

Report



Colombia—

Information System Designed for ICA

When Colombia's national agricultural research institute—Instituto Colombiano Agropecuario (ICA)—implements an IFDC-developed information system, that agency will be able to efficiently provide fertilizer recommendations to Colombian farmers based on research results and soil-testing data.

At the request of ICA, Dr. Julio Henao, Biometrician, visited ICA's facilities during March 15-May 1, 1987, to interact with the researchers, evaluate research results and facilities, and design the information system.

"ICA's interest in this project stems from the fact that the Colombian Government is now in the process of increasing its agricultural program emphasis, which, in turn, necessarily leads to increased use of inputs such as fertilizer," Henao says. "At present, Colombia consumes a total



This Colombian farmer is a potential beneficiary of a technical assistance project conducted for ICA. IFDC has developed an information system that will allow ICA to efficiently provide fertilizer recommendations to Colombian farmers based on research results and soil-testing data.

In this issue...

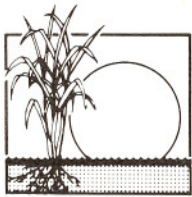
Information System Designed for ICA.....	1
Simplified Method Developed to Measure N Losses.....	2
USAID-Funded Programs to Focus on Use Efficiency and Policy Reforms.....	3
Researchers Produce Cost-Effective P Concentrates From Low-Grade Ores.....	4
Two Togolese Engineers in Training.....	5
Market Study of 11 West African Countries.....	5
Interest in Special Training Programs Growing.....	6
Regional Marketing Program Held in Kenya.....	7
Upcoming Training Programs.....	8

of 450,000 tons of fertilizer, 60% of which it imports at a total cost of approximately US \$100 million."

ICA is reorganizing its different entities to be able to better provide Colombian farmers assistance in using inputs more efficiently. One of the most important of these inputs is fertilizer, which accounts for 20%-25% of the total cost of inputs. One means that ICA is employing to ensure more efficient use of inputs is to provide improved fertilizer recommendations for the different regions of the country.

To gain assistance in carrying out this new program, ICA requested that IFDC develop an information system that will include data generated by the ICA staff through experiments conducted over the past several years. These research results are then correlated with data from soil test analyses (a service that ICA provides to farmers) to formulate fertilizer recommendations.

"We have designed a complete information system, which includes computer programs to handle the results from fertilizer experiments, soil test-



Headquarters—

Simplified Method Developed to Measure Nitrogen Losses

An Egyptian researcher and his IFDC collaborators have developed a simplified method of measuring nitrogen losses in the flooded rice soils.

The researcher, Dr. Abd El-Nabi Gadalla, is a lecturer at the Egyptian Atomic Energy Authority, who recently completed an 18-month research program at IFDC Headquarters. Gadalla was a recipient of a postdoctoral fellowship from the International Atomic Energy Agency in Vienna, Austria.

"Through this research I have been able to establish that a simple measurement of soluble nitrogen in the floodwater after fertilization can be used to predict eventual nitrogen loss," Gadalla says.

Dr. J. C. Katyal, IFDC Soil Scientist and coordinator of Gadalla's research project, is enthusiastic about the value of this work to the total picture of nitrogen research.

"The implication of these research findings is that in places where the use of ^{15}N is not possible or where trained people are not available to use ^{15}N in fertilizer efficiency research, estimates of nitrogen use efficiency can still be obtained by using the measurement developed by Gadalla," Katyal says. "In short, the method involves the assessment of floodwater-soluble fertilizer nitrogen immediately following nitrogen application. Its

conversion as a proportion of nitrogen applied provides a measure of nitrogen loss."

This methodology was developed during the course of Gadalla's training in the use of ^{15}N -labeled fertilizers in nitrogen efficiency research. In this work he had the opportunity of conducting experiments through which he could study the loss mechanisms in flooded soils.

To become acquainted with the preparation of ^{15}N -labeled fertilizers, Gadalla first spent time with the Technology Division. Then he was provided training on analytical methodologies used in ^{15}N research. Specifically, he learned how to process ^{15}N -labeled plant and soil samples, their analysis for total nitrogen, and their preparation for ^{15}N analysis by the mass spectrometer.

A second area of Gadalla's work involved research on the development of management options to save fertilizer nitrogen (a subject of great relevance to developing countries in general and ecologically disadvantaged flooded-rice systems in particular). The methodology evaluated involves applying nitrogen fertilizer to dry soil before irrigation rather than following the conventional or recommended practice of applying

fertilizer to wet puddled soil. Applying fertilizer to dry soil, followed by irrigation, results in the transport of the fertilizer down into the soil, and as a consequence the fertilizer is protected from ammonia volatilization and denitrification—the two major loss mechanisms operating in rice soils.

"A third area of my research involved the evaluation of new experimental polymer-coated, slow-release nitrogen fertilizers," Gadalla says.

Gadalla has definite plans for applying the results of the research that he has conducted at IFDC when he returns to Egypt.

"I plan to use the training that I have acquired at IFDC in assessing fertilizer use efficiency under the rice-growing environment of Egypt," he says. "I would like to pursue research on analyzing the pathways of nitrogen loss relative to Egyptian soils and climatic conditions."

More importantly, Gadalla hopes to contribute to the development of young Egyptian scientists who can use ^{15}N in their research. In addition, he would like to explore the possibility of continued cooperative research between the Atomic Energy Authority of Egypt and IFDC. ■

Continued from page 1

ing, crop production, and crop prices," Henao says. "This system will, in the end, provide a basic tool that will allow ICA to explore ways of evaluating fertilizer research results and to correlate those results with soil fertility factors. At the same time, the system will permit ICA to evaluate fertilizer results, to interact with other institutions regarding the country's fertilizer needs, and to provide cost-effective fertilizer recommendations to farmers." ■



Dr. J. C. Katyal, IFDC Soil Scientist, and Dr. Abd El-Nabi Gadalla, Lecturer at the Egyptian Atomic Energy Authority, observe rice experiments in the IFDC Greenhouse.

USAID-Funded Programs to Focus on Use Efficiency and Policy Reforms



“There has been a lot of discussion about the need to restore and maintain soil fertility in Africa. These hands-on programs are aimed at beginning that process and returning soil to productive use.”

When he made this statement, Ray Love, Acting Assistant Administrator of the Bureau for Africa, U.S. Agency for International Development, was discussing two projects that were recently funded by his agency. These projects to be conducted by IFDC's Africa Division will demonstrate the efficiency of fertilizer in renewing the fertility of Africa's soil and identifying policy reforms to encourage fertilizer use.

With matching funds coming from other donors, a US \$2.7 million

USAID grant will allow IFDC-Africa to further investigate the use efficiency of fertilizer on African soils; in particular the regional division will focus on the use of indigenous resources.

From its regional base in Lomé, Togo, IFDC-Africa will first select sites in countries where food production has languished because of deteriorating soil fertility.

The strategy of this 5-year program will include collaboration with other international research organizations, collection and analysis of data from other projects in the region, and the transfer of this information through crop simulation models to other areas.

The role of women in agriculture will prove to be a primary factor in this project. Approximately 30% of

the active participants in the on-farm activities will be women farmers. During the first year, African nationals will receive preparatory training before participating in the project.

“There has been a lot of discussion about the need to restore and maintain soil fertility in Africa. These hands-on programs are aimed at beginning that process and returning soil to productive use.”—

Ray Love, USAID

“We have purposely involved different groups in carrying out this project,” says Dr. Donald L. McCune, IFDC's Managing Director. “Organizations representing U.S., North African, and other international fertilizer producers are strongly supporting our efforts and will furnish the fertilizer used in our experiments.”

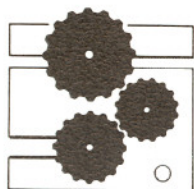
The companion project, supported by a US \$3.7 million grant, will concentrate on discerning how government policies discourage the use of fertilizer in Africa. Collaborating with IFDC on this project will be the International Food Policy Research Institute. Suggested policy reforms to alter the situations will emanate from this project.

The ultimate goal of both of these projects is to capitalize on the abundance of Africa's natural resources and, thus, lead to increased food production and an enhanced quality of life for millions of the continent's people. ■



Acting Assistant Administrator for USAID's Bureau for Africa, Ray Love (left), signs a US \$2.7 million and a US \$3.7 million USAID grant to IFDC-Africa, as Dr. Donald L. McCune, IFDC Managing Director, looks on.

IFDC Researchers Produce Cost-Effective Phosphate Concentrates From Low-Grade Ores



Using a series of statistically designed experiments, IFDC researchers have been able to produce commercially acceptable phosphate concentrates from low-grade, low-quality ores at reduced costs. These savings primarily result from a decreased cost of grinding ore and a significant reduction in the consumption of reagents used in the process.

The results of this research were reported at the American Chemical Society's Annual Meeting in New Orleans, Louisiana (U.S.A.) during August 31-September 3, 1987.

IFDC Minerals Engineer, T.A.B. Lawendy conducted this research on ores from Asia (China and India), from Latin America (Colombia), and from the Middle East (Jordan). Because silica and carbonate are common gangue minerals associated with phosphate ores, two of these samples were dolomitic and two were siliceous.

Approximately 75% of the known phosphate resources of the world are associated with deposits that contain carbonate minerals (calcite and dolomite). There are no commercial plants for removing these impurities from sedimentary ores although a small semi-industrial scale plant is in operation in India.

Therefore, since its inception IFDC has been trying to develop beneficiation procedures that would allow such indigenous resources to be used as raw materials for the production of phosphate fertilizers. By using a small representative sample (about 5 kg), IFDC's researchers can quickly evaluate many deposits and recommend appropriate processing alternatives.

By using these indigenous materials, developing countries have a cost-effective alternative to the more expensive imported raw materials or products. In addition, a reliable supply of fertilizer to the farmer is en-



IFDC Minerals Engineer, T.A.B. Lawendy, conducts research on phosphate ores containing carbonate minerals.

sured, and the foreign exchange requirement is reduced.

Several processes have been developed for the beneficiation of phosphate ores, including washing, particle sizing, flotation, and calcination. Calcination of phosphate ores is a limited alternative due to its high energy consumption. Thus, beneficiation of phosphate ores by flotation can be an economical, efficient, and selective method for separating phosphate from impurity minerals.

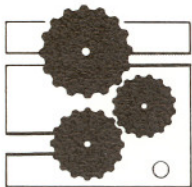
"Flotation is a process in which we alter the surface properties of minerals to be either water-attracting minerals or water-repellant," Lawendy says. "Water-repellant minerals can be separated and float to the surface when they are agitated by a stream of air bubbles. This results in the separation of phosphate from impurities."

In this particular study, Lawendy evaluated six methods for beneficiating the carbonate ores. In selecting the best method, he determined

which process was the most economical and which one gave the best selectivity, grade, or recovery.

"The phosphoric acid flotation process worked best on the high carbonate ores from China and India," Lawendy says. "In this flotation process, we depress the phosphate minerals with phosphoric acid, which is specifically absorbed on the phosphate surface. The separation is more selective and causes the carbonate mineral to float to the surface when fatty acids are used as the collector."

By using beneficiation processes such as these, developing countries can upgrade their indigenous phosphate ores, which are sometimes of low grade and low quality and pose problems in chemical processing into phosphate fertilizers. ■



Headquarters—

Two Togolese Engineers Participate in Training Program

Two engineers from the Office Togolais des Phosphates (OTP), Selom Blu and Komlan Kombate, recently came to IFDC for a specialized program on the beneficiation of phosphate rock.

Togo—currently a major phosphate rock producer—is always interested in the possibility of expanding production and markets for its products.

The engineers arrived on July 14 for a 10-week study of the beneficiation of Togo's phosphate rock. In addition, they will be introduced to the methods used in the purification of phosphoric acid. This training is being carried out in continuous laboratory-scale pilot plants under the direction of IFDC staff.

OTP is a state-owned company, which was established in 1960. The two OTP engineers provided background information on their company during a recent interview.

"We beneficiate phosphate rock from the Hahotoe deposit and then sell the phosphate rock to other countries for production into phosphate fertilizers," Blu says. "Our current production capacity is 2 million tons per year."

"Our company consists of three divisions and presently employs approximately 2,000 people," Kombate says. "The commercial division is based in Lomé, the mining division in Hahotoe, and the beneficiation plant in Kpeme."

Although Togo is currently a major phosphate rock producer, they are always interested in the possibility of expanding the production and markets for their products. The training program being conducted for these engineers is in anticipation of the future needs of the company. ■



Komlan Kombate, OTP Chemical Engineer; Alan Nix, IFDC Assistant Operations Coordinator; and Tommy Evers, IFDC Technical Aide, discuss the specialized training program on beneficiation of phosphate rock conducted for the OTP engineers.



Fertilizer Market Study of Eleven West African Countries Conducted

At the request of the Office Togolais des Phosphates (OTP) of Lomé, Togo, a study that examined the current and potential markets for fertilizer, with special reference to phosphates, in eleven West African countries was completed recently.

As part of the assignment, a fertilizer database was constructed on the countries, which include Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Ghana, Guinea, Mali, Niger, Nigeria, Senegal, and Togo. OTP plans to use this information in developing strategies for producing downstream value-added phosphate fertilizers from its phosphate rock production base.

Rosemary Cubagee, a marketing consultant, conducted the study while working in association with staff members of IFDC's Outreach Division. Individual country profiles were prepared to assess the fertilizer markets in the target countries. These country profiles include information on factors influencing fertilizer use such as land area, population



Rosemary Cubagee

dynamics, transport system, basic economic indicators, fertilizer use, supply, prices, and subsidies.

The information for the study was obtained from published data available at Headquarters and other international and national organizations active in fertilizer sector development and operation. Visits were made to Benin, Burkina Faso, Côte d'Ivoire, Ghana, Niger, and Togo to gather additional information. Note: Due to the proprietary nature of this report, it is not available for public distribution. ■



Headquarters—

Interest in Specialized Training Programs Growing

During the past few years, the number of IFDC's specialized training programs and the number of participants enrolling in them have increased dramatically.

In fact, the number of participants involved in our specialized training programs increased from 134 in 1985 to 279 in 1986. In 1986 27 different specialized programs were offered as compared with 13 for the previous year.

These programs cover a broad range of subjects relating to fertilizer production, marketing, and use research and are custom designed to meet the specific needs of a particular individual or organization. The specialized programs focus on subjects such as the use of microcomputers, fertilizer quality control, bulk handling of fertilizer, fluid fertilizer production, fertilizer efficiency research, soil fertility, plant nutrition, fertilizer dealer training, to name a few.

As a case in point, a specialized training program was recently developed for three senior officials of the Gujarat State Fertilizers Company (GSFC), Ltd., of Vadodara, India. During July 13-24, these executives participated in an intensive training program at Headquarters.

"GSFC is planning to diversify its operations, and these changes will require an expanded training program to prepare its personnel to assume leadership roles in the new areas of operation," says R. S. Giroti, Training Administrator. "Therefore, the company requested IFDC to provide experience in the areas of project management, corporate planning,

and the latest training methodologies."

The GSFC officials—Dr. M. K. Ghosh, Senior Superintendent for Corporate Planning and Training Center; S. Kumar, Chief Manager of the New Delhi office; and N. J. Shah, Manager of Project Planning—have a broad background of expertise.

Dr. Ghosh has been with Gujarat for the past 17 1/2 years, 13 of which he has been in charge of the training center. At present, Dr. Ghosh manages the corporate planning activities, project management, and

before proceeding with new projects. He serves as a liaison between various Government agencies and his company.

N. K. Shah has been with the company for the past 17 years and has coordinated the project planning activities for the past 10 years. He is responsible for planning, monitoring, and establishing new projects.

"During the program we discussed learning theories, adult learning, curriculum development, needs analysis, the training process, computer-based training programs, computer-based

project management, and industry adaptation of project management systems," Shah says.

After hearing formal presentations and participating in discussions at Headquarters, the participants visited two fertilizer industries in Florida (U.S.A.), where they gained a practical insight into the subjects they had been exposed to in the lecture setting.

Senior managers are often averse to receiving training, but the complexities of modern industrial management are such that progressive executives increasingly appreciate the

opportunity of being exposed to new areas of expertise and techniques and to be able to discuss these in depth with the presenting faculty.

Editor's Note: Any organization, company, or Government that is interested in having specialized training tailored to meet the specific needs of its personnel and situation should contact Dr. Dennis H. Parish, Director, IFDC Outreach Division, to make the appropriate arrangements. ■



From left: S. Kumar, Chief Manager of GSFC's New Delhi Office; Dr. M. K. Ghosh, Senior Superintendent for Corporate Planning and Training Center, GSFC; Dr. Donald L. McCune, IFDC Managing Director; N. J. Shah, Manager of Project Planning; and R. S. Giroti, IFDC Training Administrator.

project monitoring activities.

"GSFC has been in the fertilizer business for the past 20 years and now employs 4,400 people," Dr. Ghosh says. "We produce urea, diammonium phosphate, ammonium sulfate, and caprolactam with a production capacity of 1,125 mtpd, 500 mtpd, 600 mtpd, and 60 mtpd, respectively."

S. Kumar, another participant in the special program, is the Chief Manager of the New Delhi office. It is his responsibility to obtain clearance from the Government of India

Training Program Activities

Kenya—

Regional Fertilizer Marketing Training Program Held



“Kenya provided a perfect back-

drop for the discussion of the productivity of the wide range of agricultural systems occurring in Kenya and associated with the wide variations in elevation. The role of fertilizer in the production of both temperate and tropical crops was discussed,” says Dr. D. H. Parish, Director of the Outreach Division. Parish was referring to a recent marketing training program held in Kenya.

The International Center for Insect Physiology and Ecology (ICIPE) in Nairobi was the setting for the Regional Fertilizer Marketing Training Program, which was held July 13-24.

Twenty-six participants from Gambia, Kenya, Malawi, Nigeria, Pakistan, Tanzania, and Zambia attended the 2-week program, which was under the direction of Dr. W. E. Clayton, Transportation/Distribution Specialist. In addition to Parish, Clayton was assisted by J. H. Allgood, Market Analyst; Dr. Henry Ssali, Soil Scientist, IFDC-Africa; and L. B. Williams, Liaison Scientist, IFDC-Africa.

“The program was formally opened by the Assistant Minister of Agriculture of Kenya, the Honorable Ngenji Muigai,” Parish says. “The participation by the Ministry indicates the strong interest now being shown in the fertilizer sector.”

In addition, private-sector companies also took part in the program, underlining the interest of African countries in privatizing their fertilizer marketing systems. During the program, centralized and privatized marketing systems were discussed in depth.

The program focused on integrated marketing concepts, marketing planning, and marketing systems development. In addition, the program sought to improve the participants’ skills in analyzing fertilizer marketing systems and identifying constraints to more effective fertilizer marketing. The participants enhanced their abilities in planning, organizing, and implementing improvements in their marketing systems. An added bonus of the program was the opportunity for a mutual exchange of ideas among the participants.

The program covered a variety of topics including marketing research, demand forecasting, dealer functions and education, pricing, promotion, economics of fertilizer use, the fundamentals of plant nutrition, distribution systems, and management and procurement aspects.

As a complement to the group discussions on marketing topics, the participants worked as teams in the “hands-on” computer exercise Alpha, which simulates a realistic marketing situation. Alpha was very effective in stimulating participant interaction.

“In the past we have always operated the Alpha simulation on a mainframe computer,” Allgood says. “For the Kenya program, the exercise was modified so that it could be run on a microcomputer. This arrangement proved to be very efficient. We now know that the Alpha simulation can be operated anywhere in the world at minimal cost.”

“Field trips to a blending unit and dealers’ premises at Nakuru and to the University of Nairobi Soil Laboratory provided the participants with a firsthand look at components of the

fertilizer sector in operation,” Clayton says.

The extremely enthusiastic group of participants gave the program an overall rating of “very good.” ■



Participants in the Regional Fertilizer Marketing Training Program visit production facilities of MEA, Ltd., at Nakuru, Kenya.

“Kenya provided a perfect backdrop for the discussion of the productivity of the wide range of agricultural systems occurring in Kenya and associated with the wide variations in elevation.”—

Dr. D. H. Parish

Upcoming Training Programs

Program	Location	Dates
Headquarters		
<i>Fertilizer Sector</i>		
Workshop on Fertilizer Sector Development and Agricultural Production for Countries in the Middle East	IFDC	April 25-May 5, 1988
Advances in Fertilization and Irrigation Practices in U.S.A.	IFDC	May 8-27, 1988
Regional Programs		
<i>Fertilizer Marketing</i>		
Fertilizer Marketing Management	Manila, Philippines	December 7-18, 1987
Fertilizer Distribution and Handling Training Program	India/Indonesia/Singapore	February 15-March 4, 1988
Fertilizer Marketing Training Program	Latin America	April 11-22, 1988
<i>Fertilizer Production and Technology</i>		
International Workshop Emphasizing the Use of Urea in Granular NPK Fertilizers	Madras, India	February 8-13, 1988
<i>Fertilizer Use</i>		
Fertilizer Use Efficiency in the Tropics and Subtropics (in Spanish)	Cali, Colombia	November 9-27, 1987
Research on Effective Fertilizer Use	Aleppo, Syria	January 10-28, 1988

NOTE: Dates are subject to change.

For further information on these training programs, please contact the Director, IFDC Outreach Division.



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