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An update on the work and progress at IFDC

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Fertilizer development is a "human issue" says Thomas Hager

Board members and honored guests pose with author Thomas Hager. Left to right are Larry Paulson, Peter McPherson, Amit Roy, Mark Huisenga, Agnes Abera-Kalibata, Vincent McAllister, Mortimer Neufville, Margaret Catley-Carlson, Hager, Pat Murphy, Luc Maene, Osamu Ito and Vo-Tong Xuan.

Thomas Hager, author of *The Alchemy of Air*, presented IFDC's fifth Travis P. Hignett Memorial Lecture on September 16 at the TVA auditorium in Muscle Shoals, Alabama. Hager spoke to a crowd of about 200 scientists, educators and press about "Feeding a Hungry World: The Triumph of Synthetic Fertilizers."

Hager emphasized that he is not a scientist but rather a journalist with some knowledge of science. He began his lecture with a large-screen photo of Dr. Norman Borlaug, former member of the IFDC board of directors and third Hignett lecturer, and told about Borlaug's participation in the Green Revolution and his impact on a hungry world.

Thomas Malthus' predictions of human extinction as a result of mass starvation have not come true, Hager said. The reasons why are in Hager's most recent book, *The Alchemy of Air*. In the book, he tells the story of Dr. Carl Bosch and Dr. Fritz Haber. Their discovery in the early 1900s of how to synthesize ammonia from nitrogen and hydrogen is probably the most significant invention of the 20th century.

Developed by chemist Haber in 1909 and commercialized by Bosch, the Haber-Bosch process combines nitrogen and hydrogen, in the presence of a catalyst, under extreme

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Norman Borlaug, "father of the Green Revolution," dies at age 95

After devoting his life to feeding the world through advancements in crop science, Dr. Norman Borlaug, plant breeder and 1970 Nobel Peace Prize winner, died at age 95 on September 12, 2009.

Borlaug's work breeding high-yielding wheat varieties made it possible for countries in Asia, Latin America and the Near and Middle East to prevent mass famines and increase food security, a movement that became known as the "Green Revolution." Many Green Revolution countries, such as India and Pakistan, even increased production enough to become self-sufficient in wheat.

Born in 1914, Borlaug grew up on a farm in Iowa and completed his early education in a one-room schoolhouse. He went on to earn a master's degree and doctorate in plant pathology at the University of Minnesota.

After World War II, Borlaug worked for the Cooperative Wheat Research and Production Program, a joint initiative of the Rockefeller Foundation and the Mexican government.

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IFDC Report

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IFDC is a public international organization (PIO), governed by an international board of directors with representation from developed and developing countries. The nonprofit Center is supported by various bilateral and multilateral aid agencies, private foundations and national governments.

IFDC focuses on increasing and sustaining food and agricultural productivity in developing countries through the development and transfer of effective and environmentally sound crop nutrient technology and agribusiness expertise.

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From left, Peter McPherson, chairman of IFDC's board of directors, speaks to author Thomas Hager and board member Pat Murphy about some of the finer points of Hager's Hignett lecture.

Fertilizer development is a "human issue" says Hignett lecturer Thomas Hager (continued from page 1)

pressure and high temperature to produce ammonia (fixed nitrogen), which is a key component in manufacturing mineral fertilizers (as well as explosives).

This chemical process, which most people have never heard of, probably keeps alive almost half of the people in the world, according to Hager. Today, the Haber-Bosch process is used in huge factories, which Hager says are "the size of small cities." Haber-Bosch factories produce an amount of fixed nitrogen equivalent to that produced naturally, doubling the amount available on earth. The process burns about 1 percent of all the energy used around the world. Hundreds of factories convert atmospheric nitrogen to ammonia in order to manufacture the fertilizers that make modern-day agricultural yields possible.

Fertilizer development is definitely a "human issue," Hager said. A multifaceted approach is needed to develop environmentally friendly fertilizers and boost food production at the same time. Dr. Amit Roy, IFDC president and CEO, said that the organization's scientists are currently conducting such research around the world.

"Essentially, it comes down to how do you improve the efficiency of nitrogen fertilizer?" Roy said. Current methods for manufacturing nitrogen fertilizers require tremendous amounts of energy. The organization is also working to develop fertilizers that will retain nitrogen until it is needed by the crop and not release it prematurely so that it is washed away, eventually winding up in an ocean or volatilizing.

"The work that IFDC is doing is essential because it recognizes that this is not just a technological issue; it's not just a science issue. It's a human issue. The food supply of the world is an issue that cuts across science and technology. It cuts across culture and cultural history, national identity, international relations, politics, big business and money," Hager said.

The Travis P. Hignett Memorial Lecture Series was initiated by IFDC in 1994. The Series honors this distinguished chemist, chemical technologist and developer, author and administrator. After a 35-year career with the Tennessee Valley Authority's fertilizer program, Hignett (1907–89) served as a special consultant at IFDC for more than a decade. Often referred to as the "father of fertilizer technology," Hignett held 15 patents and was the author of nearly 150 publications. He received global recognition and many awards during his 50-year career, including the Francis New Memorial Medal from the Fertilizer Society of London in 1969.

Norman Borlaug, "father of the Green Revolution," dies at age 95 (continued from page 1)

The program later became the International Maize and Wheat Improvement Center (CIMMYT).

Borlaug and his colleagues developed improved varieties of wheat, allowing Mexican farmers to drastically increase yields. By the 1960s, Mexican wheat output had increased sixfold since the 1940s.

Following a population boom, the governments of India and Pakistan asked Borlaug for help preventing hunger. Soon the wheat production in these countries nearly doubled. Borlaug's research in improved varieties was then applied to rice.

In 1970 Borlaug received the Nobel Peace Prize for combating hunger and sparking the Green Revolution. "The first essential component of social justice is adequate food for all mankind," Borlaug said during his Nobel lecture. "Food is the moral right of all who are born into this world."

About half of the population consumes grain descended from Borlaug's wheat varieties, said Gary Toenniessen, managing director of agricultural initiatives for the Rockefeller Foundation, in a recent *New York Times* article.

In addition to these remarkable accomplishments, Borlaug also left a legacy of teaching.

According to Texas A&M University's Norman Borlaug Institute for International Agriculture, named in his honor in 2006, Borlaug "worked in the fields alongside farm workers, students and interns, sharing his knowledge as well as the labor of producing food crops."

After becoming a distinguished professor of international agriculture at Texas A&M in 1984, Borlaug split his time between teaching at the university and conducting research at CIMMYT in Mexico. He enjoyed training and mentoring young scientists from all over the world.

In 1986 Borlaug founded the World Food Prize to recognize life-saving achievements that increase the quantity, quality or availability of the world's food. Emily Nieman-Muteb was a World Food Prize International intern at CIMMYT in 2005 for two months during her junior year of high school.

On a message board celebrating Borlaug's life (http://normanborlaug.blogspot.com/), Nieman-Muteb wrote, "He took his time to engage us and mentor us. Not just once or twice — almost every day. I grew to look up to Dr. Borlaug as a mentor and to appreciate him not only for the amazing work he accomplished and awards he won but for the caring person he was. A person who sacrificed much for the livelihoods of others; a person who stood for what he believed in; a person who was never too important for a high school girl interested in following his footsteps."

She went on to describe how that summer changed her life and inspired her to study international agriculture and travel across Africa doing development work.

On March 25, 2009 — Borlaug's 95th birthday — Monsanto Company announced a $10 million grant to establish the Beachell-Borlaug International Scholars Program. The scholarships will help young scientists interested in using plant breeding techniques to improve rice and wheat production. The scholarships honor pioneer plant breeders Dr. Henry Beachell (who developed high-yielding rice varieties grown in the tropics) and Borlaug.

According to Texas A&M, the Borlaug Institute "strives to continue Borlaug's legacy by promoting science-based solutions for the world's agricultural and food challenges."

Borlaug received numerous awards and honors throughout his career. Some of the most notable include:

- Nobel Peace Prize (1970).
- Aztec Eagle (1970) — the highest decoration issued by the Mexican government to a non-citizen.
- Presidential Medal of Freedom (1977) — issued by the U.S. president.
- Congressional Gold Medal (2006) — the highest civilian honor in the U.S.
- Member of academies of science in 12 countries.
- More than 50 honorary degrees.

Borlaug served on IFDC's board of directors from 1994 to 2003. He called improved seeds the "catalyst that ignited the Green Revolution" and mineral fertilizer the "fuel" that powered it. After learning of his death, the IFDC board unanimously passed a resolution honoring Borlaug's service to the organization and to humanity.

East and Southern Africa Division

IFDC opens its East and Southern Africa Division office in Nairobi, Kenya

Contributed by Charles O. Ngutu, ESAFD administration and finance officer

IFDC officially opened its East and Southern Africa Division (ESAFD) headquarters office on August 21, 2009, in Nairobi, Kenya, on the Duduville campus of the International Center of Insect Physiology and Ecology (*icipe*). Because the scope of IFDC's work to increase agricultural productivity in Africa is expanding, the organization's former Africa Division has been divided into ESAFD and the North and West Africa Division (NWAFD).

"This is not just the opening of an office but the launching of activities that will hopefully reach millions of farmers in the region," said Rob Groot, the director of ESAFD, as he opened the event. The division is currently working in Burundi, the Democratic Republic of Congo, Kenya, Mozambique, Rwanda, South Africa, Tanzania, Uganda and Zambia.

IFDC chose to headquarter ESAFD in Nairobi — the region's commercial hub — because of the organization's history of collaboration with Kenya's Ministry of Agriculture and the presence of partner organizations and donors, Groot explained.

The Permanent Secretary of the Ministry of Agriculture, Dr. Romano Kiome, a renowned agricultural science researcher, presided over the ceremony. Kiome cited the region's food security challenges, which range from improving the fertilizer supply system to helping farmers use fertilizer more effectively. He then stated that "IFDC's presence should eventually result in the establishment of regional fertilizer production."

Kiome also paid tribute to *icipe's* founder, the late Professor Thomas R. Odhiambo, a renowned entomologist and pioneer in agricultural development in Africa. He expressed his hope that the center would host several institutions and eventually become a science "park."

Icipe is providing IFDC office space, administrative support services, information and communications technology support, vehicles and guesthouse facilities. To *icipe*, "IFDC is not just a tenant but a partner," said Professor Christian Borgemeister, *icipe's* director general and chief executive officer.

Also attending the event was Professor Ruth Oniang'o, the founder of the Rural Outreach Program (a nongovernmental organization for Kenyan farmers) and editor-in-chief of the African Journal of Food, Agriculture, Nutrition and Development. Oniang'o was formerly a member of Kenya's parliament and IFDC's board of directors.

Dr. Amit Roy, IFDC's president and chief executive officer, concluded the event by thanking the government for inviting IFDC to locate ESAFD's headquarters in Kenya. "The recent global food and fertilizer crises are similar to the world situation that led to the establishment of IFDC," Roy said. "With the faithful support of our donors and partners from both the public and private sectors, IFDC will be able to significantly contribute to agricultural intensification, poverty reduction and economic growth in East and Southern Africa."

Dr. Amit Roy, IFDC's president and chief executive officer (far right), launching ESAFD activities. From left to right are Prof. Christian Borgemeister, *icipe's* director general and chief executive officer; Dr. Romano Kiome, the Permanent Secretary of Kenya's Ministry of Agriculture; Rob Groot, ESAFD's director; Charles N'gutu, ESAFD's administration and finance officer; and Roy.

Dr. Romano Kiome presiding over the ceremony.

North and West Africa Division

Urea deep placement — the Burkina Faso experience

Contributed by Ketline Adodo, coordinator — information and communications, NWAFD

African delegation visited Bangladesh to learn about urea deep placement.

UDP trials are being conducted with 100 Burkina Faso farmers in Bagre, 150 farmers in the Kou Valley and 150 farmers in Sourou. About 200 farmers and cooperative leaders recently participated in a guided tour of UDP fields in Burkina Faso's Kou Valley.

After visiting the rice fields, Burkina Faso's Deputy Minister of Agriculture, Dr. Abdoulaye Kombary, encouraged farmers to apply the UDP package meticulously and suggested that IFDC work closely with the Institute for Environment and Agricultural Research (INERA) to disseminate UDP across Burkina Faso.

The UDP manufacturing technique compacts urea into "briquettes" that farmers place into the rice root zone while transplanting. The rice plants absorb the vital nitrogen more directly from the plants' root zone as the compacted briquette slowly dissolves. This process has environmental benefits, significantly lowering the amount of urea that volatilizes into the atmosphere and pollutes groundwater.

The adoption of UDP technology has two other key benefits: increased yields and lower costs for fertilizer. Both of these are a result of improved nitrogen "uptake" efficiency afforded by the "point placement" method of UDP application.

Farmers like UDP because it saves them money and labor. They only have to fertilize rice once instead of two or three times (the broadcast method) and fewer weeds grow with UDP application. Simply put, farmers use less fertilizer while increasing their yields. Governments see UDP as a way to make expensive fertilizer go further and save scarce foreign exchange by reducing fertilizer imports.

Dr. Bidjokazo Fofana, UDP coordinator for Sub-Saharan Africa, said, "UDP has spread successfully in Asia, but a number of factors in West Africa are different, including soil types (alkaline and acidic soils, etc.), poor water control and insufficient input accessibility and availability. For example, the standard UDP protocol calls for farmers to insert the urea briquettes seven days after transplanting. But urea often is not available when needed in African villages; it may arrive a month after transplanting. We're conducting adaptive research to determine the maximum time that briquette application can be delayed without jeopardizing the rice crop."

Kou Valley farmers who used UDP harvested about 1.3 mt/ha more than those who used conventional split applications of broadcast prilled urea, according to Fofana. UDP farmers earned FCFA 171,000/ha (US $354.32) more in additional annual income than those using conventional application.

Marius Sanon, Kou Valley chief, said, "We now have 1,260 hectares planted with rice in the rainy season and maize in the dry season. Because of the 2008 food crisis, our new objective is two rice crops per year.

"For the first 2009 cropping season, the UDP trials conducted in the Kou Valley involved 55 rice farmers, working 35 plots that cover a total of 500 square meters for demonstrations and 20 plots covering 200 square meters for adaptive research."

Abdoulaye Ouédraogo, president of the Union of Rice Cooperatives of Bama, said, "We decided to test the efficiency and profitability of UDP before committing ourselves. The rainy season has started and results are interesting. We'll wait to see dry season results to know if the technology really works.

"But we can already see clear differences. The UDP fields are greener and the size and quality of panicles are better than in the control plots. We also want to know the costs and how to ensure the production and distribution of briquettes."

Boukari Ouédraogo, a Kou Valley farmer, is concerned about the labor intensity of UDP. "With broadcasting, one farmer can cover a 500-meter plot in three hours. With UDP, it takes more than six hours."

But farmer Kindo Souleymane pointed out, "UDP takes more time, but it's only one application versus two or three using prilled urea. This actually *saves* time."

Fofana said, "UDP briquettes are not yet commercially produced in Africa. But during a recent tour by African farmers and scientists of Bangladesh UDP fields, IFDC procured two briquetting machines that can produce 400 kilograms of briquettes per hour. That was enough for our demonstrations during the first year. IFDC will help local farm cooperatives acquire their own briquetting machines and encourage local entrepreneurs to take over briquette production."

Eurasia Division

KAED II chief of party Demiri wins outstanding service award

Dr. Hiqmet Demiri, chief of party (COP) of IFDC's Kyrgyz Agro-input Enterprise Development II (KAED II) project, was honored September 16 with an Outstanding Service Award by the U.S. Agency for International Development (USAID). Of 41 USAID-funded projects in Kyrgyzstan, Demiri was one of seven COPs/country directors recognized.

The award ceremony was held at the home of the Honorable Tatiana Gfoeller, U.S. ambassador to Kyrgyzstan. Also present were Andrew B. Sisson, the new mission director of the regional office for USAID's Central Asian Republics (CAR), and USAID Kyrgyzstan country representative Pat Shapiro. Representatives of the legislative and executive branches of the Kyrgyz government, funding agencies and implementers also attended.

Demiri's Outstanding Service Award reads, "In recognition of his outstanding flexibility, initiative and dedication in conducting a market-based procurement, shipment and distribution of commodities during the harsh winter of 2008–09. Through Hiqmet's excellent management, USAID was able to provide necessary and timely assistance that helped Kyrgyz farmers and strengthened the food security situation in Kyrgyzstan."

In her speech, Ambassador Gfoeller praised the "outstanding work of IFDC that is making a difference in the Kyrgyz people's lives." Sisson, who is familiar with IFDC from the Kosovo Agri-input Emergency Project in 1999–2000, called IFDC's work "heroic and incomparable with any other initiatives."

In Demiri's acceptance speech, he said, "I am honored to receive this award. However, most of the credit for this recognition goes to the KAED team for the great work, dedication, creativity and responsiveness in implementing the IFDC project in Kyrgyzstan. The lives of Kyrgyz farmers are changing and this is the best reward for me and my team. Much credit also goes to the IFDC headquarters staff for great leadership, guidance and timely support to project needs. Without their support, it would have been impossible to respond to USAID requirements. The future prospects of IFDC in this part of the world look brighter than ever and I feel very privileged to be able to make my modest contribution to the great achievements of our organization."

Honoring IFDC's Dr. Hiqmet Demiri (center) at the USAID award ceremony are (left to right) Andrew Sisson, USAID CAR regional office mission director; Tatiana Gfoeller, the U.S. ambassador to Kyrgyzstan; Pat Shapiro, USAID Kyrgyzstan country representative; and Andrew Segars, USAID Kyrgyzstan deputy country representative.

IFDC holds staff retreat, celebrates 35 years

IFDC held its 2009 staff retreat September 14–16 at the Marriott Conference Center in Florence, Alabama. The theme was "Celebrating 35 Years."

At the retreat, IFDC President and Chief Executive Officer Dr. Amit Roy presented "IFDC at 35: Where We Were, Where We Are." IFDC was established in 1974 during a world food crisis. IFDC's initial purpose was to help developing countries solve food security problems through the development of effective fertilizers and fertilizer practices. The organization's activities have since broadened to help improve the efficiency of the entire agricultural value chain. Since its inception, IFDC has worked in 130 countries and is currently operating in 22 countries.

Timothy Karera, director of the Training and Workshop Coordination Unit, speaks about "Training as a Strategic Tool."

Roy provided an update of IFDC's strategic plan and new initiatives. IFDC's principal strategies are to improve the efficiency of a variety of fertilizers; increase adoption of proven fertilizer techniques; and forge partnerships with governments, nonprofits and the private sector to improve the functioning of markets.

As outlined in the 2009–2013 strategic framework, IFDC will work to double yields for assisted African farmers through the Africa Productivity Initiative. Yields of grains and other staple crops in Africa are only about 25 percent of the world average.

The goal of the Nitrogen Efficiency Initiative is to increase the efficiency of this key crop nutrient by 50 percent. Nitrogen fertilizer efficiency is currently as low as 30 percent, particularly for cereal crops. Improving nitrogen efficiency generates significant agronomic, economic and environmental benefits.

Phosphate rock is a nonrenewable resource. Because phosphate reserves are dwindling, the Phosphate Efficiency Initiative is working to improve crops' uptake of phosphorus applied directly from phosphate rock.

After Roy's presentations, the staff retreat continued with panel discussions, division updates and breakout sessions. Panel discussion topics included improving linkages between research and field activities; creating sustainable market development and farmer support through voucher programs; nitrogen use efficiency; and accomplishing IFDC's strategic objectives. Integrating communications across the organization, training, metrics and evaluation and mainstreaming strategic initiatives were discussed in breakout sessions.

IFDC's board of directors' meeting took place at headquarters September 16–18. The highlight of the week was the Travis P. Hignett Memorial Lecture by author Thomas Hager.

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Milestones in IFDC's History

1974 – IFDC established during a world food crisis at the suggestion of U.S. Secretary of State Dr. Henry Kissinger

1977 – President Jimmy Carter designates IFDC as a public international organization

1982 – IFDC research expanded to Africa

1987 – IFDC Africa Division established in Lomé, Togo

1992 – IFDC Asia Division established in Dhaka, Bangladesh

1996 – IFDC achieves major progress in reinvigorating Bangladesh's agricultural sector and developing a market for agricultural supplies and products in Albania

1999 – A strategic framework for an African input supply system released

2003 – Integrated soil fertility management project has major impact on productivity and farmer incomes in West Africa

2004 – Total number of countries reached since IFDC's inception: 130

2006 – IFDC organizes the Africa Fertilizer Summit in Abuja, Nigeria

2007 – The CATALIST project launched in Africa's Great Lakes region

2009 – IFDC Africa Division divided into the North and West Africa Division and the East and Southern Africa Division

IFDC Asia Division becomes the Eurasia Division

IFDC begins research on the "next generation" of fertilizers

IFDC staff retreat photos

From left to right are Corky Snipes, director of IFDC's Operations Division; David Bradford, mayor of Muscle Shoals, Alabama; and Vo-Tong Xuan, IFDC board member.

Scott Wallace, IFDC representative in Nigeria, discussing the voucher program in Taraba and Kano states.

Taking a break from retreat activities are (from left to right) Balu Bumb, policy, trade and market economist; Carlos Zandamela, chief of party and policy specialist; John Shields, director of the Research and Development Division; and Marjatta Eilittä, director of the North and West Africa Division.

Staff retreat attendees standing in front of a display indicating the global locations of IFDC staff and board members. From left to right are Musa Taylor, farmer-based organization business training coordinator; Constant Dangbegnon, postdoctoral scientist of social science and agronomy; Emmanuel Alognikou, grants manager for West Africa Cotton Improvement Program (WACIP); Kofi Debrah, representative and chief of party in Ghana; and Bruno Ouedraogo, assistant country coordinator for WACIP in Benin.

Meg Ross, graphic and web design specialist, and Henry Ekpiken, coordinator of the Agro-Dealer Network Development project in Nigeria, got front-row seats to hear the Travis P. Hignett lecture by author Thomas Hager.

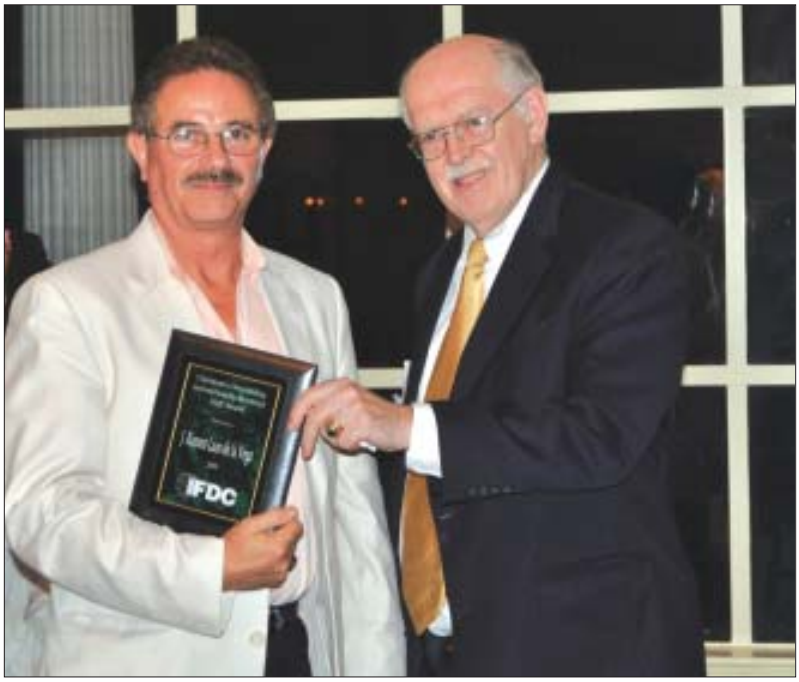
Bruno Ouedraogo, assistant country coordinator in Benin for the West African Cotton Improvement Program (WACIP), during a visit to Isbell Farms in Cherokee, Alabama.

IFDC staff members receive awards

Jose Ramon Lazo de la Vega is the recipient of the **2009 IFDC Chairman's Outstanding Internationally Recruited Staff Member Award**. Ramon is an engineering specialist at IFDC with more than 30 years of experience in the development, research and production of fertilizer. He specializes in the maintenance, construction, start-up and production of fertilizer plants. Ramon has provided technical assistance in fertilizer technology in Albania, Bangladesh, Colombia, Egypt, Germany, Guatemala, Honduras, India, Indonesia, Ireland, Malaysia, Mauritius, Mexico, Mozambique, Pakistan, South Africa, Venezuela, Zambia and Zimbabwe.

Ramon was instrumental in developing a village-level briquetting machine that compacts urea into supergranules that can be placed directly into the crop root zone, reducing nitrogen losses while increasing yields. These machines are now being manufactured and used across Bangladesh and have been introduced in Africa.

Ramon, a Mexican citizen, earned a bachelor's degree in chemical engineering from the Universidad Ibero Americana in Mexico City. He has been an IFDC employee since 1982.



Ramon Lazo de la Vega (left) receives award from IFDC's chairman of the board of directors, Peter McPherson.

Emmanuel Alognikou is the recipient of the **2009 President's Outstanding Outposted Staff Member Award**. Emmanuel is the grants manager for the West African Cotton Improvement Program (WACIP). His 19 years of experience spans agricultural research and technology development, management, leadership and policy issues, mostly in West Africa.

Emmanuel oversees the WACIP grant-making process in a way that ensures high technical quality and meets donor requirements. According to Sarah Gavian, WACIP chief of party, Emmanuel is fastidious about ensuring that all figures and concepts in WACIP contracts are internally consistent and correct. He is "a pillar of the WACIP process," Gavian says.

Emmanuel, a Togolese citizen, received a bachelor's degree in agriculture and a master's degree in crop science from the University of Benin in Lomé, Togo. He has worked for IFDC since 1988.

Emmanuel Alognikou (left) receives award from IFDC's president, Dr. Amit Roy.

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IFDC staff members receive awards
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Doyce Couch is the recipient of the **2009 President's Outstanding Headquarters Staff Award**. As IFDC's coordinator of maintenance services, Doyce is responsible for the maintenance and modification of all physical properties at headquarters. This includes temperature and electrical maintenance, properly functioning plumbing and remodeling and construction.

Most recently, Doyce and his assistant, Wendell Rhodes, worked tirelessly to upgrade and construct additional offices to accommodate IFDC's growing work force. Another example of Doyce's many talents is the beautifully constructed table in the board room. His skills as a master carpenter and skilled craftsman have eliminated the need for IFDC to hire outside construction crews. Throughout his nearly 30 years with IFDC, Doyce has kept the facilities safe, comfortable and in good working order.

Doyce Couch (left) receives his award from Dr. Amit Roy.

Left to right are Peter McPherson, Ramon Lazo de la Vega, Doyce Couch, Emmanuel Alognikou and Dr. Amit Roy.

Agricultural economist presents economic approach to fertilizer decision-making

Dr. Bob Farquharson, an agricultural economist at the University of Melbourne in Australia, spoke on July 30, 2009, to IFDC scientists and engineers about a new approach to fertilizer decision-making. His presentation was at IFDC's headquarters in Muscle Shoals, Alabama.

Farquharson's approach uses economics to help farmers determine the optimum amount of fertilizer to apply to their crops in order to get maximum returns.

"We must look at the price of fertilizer and the price of the crop in addition to how the crop responds to increasing amounts of fertilizer," Farquharson said. "Therefore, economics is important. This approach brings economics and biology together. In a sense, this is risk analysis.

"Many fertilizer recommendations fail to account for economic factors," Farquharson said. His approach involves using a crop simulation model to predict the crop's biophysical response (yield) as more nitrogen fertilizer is added. Then, an economic framework for agricultural production is used to take into account farmers' costs (price of fertilizer) and benefits (price of the crop at sale).

The simulated yield responses showed that applying more fertilizer to a crop will produce more yield, but at a declining rate. Farmers must ask themselves, "What is the best rate for my crop at this point in time?"

For example, if the price of wheat increases, wheat farmers will be able to get increased revenue from their crop. Therefore, more nitrogen should be added to the crop so that there is more wheat to sell.

If the crop simulation model can predict yield responses in low and high rainfall years, then the economic analysis can develop the best fertilizer decision in each case, and thus account for the risks in making fertilizer decisions as climate varies. Such risk analyses can also be conducted for different prices.

Dr. Bob Farquharson (left) with a Cambodian farm family.

"Fluctuating fertilizer prices make this analysis especially important," said Farquharson. "Nitrogen costs money to apply, and its price has recently fluctuated significantly." If the price of fertilizer increases, a normal response is to decrease application. The economic framework shows how large or small this decrease should be.

Farquharson worked with the Australian Center for International Agricultural Research to reduce poverty in Cambodia by encouraging crop diversification for upland farmers. An analysis of fertilizer decisions was conducted for the project's targeted crops — maize, soybean, mungbean and peanuts.

Farquharson pointed out that interest rates in Cambodia are as high as 3 percent per month. For farmers in Cambodia and other developing countries, the cost of investment in fertilizer is especially important.

"Poor farmers cannot afford to borrow money at high interest rates unless there is a good chance of substantial return. If they make a mistake and lose it all, they could starve," Farquharson explained. "In developed countries, this isn't as much of an issue.

"That's why this type of decision-making is so important for farmers in developing countries. They must earn a high return on investment from their fertilizer decisions, and the economic framework allows this consideration to be included."

Farquharson co-wrote a paper about using the approach to analyze wheat production in northern New South Wales, Australia, but he says that the principles are the same in both developed and developing countries.

"It is important to present the information in a way that makes sense to farmers," Farquharson said. "Workshops and field trials could be conducted in developing countries to show farmers that they get higher returns when taking all of these factors into consideration."

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