IFDC Corporate Report, 2004/2005

"Mobilizing Ideas, Empowering People"

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Photo by Dr. Walter T. Bowen

Message From the Board Chairman and the President and Chief Executive Officer

"Mobilizing Ideas, Empowering People"

Photo by Raphaël Vogelsperger

"I remember an experience that I had as a Peace Corps Volunteer in Peru during the early 1960s. I remember so well an Indian named Jose, with whom I was having coffee. Jose had a strange-looking house—a brick here, a brick there, but it was really quite big. After 10 years in the making, it was a substantial construction. I asked Jose, 'How did you do it?' I can see Jose yet, standing up and tightening his belt and saying 'One brick at a time, by myself.' To me, Jose exemplifies poor people all over the world—they are all doing things for themselves. Our job is to lift burdens so that they can do for themselves what they want to do for themselves. The real resource in the developing world is the desire of people to get ahead."

M. Peter McPherson

An often-quoted adage goes something like this: "Give a man a fish and he will eat for a day; teach a man to fish and he will eat for a lifetime." This has proven to be true many times in agricultural development, and the participants in "A Partnership to Cut Hunger and Poverty in Africa" have found this to be especially true.

Nearly one-half of all sub-Saharan Africans live on less than $1 per day, a per capita income that is lower now than it was 30 years ago. According to estimates of the Food and Agriculture Organization (FAO) of the United Nations, 186 million Africans are going hungry today. Even more disturbing, Africa is the only continent where hunger is projected to worsen during the next 20 years. Without significant new investments, the number of malnourished children in Africa could increase by 50% during the next 20 years.

For Africa, agriculture is not just a source of food; it is the continent's main occupation, its economy and culture—the key to its future. When farmers produce more food and other commodities, they consume some, sell the remainder, and use the additional money to buy goods and services. That multiplier promotes off-farm employment. It has been estimated that for every 10% increase in smallholder agricultural productivity in Africa, 7 million people are accelerated above the dollar-a-day poverty line. Research estimates that for every $1 of income created in the agriculture sector, the African society grows by about $2.50.

The global record during the past 50 years is full of success stories of countries that have emerged from poverty, and these stories offer lessons that can be applied in Africa. First, individual ambition is the primary driver for improving conditions. Governments must lift the barriers that inhibit individual drive for prosperity and success. Furthermore, Africa needs sound fiscal and monetary policies, governments that encourage and not burden

markets; they also need a strong rule of law with a process to enforce contracts.

Africa and its partners must embrace the challenge of building African markets and integrating Africa into regional and world markets. Additionally, Africa needs open regional markets. Some African countries have periodic food surpluses that they wish to sell; therefore, food donations must be planned carefully to avoid undercutting regional markets.

In today's knowledge-driven world, training and education are fundamental for sustained growth. Education allows a country to take full advantage of technology and policy reform. Educated people are vital to institutions that work. Technology and its application are the primary drivers of economic change. Technology can also increase agricultural productivity, and Africa needs a Green Revolution. Infrastructure improvements will raise production and lower transaction costs. Africa's agricultural development requires a long-term commitment; there are no quick fixes for poverty. Stability is necessary for progress. Freedom and private initiative complement one another.

Although agricultural production and rural income must be the main priorities, AIDS, governance issues, the role of women, and environmental concerns also deserve attention. However, it should be remembered that economic advances have other positive consequences; increases in income help provide resources for health care and other needs and reduce environmental degradation.

The development lessons of the past 50 years, adapted for Africa, can be the basis for success. IFDC and its partners are applying many of these lessons in Africa, Afghanistan, and Kyrgyzstan, to name a few locations.

Profiled on the next few pages are experiences in Afghanistan, Kyrgyzstan, and sub-Saharan Africa.

"The greatest satisfaction that I receive from our work is seeing the people whom we are trying to help eventually helping themselves. For example, on my first trip to Albania in 1992—just after the demise of that country's centrally planned economy—I saw a country in dire straits. There was no heat or hot water. The infrastructure was in shambles.

On one of my trips to Albania, I met an enthusiastic, budding entrepreneur named Agif Caca. He told me about losing his job at the closing of a state-owned dairy processing plant, where he had worked. He had to choose between escaping to Italy for a better life or building a new life and business in a competitive market economy. He had only $350, which he inherited from his father. Agif used this money to buy bricks and mortar to build his own milk and cheese plant. The road to prosperity was not an easy one for him, but he persevered. Today he is a successful businessman; he has reaped the rewards of his hard work.

I've always believed that most people are eager learners. Our job is to provide our clients with the necessary information so that they can make their own decisions. The theme of this report encapsulates our goal: 'Mobilizing Ideas, Empowering People.'"

Amit H. Roy

The CASE approach is a unique mix of ideas and provides a realistic, balanced roadmap to sustainable intensification and market development.

Photo by W. A. Toose

CASE: A Promising IFDC Innovation

An innovative solution is needed to help remedy sub-Saharan Africa's agricultural marketing dilemma. The challenges include: (1) underdeveloped markets; (2) lack of coordination among the various actors—farmers, local entrepreneurs, traders, and consumers; (3) limited integration of market segments; and (4) scarcity of managerial and organizational competencies to access and filter information, to develop networks, and to strengthen bargaining power. IFDC's answer is the Competitive Agricultural Systems and Enterprises (CASE) approach. CASE, which has developed gradually, is a unique mix of ideas and provides a realistic, balanced roadmap to sustainable intensification and market development. CASE is rightly considered an approach at the crossroads between highly diverse farming systems and specialized commodity chains, involving a multitude of actors and diverse requirements related to quality, traceability, and acceptable price ranges.

Although the participatory development of the Integrated Soil Fertility Management (ISFM) technologies was a central concept of IFDC's work in sub-Saharan Africa, the focus gradually shifted to include input distribution and financial services. During the past few years, our projects have also embraced processing and marketing of agricultural produce.

Networking between buyers, producers, and traders has become a very important activity. IFDC has invested much energy in maintaining partnerships with the traditional partners such as the national agricultural research and extension services and several nongovernmental organizations (NGOs). New partnerships are being developed with farmers' organizations, traders' organizations, and private business development services.

The ISFM project in its early stages succeeded in developing learning activities at the village level and validating and disseminating options that improved fertilizer use efficiencies and the ecological sustainability of the agricultural production systems involved. However, the progressive initiatives that relate to the CASE approach have strengthened the integration of farmers and local entrepreneurs in supply value chains. Consequently, the technology push character of the ISFM project has changed, and the innovation is progressively responsive to changes in market outlets and attuned to the preferences of specific consumer groups. Fair competition also allows farms and enterprises to innovate and to maintain and strengthen their competitive position. Improved production technologies and high-quality seeds for tomato

production in northern Togo, for example, have provided this region with significant competitive advantages and increased bargaining power. Value can be added to agricultural products by using different varieties and by improving processing and storage.

The CASE approach has been implemented in small pilot projects in several regions in West Africa, and the results are encouraging. Our conservative estimate is that at least 100,000 farmers have successfully adopted ISFM technologies. Value:cost ratios of ISFM options adopted are well above 2. Returns to (family) labor are six times higher than the average salary in the area, and farm-level incomes of ISFM farmers have increased by 20%-50%. Crop yields have dramatically increased and often doubled. At least 300 local entrepreneurs are involved in input supply, processing, storage, and marketing; many of them have received training in business management and building customer relationships. Farmer groups have experimented with inventory credit systems and are gradually developing stronger linkages with micro-financial institutions. Farmer organizations at the grassroots have been linked to national-level organizations to improve access to information and lobby for transparent decision making.

The capacity building and empowerment aspects of the CASE approach are enormously important. This requires the development of clusters of farms, enterprises, business development services, and other facilitating and lobbying institutions at various levels along key commodity chains. CASE has the potential of becoming a strong building block of the Common African Agricultural Development Policy (CAADP) of the New Partnership for Africa's Development (NEPAD)—next to national and international initiatives striving for good governance and enabling environments.

Strengthening Market Information Systems and Traders' Organizations in West Africa (MISTOWA)

MISTOWA is a pro-markets project designed to accelerate the development of agricultural input and output markets in West Africa. This goal is being achieved by increasing the efficiency and effectiveness of regional trader and producer organizations. The project improves market transparency and reduces information barriers that restrict trade and constrain the use of improved technologies. The project links market information systems (MIS) and services to private sector users. It improves and fortifies existing regional efforts to generate, disseminate, and use market information commercially.

Ghanaian trade delegation admire Brahma cattle at the livestock market in Segou, Mali.

MISTOWA photo

The MISTOWA project has already made significant strides in increasing the efficiency of regional MIS. For example, the project has assisted the Regional Market Information System (RESIMAO) in improving its technical, networking, and operational capacities at the regional and national levels. A common platform has been developed to link their databases for regional usage. A trade portal was also developed for price and commodity exchange information, currently covering 48 markets in 10 West African countries.

In addition, MISTOWA has supported trader and producer organizations at the regional and national levels to improve their organizational and operational capacities**.** For example, the MISTOWA project successfully organized two trade-related events that afforded producers and traders the opportunity to interact with each other and develop trade linkages. First, a trade mission to Mali was conducted for Ghanaian traders in collaboration with TradeMali, a U.S. Agency for International Development (USAID)-funded project. The trade delegation consisted of five men and two women traders from the Ghana Agricultural Producers and Traders' Organization (GAPTO), who went to Mali at the invitation of the National Coordination of Dealers in the Agricultural Food Market Sector (COENESAM), a Malian agricultural trade organization. The members of the trade delegation to Mali were convinced they would make a reasonable profit by dealing in livestock, rice, tomatoes, potatoes, and mangoes from deals concluded during the mission. The trade mission has opened the way for traders and increased the potential for improved trade flow in agricultural products between Mali and Ghana.

Twenty producers from nine countries participated in the 10-day International Agricultural Trade Fair in Dakar, Senegal. This activity was conducted in collaboration with the West African Network of Farmers' Organizations (ROPPA), a project partner. The Trade Fair provided the opportunity for project-sponsored participants to exhibit and sell their products and make commercial contacts. Livestock, industrial starch, organic shea butter soap, and cashew nuts were among the products exhibited by participants.

The volume of intraregional trade in agricultural products in West Africa is low because producers and traders are not well informed about market opportunities or the supply and demand situation in other markets in the sub-region. The individual national markets are too small to achieve significant levels of economic growth on their own. The MISTOWA project has been strengthening the capacities of the national market information systems to provide timely and accurate information to traders and producers in West Africa.

IFDC in Afghanistan

After almost 22 years of war and internal strife, Afghanistan had relative peace restored in the country toward the end of 2001 with the ouster of the Taliban regime. The international community came forward at this time in a big way to assist in the rebuilding of Afghanistan, particularly its destroyed infrastructure and abandoned agriculture due to one of the largest migrations of population in recent times.

Intent dealers bent on learning in an IFDC dealer training program.

Photo by M. Feisal Beig

IFDC became involved almost immediately with an emergency relief program, funded by USAID, to supply fertilizers to the returning refugee farmers. This program began to operate on the ground in March 2002 from an office in the Ministry of Agriculture, Animal Husbandry, and Food in Kabul. The plan was to coordinate the fertilizer supplies to follow an improved variety of wheat seed that was being offered to the farmers by another USAID-funded project.

Since a network of private sector traders was found to exist in the country (although struggling to establish itself and supply agricultural inputs to the farmers), IFDC decided to encourage this private enterprise and design the distribution of fertilizers using this network. A voucher scheme was developed through which these fertilizers were distributed to the needy farmers, identified by the local village council or "shura." The voucher entitled the farmer to receive a specified number of fertilizer bags from a local, trained participating dealer. The dealers submitted the vouchers to IFDC and were paid for the supplies provided to the farmers. After harvesting the wheat, the farmer paid in cash or kind to the local shura the value of the fertilizer received. The shura used the funds for development work in the village. During March 2002-September 2003, about 16,600 tons of primarily urea and diammonium phosphate (DAP) was supplied through the vouchers to about 200,000 farming families in 12 provinces with an estimated additional production of more than 80,000 tons of wheat—enough to feed about 500,000 Afghans for 1 year. In addition, IFDC also initiated the training of the dealers; established crop demonstrations on wheat, rice, corn and grapes; and produced and distributed crop production folders and recommendation charts in the local languages.

Toward the end of 2003, a larger and more comprehensive USAID-funded development program was launched. "Rebuilding the Agricultural Markets in Afghanistan Program" (RAMP) is managed by Chemonics International, Inc., with IFDC as a consortium partner. In this project IFDC is conducting a 30-month Agri-Input Dealer Training and Development Project (AIDTDP). AIDTDP began operations in February 2004 with a central office in Kabul and five regional offices in Helmand, Jalalabad, Herat, Kandahar, and Mazar-e-Sharif to cover all of the provinces in the country. Since May 2004, 39 training programs have been conducted in the local languages (Dari and Pashtu); 1,332 dealers in 20 provinces were trained in the basic technology of seed, fertilizers, crop protection products (CPPs), and the fundamentals of retail management. Extension department and NGO staff have also been trained in these programs. Linkages between the traders and the regional and international inputs suppliers and banks are also being developed. Several crop production technology booklets, recommendation charts, and other technical information have been produced in Dari and Pashtu and distributed widely through the dealer network. The project is working closely with the Ministry of Agriculture, Animal Husbandry, and Food to help formulate policies that will be conducive to the development of the private sector dealer network. Dealer association activity has been initiated, and it is expected that the first regional association will be formed in Nangarhar. In a relatively short time, this project has been able to energize the private sector dealer network and is mentoring individual traders to enable them to consolidate and expand their businesses. As a result, there is a marked improvement in the supplies of agri-inputs in the markets and an improvement in the ability of the dealers to provide proper advice and assistance to their farmer customers.

Photo by Scott J. Wallace

Field Demonstration Day in Kyrgyzstan.

IFDC in Kyrgyzstan

IFDC has been working to improve agribusiness prospects in Kyrgyzstan since September 2001. The initial focus of the activities was the creation of the Association of Agribusinessmen of Kyrgyzstan (AAK), which includes 120 private suppliers of agricultural inputs,

mainly in the south. For the past 2 years, IFDC activities have focused strictly on the institutional development of AAK; the capabilities of its member businesses to deliver inputs of seed, fertilizer, CPPs and other farm supplies to farmer customers; and demonstration and dissemination of information on "best management practices," which can be transferred by association members to their customers—the farmers.

In 2001 legal imports of fertilizer in southern Kyrgyzstan was only 729 tons, and the contraband market was almost 90% of total fertilizer sales. In 2004, legal fertilizer imports in the south reached almost 35,000 tons (a 4000% increase) and are expected to reach more than 60,000 tons in 2005! In the past, the supply of fertilizer during the planting season would decline, and the local market price would often double. However, current market prices (as of May 1, 2005) have remained stable, and the warehouses are stocked at an appropriate level to satisfy the local market demand.

Based on an annual IFDC survey of association members, during 2003-2004 the number of association members who conducted fertilizer sales increased by 38.7%. In addition, in 2003 there were only 3 members who conducted fertilizer sales valued at more that $25,000; in 2004 that number increased to 7 dealers. Thus, a competitive fertilizer market is taking shape in Kyrgyzstan.

The association lobbied successfully for the removal of a 20% value-added tax (VAT) on fertilizer and CPPs. The removal of this tax has translated into millions of dollars saved for small and large farmers, fertilizer dealers, and CPP suppliers. Ultimately this saving resulted in increased production of food for the Kyrgyz consumer at lower prices while at the same time discouraging the supply of low-quality contraband products. The trade association members increased their legal fertilizer sales by 15-fold during the past 2 years. The IFDC project, in conjunction with the trade association, organized the International Agro Expo, which attracted approximately 3,000 attendees. Exhibitors, representing more than 50 agricultural companies from 14 countries, made more than 650 new contacts for business opportunities.

The preceding vignettes illustrate only a small portion of IFDC's work; they are intended to serve as examples of countries that are benefiting from this work.

M. Peter McPherson
Chairman, IFDC Board of Directors

Amit H. Roy
IFDC President and CEO

The Way Forward—IFDC's Program Thrusts for the Next Five Years

"Mobilizing Ideas, Empowering People"

Photo by Dr. Walter T. Bowen

IFDC's 2005-2009 strategic plan builds on the Center's past experience and extends it to meet the declining conditions imposed on many rural populations by continued civil unrest, increased environmental degradation, the spread of HIV/AIDS and other debilitating diseases, which reduce or inhibit these populations' capacity to improve their agricultural productivity. IFDC's goal is to increase smallholder incomes rapidly and sustainably by increasing their access to agricultural input/output markets and to improved technology, knowledge, and practices. This goal will be reached through two primary objectives: (1) increased agricultural markets and trade for farmers through the promotion and expansion of IFDC's successful agribusiness development and policy implementation model and (2) improved and sustainable agricultural productivity through the continuous improvement, development, and adaptation of ecologically sound, integrated plant nutrient technologies.

Farmers simply replace the nutrients that are removed from the soil at harvest. Every time a crop goes to market, it takes some of the soil's nutrients with it. Those nutrients must be replenished for the soil to produce another healthy crop.

During 2005-2009, IFDC will devote priority consideration to five primary constraints to increased smallholder agricultural production: (1) poor agricultural production systems, (2) soil nutrient depletion and environmental degradation, (3) low water use efficiency, (4) rural poverty, and (5) the absence of sound global trade policies.

Fertilizers are natural-born nutrients—plant food— that plants can digest. Nutrients in fertilizers are the same as those in foods we eat and in our bodies. Fertilizers are not toxic. In fact, these nutrients are in the ground that we walk on and in the air that we breathe.

According to IFDC's new strategic plan, its efforts will be organized around four thematic programs during 2005-2009. These program thrusts include: (1) Natural Resource Management, (2) Soil and Nutrient Dynamics, (3) Agribusiness Development, and (4) Market and Trade Policy. To learn more about the goals, aspirations, and planned activities from some of the staff members leading these programs, the Corporate Report Editor interviewed these principals to gain their perspectives.

"Mobilizing Ideas, Empowering People"

A Profile of Natural Resource Management—Interview with J.J. Robert Groot, Director, IFDC Africa Division

A happy ISFM participant receives his certificate from J. J. Robert Groot

Photo by Willem-Albert Toose

Q **What are the primary goals of the Natural Resource Management Program?**

A The primary goal of the Natural Resource Management (NRM) program at IFDC is to achieve sustainable and profitable increases in agricultural productivity at high food quality standards in the developing world, while safeguarding the quality of the natural resource base on which so many small-scale producers depend. Ultimately we want to ensure the well-being of current and future generations of rural farmers and urban consumers. In sub-Saharan Africa, soil fertility is of particular concern and so is the need to find ways to improve access to agricultural inputs, in particular fertilizers. In the more intensive production systems in Asia, emphasis will need to be on increasing water and input use efficiency as rapid urbanization and industrialization siphon off resources originally intended for agriculture.

Q **What are the guiding principles for conducting an effective Natural Resource Management Program?**

A The first guiding principle for conducting effective NRM is that it should be based on dialogue and deliberation among stakeholders. Small-scale producers will have not one but a multitude of objectives. A good understanding of this complexity and a buy-in from producers are absolutely crucial. The second guiding principle is that the approaches of NRM need to be flexible and allow for quick responses to changing environments. Because of the complexity and diversity of farmer reality, single solutions do not exist. The third guiding principle is the need for a holistic approach. People, processes, and practices in NRM intervene at different scales. NRM implementation needs to identify and address appropriate scales and boundaries in which to work.

Q **What are the primary challenges that are confronting the Natural Resource Management Program?**

A The NRM program needs to produce tangible and sustainable outputs for as many people as possible in a complex environment. This environment is determined by factors that are often beyond the control of small-scale producers, such as unfavorable market conditions, harsh and changing climates, increasing scarcity of fertile soils, low education levels, and rampant health problems. To really solve problems at the local level, approaches need to be, therefore, flexible and adaptive. However, to be able to go from thousands to millions of farmers, generic tools, which can be fine-tuned at the local level, are needed. The real challenge for the NRM program is, therefore, to be flexible and generic at the same time. The second, related challenge is that farmers and their traditional national agricultural research and extension systems (NARES) and NGO partners are often not trained in adopting and adapting such approaches.

Use of fertilizers actually conserves land, making recreational areas and natural habitats possible. Fertilizers increase food production per acre. Without them, millions of acres of additional land would be needed for agriculture, reducing animal habitats and threatening endangered species.

Q **What action has to be taken to implement the required solutions to the existing challenges?**

A Since 1998, IFDC and partner organizations in West Africa have been collaborating in regions where rural populations are already engaged in some form of agricultural intensification. Farmers are taking the initiative to access factor and (new) commodity markets. There is an emerging private sector although still very small and inexperienced, including rural credit and savings banks—in short, areas with comparative advantages for agricultural intensification and a population ready to transform these advantages into competitive advantages. IFDC has developed the CASE approach to catalyze agricultural intensification in these regions. CASE combines the participatory development of more intensive production technologies with coordinated efforts to experiment and extend alternative institutional arrangements that link farmers with rural bankers, input dealers, and traders. CASE strengthens the innovative capacities of the various stakeholders, including the involved service providers (e.g., research, extension organizations, and NGOs). CASE is an example of a generic tool that is fine-tuned at the grassroots level. IFDC is training agents from NARES and NGOs in the CASE approach.

As far as NRM is concerned, IFDC is working on curricula at different educational levels that emphasize agro-ecological and socio-economic principles of soil fertility and natural resources management and that develop skills in systems and participatory approaches. System skills can help decipher the complexity of plant responses to climate, soil

fertility, and management decisions such as sowing date, use of organic inputs, and fertilizer management. This can help turn blanket recommendations into specific ones for sowing date, soil type, and available organic inputs and mineral fertilizers. Participatory research and extension skills are important (1) to build bridges between farmer and outside (scientific) knowledge; (2) to build partnerships along commodity chains to facilitate access to input and output markets; and (3) to ensure ownership and understanding at the farmer level of innovation, which will facilitate scaling up and out through farmer-to-farmer extension. It is a matter of seeing the whole picture while using "new" tools.

Q **What are the specific accomplishments (results) of the Natural Resource Management Program during the past year?**

A IFDC is implementing NRM within the CASE approach with partners in 7 countries in West Africa. An estimated 100,000 farmers have directly or indirectly profited from these activities. Increasingly donors such as the International Fund for Agricultural Development (IFAD) and the African Development Bank (AfDB) are asking IFDC to provide technical backstopping to investment projects in the region to ensure that a truly integrated approach is used toward NRM. The NRM program was also involved in more strategic research on synergies from integrated use of organic amendments and mineral fertilizers, recommendation domains for phosphate rock use, deep placement of nitrogen fertilizers, and analysis of soil fertility development and crop performance in long-term fertility trials in West Africa.

Q **What are the future prospects for the Natural Resource Management Program at IFDC?**

A We expect that activities will increase both in sub-Saharan Africa and Asia. This is possible through our flexible decentralized network structure with highly independent offices that have a strong presence and visibility in the field and are equipped with effective and unbiased monitoring and evaluation systems. We will continue recruiting world class staff and not only train others but also our own staff to be able to adapt rapidly to new challenges and changing priorities. In our network organization, we continually invest in communication and knowledge exchange among NRM staff.

As plants grow during the season, they "mine" the nutrients that they need from the soil. At harvest those nutrients "go to market" with the crop, leaving a shortage for the next season. Fertilizing completes the cycle—recycling nutrients back to the land for new crops to use.

Q **What changes do you foresee in the modus operandi of the Natural Resource Management program at IFDC?**

A The NRM program needs to retain a strong presence in the field but do less directly itself. In other words, we should implement NRM through others, placing more emphasis on training and facilitation, while establishing effective monitoring and evaluation systems. At the same time we need to continue working on generic tools and methodologies that will help us truly integrate NRM approaches across scales, disciplines, and stakeholders. In sub-Saharan Africa, NRM implementation will need to become more market driven, responding more directly to market opportunities. To scale out results, farmer-to-farmer training schemes will often become indispensable, and we need to find ways to develop such schemes and make them self-financing. We need to work on establishing "adaptive capacities," enabling farmers to escape poverty more quickly and lastingly.

There is not enough natural fertilizer to meet high-yield farming demands. Natural fertilizer does not provide a balanced diet for plants.

Q **Who are the most valuable partners of the Natural Resource Management Program?**

A Within IFDC the most valuable partners will be our colleagues who concentrate on market development to ensure that we are working in the same target regions and to match NRM with agribusiness approaches within the CASE framework. Beyond IFDC, our most valuable partners are farmers, input dealers and agents from facilitating organizations, such as development projects, NGOs, and NARES.

Without the use of fertilizers, 2 billion people would starve. Soils do not contain enough nutrients to repeatedly grow large crops, and there is not sufficient nutrient matter from animal waste and crop residue to maintain food production for the world's 6 billion people.

"Mobilizing Ideas, Empowering People"

A Profile of Soil and Nutrient Dynamics—Interview with Dr. Marjatta Eilittä of the Resource Development Division

Dr. Marjatta Eilittä visits the ANMAT project in Bangladesh. Dr. Walter Bowen (center) is the Resident Project Coordinator for ANMAT. On the right is a happy rice farmer, Md. Easin Ali Pramanik, showing off the fruits of his labor.

ANMAT photo

Q **What is the primary goal of the Soil and Nutrient Dynamics Program?**

A The Soil and Nutrient Dynamics Program develops and promotes technologies and management practices that improve the efficiency in the use of soil and water resources. Such technologies need to be profitable and directly contribute to farmer welfare. They should also be sustainable, thus ensuring that the future welfare of the farmer and his/her community is secure.

Q **What are the primary challenges that are confronting developing country smallholder farmers in their management of soil resources?**

A In discussions with farmers, the issue of declining soil fertility is a common, economic problem throughout the developing world. Middle-aged and older farmers, whether in Latin America, Africa, or Asia, are greatly concerned about the extent of the soil fertility decline during their lifetimes, and they lament both the lower yields and the lower diversity of crops that the current soils have capacity to produce.

Farmers are environmentalists too. They not only live on the land with their families; they depend on it for their livelihoods. The land is their most important asset, and they have a long-term interest in protecting its fertility.

Lack of farmer awareness is therefore not a problem; in fact, it gives us an opportunity on which we can base future efforts. The Soil and Nutrient Dynamics Program is taking a close look at the factors that prevent adoption of soil-improving technologies and is overcoming those problems with effective, efficient and economical solutions. Farmers are most often limited in the resources that they have at their disposal to improve soil fertility. This is true for inorganic fertilizers because their high price and poor accessibility greatly limit their use by smallholder farmers. We work with the Market Development Division to improve the accessibility and lower the price for

the farmers in a sustainable fashion. One should note that lack of resources can also prevent the use of organic inputs. Lack of seed, unavailability of labor, and immediate food needs often prevent the use of cover crops—a promising way to improve soil resources. Among the very poor farmers, lack of resources can be so extreme that it prevents even a very short-term investment in soil-improving technologies. For example, although in West Africa both surveys and our studies with the CERES-maize simulation model have shown that only one maize crop per year with an associated Mucuna crop is more profitable than a system with two maize crops (no Mucuna), many farmers in southern Benin are unable to forsake their second maize season (which may yield only 300 kg/ha) and wait for the higher maize yield in the following year.

Commercial fertilizers are drawn from nature and converted to a form that is digestible by plants.

Lack of knowledge about the specifics of soil degradation and about tools that could be used to improve soil fertility is also a challenge that confronts us. In certain cases, it is the farmer who has insufficient knowledge. For example, the farmer may know that his soil is no longer yielding the way it used to but does not know what is causing the low yield and, therefore, is limited in his efforts to find solutions. In many cases, we researchers also have insufficient understanding of the extent and specifics of the soil fertility decline. Only in recent years, for example, has it been increasingly realized that micronutrient deficiencies are quite widespread and greatly limit crop yields (e.g., rice in Asia) in addition to having grave impact on human health. As researchers, working with farmers, we need to develop technologies that are more effective to combat human nutritional deficiencies and nutrient depletion in the soil.

Finally, uncertainty of return on investments in soil fertility is a significant challenge that farmers are facing. A farmer may not have secure land tenure, his or her access to markets may be unpredictable, or the farm-gate prices of his or her produce may be extremely unpredictable. All of these factors decrease the ability and willingness of the farmer to invest in soil fertility management.

Q **What do you see as the most promising approaches and technologies to improve soil fertility?**

A At IFDC our approach is integrated: we focus on those factors that have the most potential to solve these urgent problems, such as organic or inorganic inputs of nutrients, pest and disease management, and water management. We also realize that only some of the solutions can be found within soils and agronomy; therefore, we often work with experts on market and policy issues.

In the Soil and Nutrient Dynamics Program, we have developed many useful technologies to manage soil fertility. Many of them have been taken to farms and have been tested through field trials and Information and Decision Support Systems (IDSS) to ensure greater applicability. What distinguishes IFDC from many other research institutions is our strong emphasis on both research and development. The technologies that we develop are closely linked to field-based development programs. Field testing of these technologies enables IFDC to increase the effectiveness of the technologies by removing bottlenecks associated with their use and enabling IFDC scientists to increase the range of applicability of the technologies.

- **Deep Placement of Urea Briquettes in Lowland Rice**. In the late 1970s and 1980s, it was shown that the common farmer practice of applying nitrogen in paddy rice—through broadcasting over the flooded field—results in losses of nitrogen that often approach 70%. Ensuing research showed that if the nitrogen was applied as large granules in the soil, losses would be minimal. The urea briquettes only started showing their economic potential in the 1990s when IFDC developed a machine to manufacture these urea briquettes at the local level. With the Bangladesh Ministry of Agriculture, Agricultural Research Institute, and the private sector, IFDC introduced the briquetting machines to farmers. Today, the briquetting machines are widespread throughout Bangladesh, and a large number of farmers are using the briquettes in their rice production. Apart from this work, IFDC has also developed methods to improve nitrogen use efficiency through urease inhibitors and polymer-coated fertilizers.

With each crop harvest, nutrients are removed from the soil and consumed in the food we eat. Without replenishing the soil, it becomes less productive and more susceptible to erosion and desertification.

- **Combining Inorganic and Organic Inputs**. Results of IFDC research demonstrate higher yields and better profitability if organic and inorganic inputs are combined. The organic inputs needed vary by region, depending on what is available. In areas with livestock, manure is an option. In areas where pressure of human beings and animals on the land is not extremely high, cover crops have potential. In areas with high land pressure, recycling of crop residues may be the only option. If a portion of this increased biomass production by crops is recycled, it will lead to improved soil fertility—an important goal in soil management.

- **Application of Phosphate Rock (PR**). IFDC is a primary center of excellence in PR work. IFDC scientists continue to identify and characterize PR deposits; this is necessary to develop these deposits to be used either for manufacturing phosphate fertilizers or for

direct application. IFDC has also researched ways in which relatively insoluble PR can be made more soluble and available to crops. This enables developing countries with deposits of PR of relatively low solubility to supply more phosphorus for plant nutrition more economically.

Q **An important component of the Soil and Nutrient Dynamics Program's work is the development of Information and Decision Support Systems (IDSS). What do you consider the future potential of such tools?**

A IDSS tools have proven useful to understand agricultural processes (nutrient dynamics, water use, and crop growth) and to integrate large amounts of data to produce information that is easily and effectively used to make both short-term and long-term decisions. In the past 20 years, these tools have been used increasingly to evaluate effects of climate change on agriculture, to map yield gaps, and to quantify risks associated with vagaries of weather.

In the future, we see promise for such tools, especially in the following arenas:

- **Development of Best Management Practices, Which are Site-Specific and Dynamic.** In many countries fertilizer recommendations developed 50 years ago are still being used although we know there have been changes in soil fertility and in the varieties that are cultivated. It is clear now that the true potential of improved genotypes and genetically modified (GM) crops will not be realized if soil nutrient management recommendations are not revised. The traditional manner of developing these recommendations through multi-site and multi-year field trials requires a great deal of resources and time. In marked contrast, the highly efficient IDSS tools developed by IFDC can be used to evaluate thousands of genotypes, seasons (climate), soil types, and management practices as a basis for making soil management recommendations. Another important future activity with IDSS will be to evaluate changes in soil-and-water management practices that could be taken in response to global climate change and such seasonal weather fluctuations as the El Niño effect.

The main nutrients in most fertilizers—nitrogen, phosphorus, and potassium—come from the land and the air. They are not man-made; they exist in Nature.

- **Increased Linkage Between Market Information Systems and IDSS**. By effectively linking market information systems and IDSS, we can help national economies to predict the impacts of changing agricultural production. For example, the flexibility and gains associated with changing to another crop can be shown for different

regions of a country. Linking MIS with IDSS will also help a country's farmers, input suppliers, and planners in their efforts to satisfy changing food habits and consumer demands and to identify bottlenecks regarding marketing of products and accessibility of inputs.

At IFDC, we realize that IDSS can increase the impacts of the promising technologies that we and others have developed. For example, to enhance the use of PR, we are in the process of finalizing a Decision Support System (DSS) that predicts PR effectiveness, based on certain soil and climatic conditions and a choice of crops and cultivars. By linking this DSS with IDSS, we can predict potential areas in, for example, sub-Saharan Africa for direct use of PR from indigenous deposits. We use these decision support tools to assist in the use of PR in organic agriculture, a growing field both in the industrialized countries and one with potential, particularly through exporting of high-valued crops, in many developing countries. Another area where we can use IDSS tools is in our work on urea deep placement (UDP). We can, for example, identify niches for UDP use in rain-fed lowland areas.

Fertilizer nutrients are the same, whether organic or commercial.

In future projects in our program, increased integration of IDSS in projects will be important. Through IDSS, researchers in developing countries will continue to have access to and ability to manage the information far into the future. At IFDC, IDSS is improving research data management and our institutional memory to share with others.

"Mobilizing Ideas, Empowering People"

Dr. Arno Maatman with farmers in southern Togo, observing a maize crop.

Photo by Anke Piederiet

A Profile of Agribusiness Development in West Africa—Interview with Dr. Arno Maatman of the Africa Division

Q **What are the primary goals of the agribusiness development program?**

The general objective of the agribusiness development program is to improve the incomes and competencies of farmers and local entrepreneurs through the development of competitive industries—based on intensive agricultural production—in well-chosen locations. The beneficiaries of our work include local actors involved in input distribution, processing, storage, transportation and trade.

A **What are the guiding principles?**

There are several significant issues that need to be addressed, specifically in sub-Saharan Africa, if we are serious about developing competitive advantages on a regional scale. First, we should recognize that economic development is based on both macro-economic policies and regulations and micro-economic, i.e., "industry-level" activities. The activities of the agribusiness program begin at the so-called "grassroots" level.

Second, at the grassroots level the development of competitive advantages hinges on individual competencies—both with respect to technical and managerial issues—and an effective combination of collaboration and competition between individual enterprises. Third, it is important to understand that the agribusiness system comprises not only the farmers and local entrepreneurs directly involved in specific com-

modity chains but also the credit institutions and other public or private business development organizations, including the traditional research and extension services. Competitive advantages depend on the competencies of these stakeholders and on the effectiveness of the linkages between them. A pragmatic demand-driven approach is of crucial importance. This means, for instance, that the knowledge of and linkages with buyers' supply value chains need to be improved. This also causes us to be very cautious about the choice of locations where we begin our activities. Targeting of commodities is another guiding principle because competitive advantages at a regional level are much easier to obtain around a group of similar commodities.

Q **Why have an agribusiness program at IFDC's Africa Division?**

A Many rural development programs, in particular those aiming for agricultural intensification, failed because they did not really change the competencies of the farmers and other stakeholders involved; neither did they change the structure and functioning of the local economies. Farmers were aided by development agencies providing support to reorient production strategies (technological packages) and to overcome market failures, e.g., through the provision of credit, inputs, and technical information. All of this only temporarily reduced the risks of farmers to produce for the market and to integrate in market-oriented commodity value systems. Artificial competitive advantages were also created by focusing on regions and commodities that were targeted merely for political reasons—and not based upon a realistic assessment of what could be done in such a locality by the various actors themselves.

Africa needs another approach that is based on empowerment and competitiveness—an approach that strengthens the capacities of rural populations (farmers and local entrepreneurs) to innovate technically and to lobby and network for their own future. Such an approach is based on "hard" management science, (institutional) economics, and "soft" learning processes to stimulate social transformation. Only by combining these three ingredients can we assist rural populations in improving their welfare by developing competitive advantages—on local and regional markets but also gradually on international markets. IFDC has developed its competencies in market-oriented approaches and institutional arrangements—linking farmers, entrepreneurs and policy makers—substantially over the last few years. It also has the right mix of staff—from researchers to marketing specialists coming from the private sector—to pursue this agenda effectively.

Q **What are the major challenges?**

A It is important to stress that the CASE approach that we developed fosters empowerment of farmers and local entrepreneurs, both women and men. It is about social transformation as envisioned by Paole Freire as much as it is about "hard" managerial skills, organizational strengthening of farmer and trader organizations at various levels, and institutional arrangements to overcome market failures (and strengthen coordination). CASE asks very much of its facilitating agents as it attempts (1) to improve coordination along commodity chains, which often implies balancing power relationships between the different actors and trying to promote healthy competition, (2) to ensure innovation and collaboration, (3) to open up new markets, and (4) to ensure that contracts with buyers are respected between farms and enterprises within the target area. Business cartels, for instance, represent a logical response of traders and entrepreneurs in a context of market failures and uncertain social and/or political environments. However, business cartels can be as detrimental to economic growth and increased private sector engagement as corruption. It is a huge challenge to develop the lobbying and negotiation skills of farmer and/or trader organizations to eliminate barriers to entry in monopolistic commodity chains without giving up on coordination. The program can therefore only be efficient if it has highly skilled, pragmatic, and creative facilitators working in the field with farmers, local entrepreneurs, and other stakeholders such as the business development services.

Second, a commodity chain approach needs a focused facilitating strategy not only involving a few well-targeted commodities but also developing local clusters of enterprises and service institutions able to move the commodity value system forward and develop real—rather than subsidized artificial and temporary—competitive advantages. This should invite us to look for creative ways of developing some kind of individual or collective specialization within often highly diverse and dynamic farming systems and for opportunities to add value through processing and stronger marketing (including storage) strategies. It also requires dialogue with policy makers and donors to discuss how competitiveness and other social and political goals can be matched efficiently. There still is much work to do in this area. Moreover, a very important challenge lies in the balancing of participatory, inclusive approaches with exclusive competitive processes. The community-based approaches that prevail in many development programs will not suffice for commodity chain development and will not lead to effective competitive advantages at the local level. Some exclusiveness is needed by focusing on the strong innovative farmers and local entrepreneurs who may very well be poor and vulnerable at the beginning of the program.

Q **What is next?**

A Although the "small but real" successes in market (commodity chain) development in some of our target areas are the main drivers to scale up CASE, effective scaling-up strategies also depend on appropriate communication strategies. These strategies include market information systems, intensive training of local trainers to multiply and maintain learning activities, and ambitious networking activities. We absolutely need more critical mass—and funding—to develop CASE properly. But we have learned much, and the flexible learning approaches that are now available within IFDC can provide a significant contribution to sustainable agricultural intensification in sub-Saharan Africa.

Food production will need to double in the next 20 or so years in order to provide global food security.

Dr. Balu L. Bumb, IFDC Principal Economist, explains the "Five Pillars of Market Development" for the Board of Directors.

Photo by Charles E. Butler

A Profile of Market and Trade Policy—Interview With Dr. Balu L. Bumb of the Market Development Division and Dr. Kofi Debrah of the Africa Division

Q **What are the primary goals of the Market and Trade Policy Program?**

A The main goal of the Market and Trade Policy Program (MTPP) is to promote economic growth and improve livelihoods by creating sound policy environments and building institutional capacity for competitive markets. The main focus will be on policy assessment and dialogue, trade policy reforms, market development, and regional and global integration of markets in the context of the World Trade Organization (WTO) rules and regional trade agreements.

Q **What mechanisms do you plan to use to achieve MTPP goals?**

A Market development and trade policy reforms will be achieved mainly by using three tools, namely, market and trade policy assessment, action plan development, and project implementation. For a given country or region, an assessment of the functioning and performance of agricultural markets will be conducted, and the constraints affecting the performance of markets, with a special focus on the private sector, will be identified. In stage two, an action plan will be developed to remove constraints and strengthen the performance of markets. Finally, a project will be designed and implemented to build institutional

capacity and improve the policy environment for market development. Likewise, issues related to global and regional trade will be diagnosed and improved through policy dialogue, regional harmonization, and capacity building efforts.

Q **Can you provide some examples of this three-stage process of market development?**

A Yes, there are several examples but I will cite two cases. For AIMs development in Malawi and Nigeria, we have followed this three-stage process. In 2000, we conducted an assessment of AIMs (seed, fertilizer, and CPP markets) in Malawi and Nigeria; developed action plans, which were validated by national stakeholders; and then implemented AIMs development projects in both countries during 2001-2005.

Q **What are the primary challenges in developing agricultural markets in Africa**?

A In many countries in Africa, agricultural markets, especially input markets, are underdeveloped and fragmented because the policy environment is non-conducive, human capital (quantity and quality) is inadequate, access to finance and market information is limited, and regulatory systems are poorly enforced. To improve the efficiency and competitiveness of markets, African leaders should focus resources on the Five Pillars of Market Development.

Q **What are the Five Pillars of Market Development?**

A The Five Pillars of Market Development consist of Policy, Human Capital, Finance, Market Information, and Regulation. Well-functioning markets need a favorable policy environment, adequate human capital (in both quantity and quality), easy access to finance and market information, and effective enforcement of regulatory frameworks (for quality control and truth-in-labeling). Policy makers in Africa should refrain from interfering in the

marketplace, devote resources to building human capital in rural areas, improve access to finance by establishing risk-sharing funds so that commercial banks can lend for agri-input business development and imports, establish market information and transparency systems, disseminate information about market activities, and build capacity for effective enforcement of regulatory frameworks so that farmers can have access to quality products.

Q **What is the role of market information in promoting market development?**

A Information is crucial for transacting all business activities. Information is money in trading and business development. With good and timely information about prices, stocks, and deliveries, traders and farmers can optimize their transaction costs. To promote market transparency and to link various markets, IFDC is implementing two projects, namely Marketing Inputs Regionally (MIR) and MISTOWA in West Africa. Additionally, these projects are also promoting the development of traders' and producers' associations that can perform advocacy functions for policy reforms and take the lead in disseminating market information.

Q **Why is the regional integration of markets important, especially in Africa?**

A The regional integration of markets is important for three reasons in Africa. First, in several African countries, the size of the national market is very small. For example, Mozambique uses only 50,000 tons of fertilizer products; Zambia uses approximately 150,000 product tons; and Malawi, 200,000 tons. If each country procures these small quantities in the global market, they pay very high prices. However, if these three countries and, likewise other country groups, could constitute a single market by removing tariffs and non-tariff barriers, any private sector trader can import large quantities of products for the regional market and thereby benefit from the economies of scale. Second, if inputs are traded without borders, there are no tariffs on inputs and thereby farmers pay lower prices for inputs. Third, integration of multi-country markets relieves the national governments, traders, and consumers from the burden of administrative hurdles because every time a trucker crosses the border between Mozambique and Zambia or other countries, he is subjected to a series of paper work, time and resources are wasted, and transaction costs are increased.

Q **Are there any other areas that require special focus by policy makers and donors?**

A Yes, it is important that adequate resources are devoted to creating well-functioning input and output markets, but it should also be recognized that not all of the members of the society will be able to participate in the marketplace because of lack of purchasing power. Unless these members are endowed with purchasing power to participate in the marketplace, they will remain "excluded" from the development process. These people need safety nets, but such safety nets should be implemented in a market-friendly manner so that market development is not distorted.

Q **What are the specific accomplishments of the MTPP during the past year?**

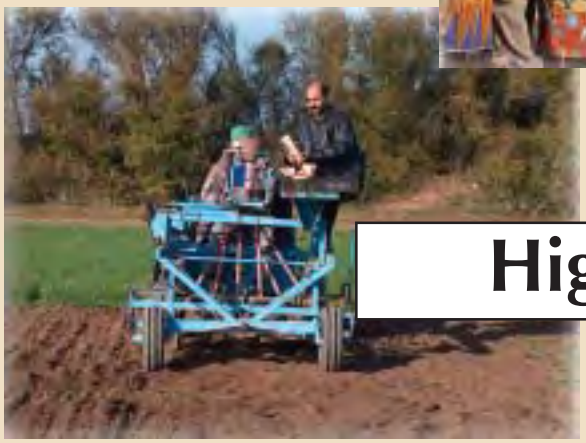
A MTPP has been active during the past year. We have completed market assessments in Angola and Madagascar; action plans for developing AIMs in Kenya, Tanzania, and Zambia; established collaborations with the Agha Khan Foundation, World Bank, Rockefeller Foundation, Millennium Challenge Corporation (MCC), NEPAD, and the Eastern and Central Africa Program for Agricultural Policy Analysis (ECAPAPA); and in collaboration with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and Iowa State University, prepared a program for developing sustainable seed systems in Africa. Project implementation activities included market development projects in Ghana, Nigeria, Malawi, and Uganda and regional market integration projects in West Africa.

The General Secretary of the Dawanau Market Development Association stresses high grain quality to Dr. Kofi Debrah (right), Chief of Party, MISTOWA Project, in the Kano, Nigeria market.

MISTOWA Photo

Q **What are the future prospects for the Market and Trade Policy Program at IFDC?**

A The prospects are very good. With globalization and WTO agreements and with the changed "mindset" among policy makers and donors, there is an increasing focus on market development and trade liberalization. The Common Market for Eastern and Southern Africa (COMESA) has already started the process of creating a "maize without borders" trading block and the Southern African Development Community (SADC), the East African Community (EAC), and ECOWAS are working to create regional markets for inputs and outputs. Although trade liberalization is important, many developing and transitional economies need institutional capacity to benefit from liberalized trade regimes. They also need to develop their domestic markets. Thus, there will be increasing demands on IFDC's resources from various organizations (national and international) to help the developing and transitional economies to build capacity for market and trade development. IFDC has already been approached by MCC to assist it in market development in Madagascar and other countries.



Highlights of 2004/05

"Mobilizing Ideas, Empowering People"

Agribusiness Development

The ultimate goal of the Agribusiness Development Program is to improve the incomes and competencies of farmers and local entrepreneurs through the development and implementation of competitive market systems. The beneficiaries of this work include those people involved in agricultural production, input distribution, processing, storage, transportation, and trade. Projects being carried out in Africa, Asia, Eurasia, and Eastern Europe are discussed in this section.

Fertilizers and Sustainable Agricultural Development and Farmers for the Future Projects

With support from the International Fertilizer Industry Association (IFA) and USAID, IFDC is undertaking two intimately linked pilot projects to promote sustainable agricultural intensification by smallholder farmers. The project, under the direction of Dr. Arno Maatman of the Africa Division, is active in 7 West African countries, collaborates with more than 30 public and private facilitating organizations, and has reached out to at least 100,000 smallholder farmers and 500 local entrepreneurs. The project enabled the development of the CASE approach, a holistic action-oriented approach that fosters both technological and institutional change, through bottom-up learning processes.

The CASE approach has evolved from the recognition that technology-push strategies to promote risky agricultural intensification processes rarely work. To enable farmers to invest in external inputs such as improved seeds, fertilizers, crop protection products, and adequate equipment, profound changes at the grassroots level are often needed. These changes include: (1) improved access to inputs, credit, and adequate information; (2) stronger management competencies of farmers, local entrepreneurs, and grassroots organizations; and (3) better coordination between farmers; local entrepreneurs involved in processing, storage and/or trade; and the principal actors and facilitating organizations (including credit institutions and NGOs). The CASE approach relates well to agribusiness and natural resource management projects that merely tend to facilitate innovation, support networking and lobbying activities, and provide—or enable access to—training to improve technical and managerial capacities of the principal actors involved. In other words, the approach relates well to projects that strengthen innovative competencies, including those needed to improve coordination between the various actors at both local and regional levels and within specific commodity chains without substituting for market agents. The responsibility for development stays at the grassroots level with the primary actors.

Improved access to inputs is a requirement of CASE.

Photo by Patrice Annequin

Adequate facilitating and networking services enable farmers, local entrepreneurs, local business development services, and credit institutions to strengthen the competitive advantages of the region, for specific industry clusters (e.g., rice, horticultural crops and products, animal feed, and meat). These services involve both social and individual learning through training, experimentation (also with alternative institutional arrangements), study visits, networking, and platform-building activities. It also includes occasional support to well-targeted catalytic events such as trade fairs and mass media campaigns. Some results from the two pilot projects include:

1. Adoption of ISFM options is taking off. An estimated total of 100,000 farmers have adopted ISFM technologies on a significant part of their farms. The value: cost ratios of ISFM options adopted are well above 2, and returns to family labor are 2-6 times higher than the average salary in the area. Farm-level incomes of ISFM farmers have increased by 20%-50%.
2. ISFM farmer learning groups established in 300 pilot villages are taking the lead in the development and validation of ISFM options for a focused set of marketable products and experimenting with alternative institutional arrangements to improve access to factor (including information) and product markets.
3. Organizational capacities of farmer groups in the pilot areas improved. Farmer groups at the village and regional levels have assumed new roles, e.g., input provisioning, diffusion of information, linkages to credit and savings systems and local and regional traders, including retailers and fertilizer companies.
4. About 500 local entrepreneurs—inputs dealers, traders, managers of warehouses and processing units—have received training, participated in round table meetings, and worked with ISFM farmer groups.
5. Gender awareness increased in the pilot villages and within the facilitating institutions. Women play an important role in the ISFM project activities and related decision making. They are on average equally represented in the ISFM farmer groups and often have leading roles.
6. Land tenure security improved for ISFM farmers, including female farmers. In some cases, contracts between landowners and ISFM farmers were established for a sequence of years.
7. Capacities of facilitating organizations were strengthened. The quality of services provided to farmers and local entrepreneurs has improved considerably.

Proactive Farming Leads to Greater Returns

Mr. Edjeou in his field that is covered with mucuna. Photo by Mariette Gross

Farmer Edjeou had to leave his native village because there was not enough productive land to cultivate so he moved to the village of Affem-Kabyè in Central Togo. After a few years he was confronted with the same problem in the new location. For this reason he actively participated in activities organized by IFDC and its partner organizations. He started to experiment with ISFM technologies on 1 hectare using legume cover crops (*mucuna*), manure, and mineral fertilizer (NPK and urea). The results were very promising; with the new technologies his production increased from 1,200 kg/ha to 4,500 kg/ha. Now he is cultivating 14 ha with the use of ISFM technologies. During the cropping season he carefully inspects the crops on his field to anticipate signs of degradation and adapts the management of his fields if needed. “Today I am proud to be a farmer and to say that soil fertility management is no longer a problem,” says Edjeou.

The returns to the CASE approach are high but very much dependent on the skills, enthusiasm, empowerment, and facilitating skills of the partner organizations. It goes almost without saying that the road to the CASE approach, which started only 6 years ago, was difficult. It was, for instance, very difficult to move beyond more or less participatory experiments with ISFM technologies that were intended to improve the efficiency of external inputs, in particular fertilizers, by introducing marketing and other agribusiness concepts and activities. The new approach necessitated the establishment of new partnerships and the development of competitive

More Groundnuts = More Cash for Women Farmers

A Nigerien woman makes zai holes for incorporating fertilizer on a collective field in Niger.

Photo by Serena Palverigiani

A female farmer group from Guidan Gaba, a village in Niger, experimented for several years with the zaï technique to rehabilitate the soil on their communal learning plot. Seeds are planted in holes having a diameter of about 20-30 cm and a depth of about 10-20 cm. A handful of manure is added to the hole. After some years of good results with this technique for millet production, the women sowed groundnuts in a few zaï holes to observe the results. Field agents were quite surprised with their initiative because traditionally farmers in this area never fertilize groundnut production. In fact, farmers plant groundnut, which is a legume crop, only on soils that have become very poor after years of cultivation. The president of the group explained, "We are interested in groundnuts because it is a cash crop for women in the village and because of the positive results with millet production; we want to see if it will also work for groundnuts." In 2005 IFDC and its partner organizations will support their initiative by facilitating learning plots for groundnut production and assisting in market analyses for processed groundnut products.

Stronger management competencies of local entrepreneurs is a CASE prerequisite.

Photo by Patrice Annequin

strategies for inter-institutional collaboration. Although ISFM-based options for agricultural intensification are still important components of the CASE approach and often an entry point in learning experiments in pilot villages, joint market analyses and experiments with alternative institutional arrangements are of equal—if not sometimes higher—importance. Many lessons have been learned, and IFDC and the partner organizations have now developed a flexible framework that provides guidance to action research and to the scaling up of successful experiences, which is capable of strengthening the capacities of farmers to invest in agricultural intensification and of local entrepreneurs and facilitating institutions to invest in chain development.

To improve the exchange of experiences between the various facilitating organizations—involving both public research and extension systems, private business development services, NGOs, farmer and trader organizations, and credit institutions—the Agricultural Intensification in sub-Saharan Africa (AISSA) network was established. This network is intended to become an important platform to exchange information on agricultural intensification processes, to develop and disseminate facilitation tools, and to stimulate more effective collaboration.

Agricultural Production Program in Mali

The International Program of the Cooperative League of the United States of America (CLUSA) is the prime contractor for a project called PRODEPAM—Program for the Development of Agricultural Production in Mali. IFDC is a

CASE = More Profits for Farmers

Women threshing maize in Togo.

Photo by Mariette Gross

Mouzou Palakyèm is a young producer in Central Togo. With the help of IFDC and its partner organizations, he increased his yield from 750 kg/ha to 3,000 kg/ha. “It was not only the new technologies that helped me to increase my production,” says Mouzou, “but with the assistance of IFDC, I learned to improve my method of farm management. Now I grow more cash crops and calculate carefully all my costs and revenues. I am able to obtain a much better yield with only slightly increased costs.”

member of a consortium led by CLUSA, which manages the project and focuses on farmer organization. Other consortium members and their areas of focus include: Sheladia (irrigation); Land O’Lakes (animal feed); and Approtec (irrigation equipment—pumps). IFDC is responsible for NRM, production technology (irrigated crops), extension (ISFM strategies) and input marketing issues.

The goal of PRODEPAM, which began in 2004, is to increase producer incomes and foster sustainable, environmentally sound economic growth. PRODEPAM is funded by USAID and is one of its primary projects in Mali. The project, led by Dr. Kabirou N’Diaye, PRODEPAM/IFDC Team Leader, aims to stimulate agricultural productivity in Mali in two sectors: (1) irrigated crops (rice and horticultural crops) and (2) animal feed. The project covers a large part of Mali: the Mopti, Ségou, Sikasso, Bamako, Tombouctou and Gao regions.

IFDC has brought in a highly skilled and balanced team to PRODEPAM. With two women on the team, it is gender balanced (A. Nobre and F. Salamanta). The team members have experience in the private sector (S.Y. Traoré), in NGOs (F. Salamanta), and with the CASE approach (A. Nobre). The team brings in new perspectives through staff from Benin (A. Nobre) and Burkina Faso (S.Y. Traoré). The PRODEPAM/IFDC team is being led by one the most respected agronomists in Mali, K. N’Diaye. Activities in the first period have concentrated on (1) the execution of diagnostic surveys within the target areas, (2) identification of public and private business development organizations (including NGOs) for specific sub-contracts,

Field visits during ISFM training of field agents.

Photo by Dr. Kabirou N’Diaye

(3) training and monitoring activities (i.e., scaling out of the CASE approaches developed by IFDC), and (4) organization of regional-level fora on seed supply and separately on fertilizer distribution with seed suppliers, input dealers, farmer-based organizations, and credit institutions. IFDC's contribution is expected to help achieve the following principal results: (1) significant increases in paddy rice and horticultural crop production through productivity enhancements and increased access to high-quality inputs and (2) significant improvement in the natural resource base through agricultural intensification and reductions in soil degradation.

Rebuilding Agricultural Markets of Afghanistan Program (RAMP)

Since February 2004 IFDC has been participating as a subcontractor in the RAMP project that aims to restore food security in devastated Afghanistan by increasing agricultural productivity and output and by improving linkages among producers, processors, and markets. IFDC is working to develop the agricultural input market system. This project, under the direction of Dr. Gerald W. Turnbull, Chief of Party, was later expanded to include a divestment study of the Afghan Fertilizer Company. In spite of challenging security since March 2004, the project has achieved significant results to date including:

Photo by M. Feisal Beig

IFDC-trained fertilizer dealers in Baghe Kazi/Kabul.

- Conducted 39 training programs for 1,332 agricultural inputs dealers and 489 extension service and NGO staff in 20 provinces.
- Commenced dialogue between the input dealers and the Minister of Agriculture, Animal Husbandry, and Food regarding policy recommendations to enhance operations of the private sector.
- Produced and distributed several hundred area crop charts on wheat technology and fertilizer recommendation booklets in Dari and Pashto.
- Facilitated credit for agricultural input dealers from RAMP credit projects and NGO projects.
- Established a database of 1,640 dealers throughout 34 provinces.
- Established a simple MIS on agricultural input and commodity prices.
- Conducted a study on divestment alternatives for the state-owned Afghan Fertilizer Company.
- Assisted with the establishment of the first agricultural input dealer association in Afghanistan.
- Linked agricultural dealers with international suppliers.

The activities of the AIDTDP project have increased the usage of high-quality fertilizers in several provinces. Furthermore, the training programs have enabled the dealers to work directly with the farmers and explain why price is not the only criteria when selecting a fertilizer. The activities of the project have linked remote retailers with importers to improve both the quality and quantity of fertilizer available to the farmers of Afghanistan. Improved business linkages in the marketing system have also resulted in a positive impact on the timeliness of fertilizer supply availability. The project is playing a key role in developing the dealers of Afghanistan to act as a single group and to have a voice in their future.

Food for Progress Program in Albania

In 2004 IFDC implemented its first Food for Progress (FFP) program with funding from the United States Department of Agriculture (USDA) in Albania. The USDA FFP program is designed for countries that have made commitments to introduce or expand free market elements in their agricultural economies. IFDC's FFP in Albania was designed to address the absence of a credit for agribusiness development in Albania, and it had two objectives. First, the project supported private sector development of agribusiness enterprises engaged in feed milling or meat, dairy, and egg production by providing technical assistance and linkages to world market sources and by promoting market development programs. Second, the project established an agribusiness credit guarantee by providing an escrow account at the American Bank of Albania (ABA). This account is being used as a guarantee for loans to the target sectors (feed milling and meat, dairy and egg production enterprises) and to other selected agribusiness activities, primarily for first-time loan applicants engaged in small and medium size agribusiness activities.

IFDC generated funds to support these objectives and the resulting activities by monetizing in Albania 16,000 tons of maize and soybean meal provided by the USDA grant. IFDC used a transparent sealed bid process that attracted more than 100 participants in each auction (three auctions held) and was successful in obtaining winning bids reflective of international prices for the commodities.

Total funds generated through the monetization activity amounted to $4.2 million. Of this amount, $1.2 million is being used for technical and market development assistance to emerging livestock and feed milling enterprises. In 2004 activities focused on experimental feeding trials for poultry, dairy cattle, and swine and the dissemination of results showing production and economic benefits derived from the use of improved feed formulations based on quality maize and high protein (48%) soybean meal raw material provided by USDA. Demand for these raw materials by the Albanian feed milling industry and its farmer clients resulted in the additional purchase of approximately 8,000 tons of maize and high protein soybean meal directly from the international market by the Albanian private sector in the latter half of 2004.

IFDC staff began implementing the loan guarantee program by partnering with the ABA to provide credit specifically for agribusiness ventures not currently serviced by the banking sector. Beginning in July 2004 IFDC assisted 25 potential clients seeking loans guaranteed from the IFDC/Albania loan guarantee fund (LGF) by performing an initial review of the financial soundness of the business proposal. For those identified as feasible candidates (22), IFDC provided additional assistance to develop a business plan including a cash flow scenario and conducted a technical review of the proposal. Candidates were then provided guidance through the loan application process at ABA, where ABA assumed responsibility for final loan approval. In 2004 loans totaling $526,000 (mobilizing approximately 20% of the LGF) were disbursed. An additional $120,000 in loans was approved but not dispersed at year's end pending documentation from the local land office verifying landowner's title. Plans for 2005 include further identification of candidates to be assisted through the LGF so as to mobilize as much of the remaining LGF as possible by year's end. To accomplish this IFDC will increase interaction with other donors, agribusiness trade associations, ABA, and other private sector players. IFDC plans to establish a financially sound revolving credit fund for expansion of agribusiness activity in Albania prior to completion of the project.

Agricultural-Input Market Development in Azerbaijan (AMDA)

AMDA staff Nizami Garayev checks greenhouse cucumbers for diseases and pests.

Photo by Manuchegr Asker

With support from USAID during 2002-2005, IFDC conducted the AMDA project, which improved agricultural input marketing and accessibility in Azerbaijan. The objectives of this project, directed by Manfred Smotzok, Chief of Party, were (1) to identify agricultural inputs dealers and create an agricultural inputs dealers' association; (2) to promote growth of the agricultural inputs dealers' businesses; (3) to increase sales volume of agricultural inputs—fertilizers, seeds, CPPs, and (4) simultaneously to increase farm-level productivity. In 2004 AMDA assisted with the creation of the Agricultural Input Dealer Association (AKTIVTA), which was the first association of its kind to be officially registered in Azerbaijan and the first organization supported by a project partner. The 92 association members are supplying more than 42,000 Azerbaijani farmers with farm inputs on a regular basis. During the third year, 14 agricultural inputs dealers received credit amounting to $81,000, and no association member failed to repay their loans on time during the 3 years of AMDA implementation. Project clients invested $152,000 of their own resources to expand business, not only in input chain but also in greenhouses for production of value-added vegetables. During 2004 the dealers increased their imports of seed, fertilizer, and CPPs by $6.8 million, which resulted in increased crop production worth $70 million. Project-organized field days to foster improved apple production, for example, stimulated higher quality production, with the result that 80% of the apples were sold to the Russian market within 2 weeks after harvest. AMDA conducted numerous seminars on fertilizer product knowledge, customer needs, international trade, pricing, pests and disease control in crop production and vegetable growing in greenhouses.

Kosovo Feed for Poultry Project (KFPP)

In cooperation with the NGO, Save the Children, IFDC worked to improve the adoption of new technologies by producers in the feed grain, milling, and poultry sub-sector to increase marketed production of quality feed grains, poultry feed, and eggs. To achieve this objective, KFPP (previously directed by Dr. Raymond J. Clark, Chief of Party) promoted the consistent delivery of high-quality animal feed ingredients by farmers to agricultural processors and by agricultural processors to poultry producers. In so doing, IFDC provided a cluster-based model that can be emulated by farmers, millers, and poultry producers in Kosovo. The Kosovo project helped spur the removal of the VAT on all inputs including animal feed ingredients and, thus, helped farmers and domestic feed millers become more competitive. Using their own resources and bank credit, project clients invested $3.3 million. The project assisted local agricultural input dealers with the direct import of 325 tons of hybrid maize and 1,500 tons of hybrid wheat seed. Total acreage planted with the maize hybrids exceeded 25,000 ha, and more than 8,000 farmers had access to improved high-yielding maize varieties for the first time.

Networking Toward Successful Marketing

Jalaladin Salahudinov, General Director of Osh Krastex, is interviewed by a television reporter.

IFDC/Kyrgyzstan Photo

One of the primary suppliers of fertilizers in Kyrgyzstan is Oshkrastex, a Kyrgyz-Uzbek joint company that was founded in 2001. Initially, the company planned to focus on solely operating a woolen mill to clean and sell wool, produce yarn, and make carpets for the local and international markets. After Jalaldin Salahudinov, the General Director of OshKrastex, became a member of AAK in 2002 his plans changed. Salahudinov has a degree in agricultural engineering and has a firsthand awareness of the problems of the Kyrgyz agricultural sector. After meeting with fellow AAK members, Salahudinov decided to reorient their company's main function toward the supply and sale of fertilizers for the Kyrgyz market.

In 2002, after Salahudinov became a member of AAK it was as if Oshkrastex found its second wind. As Salahudinov states, "In Kyrgyzstan's new market economy it is unwise to rely solely on one's own power. There is a strong need for networking and support from associates and partners that I have found through AAK." With the networking support of AAK and the business development advice from IFDC, OshKrastex opened a model farm store to sell fertilizers, seeds, crop protection products and other farm supplies to the local community. In addition, Oshkrastex has opened numerous fertilizer distribution centers and developed partner linkages with other AAK members throughout the country.

As a pioneer in the Kyrgyzstan input sector, Oshkrastex has been a significant contributor to creating a stable environment for inputs in the country. For example, in 2001 legal fertilizer imports in southern Kyrgyzstan equalled only 729 tons, and the contraband market was almost 90% of total fertilizer sales. In 2004, legal fertilizer imports in the south reached nearly 35,000 tons (a 4,000% increase) and are expected to total more than 60,000 tons in 2005! In the past, the supply of fertilizer during the planting season would decline, and the local market price would often double. However, current market prices (as of June 2005) have remained stable, and the Oshkrastex warehouses are stocked at an appropriate level to satisfy local market demand.

Based on an annual IFDC survey of AAK members, from 2003 to 2004 there was a significant increase (38.7%) in AAK members who conducted fertilizer sales. In addition, in 2003 there were only 3 members who conducted fertilizer sales valued at more that $25,000; in 2004 that number increased to 7 dealers. Thus, a competitive fertilizer market is taking shape in Kyrgyzstan.

However, Oshkrastex's success is not in fertilizer alone, in April of 2004 the company signed a contract to become the regional distributor for Nunhems Seeds (Netherlands) and became the first official distributor for an international seed company in southern Kyrgyzstan. After exhibiting at the AAK Ferghana Valley International AgroExpo, Oshkrastex has become a distributor for May Seed Group (Turkey) and has successfully imported the first international cotton seeds for demonstration purposes into the region in more than 20 years.

Another critical constraint in Kyrgyzstan is the lack of agricultural machinery. This year, Oshkrastex has rehabilitated 10 tractors from Uzbekistan and is providing land preparation services to local Kyrgyz farmers, a much needed service. Oshkrastex employs a full-time agronomist in its farm store to provide free advice to farmer customers. In addition, the company conducts an annual customer day to receive feedback from their clients and partners regarding preferred products and services.

Farmers using project recommendations (hybrid seed, high-analysis DAP and urea fertilizer, and efficient and safe CPPs) had average maize yields of 5.5 tons/ha compared with 3.5 tons/ha for farmers using traditional practices. Soybeans were introduced to Kosovar farmers as a new commercial crop for use in livestock feed. Feed millers increased their domestic grain purchases by 67%, which translated into an additional income of $400,000+ for the project's 61 farmer clients in the first year. Egg production by project clients increased 51% during the first year; this was equivalent to a monetary value of $8,300/day.

Cluster and Business Support in Kosovo

During 2004 IFDC began participating in a project to stimulate economic growth and improve employment opportunities for Kosovars by working with governing authorities to improve the business environment and by removing barriers to investment and job creation. The project also focuses on improving the economic growth and performance in two agricultural clusters—livestock feed and fruits and vegetables—and one non-agricultural cluster—construction materials. IFDC is providing short-term technical expertise for the agricultural clusters and related activities in policy advocacy and trade association development. Based on past successes, IFDC will also provide a long-term local staff position to support continuity in policy advocacy and trade association development.

Kyrgyz Agro-Enterprise Development (KAED) Project

Since late 2001 IFDC has been participating in a project to improve agribusiness prospects in the Ferghana Valley of Kyrgyzstan. During 2004/05 Scott J. Wallace served as Chief of Party/KAED; Edward Beaman assumed those duties on June 1, 2005. The KAED project established an agricultural input dealer trade association in southern Kyrgyzstan that has become one of the strongest associations in the country. In 2004, the association lobbied successfully for the removal of a 20% VAT on fertilizer and CPPs. The removal of this tax translates into millions of dollars saved for small and large farmers, fertilizer dealers, and CPP suppliers. The trade association members increased their legal fertilizer sales by 15 fold during the past 2 years. Ultimately this saving will result in increased production of food for the Kyrgyz consumer at lower prices. Prior to the project extension, there was not a single farm store where farmers could buy high-quality inputs. The project has conducted 30 training programs on the development of retail farm stores. These programs covered issues such as location, product diversity, store size, necessary legal documents, input sourcing, business plan development, and inventory management. During the past 2½ years KAED assisted with the creation of 16 retail farm stores. The project has a goal of opening 21 retail farm stores in southern Kyrgyzstan by 2006. In December 2004, the project, in

Demonstration Day Trade Fair

Photo by Scott J. Wallace

conjunction with the trade association, organized the 3-day Ferghana Valley International Agro Expo, which attracted approximately 3,000 attendees. Exhibitors at the event represented more than 50 agricultural companies from 14 countries. Participating countries in the Expo included Israel, India, Malaysia, Netherlands, United States, Turkey, Germany, Belarus, Italy, Moldova, Russia, Kazakhstan, Uzbekistan, and Kyrgyzstan. The Agro-Expo exhibitors made more than 650 new contacts for business opportunities.

Agricultural Inputs Market Development in Malawi

In mid-2002 IFDC began a 3-year project, Agro-Input Market (AIMS) Development in Malawi project, to strengthen the agricultural inputs markets in that country by deepening policy reform, establishing regulatory systems, developing the capacities of private sector dealers, and expanding market information systems. In the initial stage of the project, Herschel Weeks served as Chief of Party; Dr. Lawrence L. Hammond has filled that position since January 2005. The project supports the objective of achieving sustainable increases in agricultural productivity by improving the access of small-holder farmers to quality inputs in a commercial, market-based manner. The project has helped establish an agricultural inputs trade association. The ratio of the retail price of fertilizer to maize prices in Malawi was reduced from 3.5 in 1999 to 2.3 in 2003. Moreover, because of increased competition and efficiency (including an effective market information system), the marketing margins in Malawi were reduced from $74/ton in 1998 to $23/ton in 2003. The IFDC-supported dealers quadrupled their outlet shops and significantly increased fertilizer imports, including group purchases. Despite the spike in world prices

Judith Zembení, a member of the Agri-Inputs Suppliers' Association of Malawi, shows some of the products available for sale in her shop.

Photo by Wilma Roscoe

A Second Career Produces a Successful Marketer

Dan Harawa retired from the Malawi Government in 2002 with a house and pension but very little savings. His colleagues at IFDC/Malawi encouraged him to start a small fertilizer business. With only $250 he purchased fertilizer to sell to local dealers in his home district. To pay for transport, he convinced the shop owner in his village to purchase 20 bags of fertilizer in advance. In a short time Harawa was distributing fertilizer to nine local dealers throughout the region and is just one of more than 1,000 new fertilizer dealers, 30% of whom are women. Through the new system, employment has been created for these agricultural inputs dealers and their assistants, and fertilizer is more accessible and affordable for local farmers. This success story began with a network of middle and small entrepreneurs. Middle-level dealers like Harawa purchase fertilizer from the supplier and then distribute it to local dealers. This arrangement creates a system of credit for the local dealers—typically farmers who have little or no cash. Credit is inaccessible to most people in Malawi because of high interest rates.

for fertilizer in 2004, the cost to farmers has remained the same. The AIMS project conducted more than 20 training seminars and workshops on technical agricultural topics involving more than 800 agricultural dealers and public-sector officials. The project established 78 demonstration field trials across the country to show improved field results. These field days enabled farmers to learn from fellow farmers about plant spacing, ridge spacing, and the importance of timely fertilizer application. Weekly radio programs on agronomic and market information were produced to provide traders, farmers, and extension staff with quality market and technical information. The programs reach more than 4 million people. The Agro-Input Suppliers' Association of Malawi was established with 1,000+ members. The project analyzed and drafted regulatory legislation for fertilizers, seed quality and purity, CPPs, and genetically modified organisms (GMOs).

Woman Farmer Profits From Improved Marketing

IFDC/Malawi Photo

Mrs. Isa, Malawian farmer

A Malawian farmer—Mrs. Isa—lives near Lilongwe, Malawi, with her three sons. Since her husband passed away, she lives on what she can grow on less than 1 ha of land. Her tall maize crop is a deep, healthy green because of good rains and fertilizer. She expects a profit to help her send her 13-year-old son to secondary school. Lower prices, smaller bag sizes, and better distribution of agricultural inputs mean farmers like Mrs. Isa are already benefiting. Previously, commercial fertilizer was always packaged in 50-kg bags. IFDC local dealers have been trained to repackage the material in smaller bags and are reporting more sales. National radio and television programs educate farmers concerning suitable fertilizer types for different crops and techniques for planting.

Malawi Inputs for Assets Project

The British Department for International Development provided funding to support an innovative partnership between the NGO, Consortium for the Southern African Food Security Emergency, comprising the Cooperative for Assistance and Relief Everywhere (CARE)—the lead organization, Save the Children (U.S.A.), Africare, Emmanuel International, IFDC, and local government authorities to implement an Inputs for Assets project. The project was implemented in 10 districts and targeted 100,000 food insecure smallholder farmers who grow maize as a staple food crop. The participating farmers provided labor and were paid in vouchers that were redeemable for inputs—seeds and fertilizers—from small-scale private sector suppliers. The project reached 30,000 farmers in the 2003/04 growing season, and 70,000 are targeted during 2004/05.

Developing Agricultural Input Markets in Nigeria

During 2002-04 IFDC undertook the DAIMINA project, which aimed to improve policies and regulatory regimes related to agricultural inputs and to develop systems for providing market information and access to credit. This project was conducted in collaboration with the Federal Ministry of Agriculture and Rural Development. Dr. Har Bhajan Singh served as Chief of Party of the DAIMINA project.

The Nigeria project helped organize a national-level Fertilizer Producers' and Suppliers' Association of Nigeria and four state-level agricultural dealers' associations to encourage policy dialogue and business development. In addition, DAIMINA introduced the fertilizer voucher scheme on a pilot basis as a substitute for direct subsidy. This resulted in 100% repayment and is being considered for replication by FAO and the Special Program on Food Security (SPFS). A 558-member agricultural input and commodity chain—composed of agricultural retailers, wholesale dealers, producers, and importers of agricultural inputs; grain merchants; extension agents; and other key players—has been established in the project area. The DAIMINA team trained

500 dealers, who serve 750,000 farmers. Agricultural dealers trained by the staff realized an annual growth of 38% in business turnover, and 40% of them gained access to more than $500,000 in commercial credit. The project spurred a 70% annual increase in fertilizer imports and sales between 2001 and 2004, with a total of 500,000 tons being distributed by the private sector in 2004. Farmers paid less for urea fertilizer in 2004, compared with the fertilizer retail price in Nigeria in 2003, despite the higher world market prices. The project helped Nigerian farmers realize the following increases in crop production during its 4-year tenure: yams, 7% increase; cassava, 4% increase; maize, 11% increase; millet, 7% increase; and rice, 9% increase.

Associating for a More Prosperous Future

During a farmer field day, the Deputy Director of the Institute for Agricultural Research (IAR) at the University of Zaria, Nigeria, discussed the impact of ISFM on his region. This official with an IFDC partner organization explained, "Farmer participation has risen from 70 farmers in 1999 to more than 2,000 farmers in 2004, including 8 registered farmer associations." In 2004 for the purpose of input supply and market outlets, these farmer organizations were able to link with several agricultural and allied private companies such as a seed supplier, two agricultural chemical suppliers, and a cereal oil processing company.

Photo, Courtesy IAR, Zaria

Farmer Field Day in Nigeria

Uganda Agricultural Production Enhancement Program

Since 2004 IFDC has been participating in a project to expand the economic opportunities in the Uganda agricultural sector by increasing agricultural productivity and marketing of key food and cash crops. The project seeks to move a substantial number of subsistence farmers to a commercial and profitable orientation. IFDC provides short-term technical expertise to promote improved performance in the agricultural inputs markets. Initial activities focus on improving market transparency, developing the technical capacity, and business knowledge of agricultural input dealers, strengthening trade linkages between Kenya agricultural input importers/wholesalers and Ugandan dealers, and updating fertilizer recommendations for key crops—coffee, banana, and cotton.

Woman Farmer Realizes Power of Association

Catherine Kedokpo processes her maize.

Photo by Attisso Atliogbevi-Somado

Catherine Kedokpo is a farmer from Ahohoué in southern Benin. Because of high pressure on the land in the region, Catherine does not own any fields herself; she rents her fields on which she grows maize, cowpea, cassava and tomatoes. In 1997 she joined the farmer group in her village to profit from the input supply system of the group and to participate in training about soil fertility and mineral fertilizers. She was able to increase her yield considerably, but due to increased production land owners indicated they want to take back the land or threatened to increase the rent. Not only Catherine but also other farmers in the region were confronted with the same problem. The mayor of the region, who had been a development agent and an IFDC collaborator, anticipated the problem and proposed to formalize all contracts between land owners and farmers. This collaboration with a local decision maker has strengthened significantly the bargaining power of the farmers. Now Catherine says, “Due to improved production, increased income, and land security, I plan to rent more fields in the near future.”

IFDC/Africa Photo

Research, Support, and Training for the Initiatives of Self Development (RAFIA), a partner organization of IFDC and member of the AISSA network, has successfully facilitated trade between horticultural farmers in northern Togo, and traders from Lomé. Farmers have been trained in horticultural techniques, use and maintenance of water pumps, and linked to input dealers, and credit structures. Specialized farmer-based organizations have been set up to negotiate with traders on prices, volumes, and dates of delivery. Previously, the traders had to go to Burkina Faso to get early tomatoes. Today, the farmers in Dapaong are capable of producing tomatoes of a better quality at a competitive price.

Natural Resource Management

IFDC's Natural Resource Management Program strives to achieve sustainable and profitable increases in agricultural productivity at high food quality standards in the developing world while safeguarding the quality of the natural resource base on which so many small-scale farmers depend. The ultimate goal is to ensure the well-being of current and future generations of rural farmers and urban consumers. Particularly in sub-Saharan Africa, soil fertility is of great concern; thus, finding ways to improve the access to agricultural inputs, especially fertilizer, is very important. Five projects that are being conducted in sub-Saharan Africa are discussed here.

Development and Dissemination of Sustainable ISFM Practices for Smallholder Farmers in Sub-Saharan Africa

With support from IFAD, IFA, and USAID and in partnership with the Tropical Soil Biology and Fertility (TSBF) Institute of the International Center for Tropical Agriculture (CIAT), IFDC is undertaking a research program to improve the livelihoods of smallholder farmers in sub-Saharan Africa. IFDC is working in West Africa and TSBF in southern Africa. The program, formerly directed by Dr. Marco C.S. Wopereis, Integrated Intensification Program Leader, promotes a holistic natural resources management approach to agricultural intensification. Integrated soil fertility management is an entry point to improved natural resources management aimed at marketable commodities, using the CASE approach. Participatory learning and action research methods address the complexity of farmer reality. Strategic research is conducted to analyze long-term soil fertility management trials with national agricultural research systems in Burkina Faso, Ghana, Mali, and Nigeria. Decision-support tools are used to help analyze and extrapolate options for improved production natural resources management.

A menu of technical options has been developed and validated in 16 pilot regions. The menu combines soil and water conservation methods, soil amendments, agroforestry and mineral fertilization for a range of production systems across agroecological zones. The project contributed to the establishment of AISSA, a partnership of national agricultural research and extension systems, NGOs, credit sources, and farmer organizations working on agricultural intensification in seven countries in West Africa. Training courses have been organized on ISFM and agricultural intensification for research and development partners in these countries. A large number of manuals, technical advisory notes, brochures, posters, and scientific articles have been and will be published with AISSA partners.

More "Food" for Plants Leads to More Food for People

The logistics manager of PACOGE, a company importing agricultural inputs into Benin, explains that the consumption of agricultural inputs for food crops has increased significantly during the past few years. In Klouekanme, one of the zones where IFDC is conducting the ISFM project, fertilizer consumption for food crops increased from 55 tons in 2001 to 254 tons in 2004.

Yields of ISFM plots are typically two to three times higher than average levels. Returns on invested capital exceed 100%, with value:cost ratios well above 2 and returns to family labor 2-6 times higher than the average "salary-rate" in the region. Added benefits of combined use of mineral fertilizer and organic inputs have been quantified for a number of strategic research trials conducted in the region. Such added benefits tend to be positive but can also be negative, depending on the nature and dosage of the organic inputs used, native soil fertility, and yield ceiling. The project is tackling this complexity by adapting a soil nutrient management framework based on the QUEFTS model that allows farmers and other stakeholders to develop season- and site-specific soil nutrient management options tailored to farmers' purchasing power. The framework has been

validated for irrigated rice production systems in Burkina Faso (that depend mainly on use of mineral fertilizers) and is under validation for rain-fed mixed maize-cassava based systems (where a mucuna short fallow is used to recuperate weed-infested and degraded soils). This project ended December 31, 2004.

The president of a female farmer group in the middle of her millet harvest in Niger.

Photo by Aissatou Nobre

The Livestock Development Project in the Soum Province, Burkina Faso (PDES)

Wopereis and his staff provided technical backstopping on crop-livestock interaction to farmers and research and extension staff in the PDES project, an investment program sponsored by the African Development Bank and the government of Burkina Faso. IFDC and its partners have developed ISFM options (combining mineral fertilizer and organic inputs) in collaboration with 50 farmers for cowpea and millet. In collaboration with the national agricultural research institute, Institute for the Environment and Agricultural Research (INERA**)**, feed ratios for small ruminants were validated with 21 farmers in 2003. Results were disseminated through field visits, demonstration plots, training courses, and rural workshops. The project is an important testing ground for IFDCs activities on simulation modeling of mixed farming systems within the Desert Margin Program.

The Southwest Burkina Faso Development Project (PDRSO)

Since July 2004, IFDC has been involved in the PDRSO project, an investment program sponsored by the African Development Bank, IFAD, and the Government of Burkina Faso. Wopereis and his colleagues were asked to develop ways to intensify agriculture in the region using the CASE approach. A rapid rural appraisal survey allowed identifying four pilot villages that have good potential for agricultural intensification. Project staff members have been recruited (one agronomist and one marketing specialist). A project launching workshop and a training course on the CASE approach have been organized in November 2004. Surveys are now being conducted to determine the best marketable commodities and entry points for both the NRM and agribusiness pillars of CASE.

Desert Margins Project (DMP)

IFDC is one of the partners in the DMP consortium, an initiative to arrest land degradation in Africa's desert margins, led by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), with funding from the Global Environment Facility (GEF). During the first 2 years of this project, which started in 2003, IFDC's contribution is focusing on formal and informal training of DMP research and development staff in systems approaches and decision support tools. During Phase I of the project, previously led by Wopereis,

IFDC has parameterized the Simulating Mixed Farming Systems in the Sahel (SIMFIS) model for farming conditions in Burkina Faso, Mali, and Niger. The model was expanded to include small ruminants and applied to farming conditions in the province of Soum in northern Burkina Faso, a direct link with the work that IFDC is doing in the PDES Livestock Development project (discussed previously). IFDC also organized a training course on decision support tools for Sahelian agriculture in June 2004, attended by partners from DMP and the Permanent Interstate Committee for Drought Control in the Sahel (CILSS**).** A follow-up workshop is planned for June 2005. IFDC is giving technical support to DMP partners through backstopping missions. The project has been extended for 2 years (2005-2006) in which IFDC's role will gradually move to one of providing backstopping to DMP partners on best-bet approaches to up- and out-scaling of agricultural technologies in mixed farming systems.

Developing ISFM Options for Basil Production Around Lomé

Since 2003 IFDC has been working with farmers and a French private company, Daregal, to develop improved and integrated crop management options for basil production near Lomé on beach sand along the ocean bordering the Lomé – Cotonou road. IFDC's research has determined responses of basil to N, P and K fertilization; N, P and K recovery rates; and internal N, P and K use efficiencies of basil. The work has led to the development of a decision-support tool for soil fertility management and allowed Daregal and farmers to optimize soil fertility management as a function of the sowing date and indigenous soil fertility. The research of Wopereis and his colleagues also enabled better timing and distribution of N fertilizer application, thereby doubling N recovery rates. IFDC and Daregal developed a strategy to reduce significantly nematode infestation levels in basil production through the introduction of crop rotations. IFDC is currently determining responses of basil to brewery waste and application of micronutrients on beach sand.

A farmer applies fertilizer in Togo. Photo by Francis Tamelokpo

Improved Access to Credit Means More Income for Farmers

Yaka Joachin is the manager of a rural cooperative bank in southern Togo and president of the farmer union. He explained that the ISFM project of IFDC has helped him to link the producers' unions with the bank. Because of this, the financial capacity of the bank has increased from 9,000,000 CFA (about US $18,000) in 1998 to 41,000,000 CFA (about US $82,000) in 2005. "Now more than 700 producers have access to credit for agricultural inputs and income-generating activities," Joachin says. "As a rural bank, we were also able to strengthen our own capacity. For example, we bought the land on which we want to construct our new building, and we were able to hire a permanent manager for the bank." One of his clients, Mr. Atsou Théophile, president of one of the farmers' unions, added that not only their organizational capacities have been strengthened but also most farmers can now survive year-round because of increased food security in the area.

Soil and Nutrient Dynamics

The scientists working in the Soil and Nutrient Dynamics Program focus on developing and promoting technologies and management practices that improve the efficiency of the use of soil and water resources. It is important that these technologies are profitable and contribute directly to farmer welfare. In addition, the technologies need to be sustainable so that the livelihood of future generations is secure. On the pages that follow, projects that are being conducted in Africa, Asia, Eastern Europe, and Headquarters are discussed.

Developing a Phosphate Rock Decision Support System (PRDSS)

Photo by Dr. Upendra Singh

Visiting Scientist Suzette Smalberger examines a canola experiment in the IFDC Greenhouse. The purpose of the experiment is to test the RAE of different PRs for the PRDSS.

During 2004 an IFDC team of scientists including Dr. S. H. (Norman) Chien, Principal Soils Chemist; Dr. Julio Henao, Senior Biometrics Scientist; Dr. Upendra Singh, Senior Systems Modeling Scientist; Ms. Suzette Smallberger, Visiting Scientist, and Dr. Paul W. Wilkens, Programmer, developed a PRDSS that predicts the relative agronomic effectiveness of PR for initial application of PR. A PR database consisting of phosphorus content and PR solubility was developed for 76 unground and finely ground PR samples varying widely in reactivity. The database uses the new IFDC standardized procedure for determining PR solubility. The database thus allows fair comparison of different PR sources. Greenhouse experiments were established to provide additional information and data required for a more fully functional PRDSS. IFDC staff developed designs for field trials to validate the PRDSS in Africa, Asia, and South America. The Africa Division will conduct field trials in Togo, and the University of Hawaii will oversee trials in Mali and Thailand. The International Atomic Energy Agency (IAEA) will fund field trials based on the designs in Burkina Faso, Tanzania, Malaysia, Vietnam, Brazil, and Argentina.

Managing Soil, Water, and Nutrients for Maize-Based Cropping Systems in Eastern and Central Africa

The IFDC/International Maize and Wheat Improvement Center (CIMMYT) collaboration continued in Africa with the IFDC soil scientist/agronomist, Dr. Dennis Friesen, posted to the CIMMYT program in Kenya. Agronomic field research, supported by the German Ministry for Economic Cooperation and Development (BMZ) and the Rockefeller Foundation and implemented through the Eastern and Central Africa Maize and Wheat (ECAMAW) Network, continued to focus on improving maize production through five main research themes: (1) farmer participatory varietal evaluation, (2) scaling up of soil moisture conservation strategies with drought-tolerant varieties, (3) evaluating drought-tolerant varieties at different planting densities, (4) evaluating best-bet, maize-legume systems with nitrogen-use efficient varieties, and (5) quantifying the nitrogen requirements for nitrogen-use efficient varieties. During the reporting period, ECAMAW collaborators implemented

Photo by Dr. Dennis K. Friesen

Farmers test an ox-drawn ripper in on-farm conservation agricultural trials near Kiboko, Eastern Kenya.

29 projects at multiple sites on-station and on-farm with farmer participation. The BMZ project was completed in December 2004, and a final report is currently being prepared.

Since it was first discussed with Canadian International Development Agency (CIDA) in late 2001, Dennis Friesen has collaborated in the development and implementation of a new project implemented by CIMMYT with ECAMAW and other partners in Ethiopia, Kenya, Tanzania and Uganda. The Quality Protein Maize Development (QPMD) project aims to improve the food security, nutrition (and thus health), and farm income of resource-poor farming families by developing and facilitating adoption of stress-tolerant QPM cultivars adapted to the main ecologies of The Horn and Eastern Africa. In mid-2004, Friesen relocated to Ethiopia to assume coordination of the project, which was officially launched in January 2003. Since its initiation, the project and its partners have increased awareness and adoption of QPM varieties by farmers and other stakeholders in the region through QPM promotional activities such as demonstrations and field days (more than 6,200 participants to date in almost 1,900 demonstrations and 49 field days), animal feeding trials to demonstrate the nutritional benefits of QPM (two ruminant-based and two poultry-based feeding trials completed; two pig trials underway), and media campaigns (posters, brochures, radio and television broadcasts). CIMMYT and national agricultural research systems (NARS) breeders participating in the project have implemented 159 germ plasm screening and breeding nurseries and multi-locational QPM yield trials to identify and develop new improved varieties, resulting in the release of four new varieties in the region during the past year. Ten small seed companies are now producing and/or distributing QPM seed in the region; a total of 1,750 tons of certified QPM seed was produced and sold in 2003 and 2004. Estimated adoption of QPM in QPMD project target areas, based on seed sales in 2004, suggest average adoption of QPM in target areas of 3 of 4 countries near 20% (range 6%–45%). The 5-year project intends to achieve 25% adoption and use of QPM in target areas in Ethiopia, Tanzania and Uganda, and 10% in Kenya by the project's end. Indications are that the project is well on its way to achieving these goals.

Mitigating Poverty and Environmental Degradation Through Nutrient Management in South and Southeast Asia

In Bangladesh, Cambodia, and Vietnam, the Adapting Nutrient Management Technologies (ANMAT) project is promoting the adoption of balanced fertilizer use and improved efficiency of fertilization. Dr. Walter T. Bowen, IFDC Resident Project Coordinator—ANMAT II, works with NGOs and extension services to demonstrate the benefits of deep-placed USG for rice production. In addition to increasing the incomes of poor farmers, the improved practices are more protective of the environment. A national survey in Bangladesh during 2004 showed that more than 1,800 briquette-making machines have been manufactured and sold and that more than 550,000 rice farmers were using UDP technology in their fields. The latest evaluation of 530 on-farm trials comparing this technology and the farmers' practice of broadcasting urea clearly demonstrates how

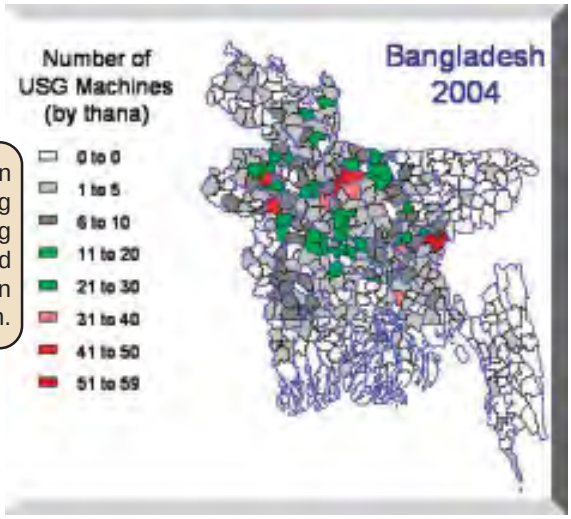
UDP technology can help farmers produce more rice, decrease the amount of urea fertilizer that they are applying, and improve their standard of living. During 2000-2004 the UDP technology increased paddy yields by 900-1,100 kg/ha (depending on the cropping season), decreased urea use by 78-150 kg urea/ha, and subsequently increased profits by US $116-$137/ha. Affordable briquette-making machines are continually being manufactured and sold in Bangladesh, which is helping to meet new demand as more farmers adopt the technology.

Various activities such as workshops and study tours aid in the dissemination of UDP technology. Examples of these activities that were conducted in Bangladesh, Cambodia, and Vietnam are as follows:

- ANMAT and the Bangladesh Department of Agricultural Extension conducted a one-day national seminar on UDP that attracted over 200 farmers, NGO staff, urea-briquette producers, researchers, and extension leaders from all over Bangladesh. The title of the workshop was "Urea Deep Placement Technology: Prospects for Poverty Alleviation and Food Security in Bangladesh". The Minister of Agriculture, Mr. M. K. Anwar, was Chief Guest and speaker.
- Study tours were arranged for visitors from Nigeria, Pakistan and Sri Lanka who are interested in adapting UDP technology in their respective countries. One briquette-making machine was exported to Pakistan.
- Farmers in Vietnam and Cambodia are experimenting with deep placement of multi-nutrient briquettes (NPK) and obtaining yield benefits with reduced levels of fertilization. In many cases these are farmers who have traditionally applied little or no fertilizer, and their yields have at least doubled with fertilizer deep placement. When compared with broadcast fertilizer applications, the deep placement of multinutrient briquettes increased yields by 25%. In Vietnam, about 4,000 farmers have used fertilizer briquettes, and at least three manufacturers have begun producing briquette-making machines.

A Bangladeshi farm worker applies urea supergranules (USG) to his rice field.

Photo by Dr. Walter T. Bowen



Geographic Distribution of Briquette-Making Machines Illustrating How Widely Spread UDP Technology is in Bangladesh.

Small Fertilizer Pellets Produce Bigger Profits for Bangladesh Farmer

Habibur Rahman, a 35-year old farmer, hails from Kumargata village in Bangladesh, 130 km northwest of Dhaka. Rahman is a primary school teacher and model farmer of the area. Because he is a respected teacher, local farmers heed his advice on modern cultivation practices. Interested in agriculture since childhood, he learned about UDP technology at a farmers' meeting in early 2003, which was organized by the IFDC-ANMAT project and supported by a non-governmental organization, the Center for International Cooperation in Agronomic Research and Development (CIRAD). The local block supervisor also helped him initially with deep placement of USG/UMG in his rice field. On most of his cultivable land (4.85 ha) he grows rice, jute, and banana.

ANMAT Photo

Habibur Rahman and his wife

After learning about the UDP technology, Rahman started using it on a small plot of rice land on a trial basis about 2-1/2 years ago. Seeing the astounding growth difference with only a one-time application of urea—increased yield of paddy using approximately 40% less urea in the UDP plot—he was convinced. In the following year he extended his UDP area. Rahman harvested about 25% greater paddy yield, compared with that of broadcast urea. In the dry season 2005 (winter paddy), he further extended his UDP area. More than 2 tons of increased grain was harvested from the area with no additional cost for cultivation of the rice crop. When asked about the cost of additional labor required for deep placement of the urea briquettes, he answered with a smile that the value of saving on urea well covered the cost of the labor. He also observed comparatively less weed growth in the UDP plot.

Local farmers were interested in learning the secret to better crop performance in his field and wanted to deep place urea mega granule (UMG) in their paddy land. He told them where they could purchase UMG. During the dry 2005 season approximately 50 neighboring farmers used UMG on their paddy fields and harvested good crops. Rahman says that he will continue using UMG in his future paddy crops because he has observed that UDP technology is profitable for him, and he advises neighboring farmers to do the same.

Note: USG = Urea super-granule (weight, 0.9 gram per granule); **UMG=Urea Mega Granule (weight, 2.7 gram per granule)

More Rice From Less Work

ANMAT, IDE/Vietnam Photo

Mrs. Ho Thi Luu and her family

Twenty-nine-year-old Mrs. Ho Thi Luu lives in a stilt house with her husband and four children in Hai Phuc commune in Quang Tri province of central Vietnam. Her family raises some animals and grows maize, peanuts, fruit crops, and rice. Although the couple works very hard, until recently their rice yield remained low. As a result, they could feed their family only 6 months of the year on their 0.3 ha rice plot.

"Life was very difficult for us," said Luu, "We didn't know how to solve the problem. We had to buy a lot of rice, and rice is expensive for us. We had to go to the forest to illegally gather forest products, sell other crops for cash to buy rice, and we didn't have much money left for buying other food."

Then Mrs. Luu saw the deep placement technique for fertilizer pellets (urea super granules) demonstrated in some of her neighbors' rice fields in the commune. She was very impressed because she had never seen such a beautiful rice crop. She and her husband were invited to participate in a farmers' meeting organized by the district agricultural station. There the couple learned about the benefits of USG and how to apply the fertilizer on their rice field.

At first they decided to try USG on 0.05 ha only—"to be safer, if we failed that crop," as Mrs. Luu said. She laughed. "Oh, and it was quite difficult in the beginning because I had to bend over to deep place the pellets. Gradually it turned out to be less complex as compared with normal fertilizer. With normal fertilizer, we were often confused because we had three types of fertilizer that had three different colors and application rates. We couldn't remember when and how much to apply. With pellets, we apply the fertilizer only once for the whole crop!" The Luu family received more than they expected with the first try: their yield was doubled! This gave them enough motivation to buy more pellets for application on subsequent crops, and the rice area under fertilizer pellets has been steadily increased. Now the family is applying pellets for the whole rice area.

"Now we have more than enough rice to eat. I am no longer worried about buying rice, and I can buy other food for the children. I am encouraging other families in the commune to buy pellets. With pellets, I'm sure that they can grow plenty of rice for their families. It is so easy—you apply USG once, and then wait until the harvest. Less work, but more rice!" Mrs. Luu concluded.

Photo by Dr. Mustapha Naimi

A senior experiment station staff member inspects an IFDC/INRA field trial in Jemaa de Shaim, Morocco.

Improving Agricultural Input Efficiency and Reducing Production Risk in the Near East and North Africa (NENA) Region

With funding from IFAD, Dr. Mustapha Naimi, IFDC Agricultural Systems Modeler, is executing a project in both Morocco and Syria, which will help to improve agricultural input use efficiency and reduce cereal production risks in the region. IFDC scientists are working with the National Institute for Agronomic Research (INRA) in Morocco and the General Commission for Scientific Agricultural Research (GCSAR) in Syria and the International Center for Agricultural Research in the Dry Areas (ICARDA) to compile

and assess historical and experimental data. Ultimately this joint effort will lead to developing and implementing an IDSS that will help stakeholders to improve practices of producing cereals by reducing risks while increasing income and food availability. The IDSS also is being developed to improve agricultural planning and decision making.

Developing Decision Support Systems for Nutrient Management and Environmental Sustainability

The purpose of this research is the development and application of decision support tools for agricultural decision making, planning, and research and management of information associated with nutrient management and sustainability. This research is conducted by Singh, Chien, Smalberger, and Wilkens. A PRDSS that provides users with the option to compare the agronomic and economic feasibility of direct application of PR with commercially available water-soluble phosphate (WSP) fertilizers has been recently developed and tested at IFDC. The PRDSS predicts the relative agronomic effectiveness (RAE) of PR with respect to WSP. The RAE as predicted by the PRDSS depends on: (1) PR sources as quantified by PR solubility determined using the second extraction with neutral ammonium citrate; (2) soil pH; (3) crops as they influence the rhizosphere, root quantity and distribution, uptake of calcium, crop duration, and aluminum toxicity/tolerance; (4) soil P-fixation capacity; (5) soil texture; (6) soil organic matter content; (7) aluminum saturation; (8) moisture and rainfall regime; and (9) lime value of PR source. Using these inputs the PRDSS predicts the RAE for the initial or fresh application of PR. The features dealing with the cumulative effect of annual PR application or the residual value effect is being incorporated in the next version of the PRDSS.

An interactive decision support system for climate impact analysis at various temporal and spatial scales is being developed for decision makers in agriculture and natural resource management. The applications of the DSS for climate impact analysis are in conjunction with the Southeast Climate Consortium. Other applications of spatial modeling are in the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) Region with the International Food Policy Research Institute (IFPRI), and fertilizer and technology recommendations in the market development project in Malawi.

Refined estimates of nutrient balance and rates of current nutrient depletion in agricultural areas of Latin America, Asia and Africa were used to characterize regions where nutrient balance and nutrient mining constitute a significant constraint to maintain and intensify agricultural production. Most countries in Latin America continued to show negative nutrient balances. All African countries except Botswana, Libya, Egypt, Tunisia, and Morocco showed negative nutrient balances on a per-year basis. Nutrient depletion in African countries has far-reaching impact that extends beyond the farm community, regions, and national economies. African nutrient depletion represents more than $1.5 billion per year in terms of cost of nutrients as fertilizers.

Investigating the Dynamics of NPK Fertilizers for Improved Efficiency in Crop Production

The objective of this research, carried out by Singh, Chien, and Wopereis, is to conduct strategic and adaptive research on alternative P fertilizer sources and factors affecting their effectiveness in various cropping systems. A suite of greenhouse experiments in conjunction with a field trial in Davié, Togo was conducted to improve our understanding of PR residual effect on different cropping systems. The field trial is on maize-maize cropping. In the greenhouse the effect of PR and TSP application on various cropping systems and the impact of these cropping systems on PR availability and residual effect were quantified. The cropping systems included ryegrass – wheat, canola – wheat, wheat – wheat, cowpea – wheat, mucuna (5 different cultivars) – wheat, and rice – wheat. The PR response and effectiveness was dependent on the crops. The residual data are being analyzed. The results will be used to test the residual/long-term component of the PRDSS.

A new study was launched by a doctoral student from the University of Sao Paulo to investigate the effect of calcination on increasing the agronomic effectiveness of phosphate rock deposits containing iron/aluminum minerals (crandallites). The study includes: (1) effect of temperature profile on solubility, (2) equilibrium solubility of calcined samples, (3) kinetic dissolution of calcined samples as influenced by soil pH and water regime, and (4) agronomic evaluation of calcined samples for upland rice and flooded rice. The work is still in progress.

Work continues to investigate whether two commonly used soil tests (Olsen and resin) can underestimate soil-available phosphorus in calcareous soils containing gypsum, which are widely distributed in the Middle East. The result might lead to over-recommending phosphorus fertilizer application and adding unnecessary inputs to the farms. The IFDC-developed Pi test (iron-oxide impregnated filter strip) may prove to be effective for these types of soils. An on-going greenhouse experiment with wheat is being used to test the hypothesis. The experiment is still in progress.

Investigating the Dynamics of Secondary and Micronutrients for Sustainable Crop Production

The objective of this research, being led by Chien, is to conduct strategic and applied research on the efficiencies of secondary and micronutrients as influenced by nutrient sources, soil properties, and crop species. Several soils were used to test possible maize and cotton responses to zinc, iron, boron, and sulfur; unfortunately none of these were observed. Work will be continued to locate proper soils to study dynamics of secondary and micronutrients for sustainable crop production.

To maximize the benefit of using urea supergranules for flooded rice production, sulfur and zinc nutrients were incorporated in urea supergranules. Unfortunately, the soils used did not show sulfur and zinc response with flooded rice. Work will be continued to locate proper soils to study the benefits of incorporating sulfur and zinc in urea supergranules for flooded rice production.

Implementation of an Agricultural Statistical System for Monitoring Agricultural Production in Albania

With technical assistance from IFDC the Ministry of Agriculture and Food has reached noticeable improvements in the development and monitoring of agricultural statistics and the establishment of agricultural information services that cover all prefectures and districts across the country.

Henao assisted the Ministry in establishing an MIS, which is based on periodic surveys carried out by networks of public institutions. It includes attribute and geo-referenced data on crop systems, areas, and production; livestock production; monitoring of input and output prices; and the use-efficiency of inputs such as fertilizers and plant protection products. It uses time series information on production, fertilizer and input use to support policy studies in agricultural development programs in Albania. The system has been expanded to manage agricultural statistics for the Ministry of Agriculture and serves as a key system to assess rural incomes, monitor agricultural and livestock production, and provide reliable information supporting programs in poverty reduction and agricultural diversification. Information sub-systems have been created to monitor agro-processing and greenhouse production of vegetables and food commodities. The whole system includes strategies to produce reports and to facilitate interchange of information in the public and private sectors. Training activities have been conducted as part of the whole system development process.

Fertilizer Materials Program

Under the guidance of Steven J. Van Kauwenbergh, Fertilizer Materials Program Leader, the staff members of the Fertilizer Materials Program conduct projects in three primary areas. They characterize fertilizer materials available in developing countries; carry out research on novel fertilizer materials containing such elements as boron, sulfur, and zinc; and develop methods to produce environmentally friendly fertilizers which, for example, minimize contamination of the environment by a toxic element, cadmium. There are strong linkages between the Fertilizer Materials Program and the Soil and Nutrient Dynamics Program of IFDC.

IFDC research on mineral resources of the essential plant nutrient—phosphorus—continues to yield valuable information regarding the location, chemical composition, and other characteristics of phosphate rock deposits in developing countries. The information generated by this research is available to the public in an IFDC database, which is useful in identifying phosphate rock deposits potentially valuable as sources of phosphate fertilizer in developing countries. Much of the information from the Fertilizer Materials Program is included in the Phosphate Rock Decision Support System (PRDSS), which is being developed by IFDC. This phosphate rock information is essential to the predictive capabilities of the PRDSS.

Development of more efficient fertilizers that are capable of controlling the release of essential plant nutrients is one of the main components of the Fertilizer Materials Program. Laboratory and pilot plant synthesis of innovative fertilizers that can more effectively deliver essential plant nutrients, particularly secondary elements including sulfur and micronutrients such as boron and zinc, is an important part of this program. In addition, IFDC's fertilizer specialists formulate custom fertilizers for scientific research, such as ^{15}N-enriched and ^{15}N-depleted nitrogen compounds to meet the needs of scientists worldwide. Some of the novel fertilizers formulated by these specialists are used by other scientists at IFDC in greenhouse experiments to determine the effects of the new fertilizers on plant growth and soil management.

Because cadmium—an element toxic to humans through the food chain—is found in many phosphate rock deposits in developing countries, it is imperative that the content of cadmium in phosphate rock deposits be determined so that the information can be used to develop technologies that minimize health risks where phosphate fertilizers are applied to crops. An IFDC staff member presented the paper, "Cadmium Removal from Phosphate Rock during Fertilizer Processing," at the Western Phosphate Mining and Process Conference in June 2004. The paper reviewed current legislation concerning cadmium around the globe, its potential impact, and methods and costs of removing cadmium from raw materials, intermediates and, ultimately, fertilizer products. IFDC engineers have conducted research on technologies to remove cadmium from phosphate fertilizers during their manufacture.

In addition, the Fertilizer Materials Program provides technical assistance to fertilizer industry members worldwide to improve their operations by providing assistance to improve product quality, increase production, debottleneck units, and optimize their processes. In carrying out these activities, these specialists perform plant audits/assessments and on-site training for operations and maintenance personnel. The specialists can provide assistance during the design, construction, and startup phases of new projects and can also participate in preinvestment analyses, pilot plant testing, production cost analyses, process design, and project management.

Advanced Technology Produces Greater Yields for Woman Farmer

Kouy Som is a small farmer in Phnom Kong village, Prey Veng province, Cambodia. She has three married daughters and two more children still living with her. Som owns and cultivates 0.6 ha of wet-season paddy that normally yields 2.0 to 2.5 tons/ha using 100 kg/ha of urea and 100 kg/ha of DAP fertilizer, and 0.4 ha of irrigated dry season paddy that normally yields 2.5 to 3.0 tons/ha using 150 kg/ha of urea and 150 kg/ha of DAP. She usually applies fertilizer during the vegetative phase by broadcasting 3-4 times depending on the color of the rice leaves. Yellowish plants receive extra applications of urea.

ANMAT Photo

Cambodian farmer, Kouy Som, and her husband

In 2004 the International Development Enterprises (IDE) introduced Som to the IFDC-promoted fertilizer pellet technology. She agreed to participate in dry-season field trials and set up three 100-m² trial plots within a 1,000-m² paddy field. Plot 1 was transplanted in straight rows and used 210 kg/ha of NPK pellets. Plot 2 was also transplanted in straight rows and used 113 kg/ha of urea pellets. Plot 3 was transplanted randomly and used 113 kg of urea pellets. Plots 2 and 3 received no PK fertilizer. The remaining 700 m² was transplanted according to her normal dry-season practice with random transplanting and broadcast urea and DAP fertilizer.

During the vegetative phase, when Som saw that the trial plots were healthier than the traditional practice plot, she tried to boost the traditional plot by applying a total of 300 kg/ha of DAP and 100 kg/ha of urea. In the end, however, all of the trial plots performed better than her traditional practice even though they used only about one-half of the fertilizer. Plot 1 yielded 5.5 t/ha, Plot 2 yielded 4.7 t/ha, and Plot 3 yielded 4.2 t/ha compared with 2.8 t/ha from the traditional practice. The yield increase over the traditional practice was 96% with NPK pellets, 68% with only urea pellets, and 50% with random transplanting and urea pellets.

Som was impressed with the results and plans to plant one-half ha of paddy using the NPK fertilizer pellets in the coming wet season. She also bought 10 kg of NPK pellets to experiment with her vegetable plot. She will also cooperate with IDE to act as a local sales agent for fertilizer pellets in her area during the coming wet season.

Market and Trade Policy

In many countries, especially in Africa, AIMs are underdeveloped and fragmented, and farmers have difficulty in accessing inputs in a cost-effective manner. To strengthen the functioning and performance of AIMs and make them competitive and efficient, IFDC has been involved in two sets of activities: (1) market assessment and action plan development; and (2) project implementation for market development. The work on action plans is partially funded by the Africa Bureau/USAID. Broadly, these activities have addressed the constraints related to macropolicy, market development, and technical issues with a special focus on the Five Pillars of Market Development and shifting the supply curve to the right to reduce input costs. Also, innovative approaches are suggested to resolve conventional conflicts between market development and poverty alleviation.

Market Assessments

Angola Fertilizer Market Assessment

With funding support from USAID/Angola, an IFDC team, led by Dr. Lawrence L. Hammond, the former IFDC Director of the Resource Development Division, conducted an assessment of the factors constraining fertilizer use and supply in Angola. Limited agronomic research support and technical knowledge, a non-conducive policy environment, poor rural infrastructure, an underdeveloped private distribution network, inadequate business skills and technical knowledge, high product prices, lack of purchasing power of farmers, the lack of market information and the absence of a regulatory framework constrain fertilizer use and supply in the country. However, the country offers good potential for the orderly development of a market-based input supply system. Recommendations for improving fertilizer use and supply include: soil analysis and field trials to develop optimum fertilizer recommendations using new fertilizer products, field demonstrations and training to improve farmers' knowledge base about new technologies, and development of output markets. Developmental work is also needed in the areas of policy improvement, human capital development, improved access to finance and market information, and creation and enforcement of regulatory systems. Based on this work, a project proposal has been submitted to USAID/Angola.

The IFDC team also conducted an assessment of the potential for use of Angolan natural resources for local production of nitrogen and/or phosphate fertilizers. Two phosphate deposits are located in Angola, and analysis is in progress to determine if the reserves are sufficient to support a phosphate fertilizer industry. Likewise, natural gas is abundant in Angola, and a feasibility study for a liquefied natural gas project and an ammonia project is currently being conducted by the Government of Angola. IFDC is evaluating the merit of including a urea project to consume partially future supplies of the ammonia.

Madagascar Fertilizer and Seed Market Assessment

IFDC collaborated with the Aga Khan Foundation to conduct an assessment of fertilizer use and supply in Madagascar to promote rice production among resource-poor farmers. The assessment focused on the policy environment and regulatory system, human capital, and access to finance and market information by the private sector. The assessment found that limited knowledge on the part of farmers, a fragile importation and dealer network, poor roads that result in high transport costs, lack of access to finance beyond the importer level, and lack of effective demand have restricted fertilizer use in the rice-producing areas.

With funding support from Business and Market Expansion (BAMEX), IFDC conducted an assessment of the seed and fertilizer markets in Madagascar and made recommendations for improving input supply. Recommendations were discussed at and endorsed by a stakeholders' workshop in the country. Impressed by that work, MCC invited Dr. Maria Wanzala, IFDC Agricultural Economist, to present an overview of IFDC activities in general and Madagascar work in particular. Based on this meeting, MCC and IFDC have agreed to sign a memorandum of presentation and a memorandum of understanding. A strong possibility exists for future collaboration in many countries.

Action Plan Development Work

Tanzania Action Plan

With partial funding support from USAID and, in collaboration with Sasakawa Global (SG) 2000, a draft action plan was prepared by Dr. Bumb for developing agricultural input markets in Tanzania. The plan assessed the functioning and performance of seed, fertilizer, and CPP markets in Tanzania. The assessment and recommendations focused on the policy environment, human capital, financing for business development, market information, and regulation. The assessment found that the policy environment is non-conducive; human capital is limited; and access to both finance and market information is limited. The plan recommends the improvement of policies including the mindset of policymakers, human capital development through training and technical assistance, and the creation of two funds to support import and marketing of inputs, especially fertilizers. A national stakeholders' workshop was conducted in August 2004. The workshop was attended by more than 100 participants, and the action plan was validated for implementation.

Photo by M. Feisal Beig

A Tanzanian agricultural inputs shop

Zambia Action Plan

An Action Plan for Developing Agricultural Input Markets in Zambia was completed by a team led by Dr. Bumb. The action plan identified several constraints affecting the performance of AIMs in Zambia. A non-conducive policy environment (created by subsidy intervention and input distribution by the government), limited human capital for efficient markets in rural areas, limited access to finance due to high interest rates (more than 50% per year), stringent collateral requirements (150%-200%), poor market information, and ineffective enforcement of regulatory frameworks keep AIMs inefficient and non-competitive. Restrictions on grain trade and limited knowledge and credit available to farmers prevent input use. The action plan made several recommendations dealing with the policy environment, human capital, access to finance and information, and regulations to improve the functioning and performance of markets.

Measures were also suggested to improve the demand for inputs. A 2-day national stakeholders' workshop, which attracted more than 100 stakeholders, was organized to validate the action plan.

Kenya Action Plan

An action plan for Developing Agricultural Input Markets in Kenya was prepared by a team led by Dr. Bumb. The team visited with more than 200 stakeholders in Mombasa, Machakos, Kitale, Sauri (Millennium Development Village), Kisumu, Nakuru, and other areas. The action plan identified constraints in the areas of soil fertility, policy environment, human capital, finance, and other pillars of and supporting conditions for market development. Recent governmental interventions and entry of parastatal have created anxiety in the market. Dealers and stockists lack technical and marketing skills and are constrained by limited access to finance. High transportation costs from port (Mombasa) to consuming areas in western Kenya add significantly (more than $50/ton) to fertilizer prices. Strengthened and increased use of railway transport can help to reduce transportation costs. Currently there is no unified fertilizer law in the country; thus, quality control regulation is fragmented and poorly implemented. Whereas improvements are needed in all areas related to the Five Pillars of Market Development, the Government of Kenya should also address the creation of market-friendly safety nets and the issues related to soil acidity and infertility. The action plan will be validated at a stakeholders' workshop in August 2005.

Establishment of Collaborations

USAID Seed Initiative

In collaboration with ICRISAT and Iowa State University, IFDC prepared a program for developing sustainable seed systems in Africa, with a special focus on the harmonization of seed policies, regional seed trade, improving access to source seed, and capacity building for private sector-based seed trade and domestic production of seed. IFDC participated in a regional meeting in Pretoria on the harmonization of seed policy and regulation in eastern, southern, and western Africa and a Seed Session at the Forum for Agricultural Research in Africa (FARA) meeting in Uganda. This session discussed the proposed program and other seed sector developments. IFDC will prepare action plans for developing seed markets in Mozambique and Tanzania. In West Africa, IFDC will take the lead in harmonizing seed policy and regulation in ECOWAS countries.

ECAPAPA

IFDC established collaboration with ECAPAPA to work on regional market and trade development and participated in its regional meeting for East Africa. ECAPAPA has done ground work for rationalizing and harmonizing fertilizer and seed policies in East Africa. Based on this and IFDC's work in the region, further collaboration may lead to market development projects.

NEPAD

IFDC established links with COMESA and participated in the G8/NEPAD meeting on the CAADP, organized by COMESA. The four pillars of CAADP are: land and water development; market, trade, and infrastructure development; food security and safety net programs; and research and technology development programs. The G8/NEPAD meeting identified several key areas, including soil fertility and market development for project implementation.

In collaboration with FAO and the African Centre for Fertilizer Development (ACFD), a proposal was prepared and submitted to NEPAD for funding. The proposal included an assessment of existing and potential fertilizer production possibilities, Africa's comparative advantage, competitive import channels, and marketing systems. After the assessment a regional stakeholders' workshop is proposed to validate the findings. The assessment will be done by using national and regional fertilizer experts. This activity may be included under NEPAD's CAADP process.

World Bank

At the request of the World Bank, IFDC prepared a paper on improving fertilizer supply in Africa. The paper focused on supply chain analysis and the five pillars of market development to find ways to reduce transaction costs. This paper will be used in the preparation of a fertilizer policy tool kit to be prepared by the World Bank. Additionally, IFDC also prepared project briefs on the voucher scheme, the CASE approach, and market development experiences in Albania, Malawi, and Bangladesh.

IFDC completed a paper on urea and natural gas pricing and subsidy in Bangladesh. This paper focused on the likely impact of the removal of the subsidy on urea and natural gas pricing. Different scenarios of subsidy removal programs were developed, and gradual phasing out of the subsidy was recommended.

SG 2000

IFDC and SG 2000 established a partnership in 1998 to conduct assessments of fertilizer markets in various African countries. During 2004 IFDC collaborated with SG 2000 on the preparation of the Tanzania action plan. In addition to funding support, SG 2000 provided logistic and administrative support for the completion of the Tanzania plan and stakeholders' workshop and provided valuable insights in the functioning of the fertilizer market in Tanzania.

Project Implementation Experiences

Favorable Socioeconomic and Policy Environments for Soil Fertility Improvement (FASEPE)

During the past 4 years IFDC has been undertaking activities in Burkina Faso, Ghana, and Mali, funded by the Government of the Netherlands, which builds on the previous 4-year undertaking that aimed at expanding soil fertility technical and program capacity in West Africa. The FASEPE project, under the leadership of Dr. Kofi Debrah, promoted sustainable agricultural production and market development by improving the necessary socioeconomic and policy conditions. The approach was to engage farmers and their organizations and to guide them in adopting practices that enhance soil fertility, agricultural production, farm incomes, and rural development.

The FASEPE project accomplished the following:

- Completed a study of the private sector input dealer associations in Mali, Burkina Faso, and Ghana and provided technical assistance to the associations.
- Partnered with existing and new networks of market information systems in Ghana, Mali, Burkina Faso, Togo, and Nigeria to form the African Agricultural Market Information Network (AFAMIN) and developed a web-based agricultural inputs market information system.
- Organized workshops on soil fertility improvement for policymakers in Mali and finalized a national action plan for soil fertility improvement in Mali.

- Assisted in developing fertilizer and seed quality control regulatory systems compatible with open markets in Burkina Faso, Ghana, and Mali.
- Developed demand-driven capacity building materials and conducted technical and advocacy training workshops for producer groups and trade associations.
- Helped establish federations of farmer organizations in Ghana, Mali, and Burkina Faso.
- Formed strategic alliances with and leveraged West African and other organizations.

Marketing Inputs Regionally (MIR)

Photo by Raphaël Vogelsperger

Franken technology is used by an agri-inputs dealer in Makurdi, Nigeria.

IFDC is implementing a 5-year project that will strengthen the private sector and facilitate dialogue among stakeholders with the aim of creating a regional agri-input market in West Africa. The project, under the guidance of Sylvain Roy, MIR Coordinator, is setting the stage for improved market efficiency and increased competition. Key activities are the reform and harmonization of policies, regulations, and practices related to seeds, fertilizers, and phytosanitary products for the region. The project is establishing national and regional trade associations and training and supporting the emerging input businesses while reinforcing the market information systems, at both the national and regional levels. Special attention is given to the cotton sector inputs for increased competitiveness in the global market. The project coordination is based in Burkina Faso with offices in Benin, Ghana, Mali, Nigeria, and Togo.

Since June 2004, The MIR project has accomplished the following:

- Helped create the Federation of African Agri-Input Trade Associations (FACIA), which was launched in October 2004. The Federation comprises 33 country agri-input trade associations from 14 West and Central African countries, giving a single advocacy voice to more than 4,900 agri-input traders in the region. Last February, MIR funded and facilitated the first meeting of the FACIA executive members, who developed a 3-year program and an annual action plan. MIR also supported the Executive Secretary of FACIA in his first FACIA activities. Within the framework of its collaboration with FACIA, IFDC/MIR signed an agreement in March 2005 to formalize its technical, human resource, and financial support to FACIA.
- Co-organized a regional workshop on the harmonization of seed legislation. The Lomé workshop attracted 20 experts from national research institutions, seed catalogs, and control and certification services representing the eight West African Economic and Monetary Union (UEMOA) member states. The two technical reports reviewed were the “Development of a Common Catalog of Plant Species and Varieties Cultivated

for the Member States" and the "Proposed Norms for the Harmonization of Seed Quality Control and Certification."

- Co-organized a workshop on bio-security and biotechnology in West Africa. This workshop, which attracted about 30 participants from different countries of West and Central Africa, helped to introduce new seed technologies and to strengthen the research capabilities in their decisions on biotechnology and bio-safety issues. It also re-opened the dialogue between the MIR-cotton partners and the seed profession on biotechnology issues.

Photo by Raphaël Vogelsperger

Training of the Association of Agri-Inputs Wholesalers and Retailers of Burkina Faso (AGRODIA)

- Organized and conducted a training session in Mali on techniques for the usage and storage of fertilizers. In October 2004 MIR organized in Segou, Mali, a training session for the members of Faso Jigi on techniques for the usage and storage of fertilizers. The workshop resulted in the development of an action plan for the purchase of fertilizer for the 2005 campaign of Faso Jigi, a farmer-based organization consisting of 3000+ members.
- Launched a series of training workshops in Benin regarding cotton inputs procurement. A first module on the "Development of the Calendar of a Decisional Mechanism of Inputs Procurement" was presented in December 2004. About 30 participants representing the leaders in agri-input management for village groups attended a workshop, which increased the level of understanding of the use and supply practices of agri-inputs.
- Launched a campaign to revise the tariffs on agri-inputs imported from countries outside the UEMOA zone. MIR undertook an awareness campaign on the customs exemption rights on fertilizers imported from countries that are not in the UEMOA zone, in particular, urea. The report of this study will be used by farmer-based organizations for lobbying actions.
- Supported the drafting of the Economic Community of West African Agricultural Policy (ECOWAAP). Because of the active participation of MIR as a task force member involved in drafting of the policy, a specific paragraph on agri-inputs and soil fertility has been added to the final ECOWAS agricultural policy document adopted in January 2005.
- Published a study report on the statement of the agri-input market of Benin. This report gives a statement of the market, identifies the obstacles related to its development, and suggests some recommendations for its strengthening.
- Co-organized a regional workshop to develop a road map for regional regulations for CPPs. This workshop aimed at developing a roadmap for harmonizing the regulatory framework for plant protection products in West Africa. The 34 participants from the public sector, private sector, and regional and international organizations adopted the roadmap.

Strengthening Networks of Regional Market Information Systems and Traders' Organizations in West Africa (MISTOWA)

USAID awarded IFDC the 4-year MISTOWA project in September 2004; this project aims to increase regional agricultural trade and food security through the improvement and linkage of the existing regional efforts to generate, disseminate, and commercially use market information. MISTOWA, under the guidance of Dr. Debrah, is helping regional MIS and trade partners to address other constraints so that strong and dynamic commodity chains emerge that will use the information to enhance production, handling, credit, and trade; and value-added services such as post-harvest, processing, packaging, and quality control. Effective MIS and trader organizations will also heighten farmer awareness of opportunities and technologies to increase production and will facilitate the demand-pull for higher value and quality agricultural products.

During 2004/05 the MISTOWA project has accomplished the following:

- Assisted RESIMAO to improve its technical, networking, and operational capacities at the regional and national levels by organizing a 1-week workshop for their managers.
- Worked with RESIMAO to develop a common platform to link their database information and databases for regional usage.
- Supported the West African Network of Economic Operators in the Food Industry (ROESAO) and its national affiliates to improve their organizational and operational capacities.
- Provided more information for producers and traders, thus making the market more transparent and efficient.
- Collaborated with the Ministry of Food and Agriculture, Ghana Standards Board and GAPTO to promote the use of standard weights and measures.
- Established baseline trade statistics for focus commodities in the target countries.

More Market Information Means More Money in Farmers' Pockets

Assane Sambo, a member of a traders' association in Niger, was one of 20 people sponsored by the MISTOWA project to participate in the International Agricultural Trade Fair conducted in Dakar, Senegal, during March 24-31, 2005. Sambo exhibited a special breed of bulls and sheep, which he had painstakingly developed through several years of genetic research and experimentation. He sold all 10 bulls and 30 sheep worth about CFA 2 million ($4,000) and received orders from several potential buyers. The MISTOWA project provides information and similar opportunities of which traders are normally not aware and facilitates the flow of agricultural products between markets for increased trade and improved food security within the West African subregion.

MISTOWA project Chief of Party, Dr. Kofi Debrah (left), observes hands-on training and use of the modern ICT facility in the Dawanau Market, Kano, Nigeria.

MISTOWA Photo

Ghana Agricultural Inputs Market Project (GAIMS)

Through the GAIMS project conducted during 2002-04, IFDC provided technical and business training to agricultural inputs dealers and importers in Ghana to effectively supply agricultural inputs in a competitive manner. Mr. Mark Owusuansah, Acting Chief of Party, and his colleagues in the GAIMS project trained 420 agricultural inputs dealers, of which 21% were women. In addition, the project trained 60 public agricultural extension agents during the past 2 years. The Ghana project supported the building of a strong association of inputs dealers to safeguard their interests; 308 dues-paying members are on the role. The trained dealers served more than 400,000 farmers with agricultural inputs. Imports and use of fertilizer imports for Ghana increased from 31,000 tons in 2002 to 48,000 tons in 2003 to 61,000 tons in 2004. On average the dealers trained by the project increased their sales of fertilizer, CPPs, and seeds from $89,501 in 2003 to $124,421 by June 2004. The Ghana project helped the dealers increase the accessibility of fertilizers; as a result, farmer travel costs were reduced by 24% during 2003-2004. The dealers trained by IFDC opened 389 new retail outlets in 2004, increased their sales by 84% over 2 years, and helped double the amount of fertilizer used in 2004 compared with 2002. In 2005 farmers will likely purchase an additional $9 million in inputs from GAIMS-trained dealers. Ghanaian farmers increased their purchases of modern inputs in 2004 for maize, rice, and cowpeas by about 11%, 15%, and 26%, respectively, and increased their output by 176%, 155%, and 69% for those crops, respectively, compared with 2003.

Capacity Building Programs

Daniel F. Waterman, Director of IFDC's Training and Workshop Coordination Department, and his colleagues annually organize an average of six short-term international and regional workshops, mainly overseas, in addition to specialized training programs and study tours. Recently the training programs have increasingly emphasized ISFM, agricultural input policy and regulatory reform, and institutional development, competitive agricultural input marketing, decision support systems, and environmental issues. In addition to project-specific capacity building programs, since 1974 IFDC has conducted more than 660 workshops, study tours, and training programs for 8,550 participants from more than 150 countries. During 2004/05 IFDC conducted five international and two specialized programs.

Photo by Dan Waterman

Participants in the Azeri Agribusiness Study Tour visit the State Capitol in Des Moines, Iowa, to learn how agricultural lobbyists work with government officials and to discuss the state's agricultural budget, in short—to observe democracy in action.

Pretoria, South Africa, was the venue for a workshop on agricultural input regulatory systems, conducted during August 2004. The main objective of this workshop was to improve the understanding of the key issues involved in designing legislation and regulatory systems for fertilizers, seeds, and CPPs. Thirty-three participants from 12 African countries, Pakistan, and Haiti attended the workshop.

Another training activity—an International Fertilizer Marketing Management Training Program—occurred in Dubai, United Arab Emirates, during November-December 2004. Twenty-five participants and two translators from 14 countries attended this program. They came from Argentina, Australia, Azerbaijan, Burundi, Ghana, Indonesia, Jordan, Lebanon, Malaysia, Pakistan, Saudi Arabia, Tanzania, Thailand, and the United Arab Emirates.

Sogakope, Ghana, was the setting for a workshop on integrated soil fertility management in the tropics; this activity was held in April 2005 and attracted 30 participants from 11 countries. The FASEPE project sponsored 12 participants from West Africa, the International Sorghum and Millet Collaborative Research Support (INTSORMIL) sponsored 7 participants from West and Southern Africa, and the special food security program of Nigeria sponsored 5 participants. The topics included the agro-ecological principles of ISFM, integrating ISFM options into the farmer cropping calendar, systems approaches to ISFM, and participants' experiences with ISFM and implementation of knowledge gained during the workshop.

During June 2005 IFDC conducted a workshop on nitrogen fertilizer production technology in Maastricht, Netherlands. This workshop, funded by IFA, attracted 26 engineers from 14 countries. This training activity examined the status and most recent nitrogen fertilizer production technologies to produce fertilizers and intermediate materials.

In conjunction with the MISTOWA project, IFDC conducted an MIS workshop in Accra, Ghana, during June 2005. Fifty participants from 17 countries gained a better understanding of how to design, operate, and finance MIS that generate effective and timely market information for agricultural producers, processors, and traders.

IFDC organized a special 3-week agribusiness study tour during May 2005, which was conducted throughout the United States for 16 Azeri representatives of the agriculture sector. The program provided an opportunity for the participants to acquire knowledge about the U.S. agricultural system and develop plans to apply the lessons and practices in Azerbaijan.

During June 2005 IFDC conducted a special fertilizer marketing training program in Riyadh, Saudi Arabia, for 25 senior staff of the SABIC fertilizer company. This program was funded by the Arab Fertilizer Association.

IFDC's overseas projects designed and implemented 289 training events that reached 12,850 people during 2004. These programs provided training for international scientists, marketing specialists, policymakers in the public and private sectors, and entrepreneurs. The programs have had a tremendous impact in terms of building human resources in developing countries and emerging market economies.

In Afghanistan, 30 programs reached 1,300 participants; Azerbaijan, 36 programs—1,806 participants; Bangladesh, 9 programs—1,052 participants; Ghana, 14 programs—395 participants; Kosovo, 16 programs—1,137 participants; Kyrgyzstan, 17 programs—1,445 participants; Malawi, 17—508 participants; Mali, 3—79 participants; Morocco, 1—22 participants; Nigeria, 61—2,074 participants; Uganda, 4—176 participants; MISTOWA project, 18—537 participants; MIR project, 12—406 participants; and Natural Resources Management, 51—1,913 participants.

Project Portfolio

Project	Objective	Collaborators	Location
AMDA	To improve agro-input marketing and accessibility in Azerbaijan	Agro-input dealers, farmers	Azerbaijan
ANMAT Project	To promote the adoption of balanced fertilizer use and improved efficiency of fertilization in Bangladesh, Nepal, and Vietnam	NGOs, extension services	Bangladesh, Nepal, Vietnam
Uganda Agricultural Productivity Enhancement Program (APEP)	To expand economic opportunities in the Ugandan agricultural sector by increasing agricultural productivity and marketing of key food and cash crop systems.	Input suppliers, distributors, and users Chemonics	Uganda
Cluster and Business Support in Kosovo	To stimulate economic growth and improve employment opportunities for Kosovars	Dealers, associations	Kosovo
Desert Margins Project	To mitigate the effect of drought and to combat desertification in Sub-Saharan Africa	NARES, NGOs decision makers, ICRISAT	Sahelian countries
Developing Agro-Input Markets in Nigeria	To improve policies and regulatory regimes related to agri-inputs and to develop systems for providing market information and access to credit	IITA, farmers	Nigeria
Developing ISFM Options for Basil Production Around Lomé (Darégal Study)	To conduct a study on improved and integrated soil fertility management for peri-urban agriculture with emphasis on basil cultivation around Lomé, Togo, at two sites: Adétikopé (Darégal farm) and Baguida (vegetable growers)	Darégal, vegetable farmers	Lomé – peri-urban agriculture farmers
Development and Dissemination of Sustainable Integrated Soil Fertility Management Practices for Smallholder Farms in SSA	To improve plant nutrient management in resource-poor areas of SSA	TSBF CIAT National partners	West Africa
Development/ Implementation of an Information and Decision Support System for Cereal Production in the NENA Region	To initiate an applied research program to reduce farmer poverty through increased income, greater food availability, and reduced risks by improving agricultural planning and decision making	Farmers, policymakers NARS	Morocco
East and Central Africa Maize and Wheat Network Project	On-farm evaluation of maize varieties; soil fertility enhancement; soil moisture conservation; agronomic methods to control Striga	CIMMYT NARS scientists	Kenya, Ethiopia, Tanzania, Uganda,
Enterprise Development Project (EDP)	To improve agribusiness prospects in the Ferghana Valley in Central Asia	Pragma	Kyrgyzstan, Tajikistan, Kazakhstan, and Uzbekistan

Project Portfolio (continued)

Project	Objective	Collaborators	Location
Farmers for the Future in West Africa	To develop and introduce integrated soil fertility management packages aimed at intensifying agricultural production by small farmers	Farmers, NGOs	West Africa
FASEPE Project	To promote sustainable agricultural production and market development by improving necessary socio-economic and policy conditions	Farmer-based organizations, public and private sector	West Africa
Food for Progress Program	To support private sector development of agri-business enterprises engaged in feed milling, meat, dairy, and egg production by providing technical assistance and linkages to world market sources and by promoting market development programs	Agricultural input dealers USDA, AAATA, and banks	Albania
Ghana Agro-Input Market Strengthening (GAIMS)	To develop technical and business training programs for agricultural input dealers and importers in Ghana	Dealers, importers, and Technoserve	Ghana
Institutional Capacity Building Agro-Input Market Development in Malawi	To strengthen agro-input markets by deepening policy reform, establishing regulatory systems, developing capacities of private sector dealers, and expanding market information systems	Agri-input dealers, importers, and associations	Malawi
ISFM Project (which combines the F&SAD and FfF projects)	To promote ISFM strategies at the village and regional levels and to develop sustainable linkages of farmers to input/output markets	NGOs, NARES, farmers, bankers, traders, and policymakers	Benin, Burkina Faso, Ghana, Mali, Niger, Nigeria, Togo
ISFM Technical Assistance (Projet de Developpement Rural du Sud-Ouest (PDRSO), Le Projet de Developpement Rural Decentralise et Participatif des Provinces du Bazega et du Kadiogo (PDRDP)	Introduce integrated soil fertility management options in large investment projects in Burkina Faso	NARS and national NGOs	West Africa
KAED	To support the development of agro-input dealers and increase agricultural production through use of improved technologies	Agro-input dealers, decision makers	Kyrgyz Republic
Kosovo Feed for Poultry Project (KFPP)	To improve the adoption of new technologies by producers in the feed-grain, milling, and poultry subsector	Save the Children, agricultural processors, farmers, poultry producers	Kosovo
Malawi Inputs for Assets Projects	To implement an inputs for assets project. The participating farmers provide labor and are paid in vouchers redeemable for inputs from private suppliers	Farmers, dealers	Malawi

Project Portfolio (continued)

Project	Objective	Collaborators	Location
Mali Agricultural Production Initiative (MAPI/PRODEPAM)	Increase agricultural productivity (irrigated agriculture, access to improved animal feeds, natural resources and environment, increased availability to inputs and technologies)	CLUSA, Sheladia, Land O' Lakes, Appro TEC	Mali
Romania Agribusiness Development Program	To develop competitive agribusiness clusters and promote policy reform to increase agribusiness prosperity	Dealers	Romania
Strengthening Networks of Regional Market Information Systems and Trader Organizations in West Africa (MISTOWA)	To improve the collection and dissemination of market information and traders' organization networks	AMEX International, Inc. Agriterra, Geekcorps, Several West African regional organizations	West Africa
Livestock Development Project in the Soum Province (PDES Project)	To enhance crop and animal production through integrated soil fertility management	NARES, NGOs in Burkina Faso	Soum Province, Burkina Faso
Promoting Agricultural Development Through the Creation of a Regional Agricultural Inputs Market in West Africa (MIR)	To strengthen the private sector and create a regional market in West Africa	UEMOA, ECOWAS, ROPPA, RECAO, CMA/WCA, private input importers and dealers, Sector Ministries	Burkina Faso, Benin, Ghana, Mali, Nigeria, Togo
Rebuilding of Agricultural Markets of Afghanistan Program (RAMP)	To provide agricultural dealer development expertise in a project designed to rebuild the agricultural markets of Afghanistan	Chemonics, agricultural inputs dealers	Afghanistan
Southeast Climate Consortium Project	To develop a climate information and decision support system for the Southeastern U.S.A. that will contribute to an improved quality of life, increased profitability, decreased economic risks, and more ecologically sustainable management of agriculture, forestry, and water resources.	Florida State University, University of Florida, University of Miami, University of Georgia, Auburn University, University of Alabama-Huntsville	U.S.A.
Technical Backstopping for IFAD and African Development Bank Investment Projects in Burkina Faso	To facilitate sustainable agricultural intensification and improve crop-livestock interactions	Farmers	Burkina Faso

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R-14 *Outils d'aide à la décision pour l'agriculture en Afrique sub-saharienne : un guide pratique.*
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Financial Highlights

The following is a summary of financial information for the year ended December 31, 2004. The full financial statements and the independent auditors' reports are available from IFDC upon request.

Balance Sheet

For the year ended December 31, 2004

	US $'000
Assets:	
Cash and cash equivalents	1,333
Restricted cash	3,678
Contributions receivable	1,218
Contracts receivable, net of allowance for doubtful accounts	1,733
Other receivables	342
Supplies inventory	102
Prepaid expenses	142
Total current assets	8,548
Buildings and equipment, net	832
Contributions receivable, noncurrent	
Total assets	9,380
Liability and Net Assets:	
Accounts payable	240
Accrued annual and sick leave	610
Deferred revenue	1,853
Other liabilities	3,678
Total current liabilities	6,381
Unrestricted net assets	2,991
Permanently restricted net assets	8
Total liabilities and net assets	9,380

Statement of Revenue and Expenses

For the year ended December 31, 2004

	US $'000
Revenue and Support:	
Care International	201
Chemonics International Inc.	846
International Fertilizer Industry Association	173
International Fund for Agricultural Development	777
Industries Chimique de Senegal	426
Netherlands Minister for Development Cooperation (DGIS)	2,863
Save the Children Federation, Inc.	407
Shell Canada Ltd.	193
The Fertilizer Institute	129
U.S. Agency for International Development	6,123
U.S. Department of Agriculture	310
Training Programs	78
Others	3,664
Total revenues and support	16,190
Expenses:	
Field programs	4,904
Research	2,631
Market development	6,359
Support activities	2,460
Total expenses	16,354
Decrease in unrestricted net assets	**(164)**

Revenue Sources (as of June 30, 2005)

Abonos Colombianos, S.A. (ABOCOL)
African Development Bank (AfDB)
CARE International
International Maize and Wheat Improvement Center (CIMMYT)
Chemical Biosolids, LLC
Chemonics International Inc.
Darégal
Global Environment Facility
Global Mechanism
Government of Burkina Faso
Government of Cameroon
Government of Togo
Chemical Industries of Senegal (ICS)
HTSPE Limited
Indian Farmers' Fertiliser Cooperative Ltd. (IFFCO)
Indo-Jordan Chemicals Company Ltd.
Institute of International Education (IIE)
International Atomic Energy Agency (IAEA)
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
International Fertilizer Industry Association (IFA)
International Fund for Agricultural Development (IFAD)
Jacobs Engineering Inc.
Mississippi State University
National Cooperative Business Association (NCBA)
Netherlands Ministry for Development Cooperation (DGIS)
Petrobras Energia S.A.
Sasakawa Global 2000
Save the Children Federation, Inc.
Shell Canada Limited
Swiss Cooperation Bureau (Burkina Faso)
The Fertilizer Institute (TFI)
The Pragma Corporation
The World Bank
United States Agency for International Development (USAID)
United States Department of Agriculture (USDA)
University of Georgia
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(as of June 30, 2005)

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5. Deceased, 2004/05.
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(as of June 30, 2005

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AAK—Association of Agri-businessmen of Kyrgyzstan
ABA—American Bank of Albania
ACFD—African Centre for Fertilizer Development
AFAMIN—African Agricultural Market Information Network
AfDB—African Development Bank
AGRODIA—Association of Agricultural Inputs Wholesalers and Retailers of Burkina Faso
AIDTDP—Agricultural Input Dealer Training and Development Project
AIMS—Agricultural Input Markets
AISSA—Agricultural Intensification in Sub-Saharan Africa
AKTIVTA—Azerbaijan Agricultural Input Dealers' Association
AMDA—Agricultural Input Market Development in Azerbaijan
ANMAT—Adapting Nutrient Management Technologies
ASARECA—Association for Strengthening Agricultural Research in Eastern and Central Africa
BAMEX—Business and Market Expansion
BMZ—German Ministry for Economic Cooperation and Development
CAADP—Common African Agricultural Development Policy
CARE—Cooperative for Assistance and Relief Everywhere
CASE—competitive agricultural systems and enterprises
CIAT—International Center for Tropical Agriculture
CIDA—Canadian International Development Agency
CILSS—Permanent Interstate Committee for Drought Control in the Sahel
CIMMYT—International Maize and Wheat Improvement Center
CIRAD—Center for International Cooperation in Agronomic Research and Development
CLUSA—Cooperative League of the United States of America
COENESAM—National Coordination of Dealers in the Agricultural Food Market Sector
COMESA—Common Market for Eastern and Southern Africa
CPPs—crop protection products
DAIMINA—Developing Agricultural Input Markets in Nigeria
DAP—diammonium phosphate
DSS—decision support system
EAC—East African Community
ECAMAW—East and Central Africa Maize and Wheat Research Network
ECAPAPA—Eastern and Central Africa Program for Agricultural Policy Analysis
ECOWAAP—Economic Community of West African Agricultural Policy
ECOWAS—Economic Community of West African States
EDS—energy dispersive x-ray analysis
FACIA—Federation of African Agricultural Input Trade Associations
FAO—Food and Agriculture Organization of the United Nations
FARA—Forum for Agricultural Research in Africa
FASEPE—Favorable Socioeconomic and Policy Environments for Soil Fertility Improvement
FFP—Food for Progress
GAIDA—Ghana Agricultural Input Dealers' Association
GAIMS—Ghana Agricultural Input Market Strengthening
GAPTO—Ghana Agricultural Producers' and Traders' Association
GCSAR—General Commission for Scientific Agricultural Research
GEF—Global Environment Facility
GM—genetically modified
GMOs—genetically modified organisms
IAEA—International Atomic Energy Agency
IAR—Institute for Agricultural Research (Nigeria)
ICARDA—International Center for Agricultural Research in the Dry Areas
ICRISAT—International Crops Research Institute for the Semi-Arid Tropics
ICS—Industries Chimiques du Senegal
IDE—International Development Enterprises
IDSS—information decision support system
IFAD—International Fund for Agricultural Development
IFA—International Fertilizer Industry Association
IFPRI—International Food Policy Research Institute
INERA—Institute for the Environment and Agricultural Research
INRA—National Institute for Agricultural Research (Morocco)
INTSORMIL—International Sorghum and Millet Collaborative Research Support Program
ISFM—integrated soil fertility management
JICA—Japanese International Cooperation Agency
KAED—Kyrgyz Agro-Input Enterprise Development Project
LGF—loan guarantee fund
MAP—mono-ammonium phosphate
MCC—Millennium Challenge Corporation
MIR—Marketing Inputs Regionally
MIS—market information system
MISTOWA—Market Information Systems and Traders' Organization in West Africa
NARES—national agricultural research and extension systems
NARS—national agricultural research systems
NENA—Near East and North Africa
NEPAD—New Partnership for Africa's Development
NGOs—nongovernmental organizations
NRM—natural resource management
OCP—Office Cheritien des Phosphates
PDES—Livestock Development Program of the Soum Province, Burkina Faso
PDRSO—Southwest Burkina Faso Development Project
PR—phosphate rock
PRDSS—phosphate rock decision support system
PRODEPAM—Program for the Development of Agricultural Production in Mali
QPMD—quality protein maize development
RAE—relative agronomic effectiveness
RAFIA—Research, Support, and Training for the Initiatives of Self Development
RAMP—Rebuilding Agricultural Markets in Afghanistan Program
RESIMAO—Network of West African Market Information Systems
ROESAO—West African Network of Economic Operators in the Food Industry
ROPPA—Network of Farmer Organizations and Agricultural Producers of West Africa
SADC—Southern African Development Community
SEM—scanning electron microscope
SIMFIS—Simulation Mixed Farming in the Sahel
SPFS—Special Program on Food Security
TSBF—Tropical Soil Biology and Fertility Institute
UDP—urea deep placement
UEMOA—West African Economic and Monetary Union
UMG—urea mega-granules
USAID—U.S. Agency for International Development
USDA—U.S. Department of Agriculture
USG—urea super-granules
VAT—value-added tax
WSP—water-soluble phosphate
WTO—World Trade Organization

IFDC Profile

What Is IFDC?

- An international center for soil fertility and agricultural development
- A nonprofit, public international organization—combining state-of-the-art research and development to address global issues such as
  - → Alleviation of global poverty
  - → Promotion of economic development
  - → Reduction of hunger
  - → Protection of the environment
- Collaborative programs and partnerships that enrich and sustain lives and livelihoods of poor people globally
- Unique research capabilities and market development and training skills, which enable IFDC to develop incentive-based programs customized for local needs and problems

Mission

To increase agricultural productivity in a sustainable manner through the development and transfer of effective and environmentally sound plant nutrient technology and agricultural marketing expertise.

Staff and Facilities

- International, multidisciplinary staff and physical facilities uniquely suited for conducting a broad range of research and development activities in sustainable food systems.
- Scientists and professionals that provide a unique mix of applied research, technology transfer, and market development capabilities.
- Activities conducted in collaboration with national and international organizations.
- Access to a wide variety of facilities worldwide.
- Specialized research laboratories, greenhouses, growth chambers, specialized instruments essential for laboratory research, bench-scale and pilot-plant units, training facilities, technical library, scientific information services, and a word processing center.

Capabilities

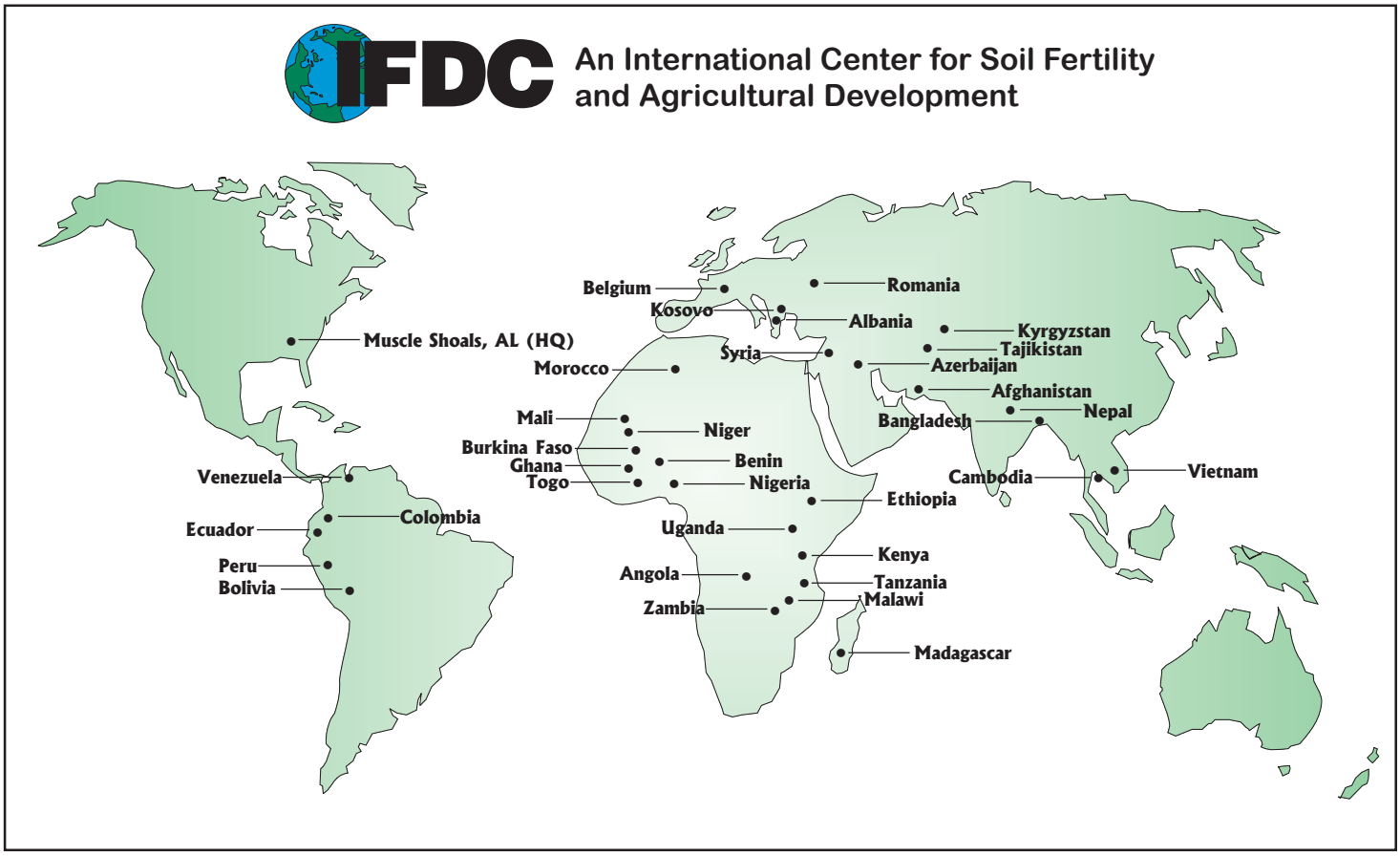
- A problem-solving, results-oriented organization with a 30+-year track record of providing a broad range of services in technical assistance, research, and training to more than 130 countries.
- Broad range of projects.
  - → Engineering and technology
  - → Management information systems
  - → Nutrient management
  - → Policy reform
  - → Market development
- Practical, unbiased solutions to challenges confronting decision makers of the world's public and private agricultural sectors in the most cost-effective and efficient manner.

Locations and Funding

- Collaborative work with IARCs, numerous national organizations, private sector, NGOs

- Partners and clients
  - → Bilateral and multilateral development agencies
  - → Host-government institutions
  - → Private enterprises

- Funding sources include bilateral and multilateral development agencies, private enterprises, foundations, and other organizations. Additional revenue is generated from long-term, donor-funded, market development projects involving transfer of policy and technology improvements in emerging economies



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