IFDC report

Vol. 5–No. 1
March 1980

ISSN 0149-3434

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

IFDC-UNIDO–

Fertilizer Manual Completed

The *Fertilizer Manual*, which was prepared by IFDC as a joint project with the United Nations Industrial Development Organization (UNIDO), has been published. The project was under the direction of Mr. Travis P. Hignett, IFDC Special Consultant, who either wrote or reviewed and edited all 26 chapters. Contributing authors outside IFDC included individuals from industry, UNIDO, and TVA. The aim of the manual is to describe in clear, simple language all major fertilizer processes–their requirements, advantages, and disadvantages–and to show illustrative examples of economic evaluations.

Dr. D. L. McCune watches Mr. T. P. Hignett autograph the first copy of *The Fertilizer Manual*.

The new manual, a replacement for the UN *Fertilizer Manual* published in 1967, is intended to be a reference source on fertilizer production technology and economics and fertilizer industry planning for developing countries. In comparison with the previous manual, the treatment of phosphate fertilizers and compound fertilizers has been greatly expanded. New chapters have been added on controlled-release fertilizers and the physical properties of fertilizers. The scope of treatment of nitrogen fertilizers is about the same as in the previous manual, but extensive updating has been necessary. Two new chapters were added on transport and storage of ammonia and on factors affecting the choice of nitrogen fertilizer. Overall, no more than 20% of the new manual can properly be termed a revision of the old one; 80% is entirely new.

The manual is organized in five parts. Part I deals with the history of fertilizers, world outlook, the role of fertilizers in agriculture, and raw materials and includes a glossary of fertilizer-related terms. Part II covers the production and transportation of ammonia and all important nitrogen fertilizers–liquids and solids.

Part III deals with the characteristics of phosphate rock, production of sulfuric and phosphoric acid, and all important phosphate fertilizers, including nitrophosphates and ammonium phosphates. Part IV deals with potash fertilizers–ore mining and refining and chemical manufacture; compound fertilizers; secondary and micronutrients; controlled-release fertilizers; and physical properties of fertilizers. Part V includes chapters on planning a fertilizer industry, pollution control, the economics of production of major fertilizer products and intermediates, and problems facing the world fertilizer industry. Distribution of the manual will be handled jointly by IFDC and UNIDO. Copies can be obtained from IFDC at US $15 per copy including postage.

IFDC Training Programs and Seminars–

Regional Fertilizer Granulation Seminar

IFDC will conduct a regional fertilizer granulation seminar from July 21 through 25 in Bangkok. The seminar is co-sponsored by the Ministry of Industry of the Royal Government of Thailand and will deal specifically with the unique production problems of multinutrient granular fertilizers in Asia.

Objectives of the seminar are to (1) provide the participants with a broad overview of traditional and emerging fertilizer granulation technologies, (2) provide instruction related to granulation processes, process design, and operating techniques suited to regional climate and requirements, (3) discuss fundamentals of fertilizer granulation plant organization and management, and (4) address fundamentals of formulation, inventory control, quality assurance and control, safety, and environmental protection.

The subject matter will be targeted toward fertilizer plant managers, production managers and supervisors, and others who have production responsibility or involvement. Participants should be fluent in the English language.

Marketing Training Program

The fourth annual fertilizer marketing training program for middle managers is scheduled for August 11 to September 19 at IFDC Headquarters.

Computer assisted exercises and workshop groups will be used to meet the course objectives which are to (1) increase the participants' breadth of knowledge of the fertilizer industry from production or procurement to the end user (farmer) with particular emphasis on marketing concepts and the elements of marketing systems,

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(2) demonstrate how to analyze, develop, adapt, or modify marketing systems to fit conditions in participants' country so that the needs of farmers will be met, and (3) develop plans for specific marketing improvements in the participants' work responsibility area.

A field trip to the Corn Belt will be centered in Kansas City and will include visits to a fertilizer factory, research farm, local fertilizer dealers, one or two farms, and the central training facility of a large regional cooperative. The program will conclude with a field trip to the phosphate mines, manufacturing plants, and distribution centers in Florida.

The program schedule will include special sessions on leadership effectiveness conducted by experts in communication, conflict resolution, time and talent utilization, and management by objective.

Participants must be able to speak, read, and write English, currently be in a middle management marketing or planning position, and be identified as promotable to a higher level position.

Training Course on Fertilizer Efficiency Research in the Tropics (FERITT)

IFDC and the International Center of Tropical Agriculture (CIAT) will conduct a training course on fertilizer efficiency research in the tropics from September 15 through October 4 at the CIAT Headquarters near Cali, Colombia. The course is designed for research workers engaged in fertilizer efficiency research.

Objectives of the course are to (1) develop and improve research skills in conducting fertilizer trials at experiment stations and in farmers' fields, (2) impart the necessary techniques to conduct, process, analyze, and interpret data generated from the trials, and (3) improve participants' ability to test new fertilizer materials and methodologies in field research.

The course content will deal with both theoretical and practical aspects of fertilizer efficiency research. Emphasis will be placed on (1) specific methodologies for conducting fertilizer trials with new or improved fertilizer material and application techniques and (2) agronomic, economic, and statistical analysis of results. The course will be conducted in Spanish.

Maintenance Management Training Program for Fertilizer Producers

IFDC will conduct a maintenance management training program for fertilizer producers at IFDC Headquarters from November 24 through December 12. The program will cover maintenance management and organization including planning and scheduling techniques in both theory and practice. The theoretical phase will be dealt with in classroom sessions and the practice phase in pilot- and full-scale fertilizer plants.

Objectives of the program are to (1) provide the participants with instruction on the theoretical and practical aspects of organizing and managing maintenance units for a variety of fertilizer production situations, (2) identify and relate the tasks of maintenance planning to the realization of factory production goals, and (3) teach the basic techniques and methods used to plan, schedule, and implement maintenance tasks.

Participants must be fluent in the English language.

ADDITIONAL INFORMATION ON IFDC TRAINING PROGRAMS AND SEMINARS CAN BE OBTAINED BY CONTACTING:

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IFDC Staff Update

Arrivals

Dr. Adolfo Martinez—Fertilizer-Use Economist—now with the Outreach Division—recently completed an assignment in Bangladesh for an engineering consulting firm in Denver, Colorado.

Dr. A. O. Falusi—Agricultural Economist, University of Ibadan, Ibadan, Nigeria—with the Outreach Division on sabbatical leave to work on marketing strategies for developing countries.

Mr. Felipe Nelson Saavedra—Mineralogist/Petrographer—from Mining Research Institute of the Faculty of Engineering and Architecture, National University of San Juan, Argentina—now with the Fertilizer Technology Division for 2 years—to carry out mineralogical studies of fertilizer raw materials and products.

Dr. Narayan K. Savant—Soil Chemist (Nitrogen)—from Poona, India—now with the Fertilizer Technology Division for 2 years—to evaluate coated urea materials in the soil.

Dr. Olumuyiwa A. Osiname—Soil Scientist—from the Institute of Agricultural Research & Training, Ibadan, Nigeria—now with the Agro-Economic Division as a visiting scientist for 1 year.

Departures

Mr. Yuzo Ito—Chemical Engineer in the Fertilizer Technology Division—1 year sabbatical leave in wet-process acid technology—returning to Nissan Chemical Industries, Limited, in Tokyo, Japan.

Update—

Technical Assistance to the Bangladesh Agricultural Development Corporation (BADC)

IFDC has extended its technical services to BADC through June 1981. IFDC's overall objective is to assist BADC in minimizing fertilizer supply and demand constraints and in improving the equitable use of fertilizer by Bangladesh farmers.

Since early 1979, Mr. John M. Hill, Marketing Specialist, and Mr. R. D. Benton, Distribution Consultant, have been stationed in Dacca, Bangladesh. Other IFDC staff members have provided short-term, in-country assistance.

During 1979, IFDC's technical assistance to BADC was directed primarily in the following areas: (1) assistance in the introduction of the new marketing system and its evaluation, (2) distribution and product handling and methods for improvement, (3) equity study on fertilizer use by Bangladesh farmers, (4) plans for a BADC dealer training program, and (5) analysis of BADC historical cost of distribution and marketing.

Although fertilizer sales in 1979 were adversely affected by drought conditions in Bangladesh, fertilizer sales increased over the previous year by approximately 10%, to 820,000 tons of high analysis fertilizer.

Brazil—

Technical Assistance to CEFER

In late January, Dr. D. L. McCune, Managing Director, and Mr. J. J. Schultz, Coordinator of Technical Assistance and Training in Technology, visited Centro de Estudos de Fertilizantes (CEFER) in Sao Paulo, Brazil, to develop IFDC's technical assistance and training support to CEFER during 1980. During the first half of 1980, IFDC will coordinate and manage four technical courses as follows: (1) production of granular triple superphosphate (GTSP), (2) pipe-reactor technology and its application to NPK granulation, (3) monoammonium phosphate (MAP) granulation, and (4) granulation pilot-plant operation. The first three courses will be held in Brazil and the fourth course at IFDC Headquarters. Following the training courses in Brazil, technical assistance is provided to selected industries by the training experts. The program is a joint effort of IFDC, TVA, and industry.

Mr. Schultz also provided technical assistance related to CEFER's pilot plants and visited the COPEBRAS phosphate fertilizer plants to better determine the technical assistance requirements that have been requested by CEFER for COPEBRAS.

Mr. J. J. Schultz, Mr. Mario Luiz Mello Mattos de Castro, Dr. Paulo Fernando Cidade de Araujo, and Dr. D. L. McCune (left to right) discuss IFDC's technical assistance and training support to CEFER.

Mr. J. J. Schultz (left) and Mr. Paulo Breno de Moraes Silveira examine a design plan for CEFER's pilot plants.

During March, Dr. A. H. Roy, IFDC Chemical Engineer, and Mr. P. K. Bhattacharjee, Chemical Engineer under contract to IFDC from Agrico Chemical Company, conducted the training seminar on the production of granular and run-of-pile triple superphosphate at CEFER Headquarters with 24 participants in attendance. Following the seminar, Dr. Roy and Mr. Bhattacharjee provided production-oriented technical assistance to COPEBRAS on the production of granular and run-of-pile triple superphosphate using Brazilian phosphate of an igneous origin.

Colombia—

Feasibility Study for Development of Phosphate Rock Deposits

IFDC, Singmaster & Breyer, Inc., Hansa Luftbild, and the Colorado School of Mines Research Institute have initiated a feasibility study for the development of Pesca and Sardinata phosphate rock deposits in Colombia. The Government of Colombia selected this consortium to conduct the study. Utilizing the indigenous phosphate deposits could satisfy part or all of Colombia's domestic needs and possibly provide some material for export. This research project is a part of IFDC's continuing effort to assist developing countries in making better use of indigenous resources under the specific constraints of the situations existing in each country.

IFDC's contribution consists of a market survey and post-beneficiation processing of the phosphate rocks. The market survey to analyze the present demand for phosphate fertilizers in Colombia and to project future demand has been completed under the leadership of Dr. R. T. Smith, IFDC Regional Coordinator—Latin America.

An IFDC technical assistance team conducted an in-country survey to identify desirable phosphate intermediates and end-use products containing phosphate. Members of the study team, in addition to Dr. Smith, included: Dr. K. J. Byrnes, Sociologist; Dr. C. A. Baanante, Economist; Dr. Y. H. Chuang, Economist; Dr. Adolfo Martinez, Economist; and Dr. L. A. Leon, IFDC Soil Scientist stationed at the International Center of Tropical Agriculture (CIAT). Staff members from the following organizations provided valuable assistance to the study team while in Colombia: Abonos Colombianos, S.A.; Empresa Colombiana de Minas; Instituto Colombiano Agropecuario at Tibaitata; Oficina de Planeamiento del Sector Agropecuario (Ministry of Agriculture); and Monomeros Colombo Venezolanos, S.A.

Data from the market survey will serve as a guide for the economic evaluation of manufacturing facility capacity in relation to future markets. The post-beneficiation processing portion of the project will consist of laboratory and pilot-plant studies at IFDC Headquarters, which are to be initiated in mid-1980. The first step will be the production of nominal 30% and 54% P_2O_5 wet-process phosphoric acid from Pesca and Sardinata beneficiated phosphate rock.

PUBLICATIONS AND REPRINTS AVAILABLE FROM IFDC

Reports

"Supplying Fertilizers for Zaire's Agricultural Development," published by TVA.

"Economic and Technical Aspects of Fertilizer Production and Use in West Africa," T. Zalla, R. B. Diamond, and M. S. Mudahar, IFDC/MSU Working Paper No. 22, 1977.

"Ghana–Progress in Fertilizer Production, Marketing, Education," published by TVA.

IFDC Publications

"Granular Urea–Advantages and Processes," T-1.

"The Potential for Regional Cooperation in Fertilizer–A Methodology Study of the ASEAN Group," T-2.

"West Africa Fertilizer Study (Volumes I-VII)."

Volume I–Regional Overview, T-3
Volume II–Senegal, T-4
Volume III–Mali, T-5
Volume IV–Upper Volta, T-6
Volume V–Niger, T-7
Volume VI–Chad, T-8
Volume VII–Mauritania, T-9

"Suggested Fertilizer-Related Policies for Governments & International Agencies," T-10.

"The Bangladesh Fertilizer Sector, 1978," T-11.

"Sulfur in the Tropics," T-12.

"World Fertilizer Situation and Outlook–1978-85," T-13.

"Organic Nitrogen Compounds for Use as Fertilizers," T-14.

"Bolivia Fertilizer Situation and Recommendations," T-15.

"Mexico: The Fertilizer Industry," T-16.

"Fertilizer Manual," R-1, Price–US $15.00.

"Progress Report, 1976-1977."

"Annual Report 1978."

Papers and Reprints

"Greenhouse Evaluation of Nitrogen Fertilizers for Rice," E. T. Craswell and P.L.G. Vlek, *Soil Science Society of America Journal*, Vol. 43, No. 6, November-December 1979.

"Transportation and Storage of Ammonia," Travis P. Hignett, to be published in the proceedings of the Fertilizer Industry Round Table, Washington, D.C., October 30-November 1, 1979.

"Technology of Production of Fertilizers Containing Ca, Mg, and S," Travis P. Hignett, to be published in the proceedings of the Colombian Soil Science Society, Colloquium on Saline Soils and Secondary Elements in Colombian Agriculture, Palmira, Colombia, September 19-21, 1979.

"An Analysis of N Nutrition on Yield and Yield Components for the Improvement of Rice Fertilization in Korea," P.L.G. Vlek, C. W. Hong, and L. J. Youngdahl, *Agronomy Journal*, Vol. 71, September-October 1979.

"Impact of a Training Program on Participant's Mastery of Fertilizer-Related Subject Matter: An Evaluation of a Fertilizer Marketing and Distribution Course," K. J. Byrnes, presented at the Annual Meeting of the Rural Sociological Society, Burlington, Vermont, August 24-25, 1979.

"Dissolution of Phosphate Rock in Acid Soils as Influenced by Nitrogen and Potassium Fertilizers," S. H. Chien, *Soil Science*, Vol. 127, No. 6, 1979.

"Effect of Nitrogen Source and Management on Ammonia Volatilization Losses from Flooded Rice-Soil Systems," P.L.G. Vlek and E. T. Craswell, *Soil Science Society of America Journal*, Vol. 43, No. 2, March-April 1979.

"Possibilities for the Improvement of Nitrogen Fertilizer Efficiency and Rice Production," D. H. Parish, Proceedings of Division of Chemical Marketing and Economics of American Chemical Society Conference, pp. 99-115, Honolulu, Hawaii, April 2, 1979.

"A Comparison of Various Laboratory Methods for Predicting the Agronomic Potential of Phosphate Rocks for Direct Application," S. H. Chien and L. L. Hammond, *Soil Science Society of America Journal*, Vol. 42, No. 6, November-December 1978.

"Bench-Scale Studies of Utilization of Problem Rocks in Wet-Process Phosphoric Acid Production," A. Varsanyi, E. B. Winn, and P. H. Peng, Proceedings of ISMA Technical/Economic Conference, pp. 133-149, Orlando, Florida, October 23-27, 1978.

"Reactions of Phosphate Rocks, Rhenania Phosphate, and Superphosphate with an Acid Soil," S. H. Chien, *Soil Science Society of America Journal*, Vol. 42, No. 5, September-October 1978.

"Interpretation of Bray I Extractable P from Acid Soil Treated with Phosphate Rocks," S. H. Chien, *Soil Science*, Vol. 126, No. 2, Aug. 1978.

"Effects of Solution Chemistry and Environmental Conditions on Ammonia Volatilization Losses from Aqueous Systems," P.L.G. Vlek and J. M. Stumpe, *Soil Science Society of America Journal*, Vol. 42, No. 3, May-June 1978.

"Fate of Fertilizer Nitrogen Applied to Wetland Rice," E. T. Craswell and P.L.G. Vlek, *Nitrogen and Rice*, Symposium proceedings, International Rice Research Institute, Manila, Philippines, 1978.

"Needed Information and Economic Analysis for Fertilizer Policy Formulation," M. S. Mudahar, Presented at FAO/FIAC Seminar on Fertilizer Pricing Policies and Subsidies, Bangkok, Thailand, 1978.

"A Simple Chemical Method for Evaluating the Agronomic Potential of Granulated Phosphate Rock," S. H. Chien and L. L. Hammond, *Soil Science Society of America Journal*, Vol. 42, No. 3, May-June 1978.

"Dissolution of Phosphate Rocks in Flooded Acid Soil," S. H. Chien, *Soil Science Society of America Journal*, Vol. 41, No. 6, Nov.-Dec. 1977.

"Thermodynamic Considerations of the Solubility of Phosphate Rock," S. H. Chien, *Soil Science*, Vol. 123, No. 2, 1977.

"Dissolution Rates of Phosphate Rocks," S. H. Chien, *Soil Science Society of America Journal*, Vol. 41, No. 3, May-June 1977.

IFDC

Published Quarterly by the
International Fertilizer Development Center

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