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

New IFDC Video Focuses on Soil Health and Agribusiness Development in Africa, Bangladesh, and Albania

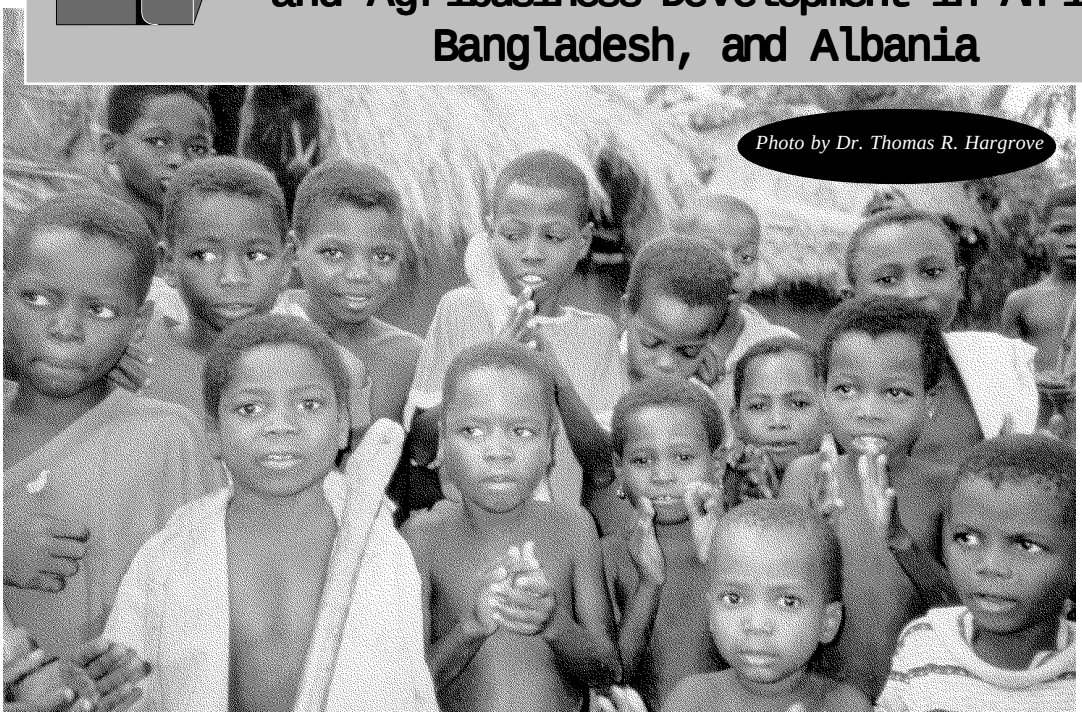

Photo by Dr. Thomas R. Hargrove

Poverty is forcing hundreds of millions of farmers in Sub-Saharan Africa to "mine" their soil of life-giving nutrients. A new IFDC video documents how organic and mineral fertilizers can replenish those nutrients and help restore soil health.

To Inherit the Earth: A Question of Survival was produced by IFDC and AGCOM International, which specializes in videos on agriculture and the environment. IFDC helps develop better agricultural policy and applies research to improve soil health and, thus, the health of plants and the humans they support in developing countries.

"That gives us not only the opportunity, but also the awesome responsibility to leave our children—and their children—a healthier soil, and a better future," says IFDC President Dr. Amit Roy.

The 27-minute video documents how Marbau and Kissem and their five children make a sparse living from the land in Togo, West Africa, where most people survive on about one U.S. dollar a day. For centuries their ancestors cleared brush, grew two or three crops, then left the land fallow for several years, so that the soil could regain its fertility.

But the soil can no longer rest; it must feed too many people. Population across Africa is increasing about 3% per year, whereas food production is increasing only about 2% per year.

"Continuously removing nutrients from the soil, without replenishing them, is like withdrawing money from your checking account, but putting none back in...ultimately you'll have no money. And that is what's happening with the soils in Sub-Saharan Africa," Roy explains.

"[We have] not only the opportunity, but also the awesome responsibility to leave our children—and their children—a healthier soil, and a better future"—IFDC President Dr. Amit Roy.

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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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Message From IFDC's President and Chief Executive Officer

Amit H. Roy

IFDC's First 25 Years

Twenty-five years ago, at the urging of the international community led by the United States, at the U.N. General Assembly, IFDC was established to address the issues of food production in developing countries of the tropics and subtropics. The primary focus was to improve fertilizer efficiency and transfer fertilizer know-how to the developing countries.

The international accomplishments of this Center have clearly shown that this is an institution with a global mandate and with a truly global impact—Dr. Nyle Brady

Over the years IFDC has had many accomplishments that have been very aptly articulated in a recent letter to me by Dr. Nyle Brady, Emeritus Professor, Cornell University, also former Director General of the International Rice Research Institute (IRRI) in the Philippines, and former official of the U.S. Agency for International Development (USAID).

Quoting Dr. Brady, "It has been my privilege to observe the emerging contributions of IFDC as it has helped farmers and their national and international compatriots gain a better understanding of the critical role of plant nutrients in helping the world feed itself. . . . the international accomplishments of this Center have clearly shown that this is an institution with a global mandate and with a truly global impact. One of the strengths of IFDC's programs is the extent to which they have focused on low-income farmers in low-income countries. In collaboration with scientists and educators in developing countries, IFDC has helped assess the supply and availability of plant nutrients from both organic and inorganic forms. IFDC has helped discover or develop appropriate systems to effectively utilize and recycle these nutrients, and has created models that helped its cooperators extrapolate their findings from one ecoregion to another. IFDC must be congratulated for having helped them blend the best of science with the down-to-earth management abilities of small farmers."

The accomplishments of which Dr. Brady wrote would not have been possible without the vision and efforts of my predecessors—Dr. Donald L. McCune, IFDC's first Managing Director; the late Dr. David B. Parbery; and Dr. Paul J. Stangel. I recognize their contributions in paving the way for the role that IFDC plays in the international arena today. Giants in the field of international agricultural development like the late Sir John Crawford of Australia and the late Dr. John Hannah, IFDC's first Chairman of the Board, were also instrumental in setting the stage for the future role that IFDC would play in improving the lives of poor people of the developing countries. Equally important have been the contributions of IFDC's dedicated staff who have spent countless hours away from home in order to make a difference in the lives of the people of the developing countries.

Since it was established in 1974 IFDC has conducted technology transfer activities in more than 120 countries and now has offices in eight countries in Africa, Asia, Latin America, and Europe. IFDC has contributed to the development of human resources and institutional capacity building through some 600 training programs, conducted in Muscle Shoals and other locations, for more than 7,500 participants from some 150 countries. Dr. Brady has called IFDC's training activities—"consistently effective human resource and institution development programs that have been especially beneficial to public and private sector institutions as well as small farmers." Much of the credit for the success of IFDC's training programs is due to the dedication of the late Ram S. Giroti.

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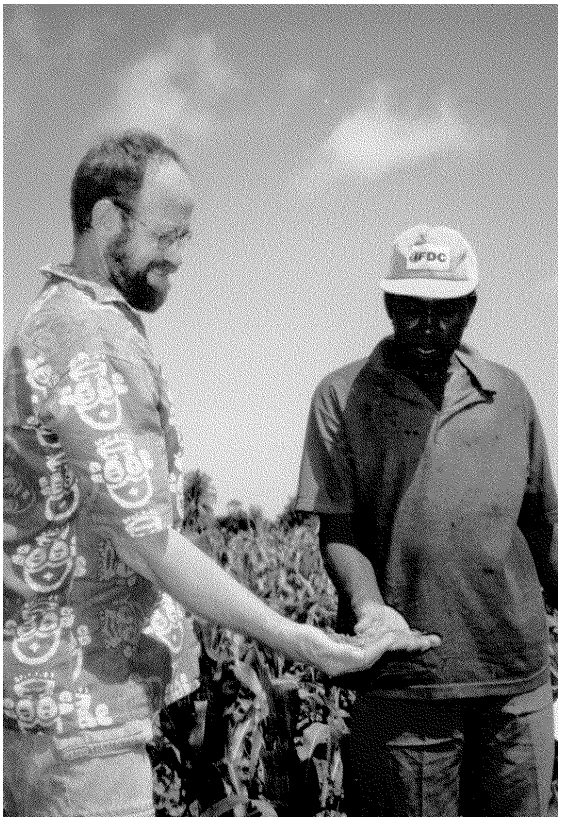
Without the support of our donors and the partnerships that IFDC has formed with national and international agricultural research centers, nongovernmental organizations, private companies, scientists, and farmers around the world, IFDC could not have reached the milestones in agricultural development that it has attained.

The founders of IFDC created this unique institution because they were committed to fighting hunger, combating its cause—poverty—and inhibiting the wider consequences of both. We have deepened our understanding of these issues over time. Today we must harness that understanding into a new vision as we confront the challenges of a new millennium. Even though the marvels of science are paving the way for us to reach new heights, there are still millions of malnourished children in the world today. More than 1.3 billion people live with less than US $1 per day income and more than 2 billion people are only slightly better off. IFDC recognizes that over the next quarter century it has to redouble its efforts as part of the international development community to promote sustainable development and end human misery. Human existence depends on land, which is the first link in the food production chain. IFDC research and development directly affects the soil health and, subsequently, food production. The relationship of soil nutrients to the challenges before us is depicted in a new video, "To Inherit the Earth: A Question of Survival," which is described on page one of this newsletter.



Fertilizers, whether organic or mineral, are food for plants and can return to the soil the life-giving nutrients that farmers harvest as food and fiber—Dr. Henk Breman, Director, IFDC-Africa.

Dr. Henk Breman, Director, IFDC-Africa, and an African scientist examine the living soil.

Photo by Dr. Thomas R. Hargrove

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The region is one of the world's most over-populated—even though population density is relatively low, says Dr. Henk Breman, Director of IFDC's Africa Program. "That's because the climates are harsh, and the soils are so poor."

Fertilizers, whether organic or mineral, are food for plants, Breman explains, and can return to the soil the life-giving nutrients that farmers harvest as food and fiber.

In the past 50 years, world use of mineral fertilizer has increased from about 30 million to 145 million tons—and grain harvests have tripled, from 680 million to about 2 billion tons, says Dr. Norman Borlaug, the 1970 Nobel Laureate who developed improved wheat varieties that feed hundreds of millions. *Time* magazine named Borlaug, who serves on IFDC's Board of Directors, one of the 100 greatest scientists of the 20th century.

The manufacture of nitrogen, the key nutrient of most fertilizers, is "the most significant technical invention of this century," claims Dr. Vaclav Smil of the University of Manitoba, Canada, in the video. At least 2.4 billion of today's 6 billion people are alive because of nitrogen fertilizer, Smil says.

High-yielding agriculture, made possible by fertilizers, gives the industrial nations the world's cheapest food, says Dr. Balu Bumb, IFDC Senior Economist. A U.S. family spends less than 10% of its take-home pay on food. In contrast, half of the world earns less than US$2 per day and spends 50 to 70% of their income for food.

"The earth's population will grow by 2 billion—equivalent to today's combined populations of China and India—by 2025," Bumb says. "Ninety-five percent of the increase will be in developing countries. Population growth will be greatest in Sub-Saharan Africa—from today's 640 million to 1.5 billion people."

Africa's wildlife symbolizes, to many, our environment. Yet hunger forces farmers like Marbau and Kissem to farm the habitats of wild animals and plants.

The bison has disappeared from the North American plains, Dr. Borlaug says, "and this will happen in...game parks in Africa, unless we learn to use the land suitable for agriculture to its maximum potential."

IFDC research shows that improving soil fertility of 1 hectare of land in Africa saves 5 to 6 hectares of endangered forest or hillside, says Dr. Deborah Hellums, IFDC Soil Fertility Scientist.

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Some cynics say that Africa can never feed itself. "But critics said the same about Bangladesh and Albania," IFDC President Roy responds. "And look what happened."

IFDC helped the Bangladesh government "privatize" its fertilizer marketing system, making plant nutrients cheaper and more widely available.

"By 1991 this country, which everyone thought would be the symbol of poverty and starvation, was feeding itself. A remarkable feat!" says Dan Waterman, IFDC Bangladesh Project Coordinator.

IFDC also developed a simple machine that forms urea into "briquettes" that farmers can place into the rice root zone. That increases fertilizer use efficiency, and yields, by about 30%. Hundreds of entrepreneurs now manufacture the fertilizer briquettes across Bangladesh.

"Albania seemed like a hopeless case when IFDC came to help develop its agribusiness sector," says Ian Gregory, IFDC Agribusiness Program Coordinator. "After 45 years of Marxism and isolation, famine seemed possible." IFDC helped develop a nationwide network of fertilizer distributors. As a result of improved fertilizer availability, wheat and maize yields have almost doubled, and agricultural production has increased by 7% yearly.

"If it can happen in Bangladesh and Albania," Ian Gregory, IFDC Agribusiness Program Coordinator says, "it can happen in Africa."

Order copies of the video—Program Number 99003 (US $24.95) from AGCOM International, 4005 North Lugano Way, Flagstaff, AZ, 86004, U.S.A. (Phone/fax 1-800-598-3372, www.agcomintl.com, larry.klaas@mciworld.com) or from Purchasing Department, IFDC, Box 2040, Muscle Shoals, AL, U.S.A. (Phone 256-381-6600, fax 256-381-7408, purchasing@ifdc.org).

Photo by M. Feisal Beig

Dr. Thomas P. Thompson, Senior Human Resource Development Specialist, answers a fertilizer distribution question for David Kamchacha of Malawi during a field trip conducted during the 1999 fertilizer marketing training program.

Human Resource Development

Entrepreneur from Malawi Returns to IFDC for Further Marketing Training

David Kamchacha fully understands the importance of training. After attending an IFDC marketing training program during 1994 as a senior employee of Farmwise, Inc.—one of the first private-sector inputs marketing companies in Malawi—he was offered a position with another company, which meant a promotion for him. In 1998 he established his own company and in September 1999 returned to IFDC to gain further insights and ideas for the development and operation of his company.

"When I attended the marketing program in 1994, I was serving as Senior Operations Manager for Farmwise, Inc., where I was responsible for market development, planning, and training of field staff," Kamchacha says. "The agricultural inputs market had just been liberalized in Malawi. The skills that I received at IFDC helped me to develop a marketing plan that had an impact on the distribution of fertilizer from the private-sector perspective. Because of the success of that plan, more companies were interested in hiring me."

> The skills that I received at IFDC helped me to develop a marketing plan that had an impact on the distribution of fertilizer from the private-sector perspective—David Kamchacha.

In 1996 Kamchacha moved to another company, Farmers' World, where he produced a 5-year marketing plan for that company; at the time the company had only 8 shopping outlets—but after his plan was implemented the sales outlets numbered 40.

"During that period—even after market liberalization—there were only three fertilizer companies operating," Kamchacha says. "I saw that the farmer was not really benefiting because of the lack of competition. In August 1998 I started Produce Mart International, Ltd., (PMI) to add to the competition. Our company concentrates on supporting smallholder farmers by providing essential farm inputs from a site near them. One of our objectives is to be a model distributor of high-quality farm inputs and general merchandise. Our main line of business is fertilizer, but we supplement this with agrichemicals and seeds. When we formed the company, we

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had only 4 sales outlets and 25 employees. Now we are opening 10 more outlets and enlarging to 40+ employees. During 1999, we have sold 9,000 tons of fertilizer, compared with 4,500 tons in 1998."

Kamchacha realizes that he has the advantage of being a pioneer in the liberalized fertilizer market. "Because of this I have had the opportunity of establishing a favorable relationship with farmers—they always follow me," he says. "My training at IFDC enhanced my skills in marketing, computer science, and accounting and helped me to develop my company much faster and more successfully."

The Malawi entrepreneur has another goal in mind for the future of his company. "Even though the Malawi Government provides extension services, I want my company to offer these services because the farmer will benefit more and we can increase agricultural production. The farmer must have the correct information—he cannot rely totally on the public sector for extension. I want to take the lead in this area."

"The first time I attended the program I was an accountant; now I am a company president and have a different perspective," Kamchacha says. "I have a much broader background now and have a wider range of interests. In addition, I am making new contacts both from the United States and other countries that will be beneficial to my company's future. Much of the credit for my success belongs to IFDC. Its publications and training have been very helpful to me."

Natural Resources Management

Brazilian Scientist Studies His Country's Phosphate Fertilizers at IFDC

In Brazil some local phosphate rocks that have a high content of iron and aluminum impurities are used in the production of acidulated phosphate fertilizers. Fertilizer manufacturers have used expensive industrial processes to reduce the concentration of impurities so that the acidulated phosphate products can meet the current Brazilian law, which specifies a minimum content of total available and water-soluble phosphorus in commercial phosphate fertilizers. For example, for single superphosphate, the minimum total available phosphorus content is 18%, of which 16% must be water-soluble phosphorus.

Since the agronomic effectiveness of phosphate fertilizers is influenced by soil properties and crop species, it is possible that the requirement of water-soluble phosphorus content could be lower for certain crops and soils. If so, the Brazilian fertilizer industry and farmers could realize a significant saving. With this in mind, Dr. Luis I. Prochnow, Assistant Professor, Department of Soil and Plant Nutrition, University of Sao Paulo, came to IFDC to conduct a 1-2 year research program with IFDC scientists—Dr. S. H. Chien and Mr. S. J. Van Kauwenbergh—and also in collaboration with Dr. R.W.Taylor of Alabama A & M University.

Dr. Prochnow's work includes the identification of minerals in various Brazilian phosphate fertilizers by x-ray diffraction and scanning electron microscopy that will be related to the solubility and agronomic effectiveness of phosphate fertilizers. "In a recently completed greenhouse experiment with upland and flooded rice grown on an acid soil, we found that a single superphosphate with only 46% of total available phosphorus content as water-soluble phosphorus was 88% as effective as 100% water-soluble phosphorus in increasing dry-matter yield of upland rice," Prochnow says. "For flooded rice, there was no difference for the two phosphorus sources in increasing dry-matter yield. The results suggest that the acidulated phosphate fertilizers with a content of water-soluble phosphorus as low as 46% of total available phosphorus could be agronomically as effective as phosphate fertilizers with high water-soluble phosphorus content for rice production. The results also suggest that acidulated phosphate fertilizers that have a lower water-soluble phosphorus content and contain iron and aluminum impurities may be more agronomically effective for flooded rice than for upland crops because of the soil reduced conditions after flooding, which promote dissolution of iron and aluminum phosphates."

Dr. S. H. Chien, IFDC Senior Soil Chemist, and Dr. Luis Prochnow, Visiting Scientist, discuss the use of phosphate fertilizer in rice production.

Photo by Charles E. Butler

Dr. Prochnow has conducted more experiments to study the effect of water-soluble phosphorus content on the agronomic effectiveness of phosphate fertilizers. One experiment examined the previously described effect of the phosphorus sources applied to upland and flooded rice on the residual effectiveness for wheat. Another experiment focuses on mixing water-leached phosphate fertilizers with a water-soluble phosphorus compound at different ratios to study the minimum

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requirement of the water-soluble phosphorus content in acidulated phosphate fertilizers for wheat grown on acid soils. The third study involved the agronomic evaluation of modified phosphates produced from a low-reactivity Brazilian phosphate rock (Patos de Minas), which is not suitable for direct application. The modification includes partial acidulation of phosphate rock with sulfuric acid and compaction of phosphate rock with single superphosphate at 50:50 P_2O_5 ratio. The test crops are wheat and ryegrass.

"When Dr. Prochnow completes his study at IFDC, he will have some valuable scientific information that is very important to the fertilizer industry and farmers in terms of the use of appropriate cost-effective phosphate fertilizers for crop production in Brazil," says Chien. "It is hoped that this research will translate into savings for Brazil's fertilizer industry and its farmers."

"This research may translate into savings for Brazil's fertilizer industry and its farmers."

Profiles of Economic Growth in Eastern Europe and South Asia

An Albanian Case Study

Agif Caca faced a difficult decision when the state-owned factory where he was employed closed at the demise of Albania's centrally planned economy. He could either escape to a possibly better life in Italy or stay and build a new life and business in the emerging free market economy. Using only a $350 inheritance from his father, Caca bought some bricks and mortar and built his own milk and cheese plant.

The young Mireli plant faced many difficulties, such as electric power interruptions and spoiled milk. With assistance from the staff of the IFDC Agribusiness Center, the Mireli plant procured and installed a power generator and pasteurizer and purchased three new refrigerated trucks. Since 1992 the Mireli factory has doubled in size and the amount of milk processed has increased from 500 liters/day to 10,000 liters/day. Today Mireli is the largest liquid milk supplier in Tirana and delivers to over 100 shops every day.

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Hignett Memorial Lecturer Illustrates Importance of Fertilizer

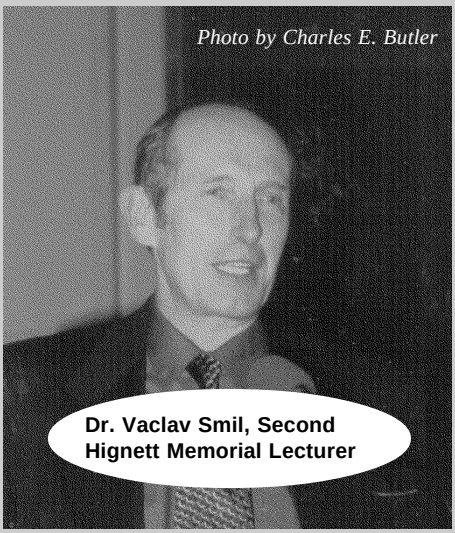


Photo by Charles E. Butler

Dr. Vaclav Smil, Second Hignett Memorial Lecturer

The second Travis P. Hignett Memorial lecture, delivered on November 1, 1999, by Dr. Vaclav Smil—a Distinguished Professor at the University of Manitoba, Canada—illustrated the importance of fertilizer to the world. According to Smil, the visit to China by U.S. President Richard M. Nixon in 1972 had a fertilizer connection and primarily served to prevent a famine in that country.

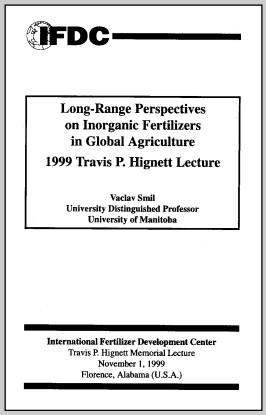
China had experienced a famine a decade before Nixon's visit and was again facing another because of rapid population increases. Within six months after Nixon's visit, China signed its first large commercial deal ever for 13 of the world's largest, most modern ammonia urea plants. As a result by the end of the decade, China was the world's largest producer of fertilizer and continues to be today. Consequently, China became self-sufficient in food production.

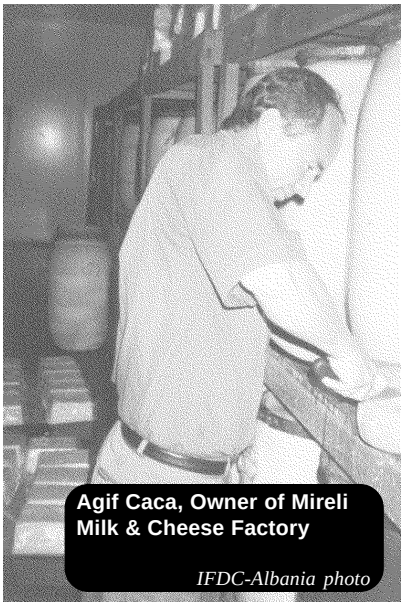
Many developing nations today face problems similar to those of China in the 1970s, Smil said. Increasing the use of fertilizer in those countries will be vital to preventing famines in the 21st century, he said.

The Hignett lecturer gave a graphic example of the importance of fertilizer in this illustration: "In China and India today, with every new child to be born—the brains, muscles, and eyes—the entire bodies will be built from the urea added to the rice fields because the farmers in those countries cannot plow up more land."

Smil pointed to possible problems on the horizon for future generations. "We must make fertilization more precise and efficient," he said. "If we don't do this, we may have a problem (eutrophication) even greater than the challenge of global warming."

To obtain a copy of Smil's lecture, please order IFDC Lecture Series LS-2 from the Purchasing Department. The price of the publication is US $4.00 to U.S. addresses and US $7.50 to non-U.S. addresses.





Agif Caca, Owner of Mireli Milk & Cheese Factory

IFDC-Albania photo

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The factory produces four dairy products: pasteurized milk, thin yogurt, curd, and soft white cheese.

"My collection system is well established because of my reasonable price; the price I offer is higher than any price offered by other milk collectors," Caca says. "By doing so, I am providing the community with income of approximately 4 million lek/month (US $30,000/month). I have sought the advice of IFDC specialists based in Tirana to assist me in business plan development, in locating equipment suppliers, and in receiving quotations for the needed technology. The Agribusiness Center has provided me with technical assistance in selecting the most profitable products to manufacture, finding financing, and locating information on machinery and equipment sources."

With funding from USAID, the IFDC project in Albania, which began in 1992, has established that the open market system will work in Albania. The impact of the overall project is that it has assisted in increasing food productivity, promoted agribusiness development, and demonstrated the potential for agricultural development.

A Bangladesh Case Study

Hosneara Begum and her family have seen their quality of life improve dramatically, thanks to the USAID-funded Agro-based Industries and Technology Development Project (ATDP) in Bangladesh. Begum, her husband, and four children have benefited from increased income from potato and paddy production on their small farm.

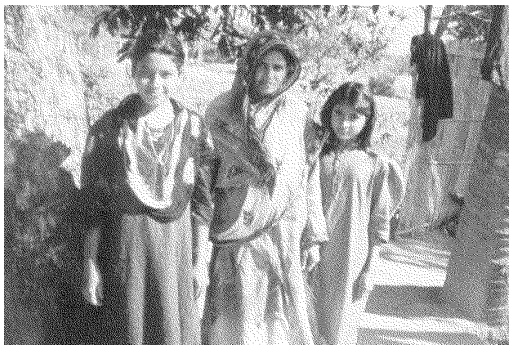
During 1999 ATDP provided assistance to a local nongovernmental organization—Poverty Alleviation Gender Equity and Environment Development (PAGE). When PAGE, which has 10,700 members (primarily women), approached ATDP for help after the devastating floods last year, the ATDP staff provided technical assistance and a grant to assist 1,000 microborrower members to produce quality vegetables for the local market and for export to ethnic markets in the United Kingdom. During the first four months of 1999, with ATDP assistance, 300 members were able to ship 20 tonnes of vegetables worth US $34,000. As a result these poor smallholder female farmers increased their incomes by 30%.

For Begum the impact has been dramatic. "From a very small plot of land, I previously earned Tk 6,000-9000 net returns, after spending Tk 1,200-1,500," she says. "Now with the support of ATDP I sell my vegetables to exporters and local markets. I now earn Tk 4,800-6,000 from one-third the amount of land, after spending Tk 1,500-1,800."

Now that Begum is contributing to her family's income, her husband now consults with her before making decisions. "This would hardly have been possible before I participated in this program," she says. The Bangladesh farmer appreciates the opportunity that she has been afforded because of the ATDP project. "In the future, I believe all of our dreams will be fulfilled."

Mrs. Hosneara Begum—one of the beneficiaries of ATDP assistance—and her two daughters.

ATDP photo



Strategic Framework Developed for African Agricultural Input Supply System

Sustainable agricultural intensification of the countries of sub-Saharan Africa (SSA) is indispensable if these countries are to meet the twin imperatives of improving food security and agricultural competitiveness while protecting the environment. This can best be achieved through a greater adoption of yield-increasing inputs and management practices, improved management of natural resources, and efficient markets. To date, the use rates of these inputs in SSA have been low. With few exceptions, these inputs were largely supplied through inefficient government-controlled systems that served program needs but did not promote a broad sustainable input supply system before being dismantled in the context of market liberalization and structural adjustment in the 80s and 90s. In most countries, the private sector has been slow in taking over after government withdrawal and policy reforms did not improve the effectiveness of markets in reaching small farmers.

The challenge therefore is to get SSA's agricultural input markets to work efficiently and effectively. With funding from the USAID/Africa Bureau, a team of IFDC scientists with the collaboration of nine other organizations developed a framework to guide interested stakeholders, including donors and national governments, in strategically promoting sustainable agricultural input supply systems in SSA. The collaborating organizations included the African Center for Fertilizer Development (ACFD), American Seed Trade Association (ASTA), American Crop Protection Association

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(ACPA), Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), Food and Agriculture Organization of the United Nations (FAO), International Food Policy and Research Institute (IFPRI), International Fertilizer Industry Association (IFA), Michigan State University (MSU), and Sasakawa Africa Association (SG2000).

During the development process, consultations were held with stakeholders involved directly or indirectly in input supply. To benefit from the wider array of knowledge and experiences available on the procurement and distribution of agricultural inputs in SSA and to ensure the African ownership of the framework, participation in its development was extended to other stakeholders in a workshop setting during July 18-22, 1999, in Addis Ababa, Ethiopia. The workshop was hosted by IFDC in collaboration with the United Nations Economic Commission for Africa (ECA). Seventy-six participants from 25 countries attended the workshop and discussed, amended, and validated a draft strategic framework document developed by IFDC and the collaborating institutes. They consisted of manufacturers, suppliers and distributors from the private sector, policy makers, donors, research and development institutions, and subregional political, economic and research organizations.

The framework focuses on fertilizer, seeds and crop protection chemicals. Nevertheless, it recognizes that besides these three inputs, the lack of other agricultural inputs such as farm power, tools and equipment is also a primary constraint to increased food production and productivity in SSA. The framework stresses that liberalization is not enough and proposes reforms and policy initiatives based on a two-pillar foundation: the reliance on the private sector to play the leading role in the supply of agricultural inputs and the recognition that governments have an important role to play in providing supporting public goods and services and creating conducive policy, legal and regulatory environments. As a result, the framework attempts to clarify the processes through which the private sector can be strengthened and the public sector, nongovernmental organizations, and donors can more actively fulfill their necessary functions. However, the framework also recognizes that in no case should input market development be regarded as a substitute for proper soil fertility management. Rather, they are important components of a national strategy for sustainable agricultural development in SSA. Moreover, the framework requires careful local adaptations.

Interested parties may obtain a copy of the document, "A Strategic Framework for African Agricultural Input Supply System Development," by writing to Dr. Georges Dimithe, IFDC Economist, P.O. Box 2040, Muscle Shoals, AL 35662.