

# Report

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

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## Four New Training Programs Emphasize Broadened Focus of IFDC

*Four new IFDC training programs highlight the broadened focus of IFDC for the 1990s. The programs are as follows: "Training Workshop on Policy Issues Affecting Fertilizer Sector Development and Sustainable Agriculture," "Plant Nutrient Management for Sustainable Agriculture," "Financial, Economic, and Environmental Impact Analysis for Fertilizer Sector Projects," and "Phosphate Fertilizers and the Environment."*

### Training Workshop on Policy Issues Affecting Fertilizer Sector Development and Sustainable Agriculture

"This workshop has given us a good perspective on the policy issues—all of the aspects that need to be considered in the design of fertilizer policies in developing countries like ours," says Enoch K. Kandie, Director of Agriculture, Ministry of Agriculture, Kenya.

Kandie was one of the 14 delegates from 10 countries to attend IFDC's "Training Workshop on Policy Issues Affecting Fertilizer Sector Development and Sustainable Agriculture." This training activity, conducted during September 9-20, at IFDC Headquarters and Washington, D.C., attracted policymakers from Burundi, India, Indonesia, Kenya, Nigeria, Rwanda, Sri Lanka, and Thailand, as well as the United Nations Industrial Development Organization and the World Bank.

According to Kandie, the workshop discussion leaders were able to give delegates a greater understanding of how to tackle policy issues. In

addition, the delegates gained new insights regarding possible solutions to their problems by exchanging ideas with each other.

Dr. Balu L. Bumb, IFDC Policy Economist and the Workshop Manager, stated that the purpose of the workshop was "to promote awareness among policymakers, donors, researchers, and sector specialists on the impact of governmental policies on fertilizer sector development and sustainable agriculture in the developing countries."

The manager of this 2-week workshop emphasized that "in many developing countries inappropriate policies have led to hunger and malnutrition and have accelerated the degradation of the country's natural resource base, the maintenance and improvement of which is essential for sustainable agriculture."

Kandie believes that agriculture can help people improve their quality of life if farmers understand modern techniques of agriculture and apply them on their farms. He gains the greatest satisfaction from his job when he sees farmers adopting modern techniques.

"Fertilizer is one of the least exploited means to increase crop production in sub-Saharan Africa,"

Kandie says. "Using high-yielding varieties and inputs, such as fertilizer, it is possible to double or triple the yield of most crops, based on their genetic potential. However, in Kenya we lack the mechanization that we need. Fertilizer, mechanization, and credit represent the greatest opportunity for us to increase our crop production."

In conclusion, Bumb emphasized that "efficient, equitable, and environmentally safe fertilizer use depends not only on sound agronomic practices and appropriate fertilizer production but also on the existence of a conducive policy environment. Further, a pragmatic and dynamic approach is needed in designing policies because of diversity of social, economic, and ecological conditions prevailing in different countries."

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### Training Program on Plant Nutrient Management for Sustainable Agriculture

Another new training program, "Plant Nutrient Management for Sustainable Agriculture," conducted at IFDC Headquarters during October 7-18, addressed the challenge of maximizing the efficiency of nutrient inputs (fertilizers and manures) while minimizing any potential detrimental impact they may have on the environment and maintaining the integrity of the resource base.

"The use of chemical fertilizers and other industrial inputs is increasingly

*(Continued on page 4)*

## IFDC Report

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IFDC is a public, international, nonprofit organization, governed by an international board of directors with representation from developed and developing countries. The Center is supported by various bilateral and multilateral aid agencies, private foundations, and national governments. IFDC focuses on creating sustainable agricultural productivity and food production in the tropics and subtropics through the development and use of improved and environmentally sound fertilizers and fertilization practices.

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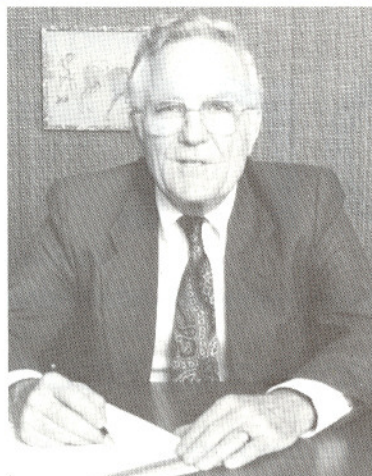
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# President's Report



(Photo by Charles E. Butler)

**Dr. Paul J. Stangel**  
**IFDC President and**  
**Chief Executive Officer**

To remain a vital force in the developing world, IFDC must keep pace with an ever-changing world by reorienting its course. The mission of IFDC was recently expanded to embrace broader questions of integrated nutrient management, issues concerning the environment, and development of an efficient agribusiness system in a deregulated, competitive marketplace and to continue its work to help preserve the land resource base to help ensure a sustainable agriculture. "Sustainability" simply means that "continued production from a specific agroecosystem depends upon maintenance and enhancement of resources on which production is based."

Eight new or expanded programs have been designed to provide solutions to the challenges confronted in the primary agroecosystems in the developing countries as they strive to attain sustainable agriculture. These programs—"building blocks of sustainable agriculture"—and their recently appointed managers are as follows: Nutrient Dynamics and Agroecosystems—Dr. Dennis K. Friesen; Information Management Systems—Dr. Philip K. Thornton; Economics and Policy—Dr. Carlos A. Baanante; Nutrient Characterization and Production—Steven J. Van Kauwenbergh; Environmental Assessment—James J. Schultz; Human Resources Development—Ram S. Giroti; Agribusiness—John H. Allgood; and Project Analysis and Assistance—Ian Gregory. The goals and major activities of each program are given below.

**Nutrient Dynamics and Agroecosystems Program**—strives to improve or maintain crop production in diverse cropping systems in a sustainable and environmentally acceptable way through the removal or reduction of soil fertility constraints that exist under different tropical and subtropical conditions. Increased and sustained crop yields will be achieved through improved nutrient supply systems that maximize efficiency of nutrient use by reducing losses of nutrients, improving nutrient cycling, and integrating inorganic fertilizer use with organic and biological inputs such as biologically fixed nitrogen. This program will evaluate the impact of the total supply of nutrients, including chemical fertilizer, and overall nutrient management practices on the environment. It will develop or improve diagnostic techniques for optimizing the efficiency of nutrient use, minimizing environmental impact and delineating and forecasting deficiencies or problems that are likely to arise.

**Information Management Systems Program**—provides, analyzes, and interprets information on the effective operation of an integrated nutrient supply and use system for use by researchers and clients at field, farm, regional, national, and global levels. The program has as its goal the establishment of effective information management systems for nutrients in developing countries needing such capabilities.

**Economics and Policy Program**—conducts analyses and research in economics, socioeconomics, and policy at the micro and macro levels. Specific focus is on helping national planners develop nutrient-related policy options that will lead to self-reliance in production of food and fiber through effective nutrient management, enhance the productivity of the land resource base, and help sustain economic growth particularly in the rural sector. This will be done cooperatively with developing countries through policy option units dealing with nutrient management.

**Nutrient Characterization and Production Program**—specializes in research and

development of both inorganic and organic sources of plant nutrients. A basic function of the program is the characterization of nutrient resources in terms of quantity, quality, suitability for direct application, potential for upgrading, and suitability as raw materials for production of plant nutrients. A major focus of the program is the use of indigenous materials, including agrominerals, and urban and industrial sources of nutrients.

**Environmental Assessment Program**—studies and assesses the systems for production and use of plant nutrients to ensure that food production and environmental protection are attainable and sustainable. Maximum protection must be afforded to the earth's air, water, and soil resources to ensure productivity for future generations while at the same time producing food and fiber for the ever-growing population.

**Human Resources Development Program**—focuses on the development of a cadre of personnel with emphasis on the production, marketing, and use of nutrients to support agricultural production. These trained personnel become advisors and future policymakers in their respective countries.

**Agribusiness Program**—integrates cost-effective, environmentally sound strategies for supply, marketing, and use of agricultural inputs, associated services, and outputs with special emphasis on plant nutrients. This program promotes the development of a comprehensive system to support and foster increases in agricultural production.

**Project Analysis and Assistance Program**—assesses the technical, economic, and financial viability of selected agricultural projects. A typi-

cal study consists of three basic parts: investment/production costs, financial/economic analyses, and farm-level benefits and cost analysis leading to a set of recommendations.

### Conclusion

The new and broadened approach by IFDC is designed to embrace total nutrient management required to support effective land management and lead to sustainable crop production. The inclusion of economics and policy, as well as agribusiness, in its portfolio of activities will allow IFDC to continue to play a dynamic role in developing countries by assisting with the establishment of appropriate agricultural policies and relevant technologies that will lead to agricultural economies that are vibrant, equitable, and sustainable.

*Paul J. Stangel*



*(Photo by Charles Butler)*

**Dr. Paul J. Stangel, IFDC's President and Chief Executive Officer; Dr. J. K. Coulter, Advisor, World Bank; and Dr. Amit H. Roy, IFDC's Executive Vice President and Chief Operating Officer, discuss the results of the Steering Committee's review of the UNDP global project. During September 4-5 the committee, consisting of Dr. Nyle Brady, UNDP Senior Consultant (Chairman); Dr. A. L. Ange, Head, Fertilizer Division, FAO; Igor Volodin, UNIDO; and Dr. Coulter, met at IFDC Headquarters. The primary recommendation of the committee was that the work should be more sharply focused on environmental issues and the role of plant nutrients in sustainable development. Efforts are underway to implement the committee's recommendations.**

(Continued from page 1)

being perceived as contributing to the degradation of the environment and the natural resource base with consequent loss of agricultural productivity, especially for future generations," says Dr. Dennis K. Friesen, IFDC Soil Scientist and manager of this program. "Yet an ever-increasing world population, whose numbers will double within the next three or four decades, demands major increases in food production for its sustenance."

Clearly a system that produces outputs requires inputs (either inorganic or organic) to maintain its productivity. It is important to recognize that organic manures are ultimately derived from fixed carbon, nitrogen, and oxygen and from inorganic elements assimilated from the soil. A fundamental requirement for sustaining the productive capacity of soil resources is the replenishment of nutrients removed during crop production.

"The purpose of this training program was to develop and strengthen awareness among agricultural scientists of issues pertaining to sustainability of agricultural production," Friesen says. "The primary emphasis was on the importance of fertilizers

and correct soil fertility management in sustaining the resource base and protecting the environment of future production. Special attention was given to alternative methods of increasing fertilizer use efficiency in diverse agricultural systems."

Besides IFDC professional and scientific staff, program faculty included recognized experts from international and U.S. organizations. Among them were Dr. C. A. Edwards, Ohio State University; Dr. Stanley W. Buol, Professor of Soil Science, Ecology, and Forestry, North Carolina State University; Dr. Rattan Lal, Professor of Agronomy, Ohio State University (formerly with the International Institute of Tropical Agriculture); Dr. Paul Singleton, Acting Director, NIFTAL Project; Dr. Hari Eswaran, National Leader, World Soil Resources, Soil Conservation Service/U.S. Department of Agriculture; and Dr. D. Kass, Centro Agronomico Tropical de Investigacion y Enseñanza (CATIE), Costa Rica.

An added feature of the program was a field trip to the University of Missouri, where participants observed the 103-year-old Sanbourne field plots and the 50-year-old erosion plots at the Claypan Erosion Station. Speakers at the University of

Missouri included Professor J. R. Brown, D. Osborn, N. Kitchen, and E. E. Alberts, U.S. Department of Agriculture/Agriculture Research Service.

This new program is designed for agronomists, soil scientists, and agricultural scientists in general who are actively involved in research and development efforts in developing countries on the use of fertilizers to enhance agricultural production and to conserve or improve the natural resource base while minimizing any detrimental effects on the environment.

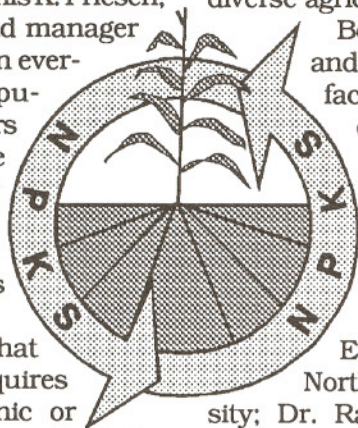
## Financial, Economic, and Environmental Impact Analysis for Fertilizer Sector Projects

A new training opportunity will be presented during November 4-22, 1991, which is designed to familiarize developing-country economists, financial managers, planners, investment advisers, and operations managers with the fundamental concepts, approaches, methods, and techniques to evaluate the technical, environmental, financial, and economical feasibility of fertilizer sector projects.

According to the program brochure, one of the objectives of this training activity is "to increase the participant's knowledge of the role of investment analysis in selecting and implementing appropriate fertilizer sector projects."

In addition, the participants should be able to more fully understand the relationship between various components of the fertilizer sector in project investment analysis. The new program should increase the participant's knowledge of the environmental impact associated with fertilizer production and how to incorporate these factors into project appraisals.

Adding a more practical aspect to this training program will be practical exercises and case studies to allow the participant to develop and improve their evaluation and analysis skills and techniques.



(Photo by Charles Butler)

**Dr. Debra T. Hellums, IFDC Research Associate, conducts the participants in the training program on "Plant Nutrient Management for Sustainable Agriculture" on a tour of the IFDC greenhouses.**

The program will also include field trips to commercial organizations involved in the manufacturing and international marketing of fertilizer raw materials and products. Environmental legislative agencies and major international institutions in Washington, D.C., will be visited to gain a first-hand opportunity to discuss a number of topics related to fertilizer-sector project analysis, assessment, and financing.

## International Workshop: "Phosphate Fertilizers and the Environment"

Tampa, Florida (U.S.A.), will be the setting for a new IFDC workshop entitled "Phosphate Fertilizers and the Environment," slated for March 23-27, 1992.

"Confronted with sensitive technical, economic, and political issues, the fertilizer sector must find ways to

cope with the environmental question while maintaining sustainable agricultural production systems," says James J. Schultz, IFDC Fertilizer Production Specialist and Workshop Manager.

Designed to provide an international forum for an objective discussion and analysis of issues facing the global phosphate fertilizer production and use sectors, this workshop will attract managers and technical staff engaged in all aspects of phosphate fertilizer production, marketing, and use. The workshop should prove to be of special interest to government planners and those engaged in the formulation of environmental regulation and government policies related to fertilizer production and use.

"The key workshop topics will be developed through the presentation of subject-specific invited papers, discussion, and debate between invited speakers and delegates," Schultz

says. "The invited speakers will be recruited from a broad spectrum of public- and private-sector national and international organizations actively engaged in the phosphate fertilizer and agricultural sectors. Topics addressed will include agronomy, production, process techniques, international trade and marketing, environmental regulations and compliance criteria, and the formulation and implementation of political initiatives."

Workshop delegates will participate in all discussions and make major contributions to the deliberations and formulation of recommendations that will enhance environmentally acceptable production and use of phosphate fertilizers. These deliberations will later be documented in a published proceedings.

**Note:** More information regarding any IFDC training program may be obtained from the IFDC Outreach Director (address information given on page 2).

Uruguay—

## IFDC Participates in Symposium on Sustainability of Crop-Pasture Rotations in the Southern Region of South America

In cosponsorship with IFDC, the International Maize and Wheat Improvement Center (CIMMYT), the Inter-American Institute of Agricultural Sciences (IICA), and Proyecto de Cooperación para el Desarrollo Tecnológico Agropecuario del Cono Sur (PROCISUR), the Instituto Nacional de Investigación Agropecuaria (INIA) conducted a symposium on Sustainability of Crop-Pasture Rotations in the Southern Region of South America during May 27-29, 1991, in Montevideo, Uruguay.

Dr. Walter Baethgen, IFDC Agronomist/Systems Modeler, who coordinates the field implementation of IFDC's United Nations Development Programme (UNDP) project in Latin America, participated in the organization of the symposium, presented a paper, and served as moderator of one of the sessions. Dr. Carlos A. Baanante, IFDC Economist, participated in the symposium and presented two papers.

The symposium was attended by 200 scientists from Argentina, Brazil, Chile, the United States, and Uruguay.

Several papers presented at the symposium were based on data and results from a 27-year experiment conducted

by INIA in La Estazuela, Uruguay, to study the sustainability of crop-pasture rotations with and without the use of fertilizers. Papers on the evolution and dynamics of nitrogen and phosphorus in various crop-pasture rotation systems and also with respect to the evolution of organic matter were presented.

During the symposium's sessions and informal discussion periods, important observations were made about issues that concern the sustainability of agricultural production systems and the need to study those systems in terms of long-term changes in the physical and chemical properties of the soils and land productivity. Other observations that were made are:

1. Agricultural production systems that are or can be made sustainable with minimum use of chemical fertilizers are viewed as "better" than those requiring more intensive use of fertilizers. In this context, research efforts appear to be directed primarily toward enhancing biological nitrogen fixation (BNF) to reduce or eliminate the use of nitrogen fertilizers. However, it appears that there is a consensus that addi-

tions of phosphorus, potassium, and micronutrient fertilizer products will be required for the sustainability of most crop production systems.

2. Problems of agricultural sustainability become evident in areas where extensive agriculture is being replaced by more intensive crop production systems.
3. In addition to the technical/physical determinants of sustainability, the demographic, economic, social, and policy dimensions should be properly considered in the development and implementation of research projects.
4. The establishment of long-term field experiments and the use of simulation models appear to be the most meaningful ways for conducting research on sustainability of agricultural production systems. A systems approach is necessary to conduct research on sustainability.

The symposium provided a useful forum for the discussion and exchange of information and ideas about the study of sustainable agriculture production systems in the southern region of Latin America.

## Collaborative IFDC/IRRI Research Continues to Provide Valuable Results

The collaborative research project between IFDC and the International Rice Research Institute (IRRI) focuses on integrated nutrient management for rice. Particular emphasis is on nitrogen because it is the nutrient required in largest quantities by rice. IFDC and IRRI scientists are striving to develop management practices and technologies that effectively use nitrogen already in the soil, enhance the input of nitrogen through biological nitrogen fixation, and judiciously use nitrogen fertilizers.

"Rice is frequently grown in rotation with other crops or followed by fallow periods; therefore, our research focuses on the entire cropping sequence rather than on one rice crop," says Dr. Roland Buresh, IFDC Soil Scientist posted at IRRI.

Past IFDC/IRRI research showed that substantial quantities of soil nitrogen (up to 90 kg nitrogen per hectare) can be lost when soil that dries out between rice crops is flooded for the

next rice crop. IFDC and IRRI scientists are striving to develop management practices and technologies in which soil nitrogen is effectively used by rice rather than lost after soil flooding. Reductions in losses of soil nitrogen can result in reduced nitrogen fertilizer requirements for rice and reduced emissions of nitrogen gases, such as nitrous oxide, to the atmosphere.

"Our recent research demonstrates that crop rotations, weed control practices, rice establishment practices, tillage, and water management may be manipulated to influence this contribution of soil nitrogen to rice and, hence, nitrogen fertilizer requirements for rice," Buresh says.

IFDC scientists collaborate closely with IRRI scientists in their research on biological nitrogen fixation and use of crop residues in rice-based cropping systems.

"We actively collaborate with IRRI scientists on various projects involving

Australian scientists (through funding from the Australian Center for International Agricultural Research [ACIAR]), Philippine scientists, and NIFTAL," Buresh says. "My research also involves collaboration with J. K. Ladha, IRRI Soil Microbiologist, as we study rice varietal differences in efficiency of using nitrogen, which is funded by the United Nations Development Programme (UNDP)."

More effective use of soil nitrogen and biological nitrogen fixation can only partially meet the nitrogen requirements of rice. For the foreseeable future, commercial nitrogen fertilizers will be required in large quantities to meet rice demand. IFDC and IRRI continue to strive to develop more effective management practices for commercial nitrogen fertilizers. IFDC collaborates with IRRI and the Institute for Soils and Fertilizer in Vietnam on integrated use of urea with farmyard manure in the Red River Delta. This research, funded to IRRI by the Australian International Development Assistance Bureau (AIDAB), seeks to determine the effect of farmyard manure on the use efficiency of urea and requirements for urea.

### Headquarters—

## Egypt Builds National Institution to Further Fertilizer Research and Development

Realizing the importance of building national institutions to deal with the challenges of creating sustainable agriculture, IFDC continues to seek opportunities to help developing countries establish their own expertise and facilities to meet their agricultural production requirements.

As a case in point, the Egyptian Fertilizer Development Center (EFDC) is steadily progressing toward becoming a full-fledged research and development organization, with technical assistance being provided by IFDC. For the past 5 years, IFDC has been involved in the development of EFDC.

The overall mission of EFDC is to develop cost-effective fertilizer products and practices that are needed by Egyptian farmers and can be economically produced by the local industry.

The specific objectives of EFDC are (1) establish a research and development center with the capability of examining in detail the technical and economic problems facing Egypt's fertilizer sector and (2) ensure that fertilizer is offered in the form that is needed,

of the appropriate quality, at a price that is affordable by the farmer, and that can be economically produced by the manufacturer.

EFDC's Chairman, Sidky Ghoneim, and Technical Director, Mohammed Fathy, visited IFDC recently to review past IFDC/EFDC collaborative efforts and to plan future cooperative activities.

In an interview with this editor, EFDC's Chairman Ghoneim highlighted some of EFDC's plans for the future. "Our purpose is to improve our fertilizer industries in Egypt," Ghoneim says. "We wish to become acquainted with new irrigation systems that need to be developed to compensate for the decrease in the water supply from the Nile. We must make certain that a number of research projects are developed to accommodate the soil conditions of our country. Because our company is one of the largest companies producing nitrogen fertilizer, we can produce a mix of such products to increase nitrogen efficiency for our soils and the crops grown in Egypt."

Ghoneim pointed out that he and his counterpart were visiting IFDC to strengthen the relationship between EFDC and IFDC and to seek IFDC's help and cooperation in "developing this small baby that we hope will grow up to be a sister research center to IFDC, which will have an impact not only in our country but also in all of north Africa and other Arab countries.

Ghoneim and Fathy appreciate the assistance that their center has received thus far from IFDC for, as they say, "IFDC staff members deliver whatever they promise to do."

### Right:

**EFDC's Chairman, Sidky Ghoneim; Dr. Paul J. Stangel, IFDC's President and Chief Executive Officer; and EFDC's Technical Director, Mohammed Fathy, review plans for the further development of the Egyptian Fertilizer Development Center.**

Headquarters—

## Fifteenth Fertilizer Marketing Management Training Program Conducted

"A visit to IFDC allows program participants the opportunity of taking a close look at ways to produce complex fertilizers that will result in higher yields for their nations' crops," says Suleman Shah Mian, Deputy Secretary for Inputs, Ministry of Food and Agriculture, Pakistan.

Mian was one of the fifteen participants from 8 countries that attended the 15th annual Fertilizer Marketing Management Training Program at IFDC Headquarters during August 5-September 6. Besides Pakistan, their countries include Ethiopia, India, Kenya, Portugal, Republic of China, Saudi Arabia, and Venezuela.

"This program has been helpful in allowing us to understand the wide range of fertilizer marketing," said Mian. "Most of the program participants are from countries where their populations are growing at a faster rate than food can be produced. It is important for us to learn how best to convince our farmers to use fertilizers in the right quantities to increase yields of a particular crop."

According to Gene Harris, IFDC Economist and the program's manager, "The IFDC marketing training program is designed to develop skilled fertilizer marketing personnel. By bringing together a group of fertilizer marketers, IFDC creates a climate for the exchange of ideas and information among the training participants."

Throughout the 5-week program the participants learned about various elements of fertilizer marketing, promotion planning, management roles, dealer functions, and identifying the needs of farmers. Using IFDC's computer-assisted fertilizer marketing simulation exercise, they gained experience in directing a marketing system while examining the impact of the system in a changing business environment.

Demissie Oluma, another participant, gained new ideas that he hopes to use to improve his marketing efforts in Ethiopia and, in turn, hopefully help his country produce more food to feed its people.

Headquarters—

## Agronomic Evaluation for Development of Fertilizer Recommendations, Subject of Recent Training Program

"The most useful aspect of this training program was the statistical portion, in which we used microcomputers to perform economical analyses of data. In this segment, I learned how to make recommendations to farmers in my country—I will now be able to give them the most economical recommendations."

These comments were made by Ing. Diogenes E. Perez R, Assistant Technical Manager of Fertilizantes Santo Domingo, after completing the IFDC training program on "Agronomic Evaluation for Development of Fertilizer Recommendations," conducted at IFDC Headquarters during July 8-26.

This training opportunity attracted 15 participants from 11 countries—Dominican Republic, Gambia, Ghana, Guinea, India, Indonesia, Madagascar, Republic of South Africa, Rwanda, Uganda, and Venezuela.

The participants like Perez found this to be an excellent training experience since they are responsible for making agricultural analyses and interpretation of these analyses in order to provide recommendations to their countries' farmers. Perez found the program especially helpful since he is responsible for "providing technical assistance to his company's customers and conducting training programs for agronomists and farmers."

The practical nature of this program allowed the participants to increase their knowledge and understanding of the statistical and economic analysis of data related to fertilizer use for practical recommendations. They used practice exercises to develop their skills in such procedures as analysis of experimental data, regression analysis, marginal analysis, production functions, and simulation models.

The fundamental question asked by farmers of those involved in fertilizer technology transfer is "how much should I apply?" Even though this may on the surface seem to be a simple question, many factors that influence or change the response from year to year often make the question difficult to answer. The question becomes more urgent and difficult when fertilizer and crop prices are subjected to uncertainty. This program equipped the participants with the appropriate skills to provide sound recommendations on fertilizer usage under the widely varying field conditions, cropping systems, and socioeconomic situations of farmers in developing countries.

Another participant in this activity, Dr. Ir. Zuhdi Sri Wibowo, Soil Scientist with the Research Institute for Tea and Cinchona, Bandung, Indonesia, described the program as "excellent for my company's work because it relates the agronomics of fertilizer use to the economics of its use. This was a very well-planned course, which incorporated the use of microcomputers to estimate profits and perform economic analyses."



(Photo by Charles Butler)



International Fertilizer Development Center  
P.O. Box 2040  
Muscle Shoals, Alabama, U.S.A. 35662

## 1991-92 Training Calendar

Program	Dates	Location	Fees
<b>1991</b> Fertilizer Marketing Training Program (FMTP)	December 2-13	Bangkok, Thailand	1,100
<b>1992</b> Fertilizer Distribution and Handling Training Program (FDHTP)	February 10-28	India, Singapore, Indonesia	1,675
Phosphate Fertilizers and the Environment (PFE)	March 23-27	Tampa, Florida, U.S.A.	700
Data Collection, Analysis, and Projections for Fertilizer Sector Studies (DCAPF)	April 8-24	Muscle Shoals, Alabama, U.S.A. Washington, D.C., U.S.A.	1,675
Fertilizer Marketing Training Program (FMTP)	May 11-22	Nairobi, Kenya	1,100
Advances in Fertilizer and Irrigation Technology (AFIT)	June 8-26	California, Arizona, Louisiana, Kansas, Missouri U.S.A.	1,675

Program dates and locations are subject to change. Fees do not include travel or living expenses.