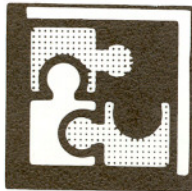
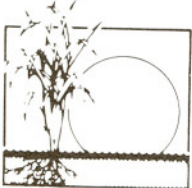


Report

Bangladesh—



The apparent contradiction of an increase in rice yields and low fertilizer use is attracting widespread attention of Bangladeshi farmers to the use of urea deep-placement (UDP) technology.

Evidence to support this was gathered by Dr. Thomas P. Thompson, IFDC Sociologist. Thompson studied the Bangladesh situation during May 25-June 30, when he monitored UDP demonstrations that were conducted on farmers' fields in 25 villages in five regions of the country. He also interviewed the farmers to gain information on their perceptions and attitudes regarding UDP technology. An IFDC soil scientist, Dr. Ray B. Diamond, who is stationed in Bangladesh, is responsible for supervising the UDP project. Diamond receives assistance and support from Giaouddin Ahmed, General Manager for Supply of the Bangladesh Agricultural Development Corporation (BADC). This

UDP Technology Gains Advocates

project is being funded by USAID under the Fertilizer Distribution Improvement Project through IFDC/Dhaka and under the auspices of IFDC's host-country contract with BADC. The demonstrations are conducted by BADC field staff with assistance from IFDC.

Average rice yields (42 demonstrations) with UDP were 1.0 mt/ha greater than those from similar quantities of broadcasted urea during the dry season. In addition, small-scale farmers find hand deep placement of urea supergranules (USG) attractive because only one fertilizer application is required.

One farmer in northern Bengal voices the enthusiasm for UDP technology that Bangladeshi farmers share: "UDP application is laborious

and time consuming only once. Broadcasting urea is laborious and time consuming two or three times; when I am finished applying USG, I am finished for the season. (Using) USG gives me more time for other important work."

The estimated 10% increase in cost of USG (produced at the village level) above that of traditional prilled urea does not appear to be a significant constraint in the adoption of the technology. As one farmer says, "It (UDP) is not more expensive (than prilled urea); I save money on fertilizer and on application because less is used and there is less weeding. When I buy it, I will use it on all my land."

The UDP demonstrations supervised by IFDC/Dhaka provide the farmers with concrete proof of the

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Demonstrations of urea deep placement technology, conducted by IFDC/Dhaka, provide Bangladeshi farmers with concrete proof of the effectiveness of this fertilizer management practice.

technology's effectiveness. As one farmer observed, "the plants are taller, stronger, greener, with more tillers and larger grain. There are fewer weeds with UDP."

Because of the success of the UDP

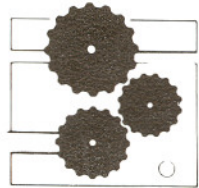
demonstrations conducted during the Boro (dry season), additional demonstrations are being conducted for the Aman (wet season). Work is continuing to provide a village-level machine to produce USG. All USG used in the

Aman demonstrations was produced in Bangladesh, and dealer production and test marketing of USG are planned for the next Boro season.

The benefits for small-scale rice farmers are being increasingly realized. ■

Headquarters—

Urea Briquette Applicator Developed for Transplanted Rice



Working on the proper deep placement of urea supergranules (USG) for transplanted rice, an IFDC soil scientist has designed a urea briquette (UB) applicator prototype that may help reduce the labor requirement and minimize the drudgery of the USG deep placement practice by hand. It is well demonstrated that the deep placement of USG in transplanted rice is agronomically efficient, can save up to 50% of urea-N without sacrificing yields, and is environmentally safe.

In developing the prototype, Dr. N. K. Savant, IFDC Soil Scientist, has attempted to keep its construction very simple and its cost to the bare minimum without greatly sacrificing its working efficiency.

"Basically, this polyvinyl chloride (PVC)-made UB applicator is a plunger-type consisting of two plungers connected with a common handle, two delivery tubes, two skids, and one connecting wooden frame," explains Savant. "Its field operation is completely manual but very simple. Via the two delivery tubes connected to the two plungers, the operator simultaneously inserts two urea briquettes into the soil at a 7- to 10-cm depth."

For effective use of the applicator, suitable periods may vary from zero days after transplanting (in the case of poor land preparation and 0-2 cm floodwater level) up to 5 days after transplanting (in the case of medium-to-good land preparation using machines and 4-6 cm floodwater level at transplanting). During these suitable periods, puddled soil is soft and the small 3.5 cm-diameter plunger holes at the placement sites close automatically and almost immediately. This helps to correct one of the main problems encountered with earlier

machine or hand placement methods.

In collaboration with the Philippines Rice Research Institute (PhilRice), preliminary field trials were conducted during the 1989 dry season in the Philip-



Photo by Dr. N. K. Savant

A Philippine farmer uses the urea-briquette applicator.

ines, and the results were found to be encouraging. With very limited practice of using the applicator, the operators were able to apply urea briquettes at a rate of 0.2 ha/day. This suggests that its proper use with sufficient practice may reduce the labor requirement up to 40% or more of that of hand deep placement.

Average urea-N contents of floodwater for applicator-placed UB were very low as com-

pared with those for broadcast or broadcast and incorporated prilled urea under the same soil-floodwater conditions. Similarly average soil depth of UB placement was found to vary from 7 to 8 cm. Agronomic performance (as judged from grain yields) of applicator-placed UB was statistically the same as that of hand-placed UB but was superior to that of split-applied prilled urea.

During the 1989 wet (Kharif) season, IFDC in collaboration with Konkan Krishi Vidyapeeth (KKV), Dapoli, and Central Rice Research Institute (CRRI), Cuttack, both in India, and PhilRice in the Philippines continued its field evaluation.

"When we try to transfer the USG deep placement technology to Filipino rice farmers, we would like to include the UB applicator, as a potential alternative method for use of UB in transplanted rice," says Dr. P. S. Ongkingio, Technology Transfer Consultant to PhilRice.

The UB applicator is very simple in design, light-weight (about 4 kg), rust free and sufficiently durable because of its PVC-pipe construction. It may be affordable because its present material cost in the United States is about US \$12.00. It is nearly maintenance free, easy to operate, and very convenient to carry to even remote interior paddies (or terraces).

Encouraged by the preliminary results, collaborative efforts of IFDC/PhilRice continue (1) to modify the existing prototype by making it semi-automatic, (2) to develop a UB applicator attachment to an existing mechanical transplanter, and (3) to evaluate its agronomic performance in direct-seeded wetland rice. With this on-going research and development work, IFDC hopes to improve the scope and utility of the present UB applicator prototype. ■



Egypt—

Technical Assistance to Egyptian Fertilizer Development Center Gains Momentum

Since 1987 IFDC has been assisting the Arab Republic of Egypt in the establishment of the Egyptian Fertilizer Development Center (EFDC). This technical assistance project has gained momentum and is beginning to emerge as a major IFDC program.

The 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. The United Nations Industrial Development Organization (UNIDO) serves as the executing agency for the project, which is funded by the United Nations Development Programme. UNIDO has subcontracted to IFDC the responsibility for providing technical services to determine the feasibility of producing in Egypt fertilizer products containing NPK plus micronutrients.

The project also includes a provision to establish a database system and investment analysis unit at EFDC and train its staff so they will be able to do data collection, analysis, and investment studies on a routine basis.

In addition, IFDC will supply most of the bench-scale equipment for phosphate, nitrogen, and physical properties laboratories. The project includes provisions for a granulation pilot-plant with a nominal 1-ton-per-hour capacity to produce experimental products that will be market tested by the appropriate governmental agencies cooperating with EFDC. A procurement contract for the pilot plant has not been awarded. When it is functioning, EFDC will produce fertilizer of experimental and demonstration quality that will allow the scientists of EFDC and other organizations an opportunity to ascertain products that are most appropriate for Egyptian agriculture.

The specific objectives of EFDC are (1) to establish a research and development center with the capability of examining in detail technical and economic problems facing Egypt's fertilizer sector and (2) to 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.

The team leader for this technical assistance project is Dr. L. E. Ahlrichs, IFDC Marketing Specialist. IFDC staff members have visited Egypt on two occasions during the initial stages of this work. Earlier this year Dr. P. J. Stangel, IFDC Deputy Managing Director, and Project Coordinator Ahlrichs traveled to Egypt to complete the initial planning with officials from EFDC, the United Nations, and the Egyptian Government. More recently, Dr. L. L. Hammond, formerly Director of IFDC's Agro-Economic Division; Dr. Adolfo Martinez, IFDC Agricultural Economist; and Ahlrichs visited Egypt to begin the initial development of the NPK assessment study.

Initial phases of this work have been completed; the potential demand for "NPK-plus-micronutrients" fertilizers in Egypt has been determined and the research blueprint to be followed by

EFDC and appropriate Egyptian Government agencies has been drafted and is now being discussed with EFDC staff.

In May 1989 five senior Egyptian scientists visited IFDC and presented position papers on the Egyptian fertilizer industry and began charting the strategies of EFDC's program. Also at IFDC Headquarters four EFDC scientists participated in a 1-month intensive training program on data collection, analysis, and the initial steps necessary for establishing a data base system and investment analysis unit at EFDC.

Future plans for the project include securing the Egyptian Government's approval of the Center's research plan. Next on the agenda will be the installation of laboratory equipment and procurement of the pilot-plant equipment. Subsequently, plans will be drawn up for extensive greenhouse and field evaluation of the experimental "NPK-plus-micronutrients" fertilizer product to be produced by EFDC. ■



EFDC officials and their IFDC counterparts meet at Headquarters to chart the course of EFDC. They are: (from left, front row, Roshdi Klada, EFDC Managing Director; Dr. M. R. Hamissa, Soil and Water Research Institute, Agriculture Research Center, Ministry of Agriculture; Dr. M. El-Fouly, National Research Center; Back row, from left, Dr. L. E. Ahlrichs, IFDC Marketing Specialist; Emad El Khashab, Manager of Agricultural Inputs, Principal Bank for Development and Agricultural Credit; Onsi Dawoud, President, Projects, Planning, and Followup, Societe El-Nasr D'Engrais et D'Industries Chimiques; and Dr. Paul J. Stangel, IFDC Deputy Managing Director.

Photo by Charles Butler

Singapore/Thailand—

FADINAP/IFDC Cosponsor Regional Training Program on Port Handling of Mineral Fertilizers



The Fertilizer Advisory Development and Information Network for Asia and the Pacific (FADINAP) and IFDC cosponsored a Regional Training Program on Port Handling of Mineral Fertilizers in the Asia-Pacific Region in Singapore and Thailand during April 10-28, 1989.

Nineteen participants attended from 11 countries—Bangladesh, the People's Republic of China, Fiji, India, Indonesia, Malaysia, Pakistan, the Philippines, Sri Lanka, Thailand, and Vietnam.

IFDC's role in the 3-week program was to provide the technical input on fertilizers. Dr. W. E. Clayton, IFDC Transportation/Distribution Specialist, made five presentations during the program. The subjects of these presentations were: (1) properties of mineral fertilizers; (2) fertilizer bags, bagging, and storage; (3) bagged fertilizer handling methods; (4) bulk fertilizer handling methods; and (5) fertilizer transport systems.

The training program was designed primarily for training of instructors and training managers. "The par-

ticipants were from public and private companies from the fertilizer industry as well as various government agencies," says Clayton.

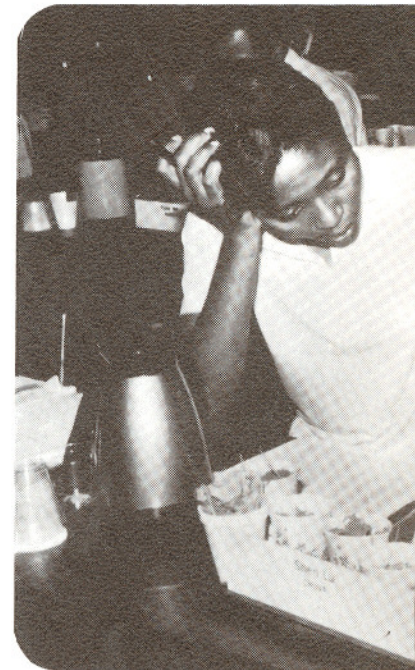
Besides the technical information on fertilizers, the program focused on port operations and educational technology. The participants were instructed in how to develop and to prepare training presentations.

According to Clayton, "This was a new experience for the participants; they had to assume a more active role, and at the program's conclusion they were very pleased with what they had achieved." ■

Three members of the FADINAP/IFDC training faculty assist the participants by organizing slide presentations. They are from left: Dr. Gustav de Monie, Director, Antwerp Port and Engineering Consulting V.Z.W., (Program Manager); Dr. W. E. Clayton, IFDC Transportation/Distribution Specialist; and Dr. Brian J. Thomas, Port Studies Specialist, Department of Maritime Studies, University of Wales in Cardiff.



Participants in the FADINAP/IFDC Regional Training Program on Port Handling of Mineral Fertilizers in Asia/Pacific Region—Tran Van Huan of Vietnam—develop plans for their training presentations which they produced using video.



Participants in the Regional Training Program on Port Handling of Mineral Fertilizers in Asia/Pacific Region—Mrs. Asongwa of the People's Republic of China—develop plans for their training presentations which they produced using video.

Headquarters—

IFDC and Purdue University Collaborate on Training Program on Fertilizer Sector Development



To help developing-country participants to understand the dynamics of agricultural development especially related to increased food production and increased use of fertilizers, IFDC offered a training program on Fertilizer Sector Development in Tropical and Subtropical Countries in cooperation with Purdue University. Participants in this program, which was conducted during July 24-August 4, 1989, received graduate credit from Purdue University.

The program attracted 22 participants from 13 countries—Burma, Burundi, Cameroon, the People's Republic of China, Guinea, Indonesia, Kenya, Malawi, Mexico, Niue, Pakistan, Sri Lanka, and Zambia. The participants are attending 14 universities in Canada, Kenya, and the United States, where they are pursuing advanced degrees in agriculture.

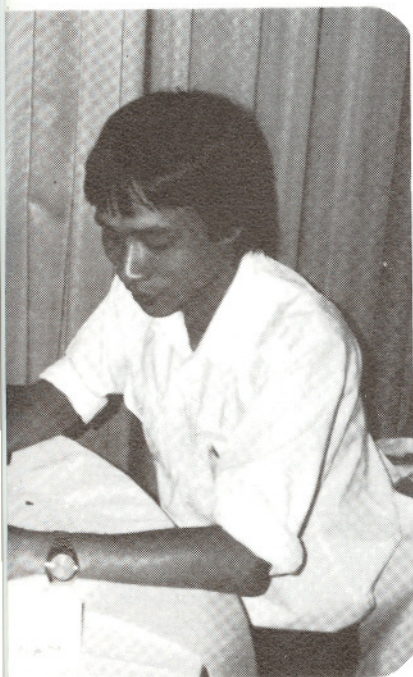
Some of the topics covered during the program included soil fertility and crop management; the role of organic matter, biologically fixed nitrogen, fertilizers, and soil amendments; sustainable agriculture and the role of fertilizers in food production in developing countries; the economics of

fertilizer use; marketing and distribution of fertilizers; the technologies of fertilizer production; and policy environment and the fertilizer sector.

Dr. Loren Ahlrichs, IFDC Marketing Specialist, served as the program's manager. Besides Ahlrichs and his colleagues at IFDC, the program faculty included representatives of Purdue University's Agronomy Department, including Dr. George E. Van Scoyoc and Dr. James L. Ahlrichs, Professors of Agronomy.

In this training program a problem-solving approach was used in describing and analyzing various issues. The presentation of issues involved background reading, demonstrations, practical exercises (case studies), and an examination. Field trips, computer problems, and presentations by visiting lecturers were also used.

"The course provides an excellent educational opportunity for international students to spend 2 weeks in an intense workshop environment with IFDC and Purdue faculty," says Dr. Van Scoyoc. "A college credit course of this breadth and depth could not be available without the combined efforts of these two organizations." ■



Program on Port Haran Van Huan and training presentation,

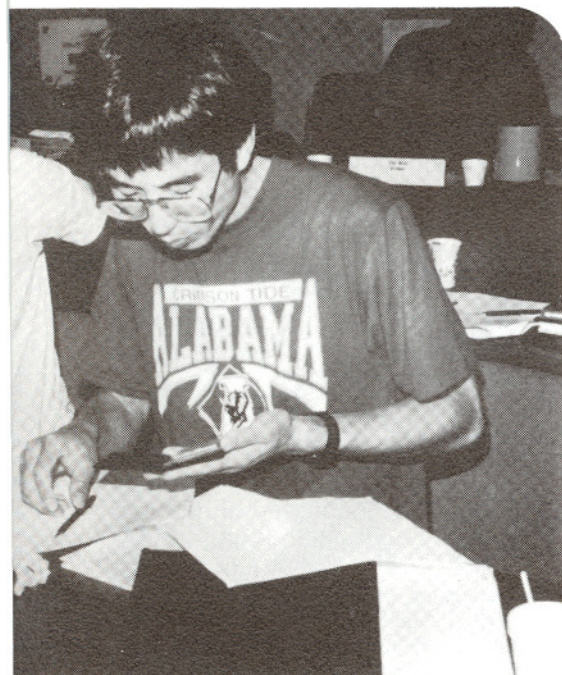


Photo by Charles Butler



Photo by Charles Butler

IFDC/Purdue University Training Program on Fertilization in Tropical and Subtropical Countries (above—stasia Akum of Cameroon and Shen Lu of the People's right photo—Joachim Nurwakere of Burundi) complete



Headquarters—

FMMTP Participants Gain New Perspectives

“When you begin talking about how to tackle a problem, you discover that people have the same problems in other countries. This program provides a way to compare with others on the same problems,” comments a participant Margaret Ngigi, about the Fertilizer Marketing Management Training Program, conducted at Headquarters during August 14-September 22, 1989. D. I. Gregory, IFDC Marketing Specialist, was the Program Manager.

Ms. Ngigi, Planning Officer with Kenya's Ministry of Agriculture, is one of the 23 participants from eight countries to participate in the annual, six-week program. In her position in the Kenyan Ministry of Agriculture, Ngigi is in the Inputs Division, where she projects the demand for fertilizers in her country and monitors the distribution of these products.

“The program so far has helped to narrow my thinking down to fertilizers specifically from my general training in agriculture,” says Ngigi. One could say that her “training” first began on the farm that she grew up on, where she developed a liking for agriculture.

While studying agriculture at the University of Nairobi, she was introduced to economics and its role in agriculture. This encouraged her to specialize in the economics aspect of the agriculture industry.

Before taking the position as Planning Officer, Ngigi worked in project evaluation; she was out of the office and into the fields with the farmers and actually saw many of the rewards of her work first hand.

“You are in contact with the people you are working with. . . it feels like your work is really fruitful when you see the results,” she adds.

Now her concern, and the concern of other participants in the program, is ensuring that the fertilizer marketing system (in their respective coun-

tries) is operated as effectively as possible. How to get exactly the right fertilizer product that the farmer needs, when he needs it, and at a competitive price are often the key points of discussion.

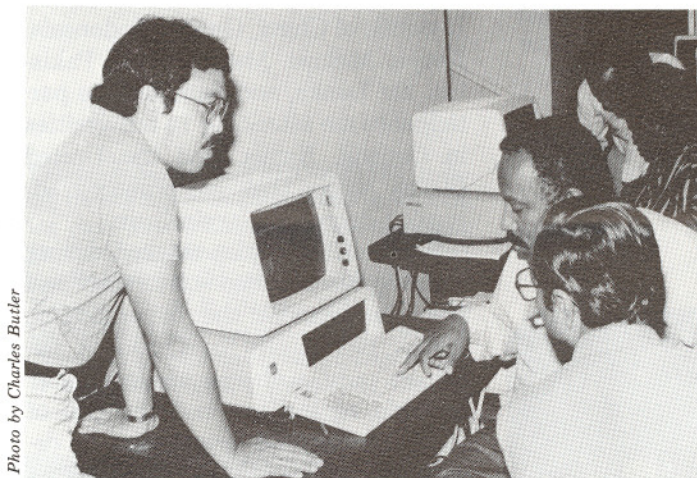
“When the participants (of the program) interact with peers from other countries, they pick up good points from the exchange of ideas and information,” comments Ram S. Giroti, IFDC Training Administrator.

He continues, “Participants in the program increase their knowledge of fertilizer marketing and improve their skills in managing their marketing systems. Armed with new knowledge and skills, they are able to improve

more effective fertilizer marketing. It is hoped that they will be able to plan and implement improvements in their countries' fertilizer marketing systems.

To experience a “real-world” situation, the marketing managers participated in a computer-assisted fertilizer marketing simulation exercise called “Alpha.” This exercise provides “hands-on” experience in directing a fertilizer marketing system while examining the impact of the system in a changing business environment. ■

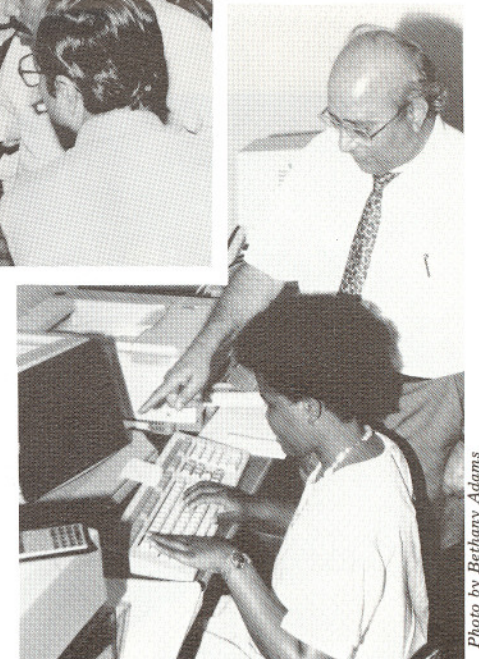
—Bethany Adams, Journalism Practicum Student, University of North Alabama.



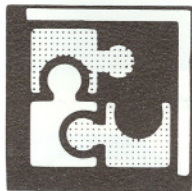
Participants in the FMMTP (from left, Erawan Setyanto of Indonesia, S. K. Das Gupta of Bangladesh, and Busa Badasa of Ethiopia) complete an assignment on a computer.

their job efficiency, thus increasing fertilizer use and, in turn, agricultural production in their respective countries.”

With the conclusion of the program, officials from Bangladesh, Costa Rica, Ethiopia, India, Indonesia, Kenya, Saudi Arabia, and Sudan will return to their countries with an increased knowledge of the fertilizer industry and effective marketing systems. They should be better prepared to analyze a fertilizer marketing system and identify the constraints to



Margaret Ngigi, Planning Officer with Kenya's Ministry of Agriculture, was one of the 23 participants from 8 countries who attended the annual, 6-week Fertilizer Marketing Management Training Program, conducted at IFDC Headquarters. Shown standing is Ram S. Giroti, Training Administrator of IFDC, who assists with all of the training programs.



Nepal—

Fertilizer Sector Management Study: One of the Keys to Increased Food Production

The people in the village of Guarati, like 90% of their countrymen in Nepal, have been farming the Himalayan soil for centuries. But with the recurring threat of the monsoons, their hold on the earth is growing more precarious with each passing season. When the rains come in Nepal, they carry with them valuable topsoil on their journey to the sea.

With two-thirds or 8 million of Nepal's population living in the Hills Region, the threat to its scarce arable land is increasing each year. The Region's rugged terrain essentially isolates it from the food-surplus areas of the Terai to the South, making it extremely difficult to transport food and agricultural inputs into the Hills Region. As a result, to secure adequate energy supplies and grow more food, farmers in the region are clearing more land, most of which is unsuited for crop production. Thus, there has been a removal of important ground cover, burning of crop residues, and animal manure for fuel, all of which further accelerates soil erosion and subsequently reduces soil productivity. The long-term implications of this are substantial because the food deficit in the Hills Region is already 300,000 mt of food annually and is expected to be five times this amount by 2000.

Nepal's only hope for increased food production is to increase production of existing cultivated land through environmentally sound practices that will lead to greater crop intensification, increased yields per hectare per crop, or both. Increased use of chemical fertilizers is a key to the success of either strategy in that Nepal's soils are seriously deficient in nitrogen and phosphate and becoming increasingly so for potash as well.

The National Planning Commission, with funding from UNDP, has laid plans to initiate a Fertilizer Sector Management Study, scheduled to begin in early 1990. Engaged to draft a project design for the study, Dr. Paul J. Stangel, IFDC's Deputy Managing Director, traveled to Nepal in May/June 1989.

According to Stangel, the main objectives of the 1-year project are to develop a plan for an appropriate fertilizer supply management system designed to pool donor assistance and Government resources and to increase significantly the total supply of appropriate fertilizers in Nepal. The project is also designed to rationalize Nepal's present transport and distribution system by

identifying the appropriate roles for the public and private sectors and the means to realize these roles. Transport, storage, and credit action plans will also be developed to ensure accessibility and affordability of fertilizer to farmers in the Hills and Terai Regions.

All chemical fertilizer used in Nepal is imported and distributed by the Agricultural Inputs Corporation (AIC), which reports to the Ministry of Agriculture. AIC supplies fertilizer to village cooperatives and private dealers. Since 1984/85 total fertilizer consumption has not changed greatly and in some regions may have actually declined. This stagnation appears to be due to both inadequate fertilizer supplies and an insufficient number of retail outlets.

In spite of its significant advances in fertilizer use over the past 17 years, Nepal still ranks among the lowest countries in Asia in intensification of use. Its farmers use fertilizer at only one-third the rate of Bangladesh or Pakistan and one-fourth the average for all Asian countries. In order to meet its food production goals by the year 2000, Nepal will have to more than triple its fertilizer use from 120,000 mt of product per year (1988) to approximately 440,000 mt of product per year by the year 2000.

Yields of maize, rice, and millet have dropped approximately 25% in the Hills Region over the past decade. To avoid a major food crisis by 2000, Nepal must take immediate action to increase its food production. It is believed that improved distribution and a higher volume of imported fertilizer will increase agricultural production and farmer income.

"The immediate beneficiaries of the fertilizer sector project will be AIC and the private sector,"

Stangel says. "However, the main beneficiaries will be the Government, the farmers, and the Nepalese people. The Government will benefit because the fertilizer sector will be more efficiently operated, which should result in a lower drain on Government funds and increased agricultural production. The farmer will benefit through additional income resulting from greater yields created by increased use of fertilizer delivered on time, in the proper amount, and at an affordable price. The nation's people will benefit from an increased supply of food, a stronger economy, and a possibly cleaner and safer environment." ■



Nepalese farmers wait in line for allocation slips to purchase fertilizer at the AIC Headquarters' office in Kathmandu.

Photo by Mrs. Paul J. Stangel

Recent IFDC Publications

The P_i Soil Phosphorus Test: A New Approach to Testing for Soil Phosphorus

This reference manual was prepared by Dr. R. G. Menon, IFDC Soil Scientist; Dr. S. H. Chien, IFDC Soil Scientist, and Dr. L. L. Hammond, formerly Director of IFDC's Agro-Economic Division.

This handbook describes the P_i soil phosphorus test, a new approach to soil testing for plant-available phosphorus. The new test uses iron oxide-coated filter paper strips as collectors for the phosphorus in the soil suspension. The test has been found to work well in acid as well as alkaline or calcareous soils.

This manual is intended for those who are interested in including the new test in their soil test calibration studies and for those who are cooperating with IFDC in P_i research.

Please address your orders for this IFDC Reference Manual, R-7, to the IFDC Purchasing Department. The price of the manual is US \$4.00 for U.S. addresses and US \$7.50 for overseas addresses.

Fertilizer Production and Supply Constraints and Options in Sub-Saharan Africa

This addition to the IFDC Paper Series was authored by J. J. Schultz, IFDC Fertilizer Production Specialist, and Dr. Dennis H. Parish, Director of IFDC's Outreach Division.

The paper draws attention first to those key factors that tend to constrain development of fertilizer production units and alternative supply systems in sub-Saharan Africa. It then provides a broad review of the available fertilizer production and supply options and a discussion of the possible role and shortcomings of the various options in meeting national fertilizer needs in specific situations.

To order this paper, IFDC Paper Series P-10, please send your request to the IFDC Purchasing Department. The price of the paper is US \$4.00 for U.S. addresses and US \$7.50 for overseas addresses.

IFDC Annual Report, 1988

IFDC recently published its twelfth annual report in the Center's 14-year history. At the beginning of the publication is an 8-page profile of the Center, which can be removed and kept as a separate document when the annual report is no longer needed.

Also included in this report are summaries of the 1988 global fertilizer situation with a map depicting data on fertilizer use per hectare, as well as the 1988 fertilizer situation in Africa, Asia, and Latin America.

Organized around a regional framework, the annual report discusses the Center's activities in research, technical assistance, and training, which are conducted in Africa, Asia, and Latin America. Presenting the largest amount of technical information ever given in an IFDC annual report, this 79-page edition contains 21 charts and graphs and 8 tables presenting the results of scientific research conducted by IFDC during 1988.

In addition, the Center's publications that were released during 1988 are listed.

Interested parties may receive a complimentary copy of the *IFDC Annual Report, 1988* (S-12) by writing to the Editor, *IFDC Report*.



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