the level of fertilizer consumption required to meet the targets for crop yield increases in Ethiopia's GTP. In addition to these estimates, the study analyzes the challenges in the fertilizer value chain and offers policy options that will support the achievement of these consumption levels.



The assessment was written by Dr. Peter Heffernan, chief program officer, Dr. Porfirio Fuentes, senior scientist-economics and trade, and Dr. Joshua Ariga, scientist-economics. The study estimates that Ethiopia must increase its consumption to nearly 1.2 mmt of fertilizer products (in the form of urea, diammonium phosphate [DAP] and muriate of potash [MOP]) to meet the GTP targets.

In addition to the fertilizer estimates, the report identifies specific constraints in achieving the nation's fertilizer market investment goals and offers options to increase market efficiency. "Achieving this level of fertilizer use requires addressing existing constraints and improving the value chains so that larger volumes of product can be handled without significant problems," states the report.

"Despite increased fertilizer consumption due to Government of Ethiopia efforts over the last decade,

Ethiopia still faces food shortages and high food prices. According to the report, although intensification continues to be necessary for increased agricultural productivity in the face of land scarcity and low production, it is important to address these problems by establishing an approach that ensures smallholders have access to the right technologies in the form that is appropriate to their local conditions and is accompanied with the right information. A judicious mix of private and public investments with consistently applied legal and regulatory guidelines can contribute to the successful development of input markets in Ethiopia."

The Ethiopia assessment is the fifth in the series. Fertilizer country assessments of Ghana, Kenya, Mozambique and Tanzania were previously conducted by IFDC.



▲ The Port of Djibouti, in the neighboring country of the same name, serves as Ethiopia's primary fertilizer import hub.

Achieving this level of fertilizer use requires addressing existing constraints and improving the value chains so that larger volumes of product can be handled without significant issues.

Composting: An Affordable Source of Plant Nutrients in Africa



▲ Participants gather information at a composting demonstration plot.

IFDC's international workshop "Promoting Affordable Sources of Plant Nutrients in Africa Through Innovative Composting Alternatives" was held in Accra, Ghana, November 26-30, 2012. Twenty-six participants (21 men, five women) from 12 countries attended. Forty-two percent of the participants were from research centers or universities, 27 percent were public officials, 26 percent represented international organizations and 5 percent were from the private sector. Speakers from Soil & More International, Biogas Engineering Ltd. and the University of Cape Coast contributed to the workshop's success.

Africa has the most depleted soils in the world, with the annual nutrient loss from the continent's soil estimated at more than \$4 billion. There is a critical need to

reverse the trend of soil nutrient depletion, meet the food requirements of the growing population and protect the environment for future generations.

The *Abuja Declaration on Fertilizer for an African Green Revolution*, a product of the 2006 Africa Fertilizer Summit, states that "fertilizer, from both inorganic and organic sources, is a strategic commodity without borders." This statement has gained political momentum and brought attention to the issue of soil nutrient depletion, but fertilizer affordability remains a key constraint to intensification in SSA. The use of fertilizer from organic sources is promoted as a complement to inorganic fertilizers, recognizing that in the short-term, organic fertilizers will continue to be a main source of crop nutrients in SSA. However, organic fertilizers alone cannot provide the yield increases needed to achieve food security in Africa.



More recently, pilot programs in Burkina Faso, Ethiopia, Ghana and Nigeria have shown that the productive use of municipal and human waste to generate fertilizer offers an important and affordable source of plant nutrients to improve soil fertility, crop yields and food security in Africa. The pilot programs have also shown that these processes can be operated in a sanitary manner that is safe for humans and animals.

The objectives of this five-day training program were to:

- Improve participants' capabilities to overcome constraints that hamper waste recycling.
- Impart recycling strategies that contribute to ensuring sustainable agricultural productivity and improved sanitation in rapidly growing rural, urban and peri-urban environments.
- Increase participants' knowledge of the principles and methodologies of solid waste and fecal sludge collection, storage and handling to ensure efficiency.
- Update participants on the development of innovative composting technologies to enhance the effectiveness, aesthetics and applicability of the composted material to increase acceptability among smallholder farmers.
- Increase participants' knowledge about: (1) proper handling of composted organic fertilizer to eliminate any risks associated with their use; (2) the calculation of optimal application rates; and (3) long-term benefits of their use on soil health.
- Identify sound policy options for promoting municipal and human waste fertilizer use and supply in Africa.



The workshop included field trips to the Biotechnology and Nuclear Agriculture Research Institute; Accra Compost and Recycling Plant Ltd.; and Safi Sana Foundation. The foundation develops scalable, local business models to produce and market renewable energy and organic fertilizer while providing quality sanitation and clean water services to communities in sub-tropical areas. The field visits complemented the training program by linking examples of direct application to the theoretical lectures.

Overall, the workshop was very successful, with 92 percent of participants rating the training "very good" to "excellent," citing the value of field trip visits and the quality of discussions and presentations.



- ▲ IFDC's Brian Kiger gives a thumbs-up regarding the tour of an industrial composting facility.
- ◀ Twenty-six participants from 12 countries attended IFDC's composting workshop in Ghana.

IFDC Conducts Granular Fertilizers Production Workshop



▲ Twenty-seven countries are represented by the 77 participants attending the international workshop in Bangkok.

IFDC conducted the “Granular Fertilizers Production” international workshop in Bangkok, Thailand, November 12-16, 2012. This workshop was the fourth of its type to be conducted by IFDC (repeated because of popular demand). The training program attracted 77 participants from 27 countries and 43 fertilizer manufacturing facilities.

The production of homogeneous granular fertilizers often involves complex manufacturing processes. There are many variables involved in the granulation process, particularly the large number of raw materials and combinations that are routinely processed in a single plant, including nitrogen/phosphorus/potassium blends (NPKs). Additionally, variations in climatic conditions, equipment design configurations and operator skills also affect the production process and product quality.

Because granular fertilizers play an important role in fertilizer supplies worldwide, this workshop was organized to facilitate a better understanding of the technology and methods used for their production. Specialized plant engineering and manufacturing criteria required to produce high-quality granular fertilizers were examined.

The workshop provided an overview on the fundamentals of granulation and the alternatives for producing granular fertilizers. Participants were introduced to various processes and equipment used in producing granular

fertilizers and the unique problems encountered during production. Discussion included appropriate methods for storing and handling raw materials and granulated, compacted and blended NPK fertilizers.

Participants visited Terragro Fertilizer Company, Ltd., an NPK producer, and Rungist Agri-Economic Ltd., an organic-based fertilizer producer.

The next granular fertilizers production workshop is expected to be held in 2014.

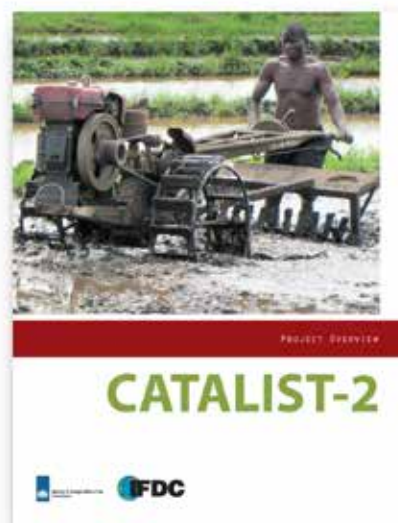
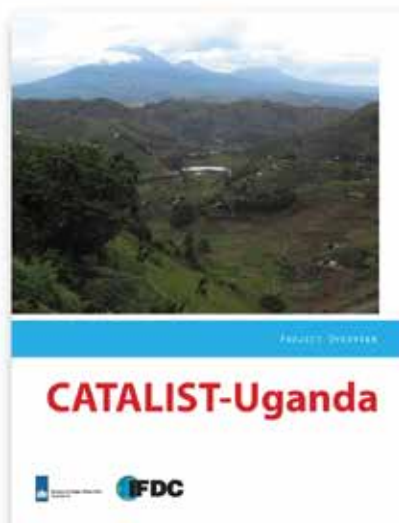
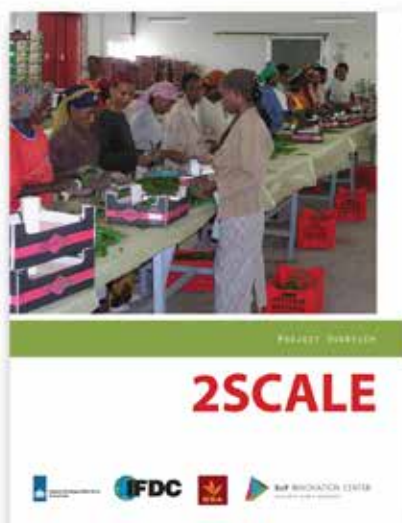
“This excellent program provided so much information that can be applied in my plant [Thai Central Chemical Public Co. Ltd.]. I really appreciate the hard work of IFDC’s staff in making this program successful and effective,” said Totsapon Wichitthammarot of Thailand.

Eustace Muriuki of Mea Ltd., Kenya, commented, “This workshop was an excellent forum where plant operators could meet to exchange ideas on various challenges experienced and solutions provided either by fellow participants or the IFDC team. It was truly a well-planned workshop.”

“IFDC covered almost all of the fertilizer industry’s latest technologies. The instructors did an excellent job,” said Khalid Khan Niazi, Fauji Fertilizer Bin Qasim, Ltd., Pakistan.



New Brochures Showcase IFDC Activities



▲ Samples of new project brochures.

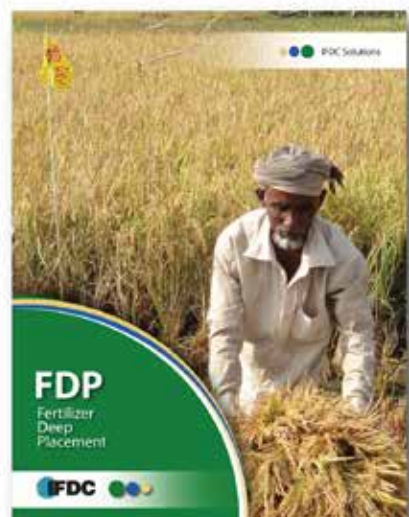
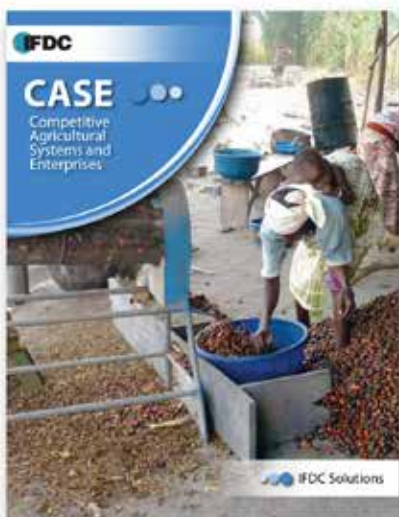
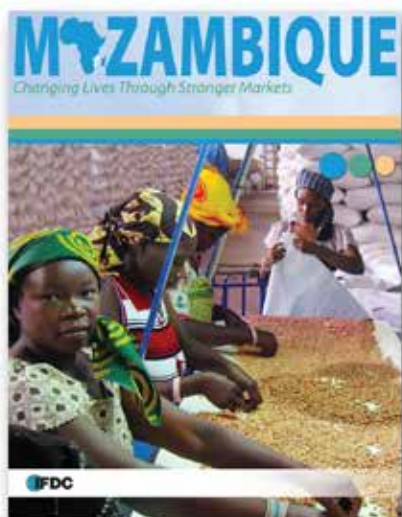
▼ Below (left to right) are: the Mozambique country brochure, the CASE solutions brochure and the FDP solutions brochure.

During 2012, IFDC began developing several brochure series designed to better communicate the Center's increasing activities. The brochures focus on specific countries in which IFDC is working, current projects and the particular expertise employed on a tactical level to accomplish projects' stated goals. The purpose of the brochures is to better inform IFDC partners

and international, regional and national stakeholders of the cumulative impact that the Center's projects are having on agricultural value chain development – from increased farmer yields and incomes to PPPs and policy advocacy.

IFDC project brochures, which are produced at the beginning of new IFDC projects, provide an overview of project goals and objectives and brief descriptions of the activities

planned to accomplish those goals. IFDC country brochures highlight key information about specific countries in which IFDC is working and the multiple IFDC projects taking place in them. *IFDC Solutions* brochures offer details into the often-proprietary tools and technologies utilized in IFDC's projects, such as FDP, ISFM, agribusiness cluster development and Competitive Agricultural Systems and Enterprises (CASE). The brochures also include case studies and success stories that bring a human-value perspective to the IFDC efforts.





World Soil Day was designated to recognize the importance of soil in sustaining plant life and its contribution to the well-being of humanity. In 2002, the International Union of Soil Sciences (IUSS) proposed World Soil Day to raise awareness of the importance of proper soil management. World Soil Day is celebrated each year on December 5th in honor of the birthday of Thailand’s King, His Majesty Bhumibol Adulyadej, who officially sanctioned the event and promotes soil science and soil resource conservation. It is primarily celebrated by 60,000 soil scientists who have the responsibility to develop and communicate soil knowledge. However, the goal is to encourage all nations to celebrate the benefits of healthy soil.

For Africa, World Soil Day is a day not only to celebrate soil but also to teach farmers about proper soil management. Soil impacts the quality and quantity of food, as well as the amount of water and energy used to produce that food. It even influences climate change by releasing carbon into the atmosphere. Next to oceans, soil contains the second largest carbon pool. Carbon is a factor in global warming, which may affect climate change.

Despite its importance, soil is often overlooked, leading to improper management of soil fertility, which then causes soil degradation. Soil degradation occurs when farmers use the land cropping season after cropping season without replacing soil nutrients that are absorbed by the crops. This ‘nutrient mining’ strips the soil of the nutrients needed by plants to grow to their full potential.

In its December newsletter, the Africa Soil Health Consortium (ASHC) described 15 ‘wishes’ that leading soil health scholars hope will come true for Africa’s soils. Several of these wishes are outlined in the following paragraphs and include research methods, fertilizer distribution, nitrogen-fixing crops and social change.

Researchers are discovering new ways to improve soil health. However, improvements in soil quality start with better understanding of farmers’ needs. Researchers must include farmers in the research process. For research to be beneficial, the research conclusions must be easier for farmers to implement as part of their farming practices. Improvement can never happen if the ones who need the information cannot understand it and use it.

Also, African governments should make additional investments in agricultural research and development to increase the technology and information that their farmers need to increase agricultural production and improve soil health.



Fertilizer usage rates in SSA are lower than anywhere else in the world. Among the issues that impact fertilizer usage in SSA are: fertilizer is too expensive for many smallholder farmers, even as the distance that fertilizer must be transported from ports causes distribution chains to be vulnerable to diversion and theft; agro-dealers who sell fertilizers are often located too far from the farmers that need the fertilizers; governments institute subsidies; and some farmers never receive the fertilizer they need.

Poor soils can be improved through a variety of methods. IFDC, ASHC and many other organizations promote ISFM. ISFM is broadly defined as the judicious use of chemical fertilizers and local organic amendments such as crop residues, manure, compost and cover crops (such as legumes, which increase the amount of nitrogen in soil through natural biological processes). Water management and conservation agriculture are also part of ISFM.

Another way to improve soil health is through social change. Teaching young people that farming can be rewarding and important for life ensures the future of agriculture worldwide. To ensure farmland stability and soil management, gender

should be codified in laws and/or regulations (for example, a woman's right to own land). Women's insecurity about land tenure and dependence on men has led to lower production levels and poor soil management.

World Soil Day 2012 was commemorated in several unique ways. Germany introduced *Plaggic Anthrosol (Plaggenesch)* as the 2013 Soil of the Year. The Department of Soil Science at Bangladesh Agricultural University held a seminar on "Soil Degradation in Bangladesh." Dubai's International Center for Biosaline Agriculture, along with Global Soil Partnerships, celebrated World Soil Day for the first time.

FAO endorsed the request made by the IUSS to declare December 5th UN World Soil Day. To show its support regarding the importance of soil, FAO held a conference entitled "Securing healthy soils for a food secure world: a day dedicated to soils" at FAO headquarters in Rome, Italy. A resolution, which will be submitted to the UN General Assembly in September to designate World Soil Day as a UN-recognized day, was discussed and will be approved before submission to the UN.

IFDC Expands Video Interview Series

In an ongoing effort to educate and inform through multi-media platforms, IFDC is posting a series of video interviews with industry experts on its website (www.ifdc.org). The videos are seven to 25 minutes in length and cover topics related to international agricultural development of special interest to each expert.



Margaret Catley-Carlson, patron and former chairperson for the Global Water Partnership (GWP) and member of the IFDC board of directors. (25 minutes)



Charlotte Hebebrand, director general of the International Fertilizer Industry Association (IFA) and former chief executive of the International Food and Agricultural Trade Policy Council. (Nine minutes)



Luc Maene, former IFA director general, former member of the IFDC board of directors and current member of the VFRC board of advisors. (Eight minutes)



H.E. Rhoda Peace Tumusiime, African Union commissioner of Rural Economy and Agriculture and member of the IFDC board of directors. (Seven minutes)

Upcoming video interviews will include IFDC division leaders, government officials from various nations, public and private industry leaders and more. The current interviews are available to the public by accessing the IFDC website at <http://bit.ly/12mRaut>.

IFDC Recognizes World Water Day and 2013 as the UN International Year of Water Cooperation

As part of the UN Decade for Action “Water for Life” 2005-2015, the UN General Assembly has declared 2013 the United Nations International Year of Water Cooperation (UNIYWC). During each year of the decade, UN-Water pairs with other environmental and humanitarian organizations to raise awareness about the international condition, conservation and management of freshwater and its resources.

According to the website, UN-Water is working with the United Nations Educational, Scientific and Cultural Organization (UNESCO) in a collaborative effort to “highlight the history of successful water cooperation initiatives, as well as identify key issues on water education, water diplomacy, transboundary water management, financing cooperation, national/international legal frameworks” and on the need to develop “water resources that are truly sustainable.”

One of the most important aspects of IFDC’s work in helping to create food security in developing nations is ensuring that the agricultural and economic systems the organization helps to establish are sustainable. IFDC recognizes that when the water in any area is compromised, the people, environment, agriculture and economy are compromised as well. IFDC has employed technologies such as FDP and alternate wetting and drying (AWD) in Bangladesh and on the African continent, as well as drip irrigation systems in Afghanistan and Africa. The Center plays an active role in responsible water management by providing efficient, sustainable alternatives to traditional farming while increasing farmers’ yields.

In Bangladesh, where 96 percent of freshwater is used in agriculture, and where 34 mmt of lowland (paddy) rice was harvested in 2009, IFDC’s implementation of FDP and AWD has been crucial to water conservation. Traditionally, farmers will flood their irrigated rice fields once per season. According to a report by the Chicago Council on Global Affairs, farmers then spread fertilizer “directly into the floodwater of lowland rice, a practice that wastes two out of every three bags of urea and pollutes surface water with



▲ (Above and opposite): Drip irrigation systems, implemented by IFDC, are shown in Afghanistan and Nigeria.

runoff.” The FDP method improves yields and reduces pollution because farmers insert fertilizer briquettes directly into the rice root system, which effectively reduces fertilizer use by as much as 40 percent and increases crop yields by approximately 15 to 20 percent.

Coupling FDP with AWD has decreased greenhouse gases, fertilizer runoff into the water system and water usage while increasing farmers’ yields. Water is already scarce during *Boro* season, and the ongoing depletion of groundwater is causing an increase in pumping and irrigation costs. Rather than flooding an entire rice field with an excessive amount of water once, AWD involves flooding the field with a smaller amount of irrigation water on a certain number of days when pond water is not available. The process not only saves water (and money for the farmer), it also results in higher crop productivity, enhanced nutrient efficiency and lower levels of water pollution.

“Unfortunately, agriculture is one of the single biggest polluters of water,” said Margaret Catley-Carlson in a recent interview. Catley-Carlson is a member of the IFDC board of



directors and serves as a patron of the GWP. “People think industry is the biggest polluter. It isn’t; it is agriculture.”

In a 2012 interview for an IFDC video (see page 65), Catley-Carlson said that AWD can decrease the amount of water used by 38 percent. “[Global and water resources] must be part of how IFDC looks at the world to understand the implications for water use of any new agricultural technique ... It also should be part of what IFDC does in the future – to start introducing the kind of projects that now also focus on water use.”

Using water more efficiently and precisely through drip irrigation systems was a focus of IFDC’s work in Afghanistan. In 2009, USAID’s Afghanistan Water, Agriculture and Technology Transfer (AWATT) program was implemented by New Mexico State University (NMSU). According to the project’s final report, one of AWATT’s goals was to demonstrate “resource-conserving technologies” to farmers that would also “enable farmers to improve yields.” NMSU awarded IFDC a two-year subcontract to help design and demonstrate the new technologies. Due to limited funds, the work was confined to one year. Nonetheless, “IFDC designed and installed 20 demonstrations in six targeted provinces.”

The Chapin quarter-acre drip irrigation kit was first introduced in Afghanistan by IFDC. Drip irrigation controls water use by gradually applying only the amount of water

the plant needs rather than using traditional flood and furrow techniques. In addition to drip irrigation, fertigation (fertilizer dissolved in water and then applied to the soil through drip irrigation) and plastic mulch (which helps contain moisture underneath the plastic and impedes weed growth) proved to be highly effective in arid regions of Afghanistan. The three technologies conserved water while greatly increasing crop yields.

On March 22, UN-Water and UNESCO will hold worldwide celebrations for World Water Day (WWD) – the culmination of awareness for the International Year of Water Cooperation. According to Catley-Carlson, the UNIWYC is mostly symbolic. Change and awareness will really begin when people and organizations make things happen. “Celebratory ‘years’ are what you make of them,” she said. “Designating 2013 as the International Year of Water Cooperation doesn’t make anything happen. It is people around the world who want to work in these areas, who go out and help to change the behavior of others – that’s when things happen.”

And while IFDC is implementing water-conserving practices and technologies, Catley-Carlson pushes for more. “This would be a great year to start talking about decreasing fertilizer runoff,” she said. “Certainly rivers cross boundaries, so UNIWYC’s theme is very real. You can’t generate change unless you create collaboration.”



Margaret Catley-Carlson Promotes Water Management



and Sanitation and as vice chair on the board of directors of the Canadian Water Network. To date, she has served in over two dozen organizations that focus on global policy, science, finance, social development and agriculture. She served as deputy director general of UNICEF, president of the Canadian International Development Agency and the Population Council. She has also served as chair of the Crop Diversity Trust and the Fertilizer Development Council, as well as the board of directors of the International Center for Agricultural Research in the Dry Areas and several other organizations.

Her greatest interest and involvement, however, is in water security and management. Catley-Carlson served as chair of the GWP, Global Agenda Council on Water Security for the World Economic Forum and the Water Supply and Sanitation Collaborative Council. She has also been a member of the International Water Academy.

Catley-Carlson will be involved with World Water Week (WWW) held annually in Stockholm, Sweden. Included in the UNIYWC (see previous article), WWW will highlight the importance of trans boundary, cross-cultural partnerships and collaborations.

Margaret Catley-Carlson has over 30 years of experience in global development issues and she has been a member of the IFDC board of directors since 2006. She is currently a patron of the GWP, an organization focused on sustainable development and management of water resources to establish better water security.

Catley-Carlson also currently serves as a member of the UN Secretary-General's advisory board on Water

Because of the collaborative, cooperative theme of the UNIYWC, Catley-Carlson suggests now is the best time for IFDC to begin discussing reducing water-borne fertilizer pollution and collaborating more with local cultures (and particularly within the cultures) for sustainable water conservation and management.

In a September 2012 interview, she stated that recycling wastewater is in IFDC's future. "I think



wastewater has an enormous future as a source of the nutrients that plants need,” she said. “I think the VFRC is going to be doing very exciting work to determine how we can safely extract otherwise wasted nutrients from excreta and wastewater flows – whether from animals or humans.”

decide the priorities. The best thing IFDC can do is continue to expand its work with women. In virtually all traditional societies, women may not hold the power, but they hold the keys to power.”

To watch a video of the interview from September 2012, visit <http://bit.ly/12mRaut>.

“The best thing IFDC can do is continue to expand its work with women. In virtually all traditional societies, women may not hold the power, but they hold the keys to power.”

– Margaret Catley-Carlson

In a more recent interview discussing IFDC’s activities, she said, “We really stand at a hugely important place in the lexicon of water issues and water quality. One, we can ‘change’ the water that is used in farming from fresh water to ‘gray water’ (treated wastewater). Two, we can really accelerate the work so that we include the organic fertilizer found in ‘black water’ (untreated wastewater) and turn all wastewater into a valuable resource.”

However, “IFDC’s technological capabilities to alleviate some of the problems caused by polluted water is a slice of the solution, but it’s only a slice,” Catley-Carlson said. “The situations (in developing nations) are usually so much more complex than they seem ... Water, in particular, primarily affects women. When you’re looking at water, you often have to look at the situation of women in the community.”

In many developing nations, the burdens of water – finding it, transporting it, cooking and cleaning with it – belong to women. Additionally, women are often oppressed and considered inferior to men. Catley-Carlson said, “bringing water to the communities is quite a low priority because men

- ◀ *(Opposite): Margaret Catley-Carlson.*
- ▶ *An Ethiopian woman carries water while also caring for her child.*



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:



Margaret Catley-Carlson has been a member of the IFDC board of directors since 2006. She chairs the Budget Committee

and is a member of the Executive and Audit committees. She is a patron of the GWP and member of the United Nations Secretary-General's Advisory Board on Water and Sanitation. In August 2012, Catley-Carlson delivered a lecture on "The Future of Water" during World Water Week in Stockholm. Also in 2012 she was awarded the Queen Elizabeth II Diamond Jubilee Medal, a commemorative medal created in 2011 to mark the 60th anniversary of the ascension to the throne of Queen Elizabeth II. The Canadian medal, which is to honor significant contributions and achievements by Canadians, will be awarded to 60,000 citizens and permanent residents of Canada who made a significant contribution to their fellow countrymen, their communities or Canada over the previous 60 years.



Dr. Jimmy Cheek serves on the Nomination Committee of the IFDC board of directors, and is the chairman of the VFRC board

of advisors. Cheek is the chancellor of the University of Tennessee, Knoxville, a top public research university. He also serves on the board of directors of the Association of Public and Land-Grant Universities (APLU), the nation's oldest, and one of its leading higher education associations. He was appointed chairman of APLU's Commission on Food, Environment and Renewable Resources and is a member of its Energy Forum. During the 2012 Public and Land-Grant University Conference on "Energy Challenges: The next 50

years," Cheek served as a panelist for the discussion "What is the role of the university in meeting the nation and world's energy challenges?"



Gerard 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. He is also a member of 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. In 2012, Doornbos was appointed vice-president of the Association of Water Boards (Netherlands). During World Water Week in Stockholm last August, Doornbos chaired "The Malin Falkenmark Seminar: How to Manage Impacts of Agricultural Land Use Changes with Respect to Sustainable Drinking Water Resources."



Dr. Josué Dioné was elected to the IFDC board of directors in 2011 and serves on its Africa Committee. He is director

of Food Security and Sustainable Development at the United Nations Economic Commission for Africa (UNECA). He delivered the welcome address for the "Workshop of the Lead Coordinators of the African Group of Negotiators on Climate Change" that took place August 13-17, 2012, in Addis Ababa, Ethiopia. Dioné also served as moderator for the discussion "Regional cooperation for coordinated food and agricultural value chain development in Africa" at the "Making the Connection: Value Chains for Transforming Smallholder Agriculture" conference presented by the Technical Centre for Agricultural and Rural Cooperation (CTA).



Rhoda Peace Tumusiime is Commissioner for Rural Economy and Agriculture with the African Union Commission (AUC). She

joined the IFDC board of directors in 2010 and serves on the board's Africa and Budget committees. On January 15, 2013, Tumusiime and Dr. Frank Rijsberman, chief executive officer of the Consortium of International Agricultural Research Centers (CGIAR Consortium), signed an MoU on behalf of the two organizations.



Dr. Vo-Tong 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. For the Vietnam Food Security Forum held in September of last year, Xuan was a panelist in the discussion "Challenges on Vietnam Food Security and Safety." Over the past several months, Xuan has been active in gathering support for the Vietnam Ministry of Agriculture and Rural Development's large-scale cultivation project in the Mekong and Red River deltas to improve the quality of the country's rice products.



IFDC Staff News

Patrice Annequin, NWAFFD senior market information specialist, participated in a panel on “Market Information Systems And Value Chains: Towards Strengthened Public Private Partnerships” during the “Making the Connection: Value Chains for Transforming Smallholder Agriculture” Conference led by CTA. Held in Addis Ababa, the conference enabled participants to share ideas, knowledge, new approaches and best practices to strengthen the efficiency and profitability of existing commercial value chains and to promote value chain development for smallholder communities. Other IFDC representatives attending included **Susan van Keulen-Cantella**, NWAFFD agribusiness program leader; **Dr. Oumou Camara**, senior scientist – economics and country representative in Ethiopia; **Abass Karim Nyo**, deputy project manager of the Linking Farmers to Markets project; and **Noel Ujeneza**, ESAFD regional value chain advisor.

Edward Baars, 2SCALE regional agribusiness coordinator, and **Beatrice Obara**, 2SCALE access to finance specialist, attended the eighth annual Business Development Services Conference in Mombasa, Kenya, in December 2012. The conference theme was “Private Sector-Driven Value Chain Development.” Conference objectives were to enhance the capacity of value chain stakeholders to manage and coordinate market development programs and to increase the number of experts knowledgeable in value chain analysis and promotion. Baars participated in a panel discussion and gave a presentation on 2SCALE, focusing on the development of competitive rural agricultural systems, viable agro-enterprises and the use of PPPs in nine African countries.

Clyde Beaver, IFDC communications specialist, participated in the 2013 IFA Communications Workshop in Paris. The January event brought together fertilizer industry communications and public relations experts to develop common strategies and messages to be employed by members of the IFA global communicators’ network.

Dr. Oumou Camara, senior scientist – economics and country representative in Ethiopia, wrote the article “Towards the Achievement of an African Green Revolution: Key Accomplishments Since the 2006 Africa Fertilizer Summit,” which was published in Issue 05 of *AU Echo*. Camara is seconded to the AUC Agriculture and Food Security Division’s Department of Rural Economy and Agriculture.

In November 2012, **Dr. André de Jager**, director of NWAFFD, attended the International Supply Management Congress in Amsterdam, The Netherlands. He participated in “Implementing Inclusive Innovation: How to Develop a Successful Base-of-the-Pyramid Venture,” a workshop that focused on new business concepts that can impact low-income groups. Attendees explored how to create value in every link of the supply chain and addressed issues such as scarcity, sustainable growth and global welfare.

Martin Drevon, chief of party of the USAID Privatization of Rwanda’s Fertilizer Import and Distribution System (PReFER) project, attended the Agribusiness Forum 2012 in Dakar, Senegal. Drevon gave a presentation on PReFER, which is assisting the Rwandan government to transition away from its previous policy of nationalized fertilizer procurement and distribution. The meeting focused on strengthening Africa’s agro-food sector by encouraging partnerships, exchanging best practices and attracting investments.

In December 2012, **Dr. Peter Heffernan**, chief program officer, and **Dr. Maria Wanzala**, senior policy economist, participated in a seminar organized by USAID on “Policy Options to Enable Fertilizer Industry Growth” in Washington, D.C. Participants introduced and discussed a policy brief that informs policymakers and donors about the conditions necessary to enable a dynamic fertilizer industry that meets farmers’ needs and fosters growth in the agricultural sector. Wanzala also participated in the 13th United Nations-Africa Regional Coordination Mechanism for Africa in Addis Ababa. Meeting participants discussed the post-2015 development agenda for Africa.

In January 2013, **Dr. Richard Jones**, ESAFD agribusiness program leader, attended the McKnight Foundation Collaborative Crop Research Program (CCRP) Annual Leadership Meeting in Faro, Portugal. Jones chairs the CCRP Advisory Committee and has been a committee member since 2001. CCRP is a competitive grants program that seeks to increase food security for resource-poor people in developing countries. Its vision is to contribute to a world where all have access to sustainably produced nutritious food.

In January, **Dr. Amit Roy**, IFDC president and CEO, spoke at *The Economist* conference “Feeding the World 2013: Accelerating Global Collaboration on Food Security.” Industry leaders, government officials, donors, aid agencies and members of the research community

gathered in Amsterdam to discuss how to improve nutrition and sustainable agricultural markets. Roy participated in an interactive workshop on “The Enabling Role of Science and Technology” in which panelists discussed the effectiveness and potential of a number of approaches to boost yields and productivity through breeding and biotechnology.



Roy also participated in the Annual General Assembly of the Global Donor Platform for Rural Development in The Hague, The Netherlands. The Platform is a network of 34 bilateral and multilateral donors, international financing institutions, intergovernmental organizations and development agencies. Members share a common vision that agriculture and rural development are central to poverty reduction and a conviction that sustainable and efficient development requires a coordinated global approach. The meeting was hosted by the Ministry of Foreign Affairs and focused on “Food, Farmers and Markets.”

In addition, Roy attended the Pacific Islands Climate Services Forum in Suva, Fiji, hosted by the Pacific Centre for Environment and Sustainable Development and the Pacific Climate Information System. The Forum raised awareness of currently available data, products and tools that assist community-based climate adaptation strategies.

ESAFD natural resources program leader **Dr. John Wendt** presented “Beyond ISFM: A market-driven approach to profitable, sustainable farming,” at the “Integrated Soil Fertility Management in Africa: From Microbes to Markets” Conference, held October 22-26 in Nairobi, Kenya. Wendt discussed applying ISFM in the context of Commercialized and Sustainable Farming Systems, which emphasizes developing sustainable farming systems based on the costs and benefits of both ISFM and non-ISFM interventions, while controlling investment risks.

Wendt also wrote “Potash Fertilizers in Africa: Background, Assessments and Prospects,” which was published in the November 2012 *Journal of the International Potash Institute*.



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2013 International Training Calendar

Training Program/Workshop/Study Tour	Dates	Location	Program Fee
1. Developing Private Sector Agro-Input Markets: Designing and Implementing Targeted Input Subsidies	April 8-12, 2013	Nairobi, Kenya	\$1,300
2. Fertilizer Policy & Marketing Strategies in Africa	May 20-24, 2013	Arusha, Tanzania	\$1,300
3. Nitrogen Fertilizer Production Technology (with IFA)	June 24-28, 2013	Sanya, China	\$2,700
4. Linking Farmers to Markets in Africa	July 1-5, 2013	Nairobi, Kenya	\$1,300
5. Technology Advances in Agricultural Production and Fertilization	August 19-30, 2013	USA (Alabama, Georgia, Illinois, Missouri, Tennessee and Washington, D.C.)	\$2,000
6. Phosphate Fertilizer Production Technology (with IFA)	October 7-11, 2013	Bangkok, Thailand	\$2,700
7. Developing and Managing Profitable Agro-Input Business Through Sustainable Value Chains	November 4-8, 2013	Ouagadougou, Burkina Faso	\$1,300
8. Fertilizer Value Chain – Supply System Management and Servicing Farmers' Needs	December 2-6, 2013	Kuala Lumpur, Malaysia	\$1,600