

# Report

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

## **New Bangladesh Project to Develop Agribusiness Link to Farmers**

In order to increase their crop yields, Bangladeshi farmers like Abdul Latiff need regular access to agricultural inputs such as improved seeds, fertilizer, and agricultural machinery. A typical Bangladeshi farmer, Latiff lives with his large family on a small plot of land and sells some produce from his farm in a nearby town.

Provided a new IFDC project reaches its intended goals, Latiff and many other Bangladeshi farmers like him should soon have improved access to high-yielding varieties, farm machinery, and other modern agricultural inputs, in addition to the already available fertilizers. The establishment of a private agribusiness sector is essential to reduce poverty through increased productive employment in agriculture and to help Bangladesh's farmers produce more food for the growing population. The World Bank estimates that Bangladesh's population (now 119 million) increased during the past decade at an average annual rate of 2.1% while a negative 0.1% average annual growth rate was realized in food production per capita. Progress in agricultural production is vital for

the future well-being of the nation given that its population is likely to swell to about 200 million within 30 years.

### **Major Successes**

The 30-month Agro-Based Industry and Technology Development Project (ATDP), which began in mid-1995, is building on the lessons learned and accomplishments of IFDC's previous Fertilizer Distribution Improvement Project, which privatized fertilizer distribution in Bangladesh. In that project, IFDC facilitated the evolution of an extensive network of private fertilizer entrepreneurs (170,000), which resulted in improved availability of fertilizer throughout the country. Eighty percent of Bangladeshi farmers can now purchase fertilizer at retail shops within 5 km of their farms. By assisting Bangladesh in making the transition to a free market system, IFDC helped the country save an estimated US \$119 million (since 1988) by eliminating fertilizer subsidies and other support costs. A prime result of the project was Bangladesh's achievement of self-sufficiency in rice production in the early 1990s.

### **New Project Initiated**

The new project is being implemented collaboratively by the

Government of Bangladesh, the U.S. Agency for International Development (USAID), and a consortium composed of IFDC—as prime contractor, Winrock International, and Ronco Consulting Corporation. The project's goal is to increase productive employment in agriculture and related enterprises. Its purpose is to create competitive markets for agriculture and agribusiness inputs, outputs, and technologies.

"IFDC can make an impact in Bangladesh by increasing the investment in agribusiness to create markets for agricultural products for both local agribusinesses and export markets," says Dr. Ronald P. Black, Chief of Party, IFDC/Dhaka.

*(Continued on page 5)*

**The Agro-Based Industry and Technology Development Project focuses on creating an agribusiness link with Bangladeshi farmers to provide access to high-yielding varieties, farm machinery, and other modern agricultural inputs.**



*(Photo by Dr. Ray B. Diamond)*

## 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 increasing and sustaining food and agricultural productivity in developing countries through the development and transfer of effective and environmentally sound plant nutrient technology and agribusiness expertise.

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# President's Report



(Photo by Charles E. Butler)

**Dr. Amit H. Roy**  
IFDC President and  
Chief Executive Officer

## IFDC Board Meeting

A major activity of the latter half of 1995 was the Annual Board Meeting. Twelve members of the IFDC Board attended the November meeting. In addition, two observers from USAID, Dr. Barry Lennon, Finance Advisor, and Dr. John Malcolm, Soil Fertility Specialist, attended. Various IFDC staff members updated the Board members on Center activities including the Initiative on Phosphate Rock as a Capital Investment, the IFDC/International Center for Tropical Agriculture (CIAT) Project, and the market reform and privatization project in Venezuela.

The Program Committee of the IFDC Board commended the Center's staff on its work on phosphorus as a capital investment in Africa and recommended further studies on the costs and benefits included in the private, social, and environmental aspects of natural resource management under current and innovative systems. The Committee complimented IFDC on its research in Colombia to identify sustainable management systems through nutrient cycling and crop rotations. The Committee urged the Center to link the current work on nutrient dynamics to further studies

on the effects of innovative no-tillage systems in other parts of South America and other continents for a full understanding of the influence of tillage, green manures and cover crops, monocultures, and rotations applied in a range of farming environments.

## New and Expanding Initiatives

To achieve its mission, IFDC cooperates with national, international, and nongovernmental organizations around the globe. In so doing, the Center is involved in a number of new and expanding initiatives, a few of which are highlighted below.

### Desert Margins Initiative

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is taking the lead in a Desert Margins Initiative to find solutions to the problems created by land degradation in the desert margins of Africa. IFDC is collaborating on this initiative with several national agricultural research systems (NARS), advanced research organizations (AROs), and a number of international agricultural research centers besides ICRISAT. This initiative focuses on arresting land degradation by promoting improved and innovative technologies that integrate effective nutrient management strategies with improved soil and water conservation techniques that are ecologically sound, economically viable, and socially acceptable to farmers in the dryland areas of sub-Saharan Africa. The key goal of this initiative is to enhance the food security of poor rural populations and alleviate poverty by halting or reversing desertification.

Desertification, now recognized as a major global problem, is a form of "progressive soil and vegetation degradation in arid lands to which both human and climatic factors may be contributing." Over 100 countries and approximately 900 million people may be suffering from the adverse social and economic impacts of dryland degradation. The extent of land degradation is most severe in the arid and semiarid regions of sub-Saharan Africa, where one-third of the global area of dryland soil degradation is found.

In the countries of sub-Saharan Africa participating in the Desert Margins Initiative—Botswana, Burkina Faso, Kenya, Mali, Namibia, Niger, Senegal, and South Africa—population growth rates are among the highest in the world. Cereal production per unit area of land in most of these countries is very low; thus, pressure is escalating to increase food production even at the cost of depleting natural resources. There is an acute need in these countries to find sustainable solutions.

During 1995 Dr. Uzo Mokwunye, Director of IFDC's Africa Division, began participating as a member of the Steering Committee of the Desert Margins Initiative. IFDC staff also participated in three subregional workshops in Western Africa, Eastern Africa, and Southern Africa to plan future activities of this initiative.

#### **Soil, Water, and Nutrient Management Initiative**

IFDC is also involved in a soil, water, and nutrient management initiative, along with the International Board for Soil Research and Management (IBSRAM), CIAT, Empresa Brasileira de Pesquisa Agropecuaria (EMBRAPA)—Brazilian Enterprise of Agricultural and Livestock Research, ICRISAT, the International Potato Center (CIP), the International Livestock Center for Africa (ILCA), the International Center for Research in Agroforestry (ICRAF), the International Institute of Tropical Agriculture (IITA), the Tropical Soil Biology and Fertility (TSBF) Programme, the Centre de Cooperation Internationale en Recherche Agronomique pour le Developpement (CIRAD), the Kenya Agricultural Research Institute (KARI), the Philippine Council for Agriculture, Forestry, and Natural Resources Research and Development (PCARRD), the International Centre for Integrated Mountain Development (ICIMOD), and Nigeria's Institute for Agricultural Research (IAR). The four consortia being developed under the initiative focus

on (1) combating nutrient depletion, (2) managing acid soils, (3) managing soil erosion, and (4) optimizing soil water use.

Two issues figure prominently in this initiative: First is the collaboration with NARS in planning eco-regional programs aimed at trying to find solutions to the regions' problems with the given human resources. Second is the emphasis on the management of natural resources. The initiative is designed to develop integrated nutrient management practices, policy guidelines, and pathways for adoption.

"IFDC's leadership role in nutrient management is unique and has been called upon to provide input in this initiative," Mokwunye says. The two institutions responsible for the nutrient depletion consortium are IFDC and TSBF; IFDC is responsible for the activities in West Africa and TSBF for those in East Africa.

#### **Initiative on Phosphate Rock as a Capital Investment**

In cooperation with ICRAF and the Norwegian Centre for International Agricultural Development (NORAGRIC), IFDC is conducting country-specific studies to assess the agronomic suitability and economic feasibility of using phosphate rock as a capital investment. Country studies concerning Burkina Faso, Madagascar, and Zimbabwe have been conducted by the three cooperators. The resulting reports discuss the possibilities of phosphate rock investments on a pilot basis to sustain soil fertility and crop productivity in the three selected countries.

The use of phosphate rock as a capital investment to replenish phosphorus in soils has a role to play in some countries of sub-Saharan Africa that have phosphate rock deposits suitable for direct application (e.g., Burkina Faso, Mali, Tanzania, and Zambia). This investment, however, must be made as a component of a more comprehensive "soil-fertility investment package" that also includes other investments such

as hedging and terracing, stone bunding, and water harvesting, in addition to measures to ensure the availability and use of water-soluble phosphorus, potash, and nitrogen from organic and/or inorganic sources.

The World Bank is planning an international workshop to discuss the findings of these studies and develop a future plan of action for the phosphate rock initiative. The workshop may also consider the launching of studies and pilot projects in other countries including Mali, Tanzania, and Zambia where phosphate rocks are relatively more reactive and available in large quantities.

#### **Alternatives to Slash-and-Burn Initiative**

As a participant in the worldwide Alternatives to Slash-and-Burn Initiative, IFDC is cooperating with national and international organizations of Africa, Asia, and Latin America to help reduce tropical deforestation and promote rehabilitation of degraded lands by providing farmers who practice slash-and-burn agriculture with alternative ways of using the land.

IFDC is contributing to the initiative by using computer-based simulation to evaluate several crop growth models in Brazil. These models provide powerful tools for the analysis of production, risk, resource allocation, land use, and environmental quality. The Brazil evaluation involves the collation of data from current and previous work to test several models. If the models are shown to provide realistic results, soil and weather data can be used to simulate outcomes at any number of sites. These data will also be assembled into a Geographic Information System (GIS) package that, used with the models, can simulate spatial variability of alternative scenarios.

*Amit H. Roy*

## Director of Australian Research Center Joins IFDC Board

"I have been pleasantly surprised to learn of the wealth of IFDC's work relating to total nutrient management and the wider implications of fertilizer management in the developing countries," says Dr. Ann P. Hamblin, Director of the Cooperative Research Centre for Soil and Land Management, Glen Osmond, South Australia.

Hamblin attended her first IFDC Board Meeting in November 1995. With a 30-year career in agricultural research, she is a valuable addition to the IFDC Board.

Besides serving on the IFDC Board, Hamblin is an advisor to

several other organizations. She is a member of the Environment Advisory Committee of the Australian Academy of Sciences; international referee, New Zealand Foundation for Research, Science, and Technology; and a consultant to the Agriculture and Natural Resources Department of the World Bank. Hamblin serves on the Editorial Board of *Soil and Land Management* and was Vice Chairman of IBSRAM's Board of Directors.

Hamblin has a dual citizenship—Australian and British. She received her education in England—B.A. and M.A. degrees in geography at Cambridge University and a Ph.D. in soil science at Reading University.

The Australian research administrator has several publications to her credit. The topic of a number of these publications is sustainability. One of these publications discusses ways to determine whether agricultural systems are

sustainable. "We know that agriculture is sustainable when it remains the economically viable major land use in a region over long time periods relative to human life," Hamblin says. "To accomplish this, agriculture must have a healthy soil and water resource base and be resilient to stresses such as natural disasters, population pressure, and markets by being flexible and capable of increased productivity and response to technological change."

Hamblin looks forward to her tenure on the IFDC Board and understands the Center's comparative advantages. "Few other international groups have the advantage of integrated problem-solving teams composed of engineers, economists, and experimental scientists," she says. ☉



(Photo by Charles E. Butler)

The IFDC Board of Directors pictured here during their annual meeting at IFDC Headquarters, November 8-10, 1995. Front row (seated), from left: Dr. Kunio Takase (Japan); Dr. W. David Hopper, Chairman (Canada); Dr. Ann P. Hamblin (Australia); Mr. Joseph C. Wheeler, Vice Chairman (U.S.A.); Dr. Norman E. Borlaug (U.S.A.); Dr. Robert E. Wagner (U.S.A.). Back row (standing), from left: Dr. Amit H. Roy, IFDC President and CEO; Dr. Hiram Grove V. (Chile); Mr. Luc M. Maene (Belgium); Mr. Baba Dioum (Senegal); Dr. John Malcolm (USAID); Dr. Bukar Shaib (Nigeria); Dr. Barry Lennon (USAID); and Mr. Pratap Narayan (India). Not pictured are: Mr. Gary D. Myers (U.S.A.) and Dr. Christian Pieri (France).

## African Policymaker Brings New Insight to Board

The Coordinator General of the Conference of Ministers of Agriculture of West and Central Africa, Baba Dioum, is another new member of the IFDC Board of Directors. He is also the Director of the Agricultural Policy Unit of Senegal's Ministry of Agriculture. The native of Senegal brings to the Board a wealth of experience that he has gained during a 30-year career as an agricultural policymaker.

Dioum received a B.S. degree in soil science, biology, and chemistry from the Faculté des Sciences

de Dakar (Senegal) and an M.S. degree in forestry from l'École Nationale des Eaux et Forêts de Nancy (France).

Other activities that require Dioum's attention include his service as a founding member of the Executive Committee of the International Union for the Conservation of Nature (IUCN) and founding member and executive governor of the International Council for Environmental Law.

According to Dioum, fundamental changes are required in the way that African economies operate and in the way they are managed. "These changes are well within the technical and economic capacity of most African nations," he says. "We need to make three critical choices: First, we have to improve the quality of governance, in general, and of agricultural policies, in particular. Second, we have to substantially increase public in-

vestment in agriculture to meet the investment needs of an accelerated growth process in that sector. Third, we must set up programs to reach and include the poor and the malnourished."

Dioum has definite ideas regarding IFDC's potential role in helping African nations solve some of their problems. "If we consider that in the developing countries agricultural growth is the engine of the economy, the agricultural resources (particularly soils) have to be capitalized as the focal point in the strategies in these countries," Dioum says. "IFDC can be involved not only in transferring technology but also in helping to implement agricultural policies in the developing countries, particularly in Africa. Sustainable development must consider preserving these resources, especially the soils."Ⓢ

*(Continued from page 1)*

The ATDP aims to promote reforms in trade policy, industrial and agricultural policy, fiscal and commercial policy, foreign investment policy, and legal and regulatory practices in Bangladesh. These reforms will facilitate the free flow of capital and technology from domestic and international sources and help to create employment opportunities, diversification and intensification of crop production, and poverty alleviation. The project also seeks to encourage private sector, market-driven technology development and transfer and provide agri-entrepreneurs with information and access to credit to foster private agribusinesses in Bangladesh.

"The seed industry in Bangladesh has great potential," Black says. "In this light we recently arranged for visits by representatives of the American Seed Trade

Association to explore the possibility of establishing joint ventures with Bangladesh entities. During the visit the team met with, among others, the Deputy Managing Director of the Grameen Bank."

### Pilot Zones

One phase of the project calls for the identification of pilot zones for technology transfer to increase employment opportunities in agribusiness and thereby increase income. The project has begun to open the first pilot zone in the thana of Kapasia, District of Gazipur.

"This thana, chosen because it shows great potential for agribusiness development involving fruits and vegetables, is not subject to excessive flooding and has fairly rich soils," says Dr. Thomas P. Thompson, IFDC Headquarters Liaison with the ATDP. "Agribusi-

ness activities in each component of the project represented in that thana—seed, livestock, poultry, agricultural machinery, fertilizers, and the processing of agricultural commodities—can be given a boost."

To be successful, agribusinesses need credit to build inventories and provide dealer training programs to strengthen technical and business skills. To this end, an agribusiness credit fund of US \$25 million is available through participating Bangladesh commercial banks to allow agribusiness entrepreneurs to create new businesses or expand an existing one in one of these components. The project will work with promising entrepreneurs to develop viable business plans and applications to obtain loans for business development or expansion.Ⓢ

## IFDC's Assistance to Institution Building in Egypt Continues

In keeping with its objective of assisting developing countries to create or strengthen national institutions to bring about technological transformation of agriculture, IFDC continues its assistance to the Egyptian Fertilizer Development Center (EFDC). With Egypt's present population of 60 million and a projected population of about 98 million in 2025, EFDC will play a vital role in helping the country to meet its food requirements. According to the World Bank, Egypt's per capita food production is increasing at an average annual rate of 1.3% while its population is expanding at an average annual rate of 2.0%. EFDC is contributing its share toward closing this gap.

Approximately 9 years ago IFDC began advising the Egyptian Government in the development of EFDC. Since that time EFDC has blossomed into a full-fledged research and development organization. To gain additional information that will assist them in further enhancing EFDC's impact on Egyptian agriculture, two officials from that organization—Eng. Abd El Monem A. Akeel, Commissioner of EFDC, and Eng. Mohamed Fathy, EFDC's Technical Director—recently visited IFDC Headquarters and various U.S. fertilizer companies.

"The overall mission of EFDC is to develop cost-effective fertilizer products and practices that are

needed by Egyptian farmers and that can be economically produced by the local industry," says Eng. Akeel. "During the past 5 years, EFDC has realized a number of outstanding achievements."

First, the Center has improved the quality of locally produced phosphate fertilizer. Egypt's two phosphate fertilizer companies have shifted to the production of granular single superphosphate rather than a powdered material, and the improved product has now been introduced on the international market.

"In addition, a liquid nitrogen fertilizer has been introduced by one of the nitrogen fertilizer producers to meet the new demand for this type of fertilizer for the developed irrigation systems in the newly reclaimed desert lands of Egypt," says Eng. Fathy. "El Nasr Fertilizers and Chemicals Company (SEMADCO), the oldest and

second largest nitrogen fertilizer producer in Egypt, is now introducing liquid urea ammonium nitrate to the Egyptian market on a pilot basis. SEMADCO is also constructing a larger plant to meet increased demand. SEMADCO is constructing a liquid ammonium nitrate/ammonium sulfate plant in its Suez location to meet the new demands for multinutrient fertilizers and is planning to introduce a liquid calcium nitrate fertilizer."

The EFDC pilot plant, constructed with IFDC's assistance, permits the production of various types of fertilizers, which have been registered by the Ministry of Agriculture and Land Reclamation. With the assistance of IFDC, EFDC is planning to construct a second pilot plant; this one will produce ammonium polyphosphate, which is a base grade for NPK liquid fertilizer. ☉

Executives from the Egyptian Fertilizer Development Center discuss new initiatives with IFDC officials. Pictured from left are: Eng. Abd El Monem A. Akeel, Commissioner of EFDC; Jorge R. Polo, IFDC Senior Engineering Specialist/Investment Analyst; Eng. Mohamed Fathy, EFDC Technical Director; and Dr. Amit H. Roy, IFDC President and Chief Executive Officer.



(Photo by Charles E. Butler)

## New Initiative Focuses on Regenerating Soils in Burkina Faso

Like many of its West African neighbors, Burkina Faso suffers from degradation of its natural resources, which is primarily related to soil degradation resulting from water and wind erosion and nutrient mining. In fact, an average of 17 tons/ha of soil is lost annually through erosion throughout all regions of Burkina Faso. Since most Burkinabe farmers are involved in subsistence agriculture, which depends on traditional practices, productivity is reduced because of nutrient mining. The Food and Agriculture Organization (FAO) of the United Nations states that the present depletion rate of nutrients on arable land in most countries of sub-Saharan Africa now averages 20 kilos (44 pounds) of nitrogen per hectare per year, 10 kilos (22 pounds) of phosphorus per hectare per year, and 20 kilos (44 pounds) of potassium per hectare per year.

### Mounting Population Pressures

Burkina Faso's population in 1995 was estimated to be approximately 10 million. In spite of adverse climatic conditions and low levels of soil fertility, Burkina Faso's agricultural production increased at a faster rate than population growth during the past decade. However, if the recent (1980-93) population growth trend of 2.6% per year continues, Burkina Faso's population is expected to double by 2025. Thus, a tremendous burden will be placed on the agricultural production system.

### The Vision: Greening of Burkina Faso

As part of its efforts toward sustainable agricultural production and market development in West Africa, IFDC-Africa recently assisted Burkina Faso in establishing a Soil Fertility Management Unit (SFMU) within the Ministry of Agriculture to ensure that an adequate strategy is developed and implemented to improve the production base of the soil.

Prior to the establishment of the SFMU, local consultants, assisted by IFDC-Africa staff members, completed two baseline studies for the SFMU. The Unit is currently sensitizing decisionmakers to take action to restore and maintain soil fertility on a sustainable basis. The

creation of an interministerial committee composed of individuals representing the research, extension, finance, agricultural marketing boards, and regional development agencies is one of the means of reaching decisionmakers.

### The Strategy

"With funding assistance from the Directoraat Generaal voor International Samenwerking (DGIS)—Netherlands Development Cooperation, the SFMU will promote national and international awareness of the need to create a favorable environment for the implementation of an integrated strategy for the restoration and maintenance of soil fertility," says Dr. A. Uzo Mokwunye, Director of IFDC's Africa Division. "The Unit will formulate integrated soil fertility restoration and maintenance strategies. It will develop action plans to improve soil fertility and promote sustainable agricultural production. This work will be based on the use of Burkina phosphate, complementary fertilizers, and other soil fertility management technologies such as crop rotations with leguminous crops. The Unit will formulate strategies to enhance farmers' access to agricultural inputs and increase crop prices to farmers. In addition, the Unit will coordinate nationally the different measures to control soil degradation."Ⓢ

***IFDC's Mission: To increase and sustain food and agricultural productivity in developing countries through the development, transfer, and implementation of effective and environmentally sound plant nutrient technology and agribusiness expertise.***

#### ***Strategic Goals***

- To conduct strategic and applied research that seeks to enhance plant nutrient efficiency.
- To transfer and implement improved plant nutrient technology.
- To assist in the development and implementation of economic policies that promote open, competitive markets.
- To help build national institutions through the transfer of technology and the development of the human resources of developing countries.
- To ensure the complementarity of international and national research efforts through close collaboration with national agricultural research systems and other international agricultural research centers.
- To conserve the natural resource base and the environment.
- To promote food security and poverty alleviation through improved management of plant nutrients and natural resources.

#### ***Clients/Beneficiaries of Our Work***

- Developing-country researchers and extension officers
- Policymakers
- Agribusinesses
- Farmers in the developing countries and the newly independent states of Eastern and Central Europe

**International Fertilizer Development Center  
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## **Recent Capacity Building Activities**



**Participants in the Fertilizer Marketing Training Program: New Challenges, December 4-15, 1995, Bangkok, Thailand, cosponsored by IFDC and the Department of Agricultural Extension, The Royal Government of Thailand.**

# Recent IFDC Publications

## **IFDC Annual Report, 1994**

The *IFDC Annual Report* for 1994, IFDC Circular—S-18, is now available free of charge. A guest essay by Dr. Michel Griffon, Coordinator, Department of Economics and Sociology, Centre de Cooperation Internationale en Recherche Agronomique pour le Developpement (CIRAD), introduces this year's report. Providing a cohesive element to the publication is its theme of IFDC's impact in the global village. The Center's activities in nutrient dynamics research; privatization; environmental research; management information systems; watershed management; policy reform, market research and development; and capacity building are highlighted. This complimentary publication can be obtained from the IFDC Purchasing Department.

## **Worldwide List of Urea Manufacturers and Traders Worldwide List of DAP Manufacturers and Traders Worldwide Capacity Listing of Potash Fertilizer Manufacturers and Traders Worldwide Capacity Listing of Ammonia Manufacturers Recent Fertilizer Project Announcements and Proposals (Worldwide)**

These recently released fertilizer situation reports, prepared by Gene T. Harris, Senior Specialist—Marketing/Economics, contain the names, addresses, fax and telephone numbers for the major manufacturing and trading companies for urea (FSR-7), DAP (FSR-8), potash (FSR-9), ammonia (FSR-10), and global fertilizer project announcements, respectively. These publications can be obtained from the IFDC Purchasing Department at a price of US \$25.00 each.

## **Use of Phosphate Rock for Sustainable Agriculture in West Africa**

IFDC's Africa Division recently released a new publication entitled *Use of Phosphate Rock for Sustainable Agriculture in West Africa*, which was edited by Dr. Henny G.M. Gerner, IFDC Economics Scientist and Data Base Manager; and Dr. A. Uzo Mokwunye, Director of the IFDC Africa Division. This document is based on an IFDC seminar, which discussed the use of local mineral resources to reverse soil fertility decline and increase farm production and income.

The document contains the general and country-specific recommendations generated during the seminar. The publication contains chapters on the following topics: nutrient needs and the availability of local mineral resources in West Africa; current phosphate rock research and use in some Sahelian countries; the reactions of phosphate rock in the soil; the amendment qualities of phosphate rock; the residual effects of phosphate fertilizers; specific aspects of capital investment in terms of promotion, costs, economic aspects, distribution, and payment; and the processing of phosphate rock into mineral fertilizers.

Interested parties can order this publication from IFDC-Africa, B.P.4483, Lomé, Togo. Please request IFDC-Africa Miscellaneous Fertilizer Studies No. 11; the price is US \$5.00.

## **Ghana Fertilizer Privatization Scheme**

IFDC's Africa Division recently released a new publication, *Ghana Fertilizer Privatization Scheme*, which was authored by Dr. Henny G.M. Gerner; Dr. Edward O. Asante, Senior Lecturer, GIMPA, Accra, Ghana; Dr. Emmanuel Owusu-Bennoah, Senior Lecturer, University of Ghana; and Dr. Kofi Marfo, Economist/Research Officer, Crops Research Institute, Ghana.

This study recommends corrective action that needs to be implemented to replenish the nutrients that have been lost from Ghana's soils as a result of cropping. This action is necessary to protect Ghana's most important natural resource base and to avoid food insecurity for current and future generations. The document presents specific recommendations that are crucial for the success of the fertilizer privatization scheme in Ghana. The study, which was conducted by a multidisciplinary team of Ghanaian and IFDC-Africa scientists, was monitored by a national fertilizer marketing advisory committee, consisting of representatives from Ghanaian institutions, universities, marketing organizations, the farming community, and the private sector.

To order this publication interested parties should address their orders to IFDC-Africa in Lomé, Togo (address listed at left) and request Fertilizer Sector Studies No. 5; the price of the publication is US \$5.00.

## **Sustainable Agriculture and Sustainable Development: At the Crossroads**

The first Travis P. Hignett Memorial Lecture, *Sustainable Agriculture and Sustainable Development: At the Crossroads*, has been published as Lecture Series LS-1. The lecture was presented by Dr. Dennis R. Keeney, Director of the Leopold Center for Sustainable Agriculture, Iowa State University, and was sponsored by the Travis P. Hignett Fund. The Travis P. Hignett Memorial Lecture Series was initiated during 1994 by IFDC to honor the memory of a distinguished chemist, chemical technologist and developer, author, and administrator. Hignett received global recognition for his many accomplishments in the fertilizer world over a period of some 50 years. The lecture presents Keeney's view of how sustainable agriculture and sustainable development intermesh and what he considers agricultural sustainability to be.

## Reminder

**IFDC is updating its mailing list. Our list has expanded to over 6,000 addresses, and we want to ensure that it is up to date. If you have not returned the green Mailing List Update card that we mailed to you in late 1995, please do so prior to April 30, 1996; otherwise your name will be deleted from IFDC's mailing list. We would be very grateful if you would take the time to send or preferably fax the mailing list update to us.**

**Thank you very much.**

**Editor  
IFDC Report**

### International Fertilizer Development Center 1996 Training Calendar

Training Program/Study Tour	Dates	Location
International Study Tour on Fertilizer Distribution and Handling	April 29 - May 11	India, Singapore, Indonesia
Computer Simulation of Crop Growth and Management Responses	May 27 - June 7	Athens, Georgia (U.S.A.)
International Training Program Study Tour on Fertilizer Marketing Challenges	July 8 - August 2	Tampa, Florida; Muscle Shoals, Alabama; St. Louis, Missouri; Chicago, Illinois (U.S.A.)
Agroeconomic Evaluation for Development of Fertilizer Recommendations	August 12-23	Harare, Zimbabwe
Technical and Financial Management of Fertilizer Production Units: International Training Program and Study Tour	September 9-27	Muscle Shoals, Alabama; Baton Rouge, Louisiana; Tampa, Florida (U.S.A.)
Plant Nutrient Management for Sustainable Agriculture	October 7-18	Muscle Shoals, Alabama; and other locations (U.S.A.)
Fertilizer Marketing Training	December 2-13	Bangkok, Thailand

Note: Program fees do not include travel and living expenses; program titles, dates, location, and fees are subject to change.

For information, please contact:

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