

Report

an update on
the work & progress at the
International Fertilizer Development Center

Impressive Gains in Bangladesh Agribusiness Sector

Mohammed Ibrahim's family never had enough eggs. His free-range chickens never produced enough, and good eggs were hard to find in the local market. With high aspirations, he built a poultry shed for 5,000 chickens.

After about 20 weeks, his egg business was doing well. His wife assured him that 4,000 eggs a day was more than enough to feed his family. He sold the surplus (about 3,996 a day) to his customers, but he could not produce enough to satisfy the demand. Determined to keep the farm running well because he had invested his own equity into a new shed, he applied for a working capital loan at a local bank.

Ordinarily, his bank manager would have rejected the loan, but the banker had just returned from an Agrobased Industries and Technology Development Project (ATDP) seminar on Agribusiness Credit Fund (ACF) loans. During those few days, the banker became aware of the feasibility of various agribusiness ventures. Now he saw opportunity where he had formerly

seen risk—he decided to fund the loan with ACF monies.

Because Ibrahim was delighted, he invested all his time and effort into his new poultry farming business—Alam Poultry Farms—with a pride uncommon to nonowner-operated concerns in Bangladesh. His new self-financed shed is almost finished, and the community will never have to worry about egg supply again. This story and hundreds of others like it have been replayed throughout Bangladesh recently although with different names and in different agricultural subsectors.

Mohammed Ibrahim is just one of hundreds of entrepreneurs who have

benefited from IFDC's Agrobased Industries and Technology Development Project, which is leading the way to food security in Bangladesh.

The Agro-Based Industry and Technology Development Project is being implemented by the Government of Bangladesh, USAID, and a consortium composed of IFDC—as prime contractor, Winrock International, and Ronco Consulting Corporation. The project aims to create competitive markets for agriculture and agribusiness inputs, outputs, and technologies. Agribusiness ventures are being initiated and existing ones expanded with financing from a US \$52 million agribusiness credit fund.

“To ensure food security for the rural poor of Bangladesh, the Agribusiness Credit Fund (ACF) of the ATDP project disbursed over \$43 million in loans to over 5,255 farmers and agribusiness entrepreneurs



Mohammed Ibrahim and his family—some of the beneficiaries of the ATDP project in Bangladesh.



(ATDP photo)

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since its inception in July 1996," says Dr. Ronald P. Black, Chief of Party, IFDC/Dhaka. "These loans were disbursed to large, medium, and microenterprises on dairy, poultry, beef fattening, seed production and processing, fish processing, trading in fertilizer, agroprocessing, agrimachinery manufacturers and traders, and also farmers who grow seeds on a contractual basis."

The program has worked not only for small individual borrowers but also for larger companies capable of revitalizing entire subsectors. Among the large borrowers is a first-ever international joint venture company developing seeds locally through a network of contract growers. Every subsector of agriculture is benefiting from the loans. Policies for the fund are established by an ACF Management Committee—consisting of representatives from the Ministries of Agriculture and Finance, the Bank of Bangladesh, USAID, and IFDC, which meets periodically to review the performance of ACF and suggest measures for improvement. For potential loan applicants, ATDP develops project prefeasibility profiles to help them prepare their own project proposals.

Since its inception in 1996 over 4,000 new agribusiness enterprises have been started through the fund; these new ventures have provided enhanced food security in Bangladesh. Private banks are now making loans as never before to manufacturers and processors of agroproducts, seed producers and preservers, and agrimachinery manufacturers.

Another aspect of the ATDP project is the development of a private/public sector market monitoring information system (MMIS). This system will improve business and information technology flow for the expansion of trade, investment, and business promotion; gather and analyze market information and data relating to fertilizer, seed, agrimachinery, agroprocessing, poultry, and livestock; organize the publication of information relating to trade, investment, and technology on a commercial basis; and contribute to establishing relationships between international centers, trade associations, and similar local organizations to exchange information on a regular basis. To further enhance the institutional capacity of the ATDP's MMIS, the Government of Bangladesh recently nominated two officials of the

Ministry of Agriculture to participate in a specialized 1-month training program conducted at IFDC Headquarters. With the assistance of Dr. Julio Henao, Senior Biometrics Scientist, the Bangladeshi officials—Mukhlesur Rahman, Deputy Chief, Planning Wing, Ministry of Agriculture, and Mohammad Abdus Samad, Research Officer, Market Monitoring and Information System (MMIS), Ministry of Agriculture, enhanced their knowledge of the operation of an MMIS. The information that the officials gained at IFDC will assist them in strengthening the MMIS within the MOA for collection of information related to inputs, outputs, and technology and to conduct analyses of the impact of policy on private sector investment in agrotechnology. ☉

Agribusiness Success in the Face of Adversity in Albania

Tosun Laci, a resourceful agribusiness entrepreneur from Lushnja, Albania, has fared better than most of his countrymen during the recent political turmoil.

Laci rents land from smallholder farmers to produce vegetables for the Italian market. Since March 20, 1997, he has exported 25 truckloads (12-13 metric tons each) of green beans to the Italian market under a joint venture with an Italian seed company that he became acquainted with during a business trip to Italy (an activity of the IFDC/Albania project). In addition, he exported an additional 8 truckloads from another dealer from Berat. The total turnover for Laci's exports during the period, March 20—June 30, amounted to approximately US \$400,000. These green beans are marketed in Milan, Italy, where they are brand named "Albanian Green Beans" and are sold at a premium because of their high quality. Under the joint venture arrangement, the Italian partner collects produce from Lushnja and transports it to Italy via the ferry from Durres.

This success story illustrates the impact of IFDC's agribusiness project in Albania, which is sponsored by the U.S. Agency for International Development (USAID). Laci is one of the beneficiaries of that project, having participated in its agribusiness training programs and business trips to investigate export opportunities.

"Under the guidance of Dr. Ray B. Diamond, IFDC/Albania's first Chief of Party, and Claude C. Freeman, the current Chief of Party, the IFDC Albania project, which began in late 1991 with funding from the U.S. Agency for International Development (USAID), was highly successful in privatizing the agriculture sector to allow the marketing and distribution of fertilizer under an open, competitive market economy," says Ian Gregory, Coordinator of IFDC's Agribusiness Program. "The project represents Albania's first successful venture into the world of an open market after some 40 years of communist domination. IFDC was selected by USAID to assist the Government of Albania in making the transition from a command system of fertilizer marketing to an open market-based system that is fully integrated into the global market."

Diamond not only accumulated very significant accomplishments during his 5-year tenure in the East European country but also was awarded the "Naim Frasheri" Golden Order Award given to him by Albania's former President, Sali Berisha.

When asked to name his proudest achievements in Albania, Diamond narrowed them down to three. "The creation of a network of agribusinesses, composed of importers, distributors, and retailers, to supply agricultural inputs to farmers ranks high on the list," Diamond says. (This network has been labeled the "most effective business association in Albania" by the International Finance Corporation.) "Another milestone for us was the establishment of an association of agribusinessmen to provide support to its member businesses. (The establishment of this association has been called by others a "textbook



An Albanian farming village.

(Photo by Dr. Julio Henao)

example of democracy in action.") Third, but equally important, was the work that our team did to encourage state-owned banks to provide commercial loans, which enabled agribusiness people to purchase supplies and sell them to the farmers."

The IFDC project has established the idea that the open market system will work in Albania. The impact of the overall project is that it has assisted in increasing food production, promoted agribusiness development, and demonstrated the potential for agricultural development.

According to the World Bank, the Gross Domestic Product (GDP) of Albania has grown by 30% over the past 3 years. In 1995 alone, the economy is estimated to have grown 8.6%, and agriculture now accounts for some 55% of the country's total GDP. Despite these significant advances, however, the level of Gross National Product (GNP) per capita in Albania is the lowest in Europe; the per capita GNP for Albania's 3.3 million inhabitants was US \$690 in 1995. Hence, a great opportunity exists for further development.

After turning over the leadership of the Albania project to Freeman, Diamond is now in Ukraine where he is participating in a USAID-funded project that is coordinated by the Citizens Network for Foreign Affairs (CNFA). With CNFA he is

introducing fertilizer into agribusiness partnerships and farm service centers and identifying entrepreneurs who can supply agricultural inputs to private farms that have been recently established.🌐

Note: For those who would like to learn more about the IFDC Albania project, the project is highlighted under the World Bank Extension web site at the following URL, <http://www-esd.worldbank.org/extension/cases/CASES002.shtm>.

Tanzanian Scientist Studies His Country's Phosphate Resources at IFDC

For many developing countries the use of their indigenous phosphate resources represents a potential alternative to the more expensive, imported, commercial phosphate fertilizers. However, these resources often must be modified before they can be used in crop production.

Tanzania is a case in point. Seeking to learn ways to enhance the phosphate fertilizer resources of his

country, Dr. Pearson N. S. Mnkeni, Associate Professor, Department of Soil Science, Sokoine University of Agriculture, Morogoro, Tanzania, recently completed a 9-month research program at IFDC as a Fulbright Senior Research Scholar. During his stay at IFDC, Dr. Mnkeni's sponsoring university was Alabama Agricultural and Mechanical University, and his adviser at IFDC was Dr. S. H. Chien, Senior Soil Chemist.

Panda Hills phosphate rock of Tanzania is a low-reactive phosphate rock that is not suitable for direct application. Modification of this phosphate rock is needed to improve its agronomic effectiveness. Previous research at IFDC has shown that partially acidulated phosphate rock and compacted products, containing phosphate rock and triple superphosphate (TSP), are potentially agronomically effective and less expensive than water-soluble phosphate fertilizers such as TSP.

"At IFDC four products aimed at improving the agronomic effectiveness of Panda Hills phosphate rock were prepared and evaluated for their agronomic effectiveness in incubation and greenhouse studies," Mnkeni says. "The products were concentrated Panda PR, partially acidulated Panda PR (PAPR) with sulfuric acid at 50% acidulation level, ground Panda PR mixed with TSP, and a compacted mixture of raw Panda PR with TSP at P_2O_5 ratio equivalent to 50:50. Results of the incubation study showed that the extent of phosphorus release from the different products varied and appeared to be a function of the water-soluble phosphorus content of the phosphate source. Thus, TSP with the highest water-soluble phosphorus content released the most phosphorus while raw Panda PR with negligible water-soluble phosphorus content released only small amounts of available phosphorus as extracted by the P_i test."

The agronomic effectiveness of the materials was evaluated in greenhouse studies using three U.S. soils and four test crops—wheat, canola (rape), maize, and soybean. The re-



(Photo by Gildardo Carmona)

Dr. Pearson Mnkeni, a Visiting Scientist and Fulbright scholar from Tanzania, inspects his canola experiment using fertilizer produced from his country's phosphate rock.

sults of the wheat, maize, and soybean experiments indicated that the modified Panda PR products improved the yields of these crops in two acid soils. Apparently, as a result of the very low reactivity of Panda PR, the crops responded only to water-soluble phosphorus in the modified products. Results of the canola study showed that in acid soils, canola unlike the other test crops used phosphorus from Panda PR in the modified products as effectively as that from TSP. When tested on an alkaline soil, Panda PR was found to be about 50% as effective as TSP as a source of P for canola. These results indicate that canola is capable of utilizing P even from unreactive igneous PRs in acid and alkaline soils. When tested under the same conditions, Panda PR, which was compacted with TSP, was found to be almost as effective as TSP in improving canola yields. Panda PAPR was intermediate in its effectiveness. Thus, Panda PR and other unreactive igneous PRs of its type could be modified and used as effectively as water-soluble phosphorus on canola when cropped on such soils. ☉

Pakistani Agricultural Officials Visit IFDC for 2-1/2 Month Training Program

To expand their knowledge of the latest fertilizer technology, three leading officials of Pakistan's agriculture sector visited IFDC for a 2-1/2 month training program during February—April 1997. Sponsored by the Overseas Project Corporation of Victoria (Australia) and National Engineering Services of Pakistan, this training program was directed by IFDC's Coordinator of Greenhouse Services, Gildardo Carmona.

The agriculture officials—Dr. Khalid Hussain Gil, Director, Rapid Soil Fertility Survey and Soil Testing Institute, Lahore; Chaudhary Ghulam Hassan, Director, Soil Salinity Research Institute, Lahore; and Dr. Muhammad Ibrahim, Agricultural Chemist (Soils), Ayub Agricultural Research Institute, Faisalabad—participated in a program that focused on management information systems, environmental problems related to agriculture, crop modeling and decision support systems, and geographic information systems. The three senior scientists also participated in five study tours to several U.S. locations, including the University of Florida's Indian River Research and Education Center; the University of Tennessee's Agricultural Experiment Station at Milan, TN; the Potash and Phosphate Institute (Atlanta, GA); a local farmers' cooperative; and local offices of the Alabama Cooperative Extension Service.

Dr. Gil, who also serves as the President of the Soil Science Society of Pakistan, has a broad range of responsibilities in his position as Director of the Rapid Soil Fertility Survey and Soil Testing Institute. "My work concerns the nutrient requirements of major and minor

crops; the monitoring of soil fertility and soil degradation; and fertilizer recommendations for all crops on the basis of soil tests and crop response," he says. "The development of production plans for different provinces and the management of soil testing services are also included in my responsibilities."

The Pakistani officials appreciated the opportunity of studying at IFDC and enhancing their knowledge of the best agricultural practices to optimize fertilizer use. "Even if this information can give us only a little edge, it will allow us to achieve so much more in our home country; this training program will update our knowledge of the most advanced technology," Gil says. "The application of the innovations we were exposed to at IFDC will translate into increased yields in agricultural production in our country."

Because Dr. Ibrahim's work in Pakistan is partially concerned with citrus and mango crops, he was especially interested in the useful information that he gained at the Florida Citrus Experiment Station and the research that he and his associates conducted while at IFDC.

"As part of our program at IFDC, we conducted a greenhouse experiment, using Hazara phosphate rock from Pakistan, applied to a canola crop," Ibrahim says. "We found the cooperation of IFDC staff to be extraordinary. As a result, we will



(Photo by Gildardo Carmona)

Dr. D. Calvert of the Indian River Research and Education Center, University of Florida, discusses citrus grove management in the Indian River area of Florida (U.S.A.) with the Pakistani agriculture officials. From left are pictured Dr. Calvert, Dr. Muhammad Ibrahim, Chaudhary Ghulam Hassan, and Dr. Khalid Hussain Gil.

encourage our professional colleagues to also visit IFDC for training."

As the Director of the Soil Salinity Research Institute, Hassan is responsible for soil reclamation efforts, the alleviation of soil salinity problems, and overall concern for soil quality. "Our work with Dr. Julio Henao on management information systems was extremely useful and will be very helpful to us in our work in our home country," Hassan says. "Many of our soils are approaching waterlogging; thus, it is difficult to grow citrus crops. During this training program we learned new techniques, including raised beds, drainage, and irrigation channels; the application of these techniques in our country will prove very valuable." ●

Determining the amount of nitrogen loss that occurs from surface-applied urea fertilizer until now has been a farmer's best guess. Experiments conducted by various groups have indicated that one-third or more of the nitrogen in urea-containing fertilizers can be lost through ammonia volatilization if the fertilizers are not incorporated by rainfall or tillage within 72

hours. Weather conditions following fertilizer application greatly affect the amount of ammonia loss. These losses can be minimized if the rate of conversion of urea to ammonia is reduced by inhibiting the soil enzyme, urease.

With funding from IMC-Agrico, an IFDC computer programmer and an IFDC soil scientist developed an ammonia volatilization model that uses crop, weather, fertilizer and soil variables. After farmers input the necessary data, the computer program estimates the potential loss of nitrogen through ammonia volatilization if the farmer uses or does not use the urease inhibitor, AGROTAIN®. The computer model allows farmers to estimate the profitability of using AGROTAIN®, an additive that delays urea hydrolysis. Once the urease enzyme is inhibited, the urea fertilizer can be moved into the soil by rainfall in no-till situations.

One of the developers of the model, Dr. Bernard Byrnes, IFDC Soil Scientist, has studied urease activity and methods of preventing ammonia volatilization for 15 years. The computer model estimates ammonia volatilization, then estimates the change in yield resulting from the loss of nitrogen, and calculates the expected return on investment from using AGROTAIN®. The model is useful in crop situations that do not allow incorporation of fertilizer, that is, in situations where top-dressing and minimum tillage are practiced.

"Ammonia volatilization occurs when urea hydrolyzes, that is, when urea is converted by the soil enzyme urease to ammonium and carbonate," Byrnes says. "Some of the ammonia can be lost to the air."

Dr. Paul Wilkens, an IFDC Scientist/Programmer and the other member of the team, says the model uses information that many farmers already know or that can be obtained from soil test results, weather reports, or a local agronomist. Although Wilkens has developed crop-specific models, this is the first computer model on ammo-

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IFDC Scientists Develop Ammonia Volatilization Model

Soil Fertility Recapitalization Workshop Paves Pathways to Increased Soil Fertility

"Not as striking a phenomenon as a swarm of locusts, rather an insidious and often imperceptible process—this was the way Burkina Faso's General Secretary of the Ministry of Agriculture and Animal Resources described soil fertility decline." By the time the decline becomes noticeable, it is already very late, according to the Burkinabe official, Martin I. Bikienga.

Summarizing the impact of a workshop on the "Development of National Strategies for Soil Fertility Recapitalization in sub-Saharan Africa" co-organized by IFDC and the World Bank in Lome, Togo, during April 22-25, 1997, Secretary Bikienga said, "This workshop will inspire governments and farmers to meet the challenge of managing the soils with care to prevent their impoverishment. In the long run soil fertility recapitalization will receive high priority in the agricul-

tural policies of our countries, and emphasis will be given to create the socioeconomic environment conducive to such an effort." Funded by the Netherlands Environmental Trust Fund, the workshop attracted 120 delegates representing government and donor agencies, the private sector, farmer organizations, subregional institutions, and national and international research centers located in 22 sub-Saharan and six industrialized countries.

Results of the workshop included a consensus on the strategic role of soil fertility recapitalization as a basic condition for agricultural growth, rural development, and the protection of the environment in sub-Saharan Africa and a strategic framework for national action plans for soil fertility recapitalization. This workshop represents an outgrowth of the 1996 World Food Summit conducted by the Food and Agriculture Organization of the United Nations (FAO), which called for a renewed global commitment to solve the problem of chronic food insecurity and urged governments and international institutions to strive to achieve lasting fertility improvements in tropical soils. The International Fertilizer Industry Association, International Food Policy Research Institute, International Centre for Research in Agroforestry, World Bank, FAO, and

IFDC have joined forces to work with governments to develop and implement national action plans to reverse the trend of declining soil fertility in sub-Saharan Africa within the framework of a Soil Fertility Initiative (SFI).

Presiding over the opening ceremony of the workshop was the Togolese Minister of Agriculture, Livestock, and Fisheries, M. Kokou Dominique Dogbe. Addresses were given by representatives of IFDC, the Netherlands International Development Agency (DGIS), and the World Bank.

Five baseline documents provided the basic structure for the workshop. The topics of these documents included: Building Soil Fertility in Africa: Constraints and Perspectives by Dr. Henk Breman, Director of IFDC's Africa Division; Soil Fertility Initiative for Sub-Saharan Africa: A Joint Search for Solutions by Jan Poulisse, FAO; Sustainable Soil Fertility Management by Paul O'Connell, Representative of the World Bank; Synthesis of Phosphate Rock Case Studies by Pierre Rosseau, Consultant to the World Bank; and Case Study on the Strategy for Large-Scale Use of Burkina Rock Phosphate by Secretary Bikienga.

Four working groups composed of stakeholders representing farmer organizations, nongovernmental or-

IFDC-Africa—Ten Years of Progress

IFDC-Africa, based in Lomé, Togo, recently celebrated its Tenth Anniversary. On the occasion of its reaching this milestone, Dr. Amit H. Roy, IFDC's President and Chief Executive Officer, recognized the many contributors to the Center's success.

"In 1985 the Government of Togo graciously agreed to help IFDC establish a regional center in Africa by providing land for the facility," Roy said. "To better serve the fertilizer development needs of Africa, the Center was established on African soil to serve the African people. We appreciate the Togolese Government for believing in this venture and supporting us during the past decade."

For the past 10 years progress has been realized in the areas of soil fertility restoration, market research and development, and policy reform. Two networks, the West African Fertilizer Management and Evaluation Network (WAFMEN) and the African Fertilizer Trade and Marketing Information Network (AFTMIN), have fostered collaboration and strengthened linkages among research, extension, and farmers. This progress would not have been possible without the

support of our donors that have included: African Development Bank, American Phosphate Foundation (APF), Der Bundesminister für Wirtschaftliche Zusammenarbeit (BMZ), Dutch Government (DGIS), French Ministry for Cooperation, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), International Fertilizer Industry Association (IFA), International Fund for Agricultural Development (IFAD), Kellogg Foundation, International Development Research Centre (IDRC—Canada), Government of Nigeria, Rockefeller Foundation, Government of Togo, United Nations Development Programme (UNDP), United States Agency for International Development (USAID), World Bank, and World Phosphate Institute (IMPHOS).

"We also recognize the guidance and encouragement of the Program Committee of the IFDC Board of Directors," Roy said. "We remember with appreciation the vision and foresight of the previous directors, Dr. Paul L.G. Vlek and Dr. A. Uzo Mokwunye. Last but not least we could not have accomplished any of the achievements of the past decade without our dedicated staff and our collaborators—our most valuable resource."

ganizations (NGOs), donor agencies, private sector/agribusiness, policy and economics, extension, and public agricultural services discussed three topics: strategy for soil fertility improvement; constraints to the implementation of improved technological options; and institutional arrangements. Plenary sessions allowed for presentation of outcomes of discussions by each group of stakeholders. During a special session the chairmen and facilitators from each group discussed the outcomes of their respective group discussions and prepared a synthesis to serve as the basis for the development of a strategic framework for national soil fertility improvement action plans.

The synthesis included the consensus that the delegates reached concerning the main constraints to soil fertility improvement and possible solutions. Identified constraints revealed a shift from the almost exclusive attention to technical, agroecological factors limiting agricultural production to policy measures and socioeconomic conditions that limit farmers' access to resources and means of production.

To assist governments in the design of appropriate national action plans, some guiding principles were aptly articulated by Baba Dioum, Coordinator General, Conference of West and Central African Ministers of Agriculture (also an IFDC Board member). "First, all government policies should consider the strategic linkages between improved soil fertility and increased agricultural productivity to ensure food security, sustainable economic growth, and conservation of natural resources," Dioum said. "Second, macroeconomic policies should encourage investments in soil fertility restoration, sustainable management of natural resources, and the expansion of the agricultural sector. Third, all government policies should involve the participation of all stakeholders."

Four building blocks should be included in all national action plans for soil fertility improvement. These building blocks include geographic

characteristics, macroeconomic data with linkages to soil fertility improvement, agricultural policies such as pricing and land tenure situation, agricultural constraints and possible solutions.

Workshop delegates developed a proposed program for soil fertility improvement that included the necessary steps and means for implementation. The indicators to monitor the performance of the program and allow comparisons with other similar programs were also included. Policymakers in the countries represented at the workshop and other interested countries of the region will receive copies of the strategic framework, which can be adapted to their own specific requirements in accordance with existing national programs.

The Director of IFDC-Africa sees a clear message emanating from the workshop. "Technical and financial support is available within the framework of the SFI," Breman says. "Therefore, interested countries are encouraged to structure and express their demand by elaborating national action plans."

Representing the World Bank, Dr. Christian Pieri (an IFDC Board member) reiterated this idea during the Workshop's closing session. "Countries in sub-Saharan Africa have a golden opportunity to design and implement efficient national soil fertility management strategies," Pieri said. "Donors are well aware of the fact that within the chain—food security—agricultural development—protection of the global environment—the main link is soil fertility maintenance. Likewise, the donors are committed to financing national efforts geared to this end."

Policymakers from the developing countries found in this workshop a very encouraging sign. As Secretary Bikienga phrased it, "The commitment expressed by donors puts our minds at ease. It shows that they recognize the challenges that confront us and are willing to share the burden by helping us develop action plans that are acceptable to them. The government

of Burkina Faso will refine its national action plan in light of the workshop's conclusions."

Bikienga articulates well the interest of the countries of sub-Saharan Africa in the Soil Fertility Initiative. "The SFI responds to a need created by the combination of soils that have a very low inherent fertility, inappropriate cropping practices, rural poverty and unfavorable climatic conditions. Through the SFI, donors, international institutions, and governments will be able to work with farmers to ensure food security, alleviate poverty, conserve the natural resources, and develop a production base for present and future generations."

Issuing a challenge to other countries of the region, Bikienga urges, "All countries in sub-Saharan Africa must believe in the SFI and mobilize their resources to avail themselves of this opportunity. They should apply themselves to developing national soil fertility management strategies to present to donors. These strategies should be aimed at the sustainability of efforts and investments involved and therefore be extended over a period of 20 years and beyond."🌐

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nia volatilization that he has produced.

"As with other models, we based the ammonia loss program on published literature and our own experiences," Wilkens says. "The program is very farmer friendly. The farmer inputs information from his own farm. He also may input several weather scenarios to produce a broader range of data to determine potential profit, loss, and saving."

By tapping into the AGROTAIN World Wide Web site at <http://www.agriculture.com/contents/imc>, interested parties can download the new AGROTAIN computer model.🌐

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ANNOUNCEMENTS

Dr. Roelof Rabbinge, Chairman and Head of the Department of Theoretical Production Ecology, Agricultural University, Wageningen, Netherlands, is the newest member of the IFDC Board of Directors. Rabbinge is also Chairman of the Board of Trustees of the International Rice Research Institute; adviser to the Minister of Agriculture, Nature and Fisheries, Government of the Netherlands; board member of the Royal Institute of the Tropics; and board member of the Dutch Organization for Technology Assessment.

Dr. Hendrik Breman, Director of IFDC's Africa Division, Lomé, Togo, was recently tapped by Her Majesty Queen Beatrix of the Netherlands to be named "Companion of the Order of Orange-Nassau (in the fifth degree)." Recognized for 25 years of research work for Africa's benefit, Breman was especially cited for his contribution toward raising the consciousness concerning poverty and the absence of food security in the Sahel.

Hendrik van Reuler, Post Doctoral Soil Scientist, joined IFDC-Africa in January 1997. He is responsible for developing appropriate technologies for soil fertility induced agricultural production increases that are viable, sustainable, and socially acceptable. For the past 20 years he has been involved in agricultural development in the developing world, particularly those countries of sub-Saharan Africa.

Daniel F. Waterman, IFDC's Development Officer, is posted in the Washington, D.C., area. Waterman has more than 25 years' experience in international agricultural development. He served as a foreign service officer with the U.S. Department of State for more than 20 years, directed the International Trade Division of the State of Ohio, and was program manager of the National Association of State Development Agencies.

IFDC's Web Site, which was launched in March 1997, can be found at <http://www.ifdc.org>. Visitors to IFDC's site can download the latest press release, a recent publications list, or a list of the Center's services. Orders for publications or additional information can be processed online. The web site is part of IFDC's outreach to promote the exchange of information and ideas with its audience around the world. Viewers can also link with IFDC's collaborators from the Center's site.