

IFDC *report*

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An update on the work and progress of IFDC



**IFDC and Partners Empower
Women in Bangladesh**

**Nigeria Sets Stage
for Agricultural Revolution**

**CATALIST-Uganda:
*Growing Success with Clusters***

**Fueling Food Security for a Century:
*100 Years of Haber-Bosch***





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Frequently Used Acronyms:

AAPI – Accelerating Agriculture Productivity Improvement in Bangladesh • ABCs – agricultural business clusters • AFAP – African Fertilizer and Agribusiness Partnership • AIMS – Agricultural Inputs Market Strengthening • CAADP – Comprehensive Africa Agriculture Development Programme • CAGLR – Central Africa's Great Lakes Region • CASE – Competitive Agricultural Systems and Enterprises • CBOs – community-based organizations • CPPs – crop protection products • DRC – Democratic Republic of Congo • ECOWAS – Economic Community of West African States • EDF – Economic Development Fund • FAO – Food and Agriculture Organization of the United Nations • FDP – fertilizer deep placement • ha – hectare • IFA – International Fertilizer Industry Association • IFAD – International Fund for Agricultural Development • IPNI – International Plant Nutrition Institute • ISFM – integrated soil fertility management • K – potassium • KAED – Kyrgyz Agro-Input Enterprise Development • kg – kilogram • MDGs – Millennium Development Goals • mt – metric ton • N – nitrogen • NGO – non-governmental organization • P – phosphorus • PPP – public-private partnership • SDGs – Sustainable Development Goals • SEW – Sustainable Energy Production through Woodlots and Agroforestry • VFRC – Virtual Fertilizer Research Center • WAFP – West Africa Fertilizer Program

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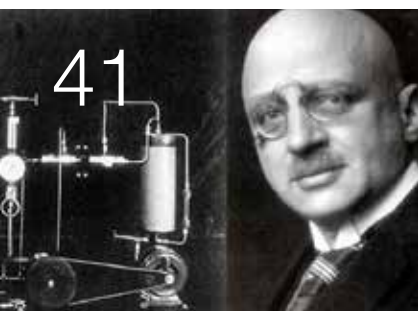


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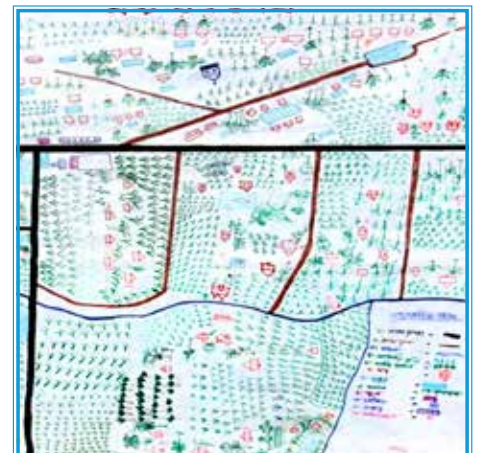
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- ▶ (Front cover): Women draw a map of their village in Masidpur, Bangladesh, during an AAPI participatory rural appraisal (PRA) assignment.
- ▶ (Right): Village Map completed under the PRA for the Madhya Chockdosh village.







◀ Male and female farmers harvest potatoes together at a demonstration plot in Bhola.

IFDC and Partners Empower Women in Bangladesh:

Capacity Building and Improved Access to Technological Advances in Agriculture Improve Quality of Life

Gender equity is essential not only for human development but for a nation's economic productivity and prosperity. An ongoing issue for nearly all developing nations, inequity slows development progress and makes improvements in the human condition difficult to sustain. According to the United Nations Development Programme (UNDP) 2013 *Human Development Report*, high levels of gender disparity persist in South Asia, with gender imbalances in education and low labor force participation, among other factors.

However, Bangladesh, a nation that has historically struggled with gender inequity, has made greater strides than most in the past two decades. In fact, according to the UNDP Human Development Index (HDI), it is one of the highest achieving countries studied, along with Ghana, Rwanda and Uganda, with significant gains in a number of social and economic areas since 1990. The HDI is a composite measure of three indicators: "life expectancy, educational attainment and command over the resources needed for a decent living." Greater gender equity is a crosscutting factor when assessing the improvement in these indicators. Between 1990 and 2012, Bangladesh reduced its HDI shortfall by 24.1 percent. The

improvement is largely due to the growth in per capita income of 3.9 percent over two decades, the tenth highest increase among the nations studied.

According to UNDP's report, "A striking feature of the world scene in recent years is the transformation of many developing countries into dynamic economies that are doing well in economic growth and trade and progressing rapidly on human development."

Women empowerment, including women's involvement in politics and economic activities, is considered in Bangladesh's 6th Five-Year Plan (2011-2015) to be a driving force behind the country's eventual transformation into middle-income status. The country was the first in South Asia to achieve parity in primary education. Other milestones are the implementation of social safety net programs and legislation mandating local elections with seats reserved for women.

"Bangladesh is an interesting country-case where major milestones have been achieved in women's empowerment and gender equality... Yet, much remains to be done," stated Neal Walker, United Nations resident coordinator for Bangladesh, in an editorial in *The Daily Star*. As one barrier, Walker cites that women are limited to a range of occupations that are deemed "fitting" by Bangladeshi society. This largely includes the textile industry and restricted areas of the agriculture sector.

Women currently make up 40 percent of Bangladesh's agriculture labor force. A recent report on "Women's Participation in Agriculture in Bangladesh 1988-2008: Changes and Determinants," by W.M.H. Jaim, indicates that women's participation in agriculture labor increased by 103 percent from 1999 to 2006.

"Women do not generally till the fields, prepare seedbeds, transplant seedlings, weed, apply fertilizers or manage irrigation," stated Ishrat Jahan, IFDC country representative to Bangladesh, in a 2012 interview. "But certainly, when the crop is ready for harvesting, it is the female farmer who steps in." In addition to 80 percent of post-harvest activities, nearly all home garden and commercial vegetable production activities are managed by women.



▲ A production inputs kit is provided to a participant in a women farmers' training program in Mymensingh.

Vegetables: A Tool to Increase Gender Equity

IFDC has been active in Bangladesh for over 35 years – assisting farmers to increase productivity, advocating for enabling policy environments and introducing new productivity-enhancing technologies such as fertilizer deep placement (FDP¹, or UDP when only urea is applied). During this time, according to the Food and Agriculture Organization (FAO) of the United Nations, Bangladesh doubled its rice production on the same amount of land – a feat that would not have been possible without women laborers. But now, IFDC's focus reaches beyond rice production to fruit and vegetable crops – an area deemed to be almost exclusively the domain of women.

Helping women improve the productivity of more nutritious, high-value products such as vegetables and fruits not only increases family income but also promotes

¹FDP involves the point placement of a large fertilizer briquette (up to 2.7 grams by weight) near the root zone of the plant. This environmentally friendly technology reduces fertilizer nutrient losses and increases crop uptake efficiency of the fertilizer. Well-suited to small, resource-poor farmers, including women, the technology achieves average crop yield increases of 18 percent while reducing fertilizer use by about 30 percent.

ground-level nutrition by increasing the amount of healthy food available for home consumption. This crop diversification provides variety for primarily rice-based diets, which inherently lack the availability of primary, secondary and micronutrients necessary for human health.

Though women contribute 16.8 percent to the nation's gross domestic product (GDP), female farmers consistently lack access to training and other capacity-building opportunities and seldom have access to yield-enhancing technologies that are essential to improved productivity. In 2008, IFDC activities in Bangladesh targeted a 10 percent participation rate by women, considered to be an aggressive number at the time. Some five years later, the Accelerating Agriculture Productivity Improvement (AAPI) project, funded by the U.S. Agency for International Development (USAID) and implemented by IFDC, now targets as much as 50 percent participation by women and has adopted an approach that expands family and community acceptance of women's participation in agriculture.

As an additional project component – through a recent partnership with the Walmart Foundation – AAPI is also now targeting 100 percent women participation within certain target areas of the project. The AAPI-Walmart Foundation component emphasizes technology diffusion and support systems specifically tailored for the rural women in what are referred to as 'AAPI-Walmart Villages.' AAPI and the Walmart Foundation are training 40,000 small-scale women farmers on the cultivation of fruits and vegetables using FDP technology over a two-year period. Due to the female-centric nature of the Walmart Foundation component, AAPI and Walmart are utilizing female trainers and extension agents in the project area to help women farmers overcome hurdles in production, finance, market integration and nutrition. As of this writing, nearly 10,000 women have received training, and an October report notes that 2,037 hectares (ha) of vegetables are under cultivation.



▲ Marium Begum plants cauliflower in her demonstration plot in the village of Putijana. AAPI Walmart activities are increasing production of beans, bitter gourds, cabbage, cauliflower, cucumber, eggplant, potato, taro and tomato.



▲ AAPI Walmart staff hold a follow-up consultation with farmers trained on the use of FDP technology in Mymensingh.

In anticipation of a rapid increase in women's utilization of FDP in vegetable production, the project is also developing a private sector, women-led supply system to provide the targeted FDP adopters an adequate supply of FDP briquettes (the combination and compaction of nitrogen [N], phosphorus [P] and potassium [K] granules into larger fertilizer forms). As FDP use on vegetable crops continues to expand, women entrepreneurs will be well positioned for success as briquette manufacturers and dealers. An expected 25 subsidized FDP briquetting machines will be bought and operated by women-owned private enterprises. These women will receive business and technical support and can expect not only attractive financial returns on their investment but also the ability to ensure an adequate supply system for the project's scaling-out activities.

can enable countries to reduce debts and deficits and generate additional public revenues to step up investment in basic goods and services, especially in health and education. And at the household level, income growth helps meet basic needs, improve living standards and enhance quality of life," states the report. And it is true; women and children in Bangladesh are healthier, better educated and more politically and economically involved, even compared with a neighbor such as India.

UN Country Coordinator Walker concludes that, "Gender equality is a fundamental human right. It is also the most practical and effective means to move the country forward, towards middle-income status, towards inclusive and sustainable development. There is much for the world to learn from the experiences of Bangladesh. The visible

“Gender equality is a fundamental human right. It is also the most practical and effective means to move the country forward...”

- Neal Walker, UN resident coordinator for Bangladesh

It is expected that women empowered through AAPI Walmart activities will be positioned for greater involvement in family resource and business decisions, positively impacting the family income, nutrition and child health and education.

National Commitment Is Key

As a result of a strong national commitment, combined with nearly four decades of IFDC involvement, the state of women in Bangladesh has dramatically improved. That national commitment is essential, according to the *Human Development Report*. "At the national level, faster growth

changes in women's political and economic participation throughout the country are proof of government commitment and to people's aspiration to a more equitable society... At the crossroads of a new global approach to development, we have the opportunity to engender the goals we set, the targets we want to achieve, the changes we want to experience for a more equitable and equal world." IFDC, its donors and its research and development partners are uniquely poised to continue this evolution toward a truly inclusive society – one in which every person has the opportunity for advancement and the tools to succeed in creating a better life.

From Seeds to Livestock: Economic Development Fund Advances Multiple Agriculture Subsectors



▲ Alisher Kasymov (right), KAED project manager, and Ashimbek Osmonkulov, head of the Agrarian Development Department in Sokuluk rayon, cut the ribbon during the opening ceremony for Kyrgyzstan's first Animal Reproduction Biotechnology Center.

The Kyrgyz Agro-Input Enterprise Development (KAED) Follow-On Project is implementing the Economic Development Fund (EDF), a dynamic three-phase program unique in its ability to transform a wide and varied range of agriculture subsectors under the same initiative. Jointly designed for optimal benefit by the U.S. and Kyrgyz governments, EDF is advancing critical improvements in a number of agriculture-related disciplines that will form the foundation for holistic agriculture sector development in the country far into the future.

Under the first phase of EDF, KAED provided 34,000 farmers with improved seeds from private sector suppliers through an IFDC-designed and -implemented voucher program. As a result, national

farm income increased by US \$12.2 million in 2011. EDF II transformed selected seed farms into viable seed companies to further develop a vibrant domestic seed supply system. Fourteen farms received modern equipment, seed and technical assistance to upgrade their farming and business operations. These farms now serve as models for other seed farms in the region.

In similar fashion, the creation of model livestock farms is the focus of EDF III, a USAID \$8.5 million support program to diffuse livestock capital investments in order to professionalize the sector. EDF III activities include training Kyrgyz livestock farmers to improve feed production and breed quality, and demonstrating the importance of proper animal care and health.

In October, KAED, local government officials, members of the Association of Veterinarians of Tajikistan and farmers from Chui and Naryn *oblasts* launched the Animal Reproduction Biotechnology Center, the first



of its kind to be established in the Kyrgyz Republic. The center, run by the Livestock Breeding Association (LBA) of the Kyrgyz Republic, will introduce modern reproduction technology. Improved genetic material will be made available for artificial insemination to breeders throughout Kyrgyzstan and neighboring countries such as Tajikistan, ensuring a cost-effective and sustainable supply and insemination system.

About KAED

In addition to EDF efforts, the USAID KAED project is enhancing food security through expanded adoption of improved production technologies, value chain linkages

and public-private partnerships (PPPs). Technology transfer is a key strategic intervention area, with an emphasis on the introduction of improved seed and fertilizers, minimum tillage technology, composting and modern agricultural machinery. The project is being implemented in a market-oriented manner, nurturing private sector development to improve import efficiencies and strengthen agro-dealer networks. KAED Follow-On provides farmers with training and access to key business resources to increase soybean and high-quality edible oil production and to increase the domestic production of protein meal for domestic egg production.

... EDF is advancing critical improvements in a number of agriculture-related disciplines that will form the foundation for holistic agriculture sector development in the country far into the future.



▲ *Kalmurat Djuarkulov, head of the Animal Reproduction Biotechnology Center, looks forward to offering farmers improved livestock care and breeding practices.*

Public-Private Partnership with Kumtor Gold Company a Success



▲ Governor of Issyk-Kul oblast, Emilbek Kaptagaev (center left), and local farmers attend a ribbon-cutting ceremony in front of the new pump station at Samat-Kol dam.

For several years, the KAED project has been an excellent example of the successes that can be achieved through PPPs. In the last issue of the *IFDC Report*, it was noted that PPPs with Oasis Agro and Eurasia Agro were exponentially increasing egg production in Kyrgyzstan to the point that the country is expected to soon be self-sufficient in egg production and may begin exporting surplus eggs to neighboring countries. It was also reported that a new PPP was formed between KAED and Kumtor Gold Company (KGC) to rehabilitate land southeast of Lake Issyk-Kul (Northeast Kyrgyzstan). The land rehabilitation involved cooperation among KGC, local farmers (who provided physical and financial support to the endeavor) and KAED project staff who rehabilitated various areas of infrastructure in Ichke-Bulun and Ak-Dobo villages. The effort was successfully completed in September with the following results:

- Repair of the Samat-Kol dam, located in Lipenka village, and its irrigation canals, and installation of transformer substations and a pump station. The dam now has a 15,000 cubic meter holding capacity.
- Repair of the Ak-Adobo irrigation canals and the cleaning of a daily run-off pond, which now has a total holding capacity of 25,000 cubic meters.
- Increased irrigation capacity for a total of 1,250 ha of land, which supports nearly 800 households.
- Field demonstrations on 20 ha at these irrigation sites to offer technical advice and training for the farmers as they prepare for the fall planting season.
- Because of the rehabilitation, nearly 800 families now have the ability to produce 50 percent greater yields of cereal crops, potatoes and perennial grasses such as alfalfa. It is expected that the rehabilitation will generate up to US \$260,000 in additional annual income for these rural communities.



Productive Agriculture Project in Tajikistan Increases Incomes



From 2009 through 2013, IFDC worked with ACDI/VOCA in the development of commercial non-cotton agriculture in Tajikistan through the Productive Agriculture Project in Tajikistan. A USAID Feed the Future (FTF) initiative, the project targeted producers located in the western area of Khatlon Province. The project's objective was to increase the productivity of traditional, high-value crops and expand agricultural profitability.

IFDC's focus within the project was to increase agricultural productivity by expanding the supply of certified agro-inputs in the region. IFDC achieved this goal by building networks among agricultural input dealers and improving the policy environment for registering inputs in the country. IFDC efforts also ensured that farmers have the production knowledge they need to successfully utilize these inputs.

Over the course of IFDC's portion of the project, the Center planned and implemented over a dozen voucher programs, reaching over 1,000 farms with new seeds, fertilizers and crop protection products (CPPs) that were rarely available in the country prior to this intervention. The voucher programs were designed to involve cost-sharing between the project and farmers and bring down the prices of certified agro-inputs in order to be competitive with the more commonly used and less effective inputs in Tajikistan. Targeted crops included lemons, onions, stone fruits, tomatoes and watermelons. Every farmer involved in the voucher programs received training and support in the use of new certified inputs.

The project also provided access to agricultural extension services, mechanization, financial services and marketing to increase the value of farmers' crops. Participating farmers experienced a nearly US \$4 million increase in sales over the course of the project.

IFDC also developed strong supply chain networks among international manufacturers, wholesale distributors and retail dealers and built dealer capacities in marketing, accounting, environmental safety, identification and use of certified products and bulk purchasing techniques. In the final year of the project, international companies from Turkey to Switzerland attended a fair in Tajikistan to connect with local partners, opening sustainable business opportunities for years to come. Over the course of the project, agro-dealer partners reported over \$5 million in incremental sales.

Project activities led by ACDI/VOCA will continue into 2014 and will focus on further developing market linkages and facilitating investments that will have the largest impact on the targeted value chains in Khatlon Province.



▲ *Agro-dealers and farmers alike benefited from IFDC's voucher programs during the project.*





◀ IFDC redemption clerks prepare vouchers for farmers in Taraba State during the 2012 Fertilizer Voucher Program. Nearly 40,000 farmers in Taraba were able to access discounted fertilizer from the private sector through the program.

Nigeria Sets Stage for Agricultural Revolution

Under optimal conditions, agricultural development has proven to be an effective engine not only to power a developing nation's economy but also to sustain its prosperity. Growth in the sector has a multiplier effect in emerging markets, sparking growth in non-agriculture sectors as well. In the book *The New Harvest: Agricultural Innovation in Africa*, development expert Calestous Juma writes, "Prioritizing agricultural development could yield significant, interconnected benefits, particularly in achieving food security and reducing hunger; increasing incomes and reducing poverty; advancing the human development agenda in health and education; and reversing environmental damage."

Recognizing this fact, and in light of the ongoing volatility of oil prices, the Federal Government of Nigeria (FGN) is recommitting itself to agricultural development. Since the oil boom of the 1970s, Nigeria has relied on oil revenue as the basis of its economy, with declining public funds allocated to agriculture that have given rise to higher annual food import bills. As a result of this dependency, when oil prices fluctuate, so does the nation's GDP. To remedy this effect, the FGN

attempted to begin implementing market-oriented reforms designed to diversify economic growth in 2008, with an emphasis on developing PPPs. However, this move toward privatization was slow and lacked the commitment and strategy necessary to affect such a dramatic change. But, as it has been widely reported in recent months, the nation is now undergoing massive restructuring and transformation – led by a new ministerial administration – moving from subsistence farming to business-oriented agriculture designed to once again become a substantial portion of the nation's GDP.

"We are driving a public sector-enabled and private sector-led agricultural transformation," said Nigerian Minister of Agriculture and Rural Development, Dr. Akinwunmi Adesina, in an address to the Earth Institute at Columbia University. "We must free ourselves from dependency on crude oil. Agriculture is the sector where we have the greatest potential to achieve this – and now is the time."

This commitment was reiterated during the 19th Nigerian Economic Summit, held in September, which focused on the theme "Growing Agriculture as a Business to Diversify Nigeria's Economy." With intensified market development plans, the expansion of Notore – the only urea plant in Sub-Saharan Africa – and six new fertilizer plants expected to be operational by 2017, the goal of the FGN is to turn Nigeria into "a global agricultural powerhouse."

But a nation's sheer will to make such a change is insufficient in and of itself; development resources are critical. This is the primary reason that the FGN has enlisted IFDC to expand its efforts to build sustainable agro-input supply networks in the nation. In the past decade, IFDC has led more than a dozen Nigeria-based projects – seeding commercial input markets in the country, building the capacity of agro-dealers and working with private companies and farmers to create more functional value chains. Farmers are almost continuously trained in new technologies and methods, such as FDP and integrated soil fertility management (ISFM).

However, these agricultural development activities will achieve maximum impact only when a proper enabling environment is created in combination with the appropriate tools needed to employ yield-boosting practices. Thus, in Nigeria, the lack of timely access to affordable, high-quality inputs remains the smallholder farmer's greatest limiting factor.

Targeted Support: the Impetus to Market Development

Targeted subsidies – if properly implemented – can serve as an effective way to get inputs (fertilizer and seed) into the hands of farmers. Input vouchers (both paper and electronic) are a popular form of targeted subsidies that act as discount coupons designed to transfer the purchasing power to targeted smallholder farmers. Successful voucher programs include heavy private sector participation and are customized to a country's particular circumstances.



▲ Farmers in Bauchi State stand in line to redeem their vouchers for fertilizer.

Conversely, heavy government subsidization almost always undermines the commercial agriculture sector and usually results in some levels of corruption and fraud. And with often-poor estimations in required fertilizer quantities and delays associated with poor infrastructure, little fertilizer actually reaches the farmers most in need. This was the reality for 40 years in Nigeria. The government subsidized fertilizer to such a degree that it, in essence, competed with the private sector rather than partnering to build a more effective input distribution system.

“Under the past fertilizer subsidy interventions, the private sector was not able to do what it does best:

We are driving a public sector-enabled and private sector-led agricultural transformation.

– Nigerian Minister of Agriculture and Rural Development, Dr. Akinwunmi Adesina

IFDC first introduced vouchers in Afghanistan in 2002 to provide post-conflict emergency assistance. Since then, millions of farmers in countries across Africa and Eurasia have benefited from these programs. When implemented effectively, subsidy programs go far beyond merely distributing vouchers to farmers. The heart of a true “smart subsidy” initiative is the effective inclusion of the private sector at every possible level of the agricultural supply chain. These efforts build the foundation for sustainable, vibrant input market systems by empowering private sector companies to deliver inputs directly to farmers, with only participatory oversight from a given national government.

provide products at an affordable price in a competitive market,” says Scott Wallace, IFDC country representative in Nigeria. “Middlemen received government contracts to deliver products to government warehouses, creating a situation in which the farmer was no longer part of the equation. Thus, fertilizer products of questionable quality were often delivered and redistributed through political connections before finding their way into the marketplace.”

Nevertheless, to address the immediate need to assist targeted farmers and the long-term need to strengthen the



private sector, IFDC has led subsidy programs in select Nigerian states each year since 2008. Through these state-level programs, fertilizer reached a total of more than 300,000 farmers, most of whom had never before received subsidized fertilizer. Sustainable and direct linkages were created, from suppliers to distributors and from distributors to local agro-dealers.

Charting a New Development Course

With the 2010 appointment of Dr. Adesina as Minister of Agriculture and Rural Development, the FGN announced that it would be exiting the business of fertilizer distribution. “Within the first 90 days of this administration, we ended the 40-year-old fertilizer sector [issues],” said Adesina in an October *Leadership* article. “The old system of government buying and selling fertilizers was scrapped, and all fertilizer companies were required to sell directly to farmers, not to government warehouses.”

The FGN’s new Growth Enhancement Support (GES) program is one of the government’s first steps in balancing its focus between the oil and agriculture sectors. To reach farmers directly, the 2013 GES program utilized electronic vouchers that were received by farmers through mobile phones (also known as an “e-wallet” system). The system allowed registered farmers to receive text messages alerting them that they could pick up their input package at a local redemption center.

IFDC provided technical expertise in the design and implementation of the program and coordinated supply-side activities in 15 states. This included coordination with input suppliers and government officials to ensure that an adequate stock of fertilizers was available throughout the program. Covering the entire nation, the program linked more than 4.5 million farmers to subsidized fertilizer; IFDC directly helped 2.4 million farmers to access the critical input within the 15 states coordinated by the Center.



“It is nothing short of amazing that the GES has already reached such an enormous scale in just its second year of operation, especially considering the decades-old precedent of government procurement, which crowded out the private sector instead of fostering it,” said Luke McCarthy, IFDC input voucher specialist.

So, one might say that the FGN not only has the sheer will to transform the sector, it also has a plan. The GES program and other market-led efforts are putting Nigeria on track for substantial agricultural transformation. “We ended the approach of treating agriculture as a development program,” said Adesina during the 36th Session of the IFAD Governing Council. “We now treat agriculture as a business to generate wealth for millions of our people.”

▲ Minister Adesina (with microphone) addresses a crowd at a voucher redemption center in Kano State. The woman standing to Adesina’s right is Kano State Commissioner for Agriculture, Baraka Sani; to her right, standing opposite of Adesina, is Abidina Yakasai, IFDC team leader in Kano.

IFDC-Led Project to Develop Agricultural Business Clusters in Benin



▲ IFDC North and West Africa Division Director Dr. André de Jager and the Ambassador of the Kingdom of the Netherlands to Benin, Jos van Aggelen, sign a contract for the new *Approche Communale pour l'Accès au Marché Agricole au Bénin* program.

In October, aboard the Dutch marine vessel HNMLS Rotterdam, which was visiting Benin, IFDC and the Embassy of the Kingdom of the Netherlands (EKN) signed a contract for the implementation of a project that aims to increase food security and develop agricultural markets in Benin over the next four years (2014-2017). The new project, *Approche Communale pour l'Accès au Marché Agricole au Bénin* (Communal Approach to Agricultural Market Access in Benin), aims to improve the livelihoods of 70,000 smallholder farmers and rural entrepreneurs through the development of no less than 100 agricultural business clusters (ABCs) in the Ouémé, Plateau and Zou Departments in southern Benin. The effort will connect the groups to agricultural market opportunities, including markets in neighboring Nigeria.

The program focus is to improve the purchasing power of economic agents directly involved in commercial transactions, increase business between domestic and foreign (Nigerian) markets and build sustainable supply and demand of quality products, including commodities such as maize, cassava, palm oil and peppers. The communal approach is a key element for building a sustainable and demand-driven agricultural market system in Benin.

“On behalf of the president and CEO of IFDC, Dr. Amit Roy, and on behalf of the other members of the consortium, I ensure that IFDC and its partners will make this program a success in Benin,” said Dr. André de Jager, director of IFDC’s North and West Africa Division, to the Ambassador of the Kingdom of the Netherlands to Benin, His Excellency Jos van Aggelen, prior to the contract signing. “It is a pleasure to continue working with the Embassy after successfully finalizing the implementation of the Improving the Access of Non-Cotton Agricultural



Producers project [2009-2013]. We are very grateful for this continued trust in IFDC and its partners.”

The program will be implemented by a consortium of five members and led by IFDC. Other consortium members include the Royal Tropical Institute of the Netherlands, Care International Benin-Togo, Sahel Capital of Nigeria and Benin Consulting Group. Together, with a grant of about 10 million Euros (US \$13.5 million), the consortium will be able to efficiently support the efforts of the government in revamping the development strategy

for its agriculture sector, particularly in the facilitation of access to markets through adequate infrastructure, adequate control mechanisms, identification of business opportunities and capacity building for stakeholders. IFDC and its partners expect to receive the full participation of the 22 target communes, representing about 400 communities, in order to create conducive socio-economic and political environments that will facilitate the development of opportunities for economic growth in southern Benin.

IFDC President and Ambassador of the Netherlands to Benin Discuss New Project

In October, the Ambassador of the Netherlands to Benin, Jos van Aggelen, met with Dr. Amit Roy, president and chief executive officer of IFDC. The center was awarded the contract for the program, “Communal Approach to Agricultural Market Access in Benin,” which is funded by the Kingdom of the Netherlands.

The Ambassador and Roy shared their perspectives on the development of agriculture in Benin, the issue of inputs, the cotton sector and the private sector’s involvement in the revival of the agriculture sector in Benin. Particular attention is being given

to the potential of the nearby Nigerian market, regional market integration and IFDC’s experience in the implementation of cross-border agricultural business centers that could serve as examples for the Benin project.

The Ambassador and Roy agreed on the importance of a close partnership between IFDC and the Embassy of the Netherlands, in close consultation with technical and financial partners and Benin stakeholders for the future of agriculture in the country.



▲ Pictured, from left to right: Marcellin Nonfon, agriculture expert (EKN); Ryan Roberge, portfolio manager (IFDC); Dr. Amit Roy, president and CEO of IFDC; Jos van Aggelen, Ambassador of the Netherlands to Benin; Dr. André de Jager, director of the North and West Africa Division (IFDC); and Mathias Ahounou, 2SCALE cluster advisor (IFDC).

Forum Focuses on Policy, Regulations to Build Fertilizer Access in West Africa



More than 235 fertilizer value chain stakeholders participated in the first annual West Africa Fertilizer Stakeholders Forum, a two-day event focused on the theme “Ensuring a Favorable Policy and Regulatory Environment

for Fertilizer Trade and Use in West Africa.” Held in Accra, Ghana, in September, the event was organized by the USAID West Africa Fertilizer Program (WAFP), implemented by IFDC in collaboration with the African Fertilizer and Agribusiness Partnership (AFAP).

The forum, hosted by the Economic Community of West African States (ECOWAS), brought together public officials, policymakers, fertilizer manufacturers and traders, importers, bankers, farmers and development partners. Participants discussed practical approaches to overcoming the challenges facing the fertilizer industry in order to improve the availability and use of quality and affordable fertilizer in West Africa. According to the FAO Fertilizer Working Group, while fertilizer use in the region is below 10 kilograms (kg)/ha annually, compared with the global average of 107 kg/ha, fertilizer demand in Sub-Saharan Africa is estimated to grow by 3.11 percent per year through 2017. In order to develop an effective regional fertilizer market, national frameworks regulating the production and trade of agro-inputs must be harmonized.

“Technical issues related to productivity increases have received a lot of attention, but the regulatory and policy environment, which is equally important, has not,” said ECOWAS Commissioner for Agriculture, Environment and Water Resources, Dr. Marc Atouga. Delivering his keynote address, Atouga emphasized that in 2015 the region will be held accountable for meeting the fertilizer consumption target of 50 kg/ha set by African

leaders through the Comprehensive Africa Agriculture Development Programme (CAADP). “The forum offers a unique platform for introspection and an opportunity to give a new impetus to a collective commitment to make fertilizers available and affordable in the sub-region,” Atouga said.

The forum explored specific fertilizer-related obstacles, which included governments’ failure to recognize agriculture as a broad-based engine for economic growth; poor port, transport and storage infrastructure; inefficiently managed fertilizer and seed subsidy programs; weak distributor and agro-dealer networks; and the lack of an effective regional fertilizer trade association that can advocate for members and effectively communicate with the governments of West Africa. Seeking to immediately address this question of advocacy, forum participants called for the formation of a West Africa Fertilizer Trade Association that would federate existing stakeholder organizations in the region. The group will represent the fertilizer industry and serve as an effective vehicle for bringing together a diversity of fertilizer stakeholders.

Representing Ghanaian President John Mahama, Minister of State in Charge of Financial and Allied Institutions, Fiifi Kwetey, used the Forum to announce approval of the nation’s National Seed Policy.



- ▲ *Dr. Monisoye Olorunsola Afolabi (center), USAID West Africa Trade Hub business environment advisor, leads a panel discussion on the formation of a West Africa Fertilizer Trade Association. Members of the panel include (from left to right) Alhaji Rabi Kwa, executive secretary of the Fertilizer Suppliers Association of Nigeria; Dr. Kofi Debrah, WAFP chief of party; Afolabi; Ablassé Ilboudo, president of Association des Grossistes et Détaillants Distributeurs d’Intrants Agricoles du Burkina Faso (AGRODIA); and Rev. B.T.S. Amatey, president of the Ghana Agricultural Input Dealers Association.*



▲ IFDC representatives demonstrate a fertilizer deep placement mechanical applicator to the Minister for Food and Agriculture in Ghana, Kofi Humado (pointing), and Minister of State in Charge of Financial and Allied Institutions, Fiifi Kwetey.

Kwetey emphasized increasing the efficiency of fertilizer use and acknowledged IFDC’s work to improve soil quality through ISFM.

To facilitate a public-private dialogue on the new fertilizer quality regulatory system adopted by ECOWAS in 2012, Dr. André de Jager, director of IFDC’s North and West Africa Division, led a panel discussion on the fertilizer industry and regulatory environment in West Africa. *ECOWAS Fertilizer Regulation C/REG.13/12/12* paves the way for a favorable policy and regulatory environment for investments that improve the supply and use of fertilizers in the region. IFDC is leading the coordination of a West Africa Committee for Fertilizer Control to support the implementation of the regulation in all 15 ECOWAS member states.

In addition to meetings and panel discussions, the forum held a business fair in which stakeholders demonstrated new fertilizer and seed technologies, innovative financing, market information and applications for information, communications and technology (ICT) systems related to agriculture.

About WAFP

The organization of the forum was a key mandate of the USAID WAFP project. WAFP is implementing activities designed to increase the private sector’s regional supply and distribution of fertilizers and facilitating an enabling environment for fertilizer policy and regulatory framework development. The project is also increasing knowledge and use of improved agricultural technologies and improving the efficiency of regional market transactions.

The forum offers a unique platform for introspection and an opportunity to give a new impetus to a collective commitment to make fertilizers available and affordable in the sub-region.

– Dr. Marc Atouga, ECOWAS Commissioner for Agriculture, Environment and Water Resources

Launch Ceremony Held for Feed the Future USAID Project in Ghana



▲ As one component of the project's technology transfer, ATT is building access to processing equipment for smallholder farmers.

In November, the Feed the Future USAID Agriculture Technology Transfer (FTF USAID ATT) project held an official launch ceremony at the University for Development Studies International Conference Centre at Dungu, near Tamale, Ghana. Guests included a representative from the Ministry of Food and Agriculture, William Boakye-Acheampong, Director-Northern Region; the United States Ambassador to Ghana, Gene A. Cretz; USAID-Ghana Deputy Mission Director, Andy Karas; and members of partner organizations.

“We are committed to promoting new forms of technology to our smallholder farmers so that they are able to produce on a commercial scale,” said Boakye-Acheampong during the ceremony. Guests also toured an exhibition that featured several agricultural technologies that the project intends to introduce. FTF USAID ATT is a project that, over the course of five years (2013-2018), will increase the availability of appropriate and affordable technologies to sustainably improve the competitiveness of the maize, rice and soybean value chains in northern Ghana.

IFDC is the lead implementing partner, with additional technical support provided by Iowa State University (ISU), the Center for Development Innovation of

Wageningen University (WUR-CDI) and the Ghana Agricultural Associations Business and Information Centre (GAABIC). Other key partners include research institutions such as the Savanna Agricultural Research Institute (SARI) and the Ministry of Food and Agriculture.

The project's primary focus is to improve the capacity of both the public and private sector in their respective roles in technology development and dissemination, focusing on seeds, ISFM and agricultural research capacity building. The project plans to reach over 100,000 maize, rice and soya farmers in northern Ghana through public and private sector partners.



▲ ATT is working closely with other USAID activities in research, policy, finance, commercialization and value chain development.



IFDC/ECOWAS Study: Tighter Regulation Key to Ensuring Fertilizer Quality in West Africa



▲ Fertilizer storage facility in Kwara State, Nigeria.

A study funded by the Netherlands' Directorate-General for International Cooperation (DGIS) that analyzed the quality of fertilizer in five West African countries tells a compelling story. The study, implemented by the IFDC Marketing Inputs Regionally (MIR) Plus project on behalf of ECOWAS and the West African Economic and Monetary Union (UEMOA), conducted extensive fertilizer market research and product testing in Côte d'Ivoire, Ghana, Nigeria, Senegal and Togo. Researchers found severe nutrient deficiencies in bulk blends due mainly to inappropriate blending technology, frequent bag weight shortages, low quality in some fertilizer imports and degradation of fertilizer physical attributes due to manual handling and inadequate storage. Surprising to some, of all the samples tested, only 0.3 percent showed clear evidence of adulteration.

“Against expectations, we did not find evidence of product adulteration being the dominant quality problem of fertilizers in the region,” said Dr. Joaquin Sanabria,

IFDC scientist-biometrician and technical leader of the study. Instead, said Sanabria, the region's most serious problem is with the quality of blended products. “Creating a good blend of fertilizer is not just being able to mix a few fertilizers together; it takes good quality input products, adequate equipment and experienced engineers to produce blends that are effective fertilizers. We also found that imported fertilizers present quality problems with higher frequency than expected.”

With various fertilizer quality issues solidly identified, the authors point to a list of recommendations that make the report a tool for change in the regional fertilizer market. “Enforcement of the whole regulatory system is the way to change the fertilizer quality situation in West Africa,” said Sanabria. “Governments must create or improve their regulatory capacities by having appropriate personnel that can inspect blending plants, ports and markets, and establish laboratories or collaborate with private laboratories to perform proper chemical analyses.”

According to the authors, for this effort to be successful, national frameworks regulating the production and trade of these products must be harmonized. Beginning to address the issue, in 2012, ECOWAS and UEMOA, with technical assistance from MIR Plus, developed the *ECOWAS Fertilizer Regulation C/REG.13/12/12*.

Given the MIR Plus project's extensive involvement in this milestone, ECOWAS has appointed IFDC as the lead facilitator in the setting up and operation of the West Africa Committee for Fertilizer Control and the national committees dedicated to more stringent fertilizer control. IFDC is slated to analyze the abilities of all 15 ECOWAS member states to effectively implement the regulation and support the adoption of additional mandates. These analyses are to be completed by June 2014, with the construction of action plans for capacity building at both national and regional levels.

The full regional report, titled “The Quality of Fertilizer Traded in West Africa: Evidence for Stronger Control,” was published in October, and five individual country reports that supported the regional report have been published for the benefit of national stakeholders. These reports are available for review on the IFDC website at www.ifdc.org/R-D/Research.

USAID WACIP Boosts Farmers' Incomes, Ginning Efficiency in West Africa



Cotton, the primary cash crop grown in the Cotton-4 (C-4) countries of Benin, Burkina Faso, Chad and Mali, is a strategic component for food security and economic development in West and Central Africa. In order to boost the productivity and profitability of the cotton sector – a major employer in the region – the recently completed USAID West African Cotton Improvement Program (WACIP) had been active in the C-4 and in Senegal since December 2006. The program's purpose was two-fold: to reduce poverty and hunger by increasing cotton farmers' incomes and increase the added value of cotton that is processed by artisans and ginners.

WACIP activities focused on the dissemination of good agricultural practices (GAP), integrated pest management (IPM) and ISFM. These activities were implemented by IFDC in collaboration with WACIP partners, which included major ginning companies and their extension services. By applying sustainable techniques, WACIP-assisted producers have been able to substantially increase the productivity of cotton in combination with rotational crops (such as maize and cowpeas). WACIP demonstrated that, if the appropriate agricultural techniques are applied, a farmer's income can increase by more than 45 percent.

By the end of the project, WACIP's interventions resulted in the following key accomplishments:

- Increased yields for seed cotton (by 16 percent), maize (14 percent) and leguminous crops (over 50 percent).
- Increased returns per hectare for seed cotton (by 78 percent), maize (45 percent) and leguminous crops (over 150 percent) for WACIP-supported farms.
- Nearly 3,000 extension agents and 170,000 farmers were trained (who, in turn, trained more than 1.3 million producers in their areas).

To assist ginners, WACIP and its partner, *Coton et Industries du Monde, Expertise et Services Afrique* (COTIMES Afrique), designed and launched a program to improve the efficiency of ginning systems at three plants in Benin, Burkina Faso and Senegal. The investment involved a contribution to the plants for the purchase of state-of-the-art humidification equipment, resulting in financial gains of US \$14-\$22 per metric ton (mt). With an annual production capacity over 100,000 mt, there stands the potential for a plant to gain as much as \$2.2 million.

In order to link textile artisans to markets, WACIP and its implementing partner, Aid to Artisans (ATA), worked with 30 groups, representing 3,000 artisans, to design and market 1,100 new products for national, regional and international markets. This resulted in total sales of nearly \$2 million.



WACIP Regional Forum: Evaluating Results

WACIP recently held a regional forum in Cotonou, Benin, on “Final Project Results and Perspectives on Cotton and Food Security in West Africa,” bringing together U.S. experts, national and regional cotton producers’ organizations, regional economic communities, major ginning companies and USAID/West Africa representatives. Participants reviewed the impact of WACIP’s promotion of improved agricultural practices and discussed agricultural policies related to climate change and food security. The event also served as a venue to present the results of two WACIP-funded studies: the impact of the diffusion of GAP (conducted

in collaboration with the National Agricultural Research Institutes of Benin, Burkina Faso and Chad) and the relationship between cotton and food security in the C-4 countries.

With over 80 participants from seven countries, the forum was led by Benin’s Minister of Agriculture, Livestock and Fisheries, Madame Fatoumata Amadou Djibril. Dr. Amit Roy, IFDC president and CEO, and Dr. André de Jager, director of IFDC’s North and West Africa Division, also attended. Workshop participants concluded that, in addition to its original objectives, WACIP nurtured rich dialogue, respect and understanding within the large cotton stakeholder community.



Attendees participate in a work session during the forum.



- ▲ Participating in the forum’s closing ceremony were (from left to right): Dr. André de Jager, director of IFDC’s North and West Africa Division; Maurice Shines, USAID/West Africa agriculture/private sector officer; Dr. Amit Roy, IFDC president and CEO; Fatoumata Amadou Djibril, Minister of Agriculture, Livestock and Fisheries of the Republic of Benin; Mathias Aounou, IFDC country representative in Benin; Bani Bio Touro, Benin representative of the African Cotton Producer’s Association; and Bruno Ouedraogo, WACIP chief of party.





◀ Along with cluster development, CATALIST-Uganda is developing integrated cropping systems for rice and other crops.

CATALIST-Uganda:

Growing Success with Clusters

“It is a cliché of development discourse that it is better to teach people to fish than to give them fish to eat. But a transformative and sustainable development agenda sets the bar higher than this, addressing the whole context in which people fish, how they fish and what they fish for. It helps them fish today in a way that will also ensure that there will be fish to be caught tomorrow, and a thousand days in the future.” – Kanayo Nwanze, President of IFAD

Eighty percent of Uganda’s 16.5 million-strong workforce relies on agricultural productivity for its livelihood. But perhaps ironically, this workforce also comprises 90 percent of the rural poor. They are subsistence farmers, providing 70 percent of the country’s marketed produce but, for the most part, are barely producing enough income for their families to survive, much less prosper. According to Kanayo Nwanze, president of the International Fund for Agricultural Development (IFAD), many of these smallholders are net buyers of food, producing what they can for personal consumption and purchasing the remainder. Making the situation worse, these smallholder farmers, who often lack access to modern agricultural technologies and

training, are responsible for feeding a population that is growing more than 3.2 percent annually. In the article “Down to earth: Sustainable rural transformation,” Nwanze makes the point that these obstacles cannot be overcome by simply teaching smallholders to farm better. For smallholders – and one might go so far as to say for all farmers – farming is more than an occupation, more than fertilizers, seeds and CPPs; it is a way of life, beginning in the half-light before dawn and encompassing the whole context of a farmer’s life. For agricultural development to be sustainable, for these smallholders to truly profit – financially and nutritionally – this whole system and its context must be taken into account and addressed.

Since 2006, IFDC has employed the Competitive Agricultural Systems and Enterprises (CASE) solution in Sub-Saharan Africa. It has become the cornerstone for the Center’s market development solutions, the ultimate goal being to give farmers the knowledge and tools they need to increase the amount and quality of their crops and to link them to profitable markets for the equitable purchase of their produce. CASE is an all-encompassing systems solution developed around the creation of crop-



specific agribusiness clusters, generally described by the Center as the coordination among various stakeholders at the grassroots level, including smallholder farmers, local entrepreneurs, traders, financial institutions, research and extension services and market information systems. CASE is key for IFDC’s activities in Uganda and is a viable solution to barriers impeding smallholder farmer activities in the nation.

The CATALIST-Uganda project is employing this systems-based approach to help sustainably commercialize smallholder farmer agriculture through improved productivity and value chain development, resulting in marketable surpluses that raise farm incomes and food security. Much of the work conducted by the project is accomplished under the realization of the farming way of life, that smallholder farming cannot be envisaged as a solitary farmer who plants, reaps and sells the produce as a single, unconnected individual. Farming in clusters has – by necessity – become the new definition of “smallholder farming,” differentiating those farmers who are professionally connected from the individual subsistence farmer.

Currently, CATALIST-Uganda is building partnerships with public entities, private enterprises and non-

governmental organizations (NGOs) that help the project professionalize smallholder farmers and connect them to viable markets. In professionalizing the farmers, CATALIST-Uganda is forming clusters of farmers around the nation. These clusters, made up of smallholder farmers and key players in a given crop-specific agricultural value chain, gain access to markets as a unit to obtain the best prices possible, whether it is to buy crop inputs or sell their collective crop outputs.

The CATALIST-Uganda project is also connecting these clusters to specific buyers who offer fair, consistent prices for specific crops. For example, the project recently partnered with Tropical Heat (of Deepa Industries Ltd.) and Kisoro Potato Processing Industries LTD (KPPIL) to increase potato crop production and quality through more efficient production methods. These companies are working with the project and its potato farming clusters to increase the quality of their production in order to create a regular purchasing relationship. The synergy created will encourage farmers to grow higher quality crops and will encourage Tropical Heat to buy from farmers in which they have invested.

Once the project aligns farmers into groups and connects them to buyers (when possible), it ensures that these farmer groups have adequate access to knowledge and training on modern agricultural technologies and practices in order to help improve their yield capacity. This often is accomplished by connecting to community-based organizations (CBOs) and other NGOs who are able to establish and sustain demonstration plots and provide training to farmer groups. Often, successful farmers from previous seasons will take the lead and share their experiences using modern agricultural inputs and techniques.

From planting to harvest, farmers involved in cluster activities have been more successful. They are growing more food for their families, getting more of their crops to market and making enough money to secure greater livelihoods for themselves and their families. Truly, success in the world of smallholder farmers is found when the entire context of the smallholder farming experience is recognized and considered in agricultural development plans.



Nwanze further notes, “Transformation means not just changing the outcome, but changing the context. Sustainability implies transformation because it must be both ameliorative and preventive at the same time – changing the present, and opening the door to a better and more secure future.” The CATALIST-Uganda project exemplifies this idea; it strives to connect farmers with each other and with other partners, who are all afforded a greater opportunity to improve global, national, local and personal well-being. This transformation will require synergistic efforts, but will result in sustainable food security for smallholder farmers now and in the future. By project end, 110,000 smallholder farmers will have sustainably doubled yields and achieved 50 percent increases in incomes.

- ◀ *(Opposite): A schematic representation of CASE: CASE is based on agribusiness cluster formation, value chain development and strengthening the abilities of public and private institutions to enable agribusiness and trade.*
- ▼ *CATALIST-Uganda is improving rice cropping systems by teaching farmers best practices, such as the use and benefits of urea deep placement.*



Private Sector-Led Subsidy Program Triples Fertilizer Available in Burundi



▲ Producers in Burundi line up to pay the non-subsidized portion of their fertilizer in advance.

In a country that has faced chronic food insecurity for decades, the Government of the Republic of Burundi (GRB) has taken an important step toward national food security through its new fertilizer sector privatization policy. To act as major support for this policy, the GRB has implemented the *Programme National de Subvention des Engrais au Burundi (PNSEB)*, also referred to as the National Fertilizer Subsidy Program. The program is intended to increase agricultural productivity by sustainably increasing farmers' access to fertilizers utilizing a private sector-led importation and distribution system.

Prior to the formation of PNSEB, IFDC and its development partners began support of the privatization policy through the *Projet d'Accompagnement du Nouveau Programme National de Subvention des Engrais au Burundi*, or PAN-PNSEB project. The project provided guidance and support for the creation of the National Fertilizer Subsidy Program and continues its support in other areas of ISFM and market development.

According to the GRB and its agricultural development allies, the stakes are now too high for this portion of the national economy to be overlooked. Accounting for 46 percent of the nation's GDP and 80 percent of export revenue, agriculture is by far Burundi's most important national economic activity. Unfortunately, farmland is scarce for 1.2 million Burundian rural households,



averaging only about 0.5 ha per farming family. This is particularly troubling because, on average, every family has to support 6.7 members. “This land limitation, despite the remarkable skills of Burundian farmers, results in a progressive decrease in soil fertility,” says Leone Comin, PAN-PNSEB project coordinator. “There is no time to leave the land fallow, and the available amount of organic material [mostly manure] is largely insufficient to replace the nutrients mined by crops. This decreases the amount of fertile land available for farming and locks farmers into a system of subsistence agriculture.”

“We estimate that more than 30 percent of households lack any appreciable marketing revenue,” says Comin. “This financial weakness explains the poor commercial demand for fertilizer despite the fact that this input ranks among the peoples’ most desired goods.”

To satisfy this need to put affordable fertilizer into farmers’ hands and build a sustainable input supply market, the GRB is working aggressively with fertilizer industry traders to create a demand-driven commercial system implemented by the private sector, with the Ministry of Agriculture serving in a regulatory capacity.

Fertilizer distribution for the first season in 2014 began in March 2013, following a nationwide information campaign. Nearly 275,000 farmers placed their orders by paying a fixed deposit (about 10 percent of the fertilizer market price); the resulting demand (nearly 13,000 mt) was imported by private traders. After paying the balance of the non-subsidized part of the fertilizer cost, farmers received a voucher, accounting for the 40 percent subsidy, which enabled them to obtain their fertilizer from the nearest distribution point.

(continued on page 26)

Beneficiary Spotlight: Gikumwete Dukore



▲ *Voucher recipients in Burundi stand in line to receive subsidized fertilizer.*

Since 2008, members of the rice farming cooperative *Gikumwete Dukore* have been implementing improved agricultural technologies developed by IFDC. Located in Bujumbura, the cooperative received training in ISFM through the Catalyze Accelerated Agricultural Intensification for Social and Environmental Stability (CATALIST) project. Support to the cooperative continues through CATALIST-2, which promotes agribusiness cluster development, market integration and agricultural intensification in Central Africa’s Great Lakes Region.

Applying ISFM techniques enabled *Gikumwete Dukore* members to increase rice production from an average of 4 mt/ha to 6 mt/ha. Cooperative members further increased yields to 8.8 mt/ha by employing FDP, a

more efficient method of fertilization that increases production while using less fertilizer. In 2009, CATALIST granted *Gikumwete Dukore* a fertilizer briquetting machine; the cooperative makes briquettes to sell for its own members and produces enough to sell to other producers as well.

Such yield increases encouraged cooperative members to adopt these improved practices and seek access to modern agro-inputs, but affordable fertilizers were not easily obtained; with the government acting as the country’s main importer, fertilizer distribution was poor. Lack of access to quality fertilizer remained the cooperative’s biggest challenge.

Through Burundi’s new fertilizer subsidy program, *Gikumwete Dukore* now has access to fertilizers. “About 95 percent of our members joined the program and are now receiving their fertilizers,” says Odette

Ntirampeba, chairwoman of the cooperative. “We are happy that we can now access fertilizers without many difficulties.” The cooperative is helping its members pay the subsidized fertilizer price with loans that will be paid back after harvest.

CATALIST-2 is funded by the Netherlands’ Ministry of Foreign Affairs through the embassies of the Kingdom of the Netherlands in Burundi, Democratic Republic of Congo and Rwanda and the Swiss Agency for Development and Cooperation.

“Already, in its first campaign, the program has made available three times the amount of fertilizer that was typically procured by the previous state-owned subsidy program,” says Comin. “We expect that in the future the number of beneficiaries, and thus the amount of fertilizer demanded, might easily double further. As a realistic target, we expect up to 600,000 households to benefit annually, with up to 60,000 tons of fertilizers supplied.”

IFDC’s primary support activities include the development of all technical aspects of the fertilizer subsidy program,

date as far back as 1985. To begin to rectify this issue, PAN-PNSEB is coordinating a soil-testing campaign involving IFDC, the Ministry of Agriculture, the National Institute of Agricultural Sciences (ISABU), FAO and two Burundian universities to update these recommendations. To date, about 1,000 soil samples have been collected in selected sites throughout the country and sent to a firm in Nairobi that specializes in soil analysis. The results show high acidity, widespread and severe lack of boron and phosphorus and insufficient amounts of zinc, sulfur and

“Already, in its first campaign, the program has made available three times the amount of fertilizer that was typically procured by the previous state-owned subsidy program.”

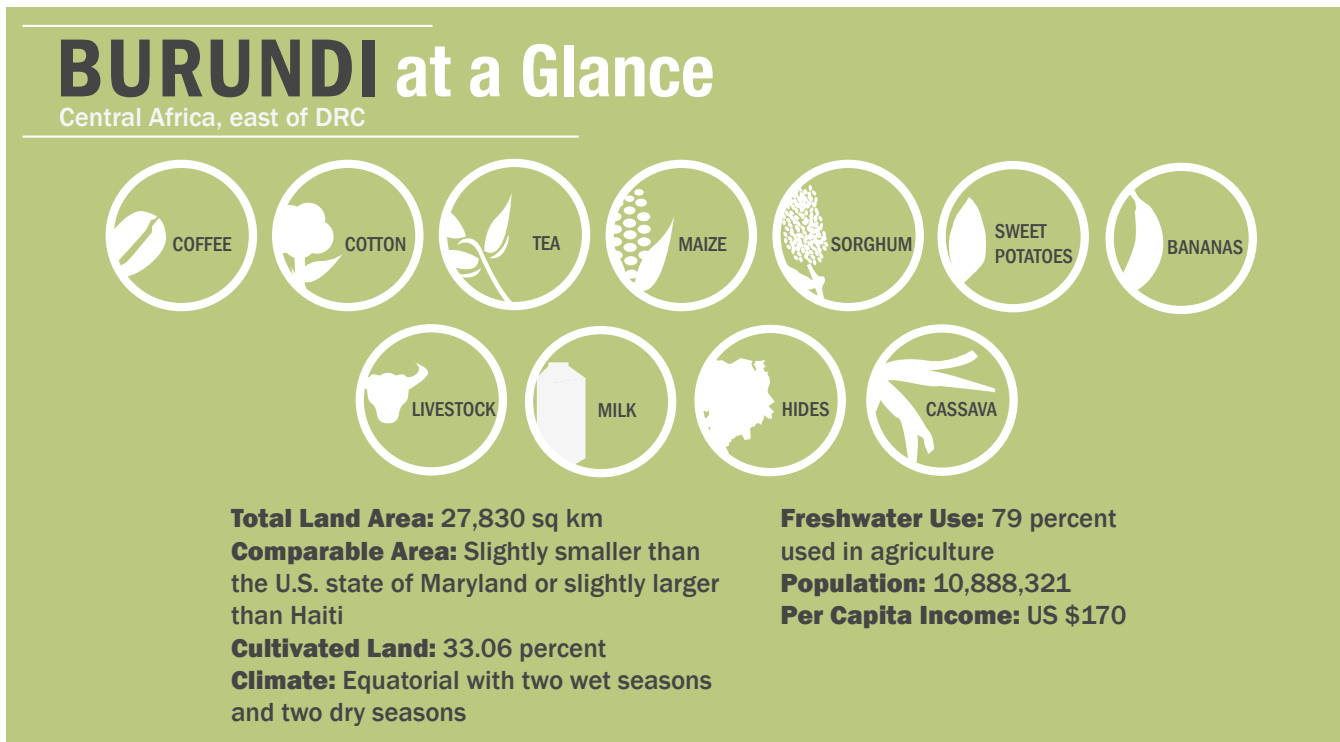
– Leone Comin, PAN-PNSEB project coordinator

including its computerization, and the development of targeted fertilizer formulas suitable to Burundian soil conditions.

Certainly, taking advantage of technological advances to support market trade is important, but such a professionalized system might do little good if farmers cannot improve the conditions of their soils. The reality is that current fertilizer recommendations in Burundi

calcium. Based on the results, 1,780 on-farm trials have been prepared in the same areas of soil sampling in order to determine the most suitable and profitable fertilizer formulas for local crops.

PAN-PNSEB is funded by the Netherlands’ Ministry of Foreign Affairs.





Documentary Tracks Fertilizer Journey From Kenya to South Sudan

USAID Seeds for Development in South Sudan:

400 Tons, 600 Miles

A DOCUMENTARY OF THE DRAMATIC JOURNEY TO DELIVER FERTILIZER FROM KENYA TO SOUTH SUDAN

WATCH VIDEO



Lack of infrastructure, particularly transportation and storage, are often cited as the greatest constraints to sustainable agricultural intensification in the developing world. According to the World Bank, only about 20 percent of all roads in Sub-Saharan Africa are paved, and many of those are much in need of repair.

To bring focus to this issue, the USAID Seeds for Development in South Sudan project, implemented by IFDC, produced a documentary video that followed the dramatic journey to deliver 400 mt of fertilizer from Nakuru in western Kenya to its final storage destination in Yei, South Sudan. Large transport trucks drove 600 miles across three countries to deliver the much-needed agro-inputs, which were a key component of the USAID project.

Teams of drivers traveled poorly paved and narrow dirt roads constantly congested with other traffic. Foul weather plagued much of the trip, with rains causing muddy and slippery conditions that more than once put the drivers in peril. The operational condition of the trucks was also a concern. With each breakdown, crafty drivers who lacked immediate access to spare engine parts were left with only their ingenuity to get the machines moving again.

The trip took 11 arduous days, but the trucks finally reached their destination in Yei. “Despite the challenges, I would make the journey again. The farmers who will use the fertilizer will benefit,” said one driver, referring to the 200 mt of urea and 200 mt of diammonium phosphate (DAP) that were finally available to farmers participating in the USAID project.

The USAID Seeds for Development project (2011-2013) worked to transform agriculture from subsistence farming to a market-oriented, competitive and profitable agricultural system. The project harnessed the entrepreneurial spirit of agro-dealers, seed companies, farmers, food processors and financial institutions to commercialize the agricultural value chain. A key methodology utilized was integrated seed sector development combined with the formation and maturation of specific agribusiness clusters. Through Seeds for Development, IFDC educated farmers about the benefits of high-quality seed and modern fertilizer technologies and trained them in their proper use.

The documentary may be viewed at: www.ifdc.org/Videos/26187/.

SEW Completes Efforts to Introduce Sustainable Energy Production in CAGLR



▲ *Members of a professional charcoal-makers association in Rwanda inspect an improved natural kiln.*

The recently completed Sustainable Energy Production through Woodlots and Agroforestry (SEW) project has decreased the competition for land between energy production and agricultural production by establishing wood plantations (micro-woodlots) on lands considered marginal by the region's agricultural communities. SEW has also increased the efficiency of the charcoal, brick making and cook stove value chains, creating new opportunities for local entrepreneurs. Implemented from 2009 to 2013, the project planted 22,500 ha of trees in Burundi, Rwanda and North and South Kivu in eastern Democratic Republic of Congo (DRC), all part of Central Africa's Great Lakes Region (CAGLR). Using a labor-intensive (HIMO) approach for tree planting on private land, the project established 400 tree nurseries to produce 34.5 million tree seedlings, providing employment to more than 38,453 tree growers and injecting US \$3.6 million into local economies. More than half of those involved in HIMO activities were women.

Practices such as harvesting trees for fuel (often illegally) without planting replacements once fostered severe environmental degradation and jeopardized agricultural production. For example, between 1990 and 2010, Burundi lost 40 percent of its forests to deforestation.

Further compounding the problem, household use of energy-inefficient cook stoves and traditional methods of brick making once also wasted enormous amounts of energy and increased environmental pollution.

SEW's efforts led to significantly more available wood, which was converted to improved charcoal for cooking and heating in the region – a critical achievement in light of the energy crisis in the CAGLR. Through field trainings for more than 2,000 charcoal producers, SEW introduced improved natural kilns that increase the amount of charcoal produced while using less wood. The specialized charcoaling process also reduces environmental impact and consumer costs because the high-quality charcoal burns longer.

Association building led to professionalization of the sector; 121 associations/groups were organized. In addition, local artisans in Burundi and eastern DRC received training in the production of improved cook stoves. By project end, 21,756 improved stoves were produced, and artisans were able to charge 25-30 percent higher prices for their superior products.

SEW was funded by DGIS. Project oversight was provided by the Embassy of the Kingdom of the Netherlands in Rwanda.



▲ *A laborer transports tree seedlings for planting in Rwanda.*



Improved Fertilizer Blends Double Maize Harvests for Mozambican Farmers

Rosa Carlos, a 47-year-old widow with two young children, has become a model for Mozambican farmers, running two thriving shops that sell foodstuff, household goods and farm inputs. She has two homes, one in Chimoio and one in Vanduzi, both in the Manica Province of Mozambique. Carlos says she is doing “quite well – thank you.”

So, what is the key to Carlos’ well-being? It is the improved fertilizer blends that are being promoted by the USAID Agricultural Input Markets Strengthening (AIMS) III project.

“It’s made a huge difference,” Carlos explains. “With the usual fertilizer, I was harvesting 900-1,000 kilograms of maize per hectare. This year I used an improved fertilizer blend from the AIMS III project and harvested 2,400 kilograms per hectare.”

Carlos is just one of many farmers in Mozambique learning the importance of using the correct blend of NPK fertilizers to optimize yields. Farmers in Mozambique mostly use a blend of 12:24:12 NPK fertilizer – an inappropriate choice for the nation’s most important crop (maize) and for the type of soil found in 45 percent of the country’s farmland.

AIMS III and its partners are promoting recently developed alternatives to the 12:24:12 NPK blend. These formulations are cheaper and more effective fertilizers, specifically designed to overcome the nutrient deficiencies common in Mozambican soils. For example, the newly introduced blends provide more N (important for maize), as well as necessary but often overlooked micronutrients such as sulfur, zinc and boron. And because they contain less potassium, which is expensive and unnecessary for cereal crops in most areas, they are less expensive than the 12:24:12 blend.

The new fertilizer blends were developed by IFDC and are being scaled out in Mozambique through the AIMS III project. Farmers like Carlos accelerate the scaling-out process not simply because they are pioneering technology adopters but because they are actively involved within their communities. She wants those around her to experience the same joys of agricultural success.

Carlos’ farm in Macadera, Manica Province, covers 5 ha. Like many other smallholder farmers in Mozambique, she can only cultivate 3 ha of her land because hired labor is so expensive, but she makes it count, using several new technologies introduced by the project in addition to the new fertilizer blends, such as CPPs, crop rotation, mulching and pest and disease management.

Carlos has set aside a 0.12-ha plot on her farm for AIMS and its partners to run crop demonstrations. Farmers visit Carlos’ demonstrations throughout the season, seeing first-hand how the new technologies can increase yields, reduce production costs and raise profits. Carlos says that she feels energized when farmers adopt a new technology or improved practice after visiting her farm. “It means that I am doing something good for my community.” And in the world of smallholder farming, that makes all the difference.



▲ Farmer and agro-dealer Rosa Carlos in her shop in Vanduzi, Manica.

IFDC Introduces Specialized Training Calendar for 2014

IFDC's international training, workshop and study tour programs are designed for professionals in private, public, cooperative and non-governmental organizations. Each program is conducted by a multi-disciplinary team from IFDC's experienced and qualified international staff and invited experts.

The latest training technologies are used to promote knowledge transfer and skills development. To date, IFDC has held more than 700 workshops, study tours and training programs for over 11,000 participants from over 150 countries.

2014 International Training Calendar

Training Program/Workshop/Study Tour	Dates	Location	Program Fee
Fertilizer Value Chain—Supply System Management and Servicing Farmers' Needs	April 14-18	Accra, Ghana	\$1,500
Developing Private Sector Agro-Input Markets: Designing and Implementing Targeted Input Subsidies (French Edition)	May 5-9	Dakar, Senegal	\$1,500
Agricultural Market Information Systems and IT Platforms for Business Management Across the Value Chain	June 2-6	Nairobi, Kenya	\$1,500
Linking Farmers to Markets in Africa (French Edition)	July 7-11	Bamako, Mali	\$1,500
Technology Advances in Agricultural Production, Water and Nutrient Management	August 18-29	Alabama, Tennessee, Missouri, Arkansas, Iowa and Washington, D.C. (United States)	\$2,200
Nutrient Delivery Strategies – Fertilizer Deep Placement (FDP) and Blending Opportunities in Africa	October 6-10	Pretoria, South Africa	\$1,500
Granular Fertilizers Production	November 3-7	Bangkok, Thailand	\$1,900
Promoting Innovative Composting Alternatives of Agricultural and Municipal Waste	November 24-28	Accra, Ghana	\$1,500
Fertilizer Marketing Strategies: Improving Efficiency in Pricing, Product Management, Technology Promotion and Logistics	December 15-19	Jakarta, Indonesia	\$1,900



USA Training and Study Tour Receives Highest Satisfaction Rating to Date



▲ IFDC staff and training participants pose for a group photograph at IFDC headquarters in Muscle Shoals, Alabama, USA.

In August, IFDC conducted a two-week training and study tour on “Technology Advances in Agricultural Production and Fertilization” that took participants to Washington, D.C., and several southern and midwestern U.S. states, including Alabama, Arkansas, Illinois, Missouri and Tennessee. The training group visited public and private sector organizations that are impacting U.S. agriculture through advances in production and fertilization that not only improve productivity but also safeguard the environment.

The training program was attended by 32 participants (including eight women) representing 27 organizations from 11 countries. Fifty-six percent of the participants came from agricultural research organizations, while 41 percent represented private fertilizer companies. Three percent were from the public sector.

The training and study tour received the highest satisfaction rate ever recorded for specialized IFDC training programs, with participants unanimously rating the program as “very good” to “excellent.” Participants noted a number of benefits derived from the program – in particular the value of field trips, travel arrangements, quality of discussions and planning of the entire program, as well as the achievement of program objectives. The study tour also provided participants with a unique

opportunity to develop their professional skills while building relationships with professionals involved in these new technologies.

Technology: The Future of Farming

Several systems-research tools such as geographic information systems (GIS), global positioning systems (GPS) and remote sensing (RS) have become widely available for fertilizer and irrigation management in many parts of the world. Farmers can now refine nutrient recommendations and water management models to the site-specific conditions of each field. Variable rate technology, combined with agricultural technologies such as fertilizer, irrigation systems, CPP applicators and yield monitors, has evolved rapidly and fostered the growth of what is known as precision agriculture. This approach to agriculture maximizes farmers’ benefit-cost ratios by integrating GIS, GPS and RS into agricultural practices to manage within-field variability.

Many of these advanced technologies are directly applicable to agricultural production in both developing and developed country environments. The main objectives of the training and study tour were to improve participants’ knowledge and understanding of recent technological advances in biotechnology, sensor-based irrigation, information management, precision agriculture and RS, and to familiarize them with the farm-level



farmers, agribusinesses and policymakers are adjusting to them by using state-of-the-art information and technology.

The program began on August 19, 2013, at IFDC headquarters in Muscle Shoals, Alabama, and was officially opened by IFDC President and CEO Dr. Amit Roy. The program started with nearly two days of classroom-style presentations by IFDC staff and invited experts and by the participants, who gave presentations on their home countries. Following these sessions, the group departed for a week of field visits and tours of 27 U.S.-based organizations, including small private farms, agricultural

impacts of each of these advances on water and nutrient management under changing climatic conditions. The training also provided an opportunity to observe and discuss the practicality and economics of integrating these innovations into the mainstream of major cropping systems. Just as importantly, participants were exposed to trends and challenges in the global agricultural market and learned how

research centers, extension services, private fertilizer companies, education centers, governmental organizations and NGOs. Technological advances in agriculture and fertilization were demonstrated around four key agricultural commodities: maize, cotton, rice and soybean. Participants also attended the 2013 Farm Progress Show



▲ Precision agricultural technology, like this nitrogen sensor, can help reduce and optimize crop input use. Photo: Wikimedia Commons.

► The Farm Progress Show is the nation's largest outdoor farm show, featuring the most extensive state-of-the-art agricultural information and technology available. Photo: KBIA.org/Bill Wheelhouse/ Harvest Public Media.



▲ Training participants learn about modern techniques to optimize water usage.

in Decatur, Illinois. The Farm Progress Show is the nation's largest outdoor farm show with more than 500 exhibitors and features the most extensive state-of-the-art information and technology available for today's agricultural producers. The event hosted exhibits by the world's largest and regionally significant agricultural manufacturers and service providers. Live field and

technology demonstrations and seminars were held during the show. Due to the success of the program and ongoing interest in this unique training experience, IFDC plans to hold the next edition of the training and study tour in August 2014.

I learned a lot and received a lot of inspiration and aspirations that I hope to put into practice. I intend to set up a precision farm of my own, both educational and research-oriented, as well as a small food production, processing and storage center...

– Dr. Roseta C. Eneje, Michael Okpara University of Agriculture, Umudike, Nigeria

IFDC and IFA Share Knowledge in Phosphate Fertilizer Production



▲ IFDC staff and training participants pose for a group photograph in Bangkok, Thailand.

Since 2001, through biennial events, the International Fertilizer Industry Association (IFA) and IFDC have conducted the Phosphate Fertilizer Production Technology workshops to share knowledge and exchange information with representatives of the phosphate fertilizer industry regarding various production technologies. These workshops have been highly successful due to their unique scope. Unlike similar training programs in the industry, IFA-IFDC workshops are not process/product specific, but instead focus on all phosphate-based fertilizer processes.

Phosphate fertilizers include single superphosphate (SSP), triple superphosphate (TSP), DAP, monoammonium phosphate (MAP), ground phosphate rock and ammonium phosphate-based NPKs. These products are effective means of correcting soil phosphorus deficiencies and increasing production yields with better quality crops. Phosphorus is a critical nutrient to current and future global food security.

Phosphate rock is the primary source of phosphorus and the main raw material from which phosphate fertilizers are produced. While phosphate rock is a non-renewable resource, phosphorus, on the other hand, is a renewable resource that can be captured, recycled and reused within economic and technical limits. IFA and IFDC, together

with partners in the fertilizer industry, are committed to the sustainable use of all phosphorus resources. For this reason, they joined to organize the seventh international workshop on Phosphate Fertilizer Production Technology in Bangkok, Thailand, in October, with the ultimate goal to increase efficiencies and reduce losses in phosphate fertilizer production processes.

The objectives of the five-day workshop were to provide engineers and other specialists in the fertilizer industry with an in-depth view of phosphate fertilizer production technologies and identify future trends and needs. Organizers offered an examination of the status of the most recent phosphate fertilizer production technologies and provided participants with technical knowledge across a broad range of phosphate production techniques, including an understanding of the best available technology options, economic factors impacting the sector, energy use scenarios and the best approaches to safety. The workshop also enhanced the participants' analytical and troubleshooting skills in order to better identify and resolve operational inefficiencies within their facilities, and provided an opportunity to exchange ideas on a range of production topics with leading technology experts and participants.

The workshop was attended by 33 participants representing 26 organizations from 19 countries, including Australia, Brazil, Burma, Canada, Egypt, Fiji, India, Indonesia, Malaysia, Morocco, New Zealand, Pakistan, Philippines, Qatar, Romania, Serbia, Singapore, South



A big thank you to IFDC for organizing the phosphate fertilizer workshop in Thailand. The sessions were very informative, and what I liked the most was open discussion ... everyone participated energetically. Well done, IFDC!

– Mr. Ashween N. Ram, South Pacific Fertilizers Ltd., Fiji

Africa and the U.S. All participants represented the private sector with the exception of one national agricultural research center representative. Private industry speakers from Yara International, Prayon Technologies S.A., RHEWUM GmbH and Fertiplant Engineering Company, Pvt. Ltd. joined IFDC and IFA in Bangkok to share their knowledge and expertise with the group.

Following two days of classroom presentations and discussions, the group took a field trip to Rangsit Agri-Economic Co., Ltd. Part., a small organic granulation plant. The group then participated in two more days of discussions on engineering topics and various presentations before evaluating the workshop. According

to the evaluations, 77 percent of the participants rated the overall program as “very good” to “excellent.” Some aspects that participants rated particularly high were IFDC staff presentations, external industry speaker presentations, the quality of discussions and the knowledge gained from the program.

The next edition of the IFA/IFDC Phosphate Fertilizer Production Technology workshop will be organized in 2015 and will take advantage of the improvements suggested by the participants during their evaluations. In particular, new engineering topics meant to improve phosphate-based fertilizer production processes will be added to the program.



▲ Phosphate rock is the primary source of phosphorus and the main raw material from which phosphate fertilizers are produced.
Photo: StarTribune.com/JimStem/Bloomberg.

AIRCA White Paper Recommends “Landscape” Solutions



In October, the Association of International Research and Development Centers for Agriculture (AIRCA) released a white paper offering recommendations for transforming rural livelihoods in the developing world at the “landscape level.”

AIRCA was formed in March 2012 by nine research and development institutions (including IFDC) as a platform for the organizations to make a combined impact on the Millennium Development Goals (MDGs), particularly Goal 1: the eradication of extreme hunger and poverty. The diverse expertise and global reach of its member organizations provide AIRCA with the linkages and capacity necessary to develop and execute scientific programs with strong local support and a high probability of attaining sustainable development outcomes.

The white paper, “Transforming Rural Livelihoods and Landscapes: Sustainable Improvements to Incomes, Food

Security and the Environment,” represents AIRCA’s foray into the post-MDG discussion, looking past the United Nations Development Program’s MDGs that expire in 2015, toward the currently proposed Sustainable Development Goals (SDGs).

AIRCA is dedicated to sustainable agricultural intensification by addressing the challenges of food security and poverty at the “landscape level,” that is, creating solutions that take into account the diversity of interactions among people and the environment, agricultural and non-agricultural systems and other factors that represent the entire context of agriculture. Because of the wide array of knowledge and expertise within the Association, integrated action to deliver sustainable agricultural intensification at the landscape scale is possible, as each member organization has a proven track record of research, development and implementation.

The paper sets out the Association’s “combined experience of successful approaches, opportunities and challenges in moving farmers from a subsistence to a business basis, and their communities from poverty to prosperity.” The combined experience offers the following recommendations:

- The scaling out of integrated management approaches to seed selection, soil fertility, water utilization, agronomy and pest management and preserving and utilizing crop diversity to arrive at balanced and optimized practices in the context of the local environment and income and food and nutritional security.
- Local and regional inclusive capacity strengthening to improve productivity, market access and landscape management, involving women, young people, indigenous communities and marginalized groups.
- Local, national and regional policy development to capture the economic value of outputs from landscapes – balanced against the long-term values of landscape-scale ecosystem services, biodiversity and interventions.

The paper is available at www.ifdc.org/About/Initiatives/AIRCA.



Selected Studies and Research Now Featured on IFDC Website

IFDC regularly conducts studies and assessments of fertilizer markets, products and policies in order to assist governments and regional economic communities in facilitating an enabling environment for robust agro-input trade and increased agricultural productivity. Selected IFDC studies, reports and research, including fertilizer situation assessments, quality studies and policy briefs, are now housed in a central location on the IFDC website and are available for download. The following are examples of publications that are now available.

Policy Brief: Role of Fertiliser Subsidies in Input Market Development

This policy brief answers the important question: When and under what conditions do subsidy programs present a viable option for linking farmers to fertilizer markets and help to establish private sector-led input distribution systems? The brief draws on the NEPAD policy study, “Practices and Policy Options for the Improved Design and Implementation of Fertiliser Subsidy Programs in Sub-Saharan Africa,” which assesses fertilizer subsidy programs in eight Sub-Saharan African countries. The information presented in this brief was adapted from that study by IFDC experts who contributed to the original publication.

Country Fertilizer Assessments

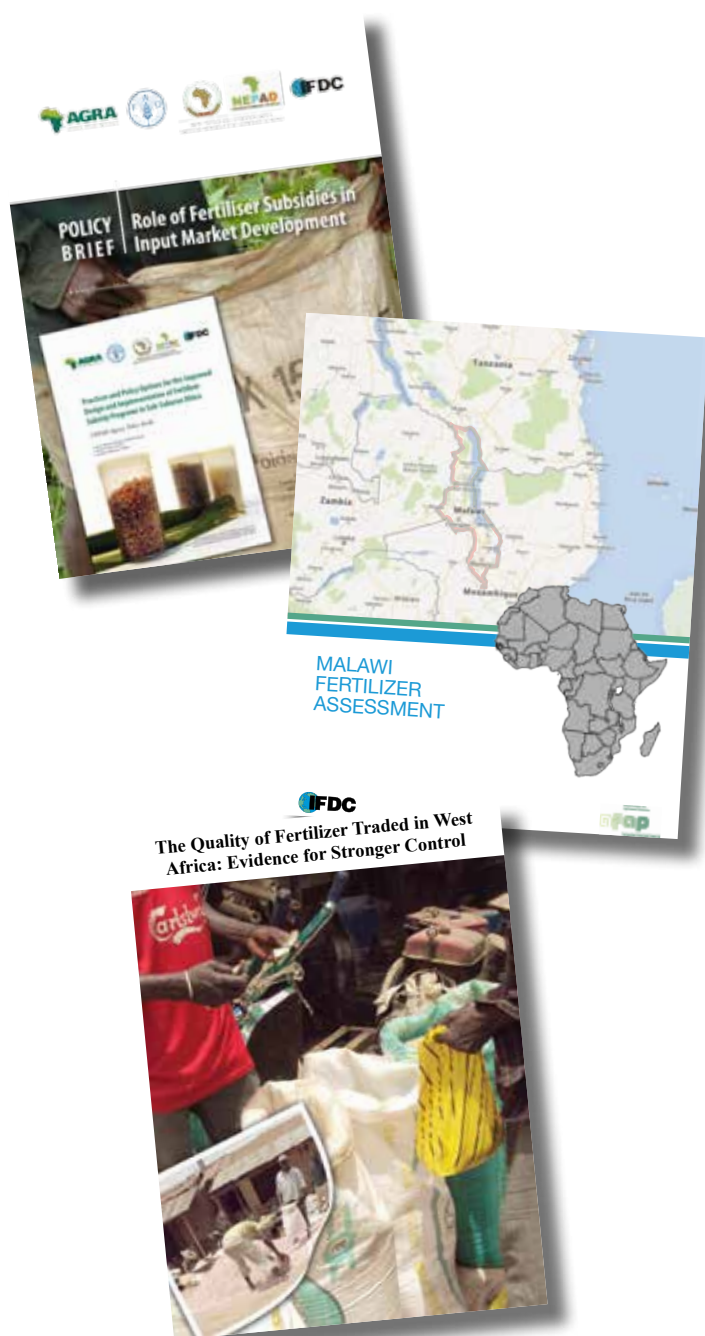
To help nations meet targets set by CAADP, IFDC is conducting a series of fertilizer country assessments funded by USAID. The assessments estimate the fertilizer requirements needed to achieve individual country agricultural growth targets and offer policy options to ensure that these levels of fertilizer use are achieved. AFAP is using the reports to identify constraints to private sector investments in the agriculture sector. Fertilizer assessments have been conducted for Ethiopia, Ghana, Kenya, Malawi, Mozambique, Tanzania and Zambia.

Fertilizer Quality Studies

IFDC’s MIR Plus project, on behalf of ECOWAS and UEMOA, has conducted a regional study analyzing the quality of fertilizer in Côte d’Ivoire, Ghana, Nigeria, Senegal and Togo. After determining the existence of

severe nutrient deficiencies in bulk blends, the study’s authors are calling for the effective enforcement of a new fertilizer quality regulatory system adopted by ECOWAS in 2012. The full regional report, “The Quality of Fertilizer Traded in West Africa: Evidence for Stronger Control,” and five individual country reports that supported the regional report have been published. (See page 17 for more information.)

These and other publications are available for free download at the IFDC research portal: www.ifdc.org/R-D/Research.



2013 Board of Directors Meeting and Workshops Synergize Center's Focus



▲ 2013 IFDC board of directors (left to right): Dr. Vo-Tong Xuan (Vietnam), Dr. Jimmy Cheek (USA), Dr. Mohamed Badraoui (Morocco), Dr. Agnes M. Kalibata (Rwanda), Dr. Steven Leath (USA), Board Chairman M. Peter McPherson (USA), Dr. John B. Hardman (USA), IFDC President and CEO Dr. Amit Roy (USA), Vice Chairman Gerard Doornbos (The Netherlands), Margaret Catley-Carlson (Canada), Vincent McAlister (USA), Dr. Mortimer Neufville (USA) and Patrick J. Murphy (USA). Not pictured: Dr. Josué Dioné (Mali) and H.E. Rhoda Peace Tumusiime (Uganda).

In September, IFDC held its annual board of directors meeting at the Center's headquarters in Muscle Shoals, Alabama, USA. The combination of board members, special guests and nationally and internationally based staff members led to record attendance for the IFDC event.

In the days prior to the board meeting, two workshops were held. The first workshop, titled "Effective Nutrient Management Strategies for Enhanced Productive and Nutritive Agriculture," created a platform to develop a unified vision for IFDC's nutrient management research and implementation efforts, with input from the Center's nationally based and international science experts. The workshop also identified particular niches and key strategies for action. Prior to the workshop launch,

Dr. Terry Roberts, president of the International Plant Nutrition Institute (IPNI), presented "The 4Rs of Fertilizer Use," an in-depth look at the principles of "the right product, right rate, right time and right place" in agro-inputs management.

The second workshop, titled "Capitalizing on Unique Capabilities to Inform Input Sector Policies," was designed to develop a consensus vision for maximizing IFDC's contribution to input policy for smallholder agricultural growth and sustainability. The approach, founded on IFDC's strategic plan and organizational structure, capitalizes on the Center's cumulative intellectual capital and its particular capacity to fuse science with field implementation. Prior to the workshop, a presentation was given by Dr. Per Pinstrup-Andersen, the H.E. Babcock Professor of Food, Nutrition and Public Policy, the J. Thomas Clark Professor of Entrepreneurship



and Professor of Applied Economics at Cornell University and Adjunct Professor at Copenhagen University. Pinstруп-Andersen is also a former director of IFDC's research and development division, now known as the Office of Programs. His presentation provided an overview of key policy issues surrounding food security in the coming years.

Other special guests who attended the four days of events were USAID representative Andrew Levin, who is also a member of the board of advisors for the Virtual Fertilizer Research Center (VFRC), and James Oehmke, also a USAID representative. Dr. Prem Bindraban, executive director of the VFRC, also attended the event in advance of the VFRC board of advisors annual meeting held following the IFDC board meeting at IFDC headquarters.



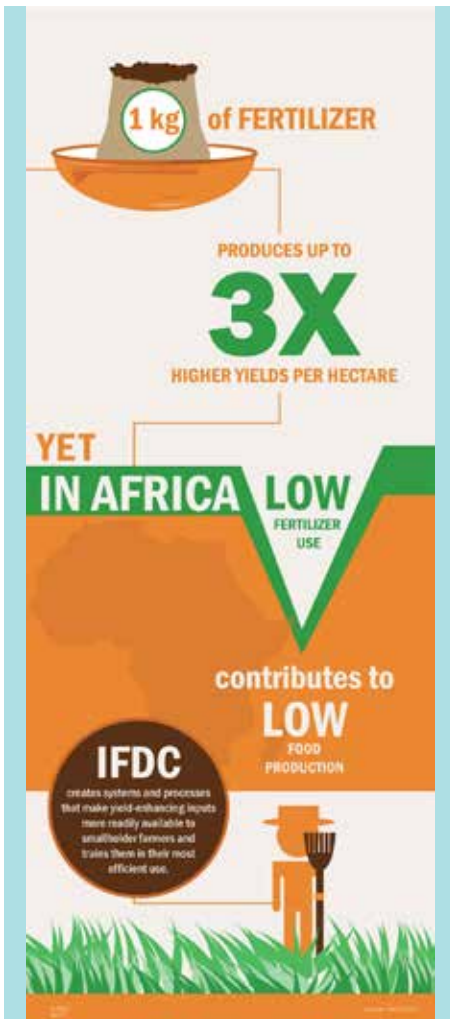
(1) Dr. Md Abdul Wohab, agricultural engineer for IFDC's AAPI project and recipient of the IFDC President's Outstanding Outposted Staff Member Award for his invention of a mechanical FDP applicator that is now in wide use, talks with board chairman M. Peter McPherson; (2) Dr. André de Jager, director of IFDC's NWAFFD, delivers a



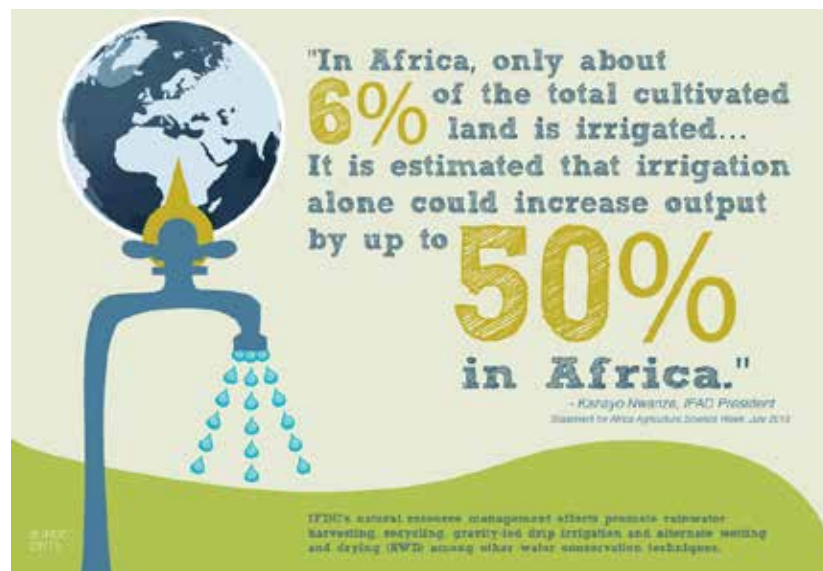
presentation on nutrient use efficiency; (3) Left to right: VFRC board member Dr. A.K. Singh, Dr. Amit Roy and Dr. Prem Bindraban, executive director of the VFRC, discuss issues during a break; (4) Over 150 staff, board members and guests attended the board meeting, workshops and dinner; (5) Robert Groot, director of IFDC's ESAFD, talks with John Wendt, IFDC senior expert - soil fertility management (right); and (6) Dr. Amit Roy (left) and board member Patrick Murphy (right) talk with special guest Dr. Per Pinstруп-Andersen.



New Infographics Page on IFDC Website Designed to Engage Users



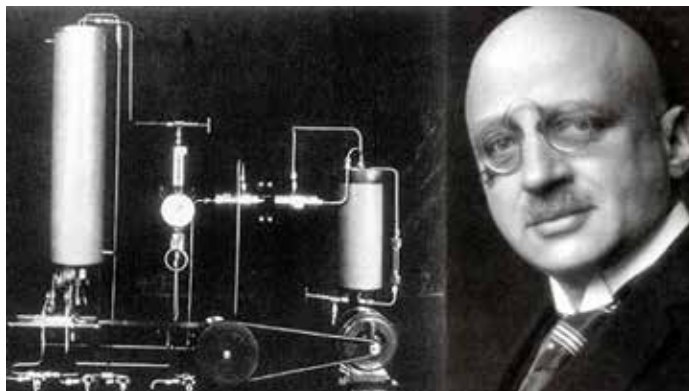
As the IFDC website continues to evolve, new features are being added regularly to supplement IFDC’s informational content. In its efforts to make information more engaging for site visitors, IFDC is developing new infographics that offer timely data on priority issues such as global food security; hunger, malnutrition and poverty; fertilizer technology; and value chain development. To learn more, go to www.IFDC.org and click “Infographics” at the top of the page. And remember to visit the site often, as new infographics and other developments are always in the works.





Fueling Food Security for a Century:

100 Years of the Industrial Application of the Haber-Bosch Process



The creation of the Haber-Bosch process for fertilizer production may be the only event in modern agricultural history that trumps Dr. Norman Borlaug's "Green Revolution" in eminence – in fact, Borlaug often noted that chemical fertilizers "fueled" that revolution. One hundred years ago, the German dye company-turned-ammonia-producing giant BASF began operations of the first-ever industrial-scale ammonia production plant in Ludwigshafen, Germany. Since then, nitrogen fertilizer production and use have increased exponentially and, according to noted economist and agricultural expert Dr. Vaclav Smil, are sustaining the lives of billions of people.

The Haber-Bosch process combines atmospheric nitrogen with hydrogen under incredibly high temperatures and pressure to produce ammonia, a key ingredient in nitrogen fertilizers. Driven by Sir William Crookes' 1898 warning that "England and all civilized nations stand in deadly peril" of a population that would soon outgrow its food supply, the Haber-Bosch process grew from producing only a few drops at a time in 1909 to producing 20 mt of fixed nitrogen per day at BASF's Oppau plant in 1913. By the end of World War I, BASF's plant in Leuna reached a capacity of 200,000 mt annually.

Soon after that scaling in Europe, the U.S. Government obtained access to the process and began producing ammonia-based products in Muscle Shoals, Alabama. By the 1960s, the fledgling yet booming U.S. fertilizer industry grew with each new technological advance made by the National Fertilizer Development Center (NFDC), the predecessor to IFDC. It was this plethora of modern inorganic fertilizers that "fueled" the Green Revolution, according to Borlaug. Because of the Green Revolution,

Borlaug is credited with feeding 1 billion people who would otherwise have starved, and he could not have succeeded without the Haber-Bosch process.

Harnessing that same momentum and responding to the food and energy crisis of the 1970s, IFDC was created in 1974. The Center was tasked with developing cheaper and more efficient fertilizers for deployment to developing nations. Since then, IFDC's work has greatly



expanded to include efforts to increase soil fertility, build national economies through agricultural market development and drive enabling policies for agricultural trade. Along the way, the Center developed the concept of FDP, a process that increases fertilizer efficiency, thus improving yields while decreasing fertilizer use. This

technology has transformed nations like Bangladesh and is beginning to change agriculture in Sub-Saharan Africa, but it would not exist without Haber's scientific brilliance and Bosch's innovative drive.

Dr. Smil states that "Without [Haber-Bosch] synthesis, about two-fifths of the world's population would not be around – and the dependence will only increase as the global count moves ... to 9 or 10 billion people." Crookes' warning could still ring true. The global population is estimated to increase to 9.6 billion by 2050. So, more is required – not a rampant increase in the production of nitrogen fertilizers, but the development and widespread judicious use of more efficient 'smart' fertilizers targeted to crops that promise greater yields and better nutrition – all the while creating better livelihoods for the vast number of farmers who grow our food. It is in this way that IFDC honors Fritz Haber and Carl Bosch at this milestone – by seeking to feed the world in a wise and sustainable way.

- ▲ (Top left): Fritz Haber and a tabletop model of his nitrogen fixation machine.
- ▲ (Above): Carl Bosch, the man responsible for scaling up Haber's invention.

IFDC Board of Directors/ VFRC Board of Advisors

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

IFDC



Margaret Catley-Carlson, patron of the Global Water Partnership (GWP) and member of the UN Secretary General's

Advisory Board on Water and Sanitation, moderated a luncheon with the 2013 World Food Prize laureates during the 2013 Borlaug Dialogue in Des Moines, Iowa (United States). The luncheon, "Looking Ahead: A Conversation with Laureates," featured Mary-Dell Chilton, Robert Fraley and Marc Van Montagu, who share the prize for their work in agricultural biotechnology. Catley-Carlson has served on IFDC's board of directors since 2006. She chairs the board's Budget Committee and is a member of the Executive and Audit committees.



Agnes Kalibata, Rwanda's Minister of Agriculture and Animal Resources, participated in the ICT4Ag international

conference in Kigali, Rwanda. Organized by the Centre for Technical Agricultural and Rural Cooperation (CTA) and the Rwandan agriculture ministry, the event provided an opportunity for participants to discuss solutions to the key challenges facing the widespread use of information and communication technologies (ICT) in agriculture. During the conference, Kalibata described both agriculture and ICT as low hanging fruits for poverty reduction. Kalibata has been a member of the IFDC board of directors since 2008. She chairs the board's Africa Committee and is a member of the Executive Committee.



Rhoda Peace Tumusiime, African Union Commissioner for Rural Economy and Agriculture, was a speaker at the 2013 African

Green Revolution Forum (AGRF) in Maputo, Mozambique. More than 150 stakeholders gathered to discuss the theme "Scaling Up and Financing Inclusive Agribusiness Through Transformative Public-Private Partnerships." Opening the forum, Tumusiime stated, "Ten years ago, African leaders made a commitment here in Maputo to commit greater funds to develop agriculture and increase food security on the continent. We must use this Forum to remind leaders of the critical importance of that commitment and their continued support to agriculture. The African Union welcomes this timely discussion around strengthening the role of public-private partnerships within the framework of the AU's Comprehensive Africa Agriculture Development Programme. 2014 has been declared by the African Union as the Year of Agriculture and Food Security. It will be the year in which heads of state will renew their commitments to CAADP." Tumusiime has served on IFDC's board of directors since 2010 and is a member of the board's Africa and Budget committees.

VFRC



Peter McPherson, chairman of the board of the Partnership to Cut Hunger and Poverty in Africa, and **Marco Ferroni**, executive

director of the Syngenta Foundation for Sustainable Agriculture, served as co-chairs and moderators of a symposium on "Developing Strong Public-Private Partnerships for Agriculture, Food and Nutrition in Africa." The symposium was a side-event during the 2013 Borlaug Dialogue. Peter McPherson is chairman of the IFDC board of directors and has been a member of the board since 2004. He chairs the board's Executive

Committee and is a member of the Nomination Committee. McPherson is also a member of the VFRC board of advisors. Ferroni has been a member of the VFRC board of advisors since 2010 and serves on the Science Committee.



Ruth Oniang'o, chair of the Sasakawa Africa Association and editor-in-chief of the *African Journal of Food, Agriculture, Nutrition and*

Development, gave a lecture titled "Sub-Saharan Africa Needs Food Science and Related Disciplines NOW" as part of the World Food Prize Lecture Series during the 2013 Borlaug Dialogue. Oniang'o is one of 15 experts appointed by the Bureau of the Committee on World Food Security to serve on the Steering Committee of the High-Level Panel of Experts on Food Security and Nutrition from 2013 to 2015. Oniang'o has been a member of the VFRC board of advisors since 2010 and serves on its Executive Committee. She previously served on the IFDC board of directors from 2002 to 2008.

IFDC Staff News

Sampson Agyin-Birikorang, IFDC scientist - systems agronomist, co-wrote the paper "Sustainable Nutrient Management Package for Cost-Effective Bioenergy Biomass Production," published in the *Journal of Plant Nutrition* (Volume 36, 2013). The article evaluates the feasibility of co-applying Gibberellins (plant growth regulators) and reduced nitrogen rates to produce bioenergy crops less expensively. Co-authors are George A. O'Connor and John E. Erickson of the University of Florida.

Patrice Annequin, senior market information specialist, and **Bridget Okumu**, ESAFD regional market information system specialist, participated in the ICT4Ag international conference in Kigali, Rwanda. Annequin



chaired a group discussion on “ICTs/ Mobile Apps for Access, Distribution and Application of Agricultural Inputs.” During the discussion, Okumu gave a presentation on “Linking Farmers to Agro-Input Supply Chains from Global to Local Levels through ICT.” IFDC was also represented by **Dennis Mose**, ESAFD database administrator; **Willen Selen**, IT specialist; and **Rieke Weel**, regional development communication officer. Weel also served as a social media reporter for the conference.

Rieke Weel and John Veerkamp, CATALIST-2 chief of party, organized a workshop on “Access to Markets: Information Systems and Communication Technology” during the EMRC Agribusiness Forum 2013 in Kigali, Rwanda. The largest forum of its kind on the African continent, the event focused on “The Agri-Food Sector: A Catalyst for Sustainable and Inclusive Growth in Africa.” Workshop participants included **Martin Drevon**, PREFER chief of party; **Innocent Ntabana**, IFDC consultant; **Bridget Okumu**; **Willen Selen**; and Titus Nalinda, Makerere University research assistant. As keynote speaker, Olaf Erz, International Institute for Communication and Development (IICD) regional manager in Ethiopia, highlighted key success factors for market access through ICT.



Steven J. Van Kauwenbergh, principal scientist and project leader of IFDC’s Phosphate Research and Resources Initiative, was the keynote speaker at the 2013 Annual Regional Phosphate Conference in Lakeland, Florida (United States). Van Kauwenbergh’s presentation was on “Future World Phosphate Rock Reserves and Resources.” The conference focused on the need for phosphate mining and new technologies that increase productivity while using sound environmental strategies. Van Kauwenbergh co-wrote the article “World Reserves of Phosphate Rock... a Dynamic and Unfolding Story,” along with Mike Stewart and Robert Mikkelsen of IPNI. Published in IPNI’s *Better Crops with Plant Food* (2013, No. 3), the article provided a brief review of global phosphate rock reserves and resources, stressing that recent concerns of a catastrophic phosphorus shortage are not warranted.

Sarah Gavian, IFDC chief economist, participated in a delegation of IFA members during a series of United Nations meetings in New York City. During the event, Gavian attended the fifth session of the Open Working Group on the SDGs. The SDGs will build upon the Millennium Development Goals and provide a unified framework for the UN development agenda post-2015.

Deborah Hellums, leader of IFDC’s Soil and Plant Nutrition program, contributed to the World Resources Institution (WRI) working paper, “Improving Land and Water Management.” The paper discusses IFDC’s work with ISFM and presents ISFM as one of the four most promising improved land and water management practices, particularly for the drylands of Sub-Saharan Africa. The publication is Installment 4 of WRI’s series *Creating a Sustainable Food Future*.

Grahame Hunter, AAPI chief of party, attended IFA’s Crossroads Asia-Pacific 2013 in Bali, Indonesia. The IFA event focuses on the fertilizer industry in Asia and the Pacific Basin. During a workshop on nutrient stewardship initiatives in the Asia-Pacific, Hunter gave a presentation on urea deep placement in Bangladesh.

Latha Nagarajan, IFDC scientist - economics and Rutgers University research associate, co-wrote the article “Role of Biotechnology in Stimulating Agribusiness R&D Investments in India.” The article was published in *AgBioForum* (Volume 16, Number 2, 2013) and co-written by Carl E. Pray, Rutgers University professor. According to the paper, the introduction of biotechnology cotton increased seed sales and research and development in India.

Several members of IFDC’s Office of Programs presented their research at the American Society of Agronomy (ASA), Crop Science Society of America (CSSA) and Soil Science Society of America (SSSA) international annual meetings held in Tampa, Florida (United States). **Joaquin Sanabria**, scientist - biometrician; **Georges Dimithe**, MIR Plus project coordinator; and **Emmanuel Alognikou**, MIR Plus fertilizer policy expert, co-authored the poster, “Quality Assessment of Fertilizer Commercialized in West Africa.” The poster summarizes the study “The Quality of Fertilizer Traded in West Africa: Evidence for Stronger Control” (see page 17 for more information). The paper “Using Bio-Organic Acids to Improve Agronomic Efficiency of Unreactive Phosphate Rock” was presented by co-authors **Sampson Agyin-Birikorang**; **Upendra Singh**, principal scientist - systems modeling (soil fertility); **Joaquin**

Sanabria; and **George Smith**, senior technician - greenhouse services. In addition, the paper “Evaluation of Boron as Urease Inhibitor” was presented by co-authors **Upendra Singh**; **Job Fugice**, coordinator of analytical services; **Wendie Bible**, senior laboratory analyst; **Rick Austin**, retired coordinator of analytical services; and **Joaquin Sanabria**.

Amit Roy, IFDC president and CEO, attended the 19th Nigerian Economic Summit, which focused on diversifying the country’s economy through agricultural development. Roy served as moderator for a discussion on “Building a World Class Petrochemicals and Fertilizer Industry in Nigeria.” **Scott Wallace**, IFDC country representative in Nigeria, moderated a break-out session on “The Growth Enhancement Scheme: Success and Input-Building the Seed Industry.”

Amit Roy also participated in the 2013 Fertilizer Outlook and Technology Conference in Tampa, Florida (United States), along with **Rob Groot**, director of ESAFD; **Olivia Gist**, GIS specialist; and **Janice Berry**, retired coordinator of the market information unit. Organized by The Fertilizer Institute (TFI) and Fertilizer Industry Roundtable (FIRT), the event brings together fertilizer industry experts to discuss supply and demand factors surrounding agriculture and emerging crop nutrient technologies. Groot gave a presentation on the fertilizer market in Sub-Saharan Africa. During a roundtable discussion on innovation in the fertilizer industry, Roy gave a presentation on “Global Research and Development Opportunities to Advance Technologies.”

Maria Wanzala, senior policy economist seconded to NEPAD, and **Rob Groot** developed a policy brief on the “Role of Fertiliser Subsidies in Input Market Development.” The brief was adapted from the NEPAD policy study, “Practices and Policy Options for the Improved Design and Implementation of Fertiliser Subsidy Programs in Sub-Saharan Africa,” which assesses fertilizer subsidy programs in eight Sub-Saharan Africa countries. (See page 37 for more information.)



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