



## IFDC FACILITY—Flexibility of Design

The design and engineering of the IFDC facility have been guided by high standards of scientific research, training, and administration. Building design allows for expansion and inexpensive remodeling. Building materials were chosen partly on their ability to be reused as building expansions and modifications are necessary.

Phase A with a greenhouse and a headhouse complex of offices and laboratories for testing fertilizer effectiveness is nearly ready for occupancy. Phase B, consisting of pilot-plant facilities, laboratories, and offices to evaluate new fertilizer processes and products is under construction and will be ready for use in early 1977. Phase C, which includes laboratories, a training center, and administrative and outreach offices, will be ready by early 1978.

The total facility, located on a 30-acre site within TVA's Wilson Dam reservation, has energy conservation features including the potential for a pilot solar energy unit.

## International Status

Our Managing Director, Don McCune, attended Centers Week in Washington, D.C., as an observer and to report on IFDC progress. The CGIAR agreed to nominate three members to the Board of Directors of IFDC. This is an important step in attaining international status for IFDC under U.S. laws and will greatly facilitate the hiring and travel of non-U.S. staff.

## Cooperative Agreements

Cooperative agreements with CIAT and IRRI have been made. At least one IFDC staff member will be stationed at each center as soon as mutually agreeable candidates are identified. Work on phosphate fertilization will be emphasized at CIAT. Work on nitrogen fertilization for rice will be the first priority at IRRI.

## A Year Old and Progressing

IFDC is now one year old and progress is evident on all fronts.

IFDC legally became a private, nonprofit corporation in October 1974. Actual program activities began in July 1975 in renovated temporary facilities on the TVA reservation. As of August 1, 1976, our total staff numbered 45 including 26 technical positions. Two new technical staff positions will be filled in September. In addition, two postdoctorate fellows are associated with IFDC.

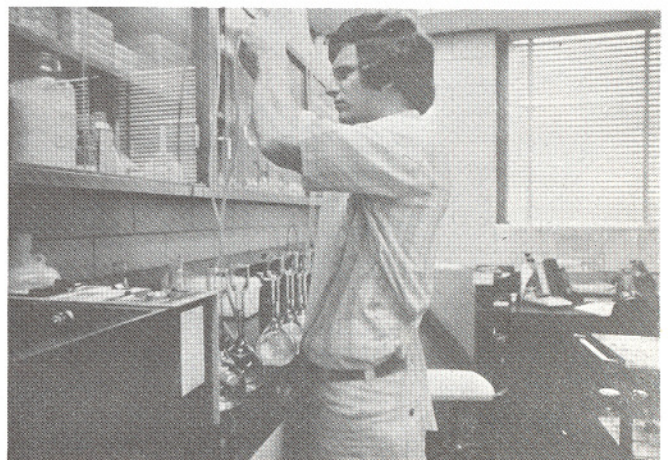
In the first year of operation, we have responded to over 400 inquiries for technical information and reports. More than 100 visitors from outside the United States have traveled to IFDC for technical discussions with our staff.

During the year, major fertilizer development studies were carried out for the ASEAN region of Asia and for six Sahelian countries of west Africa.

We have made progress in our world database system on fertilizer technology and use. Plant investment information on over 50 fertilizer processes and quarterly marketing statistics are being compiled.

A social science research program, with the goal of improving fertilizer decision making both by producers and consumers is under way.

A fertilizer research program focusing on nitrogen and phosphorus effectiveness in tropical and subtropical agriculture directed toward more efficient, lower cost fertilizers has started.



# West Africa Fertilizer Study



Dr. Ray Diamond is team leader of the West Africa Fertilizer Study. Principal team members were Mr. Don Waggoner and Mr. Pham Thanh Kham, and Dr. Hans Braun, on loan from FAO. Several special consultants and other IFDC staff also contributed to the study.

IFDC was requested by the Agency for International Development (AID) to determine the current capacity and potential to produce, market, and use fertilizers in Senegal, Mali, Upper Volta, Niger, Chad, and Mauritania. An IFDC study team made a preliminary assessment of the food and fertilizer situation in each of these six countries. These findings will soon be published in English and French in a seven-volume West Africa Fertilizer Study.

Major food deficits in millet and sorghum, upwards of 2.17 million metric tons (mt), loom by 1985. Substantially increased quantities of rice, possibly as much as 461,000 mt, will also be needed by 1985.

Considerable potential exists to expand agriculture in west Africa. The cultivation of larger land areas, utilizing increased animal traction, can do much to narrow the impending production gap. Increased productivity on existing cropland is also possible through the use of fertilizer and other improved cultural practices.

## Fertilizer Use

Fertilizer use is low in all six countries in the study area. Senegal, however, does consume more fertilizer than the other five countries combined. Almost all fertilizer currently used is on export crops, except in Senegal, where fertilizer is also used on staple food crops. The cost of currently used fertilizers in five inland countries runs much higher than world prices. Higher prices are due to international transport costs, low volume of use, and the special, high cost nature of imported fertilizer mixes.



Senegal is currently the only one of the six west African countries producing fertilizers (DAP, TSP, and mixed NPK). Ivory Coast and Nigeria also have plants.

## Fertilizer Materials

Significant quantities of phosphate rock exist in Senegal, Niger, Mali, and Upper Volta. Deposits have also been reported in Chad and Mauritania. The use of rock phosphate for direct application appears to be agronomically feasible although fertilizer production does not appear to be economically justified until consumption levels increase.

In addition to rock phosphate, some soluble phosphate and NPK grade fertilizer will also be needed. This demand, except in Senegal, must be supplied by imported fertilizers. The installation of simplified bulk-blending operations in Chad, Mali, and Upper Volta could result in savings up to \$80 per mt for imported fertilizer over current costs.

## Fertilizer Development

IFDC estimates that with the proper fertilizer development program, cereal production on existing cropland can be increased by 590,000 mt by 1985. This would reduce projected 1985 food deficit by 27%.

Various supply alternatives, reviewed and analyzed by IFDC, are contained in the regional overview report and six individual country reports.



# HUMAN RESOURCE DEVELOPMENT

## FACTORY MAINTENANCE COURSE

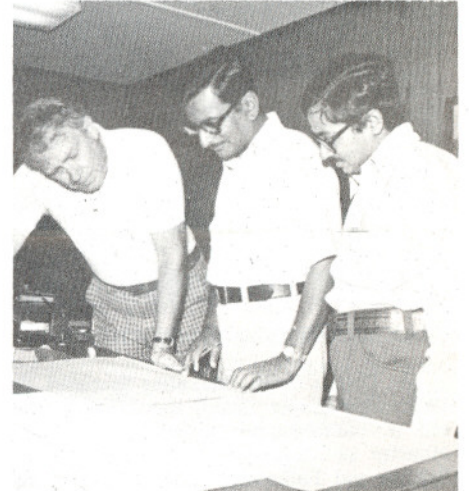


Ivan Dario Parra, (right) a chemical engineer sponsored by NITROVEN, Venezuela, receives a certificate of completion of Management Studies in Fertilizer Transportation and Distribution from Carl Amstrup, IFDC Training Coordinator. Mr. Parra also worked on plans for a Venezuelan fertilizer technology center during his 16-month program with IFDC.

A team of nine Bangladesh engineers arrived in June 1976 to begin a 12-month in-depth training program in fertilizer factory maintenance financed by AID in cooperation with the U.S. Department of Agriculture.

The training program is a cooperative activity with TVA's National Fertilizer Development Center (NFDC). Bangalee engineers are studying with NFDC and IFDC staff in all phases of fertilizer plant maintenance, trouble shooting, and repair.

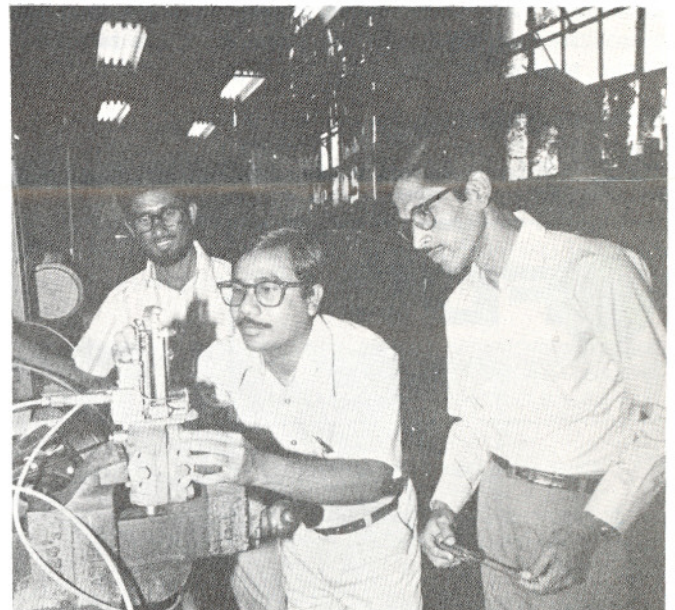
An important component of the IFDC training program is to assist the Bangalee engineers in designing effective maintenance training programs to be conducted when they return to Bangladesh.



Taibur Rahman and Mohammad Humayun, Deputy Chief Mechanical Engineers from Bangladesh, discuss Critical Path Methods in fertilizer factory maintenance with Bruce Edwards, Chief of Maintenance at TVA's NFDC. Rahman and Humayun are studying all phases of maintenance, spare parts inventory and fabrication, for program planning of future training programs to be carried out when they return home.



Factory maintenance work should be scheduled on a regular basis. At the NFDC nitric acid plant, a turbine overhaul is standard operating procedure. Four Bangladesh mechanical engineers study the planning for such standard maintenance procedures and get involved in some of the work. Ken Rhoden, TVA Chief Maintenance Instructor, explains part of the process to Md. Abu Hassan, Saifallah Mahumder, Md. M. Alam, and A. H. Md. Serajul Haque.



Instrumentation technology is critical to successful fertilizer factory operation. Three electrical engineers from Bangladesh, R. U. Ahmed, Abdur Rab, and A. H. Khan, are concentrating their studies in instrumentation and electricity; Charles Snipes, TVA Electrical Engineer, is the primary instructor in this field of work.

# OUTREACH



## TRANSFER OF TECHNOLOGY TO ASIA

Dr. Dennis Parish, Marketing Specialist, (left) and Mr. Don Waggoner, Chemical Engineer, (right) traveled to Korea (July 1976) to discuss the use of controlled-release fertilizers in Korea with members of the Ministry of Agriculture and to consult with the Korean Institute of Science and Technology (KIST) on the possibility of installing a pilot-size sulfur-coated urea (SCU) plant.

Parish and Waggoner also consulted with a representative of the Korean Office of Forestry on the use of controlled-release fertilizers in forest fertilization.

## Technology Demonstration

IFDC is assisting several representatives of developing countries in attending TVA's 11th Technology Demonstration, October 5-6. Demonstration visitors are invited to tour IFDC research facilities. Briefings are planned on our program of research, technical assistance, and training.

## World Fertilizer Database System

In addition, an orientation to our database system and demonstrations of its capabilities will be conducted.



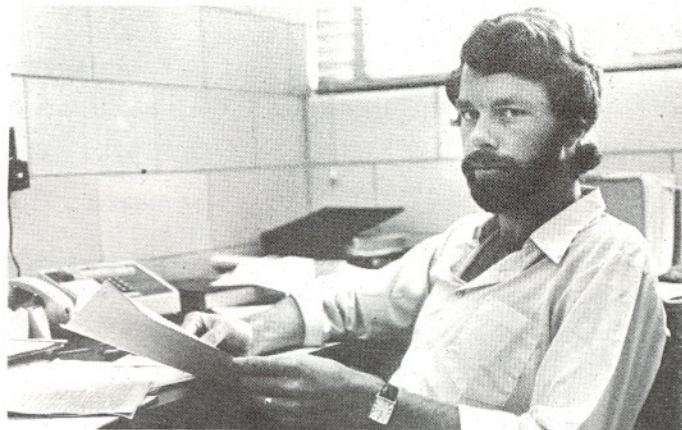
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## IFDC NITROGEN PROGRAM

Dr. Paul Vlek, Soil Scientist in the IFDC research program on nitrogen, spent 3 months (May-July 1976) consulting with scientists at national and international research centers in Asia. IFDC is concentrating its initial research emphasis on improving nitrogen efficiency on irrigated rice. Three important research areas—nitrogen uptake, nitrogen losses, and nitrogen sources—have been identified for study.



## TAIWAN FERTILIZER COMPANY

IFDC Chemical Engineer, Terry Frederick, (right) accompanied by I. W. McCamy, TVA expert on granulation, (center) traveled to Nankong, Taiwan, (June-July 1976) to assist engineers of the Taiwan Fertilizer Co., Ltd. in the startup of a new 25-ton per hour NPK plant. The IFDC engineering team spent 6 weeks working to get the plant in operation.

IFDC offers technical assistance on a reimbursable basis in the chemical engineering mechanics of fertilizer and fertilizer intermediates production.