

HORIZONS

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On the cover: Indonesian farmers are past masters of terracing. Using traditional practices, they can take maximum advantage of new high-yielding rice varieties which do far better with controlled irrigation. Pictured here: Terraces in Bali. Article begins on page 14.

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ACCENT ON



DEVELOPMENT



TAKE A CLUE FROM A CRIPPLED GOAT:

A recently identified virus that causes "big knee disease" in goats may help researchers learn more about rheumatoid arthritis in humans. Agricultural Research Service scientists at Washington State University, led by D. Scott Adams, discovered that caprine arthritis-encephalitis (CAE) is a retrovirus—one that persists throughout the life of the host and produces the disease only after a long incubation. It is the only virus to date that's been proven to cause chronic arthritis in a mammal, reports Adams in the U.S. Department of Agriculture's *Agricultural Research*.

CAE is transmitted to newborn kids mainly through colostrum and milk from infected mothers. By discovering that heat can kill the virus without harming protective antibodies in the colostrum, control measures have been developed. Adams suggests separating kids from their mothers at birth and feeding them colostrum that has been heated for one hour at 56 degrees Celsius, and then pasteurized milk until they are weaned. This prevents further infections and eventually can eradicate the disease from a herd. Several herds in the United States are now CAE free as a result of using proper management practices and are allowed to export semen.

Infected goats that do not show symptoms—swollen, disfigured joints, or encephalitis and progressive paralysis—can transmit CAE. Contact between does and kids should be limited, and infected goats should be separated from uninfected goats.

For more information, contact D. Scott Adams, Washington State University, Veterinary Science Building, Pullman, WA 99164.



LET YOUR FINGERS DO THE WALKING:

The eighth edition of the *TAICH Directory: U.S. Nonprofit Organizations in Development Assistance Abroad* is a comprehensive directory of development assistance information. The directory has approximately 500

entries. Each entry gives the agency name, history and structure, executive staff members, a brief description of agency programs, countries assisted, financial and personnel data, and publications available.

Over the next three years, regional directories will be published. The first regional directory, already available, covers Central America and the Caribbean.

TAICH Directory 1983 costs \$24.50; the regional directories, \$4.50. Mail orders to UNIPUB, Box 433, Murray Hill Station, New York, NY 10157.



PRESIDENTIAL SUPPORT OF IMF:

The President, in an address to the boards of governors of the World Bank and International Monetary Fund (IMF), during their recent annual meeting, strongly endorsed and called for the United States' participation in the IMF quota increase scheduled to become effective in 1984. In doing so he pointedly noted that the quota increase would not serve to bail out banks that have made loans to developing countries. The IMF plans to support financially troubled countries' call for the banks to put up more new money than the IMF itself.

President Reagan called the IMF "the linchpin of the international financial system," noting that "among official institutions, it serves as a counselor, coaxing the world economy toward renewed growth and stability." He said his Administration "is committed to do what is legitimately needed to help ensure that the IMF continues as the cornerstone of the international financial system."



PRAISEWORTHY PROJECT:

A final review of the AID-funded Benchmark Soils Project (BSP) praised AID and the University of Hawaii project staff for carrying out the project, and pinpointed two important accomplishments. Quantitative tests of soil taxonomy as a vehicle for technology transfer were made; and new meth-

odologies and statistical tests for analyzing, interpreting, and scientifically testing technology transfer models were developed. On the review panel were Ralph J. McCracken from the U.S. Department of Agriculture's Soil Conservation Service; Michael L. Leamy, head of New Zealand Soil Bureau; and Robert G. Gast from the University of Nebraska.

The Benchmark Soils Project, carried out by the University of Hawaii, proved that agrotechnology can be transferred through the soil taxonomy introduced by USDA Soil Conservation Service. The soil taxonomy system classifies soil families. Using this system will save millions of dollars and accelerate agrotechnology transfer by eliminating adaptive research and on-site field trials of technologies developed elsewhere.

BSP also has a number of spin-off benefits to its credit, including training host country personnel; collecting information on crop-soil matching, cropping systems, nitrogen-fixing trees, and fuelwood production; compiling meteorological and soil temperature-moisture data; indexing soil erosion and other information for soil conservation; introducing soil taxonomy to host countries as a way to inventory land resources; and providing information that will lead to improved soil taxonomy.

The Philippines, for example, recently launched a \$600,000 project to classify soils using the soil taxonomy for agrotechnology transfer. The project will classify and map soils in four priority areas. Each area will have a research station surrounded by farms totaling 2,500 hectares. The Philippine government's agricultural support services program is financing the project through a World Bank loan. The project is a cooperative venture between the University of the Philippines at Los Banos and the Philippine Ministry of Agriculture. The Philippine Council for Agriculture and Resources Research and Development will coordinate the research. AID, through the Soil Management Support Services project, will fund training workshops.

The next phase of the project—the International Benchmark Sites Network for Agrotechnology Transfer (IBSNAT) is underway. IBSNAT facilitates the transfer of agrotechnology among and within tropical and subtropical countries. The network uses systems analysis and crop simulation models to cut down on costly and time-consuming trial and error research that goes on when innovations are transferred from original sites to new environments.

For more information, contact the University of Hawaii, College of Tropical Agriculture and Human Resources, Department of Agronomy and Soil Science, Benchmark Soils Project, 2500 Dole St., Krauss 21, Honolulu, HI 96822; or Tejpal Gill.

AID/S&T/AGR, Room 406C SA-18, Washington, DC 20523.

 **WITH A LITTLE NUDGING** from necessity, the "mother of invention," pump repair is easier in Sudan. Long delays and high transport costs associated with handpump break down sparked UNICEF to design pump components that can be easily hoisted from underground for easy repair. A simple gantry that costs about \$40, was installed into the concrete apron of new pump installations. The gantry is a two-inch diameter galvanized iron pipe rising three meters above the pump apron, with a short braced crosspiece carrying a hook. Should the handpump break down, a village pump attendant operates the hook as a pulley to lift out the drop-pipe and cylinder for repair. The gantry, reports UNDP's *Decade Watch*, will make an enormous difference in community-level maintenance and service. For more information, write UNICEF, 866 UN Plaza, New York, NY 10017.

 **TO KEEP THE BALL ROLLING** despite adverse international economic conditions, the World Bank has introduced a special action program. The two-year program offers financial measures and policy advice to developing countries which are making serious efforts to restore and sustain growth. Major elements of the program, which involve temporary shifts in the composition of Bank lending, include expanding structural adjustment lending beyond the 30% limit previously applied to an individual country's lending program; expanding sectoral lending for export development, rehabilitating and modernizing existing facilities and financing key imports for productive activities; and financing more project costs by providing supplementary loans for ongoing projects or restructuring existing loans.

 **FYI, FORESTERS . . .** AGRINTER is a data bank on tropical forestry for Latin America and the Caribbean. The exchange has information on agricultural sciences, soils, meteorology, ecology, forest production, forest management, forest use, aquatic systems, natural resources, and pollution. Data are collected from 120 institutions in 19 countries, and are prepared by the InterAmerican Center of Agricultural Documentation in Costa Rica. For more information, contact CIDIA, Apartado 10281, San Jose, Costa Rica.

 **. . . AND CONSERVATIONISTS:** The Soil Conservation Society of America (SCSA) has published an expanded edition of the

Resource Conservation Glossary. The glossary includes more than 4,000 terms used in soil and water conservation and related disciplines. The glossary costs \$7.00 and is available from SCSEA, 7515 NE Ankeny Road, Ankeny, IA 50021.

 **LOOKING FOR A BEETLE IN A HAY STACK?** Ferreting out adult insects in grain—important for grain exporters—is a little easier because of a vibrating screen developed by the Wheat Research Unit of Australia's Commonwealth Scientific and Industrial Research Organization. The apparatus uses expanded metal called "ornamesh" as the screen. The grain flows over the top of the screen letting small particles and insects fall through it into a tray. The machine can screen 500 grams of grain at a time if fed through a hopper, or it can process grain continuously from a belt conveyor. In either case, reports *ASEAN Food Handling Newsletter*, insect detection is carried out by examining the fine material screened out of the grain.

The simple and reliable screen speeds the examination of export grain for infestation by freely moving, adult insects. The vibrating screen, however, does not detect eggs or larvae trapped within the grains.

For more information, contact Eroiz Magnetics Pty Ltd., St. Leonards, N.S.W., Australia.

 **SHEEP AND GOAT OWNERS** can effectively keep a lid on herd-plaguing internal parasites—roundworms, flukes or flatworms, and tapeworms—by managing the environment. Winrock International's *Technotes* recommends several preventive measures:

- Do not overstock pastures for long periods.
- Avoid continuous use of poorly drained feeding areas, such as those near swamps or around water reservoirs, tanks, or troughs.
- Use "clean" grazing areas for young stock because of susceptibility to internal parasites.
- Do not feed animals supplements and roughages on the ground where they will be likely to eat vegetation carrying the parasites.
- Provide proper nutrition for livestock. Poorly fed animals are more likely to get infections.
- Place livestock in clean pastures after dosing them with medications to avoid reinfection in contaminated pastures.
- Without overgrazing, let animals crop pastures closely enough to prevent heavy forage growth and to keep the ground drier.
- Rotate herds to new grazing areas daily or weekly; avoid using the same sleeping or holding areas for long periods. Nightholding areas should be on high ground, away from water sources.

For more information, or information on medications to control internal parasites, write

Winrock International Livestock Research and Training Center, Petit Jean Mountain, Morrilton, AK 72110.

 **WINROCK INTERNATIONAL**, with support from AID, has computerized information on goats, sheep, cattle, and water buffaloes. The information can be retrieved by breed, country, climate, and subject. The organization also has country profiles that contain livestock production data from UN Food and Agriculture Organization surveys; a list of nonprofit institutions and specialists working on livestock problems in each developing country; and an extensive bibliography.

 **A NOT-SO-WHOLE WHEAT BREAD** Substituting 30% of the flour made from imported wheat with local "composite" flours in bread baking could save African countries such as Angola, Ivory Coast, and Zaire more than \$12 million a year. Composite flours, the result of long-term research by the UN Food and Agriculture Organization and the U.S. Department of Agriculture, are flours in which 5% to 30% of the wheat has been replaced by millet, sorghum, maize, soy, or other flours.

A mechanical dehuller, developed by the Prairie Regional Laboratory of the National Research Council of Canada, is making local cereals more appealing to consumers in Africa. Mechanical dehulling of local grains unplugs the bottleneck in the milling process for urban African homemakers by replacing traditional mortar-and-pestle dehulling. The mechanically dehulled flour contains less water and, therefore, lasts longer, and contains more dry matter by weight, writes Jean-Marc Fleury in Canada's *IDRC Reports*.

Bread made from composite flours would help reduce Africa's costly imports of wheat which are increasing each year at a rate of 25% in value and 12% in volume. Wheat imports were estimated at about \$3.6 billion in 1980. The composite flours also would strengthen the link between agricultural production of local cereals and urban demand.

Now that the processing technology is perfected, the stumbling block to building mills throughout Africa and marketing the composite flour will be: 1) inadequate supply of local cereals, 2) national import and production pricing policies, and 3) adequate urban effective demand to afford the value added to this important convenience food.

 **PRECIOUS PESTS IN PERIL:** Europeans who want the "Red-knee Tarantula Spider" as a pet may be the cause of their downfall. The "Pygmy Hog Sucking Louse" is endangered because the grasslands of its host,

the Pygmy Hog, are threatened.

Animals without backbones are the subject of a comprehensive compilation which has been published for the first time. It should be of interest to scientists as well as laypersons. The *IUCN Invertebrate Red Data Book* lists threatened invertebrates and proposes ways to save them within their own environments. A strong case for protecting invertebrates is made in light of their importance to agriculture, medicine, and the ecosystem. And, the book is crawling with proposals to help the little creatures. To obtain a copy at a cost of \$20 write to UNIPUB, Box 433, Murray Hill, New York, NY 10016.

 **SIRENS AND FLASHING LIGHTS** are not standard equipment on all emergency vehicles. In Malawi, sick and injured people are reaching hospitals and clinics in bicycle "ambulances." Poor roads and lack of suitable transportation have made access to treatment difficult for many people in remote rural areas of developing countries.

Designed by the Malindi Rural Center in Malawi, and put into practice by a technology development group from the United Kingdom, the bicycle ambulance is a simple-to-make, lightweight attachment that holds a detachable stretcher. A major advantage of the attachment—of which more than 90 are in use in Malawi—is that they need little upkeep. Field trials for the bicycle are planned for Zimbabwe, Tanzania, and India.

 **WATER DECADE DIRECTORY:** International water and sanitation programs in developing countries that are sponsored by U.S. private agencies are listed in a new directory by the National Council for International Health and the AID-funded Water and Sanitation for Health (WASH) Project. The purpose of the *Guide to U.S.-Based Agencies Involved in Water Supply and Sanitation* is to encourage information exchanges among organizations with water and sanitation programs in developing countries. Entries include the name of the organization, geographic location of activity, length of involvement, type of services, training, health education, project descriptions, and type of research and evaluation. Among the 150 agencies listed are universities, associations, private voluntary organizations, foundations, and consulting firms. The guide costs \$4.50 for NCIH members and \$6.00 for non-members, plus \$2.00 for postage and handling and \$5.00 for overseas mail. To order, write NCIH, Publication Sales, 2100 Pennsylvania Ave. NW, Suite 740, Washington, DC 20037; telephone (202) 466-4740.

 **FROG MUGGERS**, heinous criminals in ancient India, may find themselves back on the "Wanted" list. The Indian Council of Agricultural Research is alarmed by the large scale disappearance of the country's two most common frog species. The council has urged the government to ban frog killing during the peak breeding season. Frogs, which feed on the host of insects that continuously threaten agricultural crops, are important to the country's food supply.

The Bombay Natural History Society recently carried out a field study to assess the damage caused by frog poachers. They discovered that farmers in the affected areas—mainly around Calcutta, Hyderabad, and Cochin—have taken to spraying pesticides to counteract the mounting threat from predatory insects, reports Canada's International Development Research Center.

Indian peasants are indiscriminately killing the valuable amphibians for the handsome price frog legs brings in Western Europe and North America.

 **A POLLUTION-RESISTANT FISH** capable of surviving in water poisoned by industrial waste has been bred by scientists at Lancaster University in the United Kingdom. The new breed of trout, reports *ICLARM Newsletter*, can withstand high acidity levels now common in many rivers, lakes, and streams. The breed took three years to develop.

 **FOLK MEDICINE:** Medicinal plants play a major role in treating people in the developing world—particularly in areas where there are few health facilities. Estimates of the total number of higher plant species in the world run between 200,000 and 700,000 plants. Many serve a variety of health functions—everything from relieving itching to inducing vomiting. Some of this valuable germplasm resource is disappearing as tropical forests are being destroyed. The World Health Organization has picked 200 for more detailed study, reports *Unasylva*.

Rauwolfia is one such plant. Two of its 100 species with important medicinal uses are *Rauwolfia vomitoria*, from tropical Africa, and *Rauwolfia serpentina*, from humid Asia. Medicines derived from this plant are used for sedation and against hypertension. In folk medicine, the bark and roots are used for their emetic, purgative, antidiarrhetic, sedative, and insecticidal properties. Chopped *R. vomitoria* leaves stewed with animal fat is reported to reduce swelling. Preparations made from *R. serpentina* root is said to relieve central nervous system disorders and intestinal disorders.

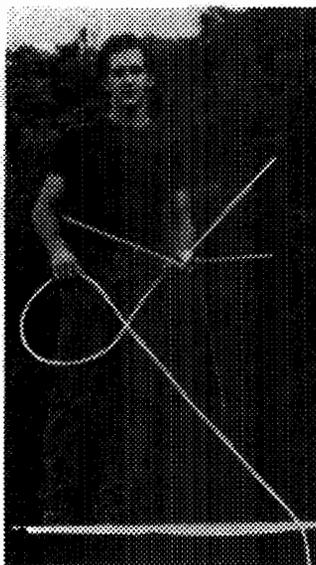
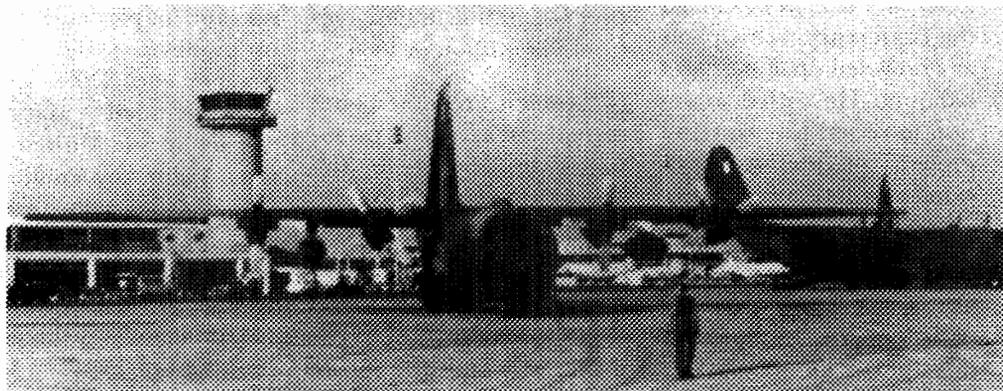
AID Airlifts Emergency Supplies to Grenada

AID is providing Grenada with \$3.475 million in relief and reconstruction assistance, AID Administrator M. Peter McPherson announced at a Nov. 2 press conference. The Agency will contribute \$3 million for an infrastructure restoration program for Grenada, in addition to \$475,000 already provided for immediate relief needs.

The first airlift of basic supplies arrived in Point Salines from Bridgetown, Barbados on Oct. 28. AID and Grenadian charities distributed the shipment which included evaporated milk, sugar, canned corned beef, sardines, and fruit juices to displaced persons.

From its disaster relief stockpiles in Panama, AID airlifted two plane loads of supplies, including five generators to provide emergency power for lighting, communications equipment and water supply; a jeep and driver; two mobile water trailers with a capacity of 250 gallons each; eight 3,000-gallon collapsible water tanks; and 1,000 five-gallon potable water containers. AID also sent an epidemiologist from the Centers for Disease Control in Atlanta and a sanitary engineer.

"We foresee relief measures continuing for at least several more weeks," McPherson told reporters. "In addition to serving these needs, we have the primary objective of returning the Grenadian economy to a normal state of activity,



Disaster assistance was flown to Grenada from Barbados. Disaster team member Diel Tully installs communications equipment at AID's temporary office.

major population centers. This problem must be dealt with."

McPherson said that three U.S. public health officials are in Grenada surveying basic health needs. Their recommendations will guide AID's response.

"AID is firmly committed to the economic recovery and long-term development of Grenada," McPherson said. When asked about Grenada's future, he said, "I

look at Grenada and see some advantages that I don't see in places like Africa: an 85% literacy rate, for example, a fairly low child mortality rate, and a number of other advantages that Grenada can really build on. We are particularly sensitive to the needs of the Grenadian private sector as a central instrument to the recovery process."

To the extent that AID has the resources and mandate, we will make every effort to support the return of economic and social prosperity in Grenada," concluded McPherson. ■

which is the way the people can start to take care of their needs."

McPherson said that medical and public health services were disrupted by the exhaustion of basic supplies and equipment: "Early reports indicate that damage to the existing system in various parts of the country prevents major segments of the population from receiving potable water. The delivery of life-supporting human services is threatened by the badly deteriorated road system that connects

First Annual Conference Reviews WID Experience

Over 800 participants from around the United States and several developing countries gathered recently in Washington for the first annual meeting of the Association for Women in Development (AWID). The conference, "Women in Development: A Decade of Ex-

perience," focused on food and energy issues as they relate to women and to U.S. interests in the developing world. It also commemorated the tenth anniversary of the "Percy Amendment" to the U.S. Foreign Assistance Act which resulted in the establishment of AID's wo-

men in development program.

AID Administrator M. Peter McPherson welcomed the conference participants at a crowded opening night banquet. He called attention to recent progress and growth in the Agency's women in development program.

"No other donor nation has such a comprehensive policy or commitment to this effort," he noted. AID is training senior staff in project design and imple-

mentation to better reflect women's activities and needs. AID funding of WID-related projects was over \$44 million in 1982—up from \$29 million in 1980.

"Women are now being recognized as active, essential contributors to the development process," McPherson said.

In introducing Sen. Charles Percy (R-IL), McPherson commended the chairman of the Senate Foreign Relations Committee for his continued support

of women in development.

Sen. Percy reiterated his personal commitment to women in development issues and his particular pride in pioneering the "Percy Amendment." Other speakers included Margaret Snyder of the United Nations Voluntary Fund, and Jane Knowles, of the University of Wisconsin and president of the Association of Women in Development.

Throughout the three-day conference, experts from public and private sector organizations, such as the UN

Food and Agriculture Organization, Canadian International Development Agency, International Labor Organization, World Bank, Oxfam, Ford Foundation, Partners of the Americas, Peace Corps, AID, and numerous universities, discussed the economic benefits of including women in development. A comprehensive series of workshops covered numerous topics ranging from food self-sufficiency, to linking policy to implementation in donor programs, to recent research

New Development Foundation for Africa Takes Shape

Five new members were sworn in Oct. 18 to the board of directors of the African Development Foundation (ADF), a government corporation recently established to assist indigenous community organizations throughout Africa.

Among those joining the board is Chairman William F. Pickard, former associate director of Cleveland State University's Department of Urban Studies (1971-1972), and a former executive director of the National Association for the Advancement of Colored People (1967-1969). Pickard owns and operates six McDonald's restaurants in Detroit, MI.

Other new members are:

- Patsy Baker Blackshear, assistant superintendent of the District of Columbia Public Schools' Budget Division, and a former national policy fellow of the Institute for Education Leadership (1977-1978).



Richard W. Parsons, AID's deputy director of personnel management, swears in the new ADF members. From left: ADF Chairman William F. Pickard, Charles G. Wells, Patsy Baker Blackshear, Chester A. Crocker, Francis S. Ruddy, and Parsons.

- Chester A. Crocker, assistant secretary of state for African affairs, and a former director of African studies at Georgetown University's Center for Strategic and International Studies (1976-1981).
- Francis S. Ruddy, an AID

assistant administrator, and former counsel for the Exxon Corp.

- Charles G. Wells, president and chief executive officer of the Sunbelt National Bank, Dallas, TX.

Two other board members are to be appointed soon.

One of the board's first tasks will be to appoint a full-time president to oversee the foundation.

The foundation was created in 1980 in response to a need for greater local involvement of the poor in their countries' development. ADF is expected to fill the gap not met by larger multilateral and bilateral donor programs. The foundation will start off with a budget of \$4.5 million from funds appropriated to carry out the Foreign Assistance Act.

Designed to reinforce local African development initiatives, skills, and leadership, the program will concentrate on private local developmental activities. "Program liaison officers will work closely with local African groups to identify appropriate projects for ADF support," according to Doug Robbins of the foundation's liaison office.

findings in Africa. AID's WID office, involved in both formulating the actual conference and conducting various workshops, distributed several thousand copies of women in development documents, including the recent Agency policy paper on women in development, which was discussed in several sessions.

The second plenary session featured Per Pinstrup-Andersen from the International Food Policy Research Institute, who presented an in-depth study of

the need to improve women's economic productivity to ensure greater economic productivity of developing countries. The audience responded with individual accounts of field and project experiences. They discussed the complexities involved in accurately assessing and measuring women's extensive work in the household and community, and the critical need for viable small technology, credit, and income-earning programs.

Among the many conferees were 12 women re-

searchers and graduate students from developing countries presently enrolled in programs at various U.S. universities—under the sponsorship of AID's participant training program. For these women, and for the many participants, the AWID conference provided a unique opportunity to share experiences and knowledge with fellow scholars and researchers in a variety of disciplines, and from universities around the world. The conference also played an important part in

formally strengthening and expanding the wide range of women in development constituencies. It was generally agreed that the first decade of women in development programs has produced some valuable lessons. By providing a unique setting for discussing practical approaches, obstacles, and theories in undertaking effective women in development programming, the conference also was instrumental in highlighting the future direction of the WID movement. ■

ADF's program will complement both national and international development programs by strengthening local institutions and local capacity to take advantage of larger programs.

"Overall, ADF's unique contribution to African development should not be just the sum total of numerous local development projects, but should arise from shared knowledge of how local development takes place in Africa," said W. Haven North, special assistant to the AID Administrator for ADF affairs.

"Its ultimate accomplishment will come with the dissemination of local development ideas and experiences and the creation of informal networks of African expertise on local self-help development," he said.

The foundation's long-term objective is stronger local private organizations and leadership committed to self-help development in poor African communities. ■

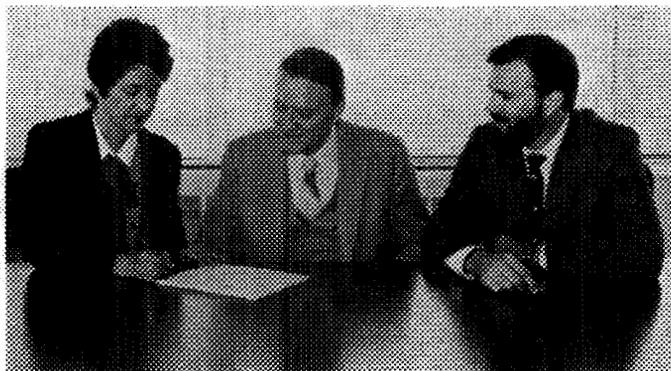
AID Contract Promotes Better Health Care

AID awarded an \$8.7 million contract to Management Sciences for Health (MSH) of Boston, MA, to help developing countries reduce disease and death, especially among infants, children, and mothers.

Under the five-year contract, MSH will work with AID missions in about 30 developing countries in Latin America, Africa, Asia, and the Middle East, providing management and technical assistance for primary health care systems. It also will train health workers, and supply commodities for immunizations and oral rehydration therapy (ORT).

In addition, MSH will set up regional health conferences overseas and provide support through an information center to be established in Washington, DC.

Playing key roles in this project are three subcontractors: Johns Hopkins University, Academy for Educa-



At the signing of the five-year contract were, from left, John Partner of AID's contract office, Nain C. Brady, senior assistant administrator for research and technology, and Peter Rowboth, treasurer of Management Sciences for Health of Boston.

tional Development, and Jefflyn Johnson Associates.

AID and MSH expect that over the five-year contract period:

- Primary health care programs will be strengthened and made more cost effective. Improved immunizations and ORT will be provided.
- Countries will improve their capabilities in controlling selected diseases.
- The private sector in these

countries will become more involved in managing and delivering health care services.

- The management of health care systems will be strengthened and workers better trained.
- Conferences will be held in Africa, the Middle East, Asia, and Latin America—together with one international world conference—to promote and support health care programs. ■

BUSINESS

Toning Up Business for the Health of It

AID and Bolivia's Central Bank (BCB), through the ministry of finance, recently signed a loan agreement that strengthens Bolivia's private sector savings and loan system and meets the water and sanitation needs of Bolivia's poor. Because of the AID loan, 50,000 families will have water or sanitation systems or both who otherwise would not.

The \$2 million AID loan is made to the central bank for re-lending in Bolivian currency to the Caja Central de Ahorro y Prestamo Para la Vivienda (CACEN), and its 12 savings and loan (S&L) associations that make up Bolivia's private sector S&L system.

The project uses the need for better water and sanitation to diversify CACEN's portfolio into short-term lending. Loans will be made by the S&Ls to low-income individual homeowners or groups of homeowners in budding communities, small towns, and villages to install single tap water and sanitation systems. Many new housing developments are going up around Bolivian cities. And, most do not have adequate water and sanitation systems.

As interest accrues and loans are repaid, the savings and loan associations will fund an increasingly higher percentage of the loans. Initially, AID and S&L funds will be used. By the end of the loan period—in 12 years—the banks will be financing the entire loan with their own funds.

Dynamic policy dialogues also are taking place as the private sector works with central and local government agencies to improve health through cleaner water and better sanitation services. For example, experts from CORPAGUAS, Bolivia's central water authority—

which will coordinate maintenance of the systems—are working with CACEN and AID's Bolivia mission to design the project.

The savings and loan system will also be going into a new business. It will be both seller and lender to community residents. Borrowers will use the loans to pay for project materials—plastic piping, valves, and meters—which will be purchased and stored by CACEN. Profits from the loans will be used by

the S&Ls to buy more supplies. The private sector will tap into the project by manufacturing water and sanitation equipment that now is imported for sale to the S&Ls. Only individuals and groups borrowing under the program will be able to buy equipment from CACEN.

After the systems are installed, residents will pay normal user fees.

This project activity is coordinated with a recent \$15 million AID loan for housing. ■

AID Loans Boost Business and Development

There are two new AID-funded projects that involve direct investments in developing country private sector activities with high development impact.

One, a loan agreement for \$2 million to partially capitalize the new Leather Industries of Kenya, was recently signed in Nairobi. Under the agreement, the tannery will use local hides to produce high-quality finished leather for export, primarily to European markets. The project, which is expected to generate foreign exchange and new jobs, also will act

as a catalyst to rural private agribusiness in Kenya. It also will provide rawhides to the domestic market.

The other project involves loan and grant agreements totaling \$1 million for Sayyed Machinery Ltd. in Pakistan. The \$800,000 loan will partially capitalize a manufacturing facility for farm implements, marked by interchangeability of parts and low production costs. The \$200,000 grant will set up rental/education centers for small farmers so they can make the best use of the equipment. ■

Operation Opportunity

The Overseas Private Investment Corporation's (OPIC) *Opportunity Bank*, a computerized data system, matches potential foreign investment projects with U.S. investors who are looking for overseas investment opportunities. Limited information flow between potential U.S. investors and developing country sponsors of investment projects has been one of the roadblocks to developing countries attracting U.S. investment capital.

The data bank has two files—one for U.S. companies, the other for foreign investment projects. Registered U.S. firms give a company profile, including background in-

formation on the firm, country or region of interest, product or industry of interest, and general financial information. Foreign businesses interested in joint ventures with U.S. partners or other U.S. private participation are listed, with background of the sponsor, the proposed investment project, the country, type of product or service, and financing requirements.

The bank has more than 4,000 U.S. company profiles and 1,000 foreign project profiles. For more information, contact Daniel Rioridan, OPIC Opportunity Bank, 1129 20th St. NW, Washington, DC 20527; telephone (202) 653-7361. ■

Management and Technical Education Spread to Egypt's Villages

At the heart of AID's Basic Village Services project in Egypt is decentralization. Villagers are responsible for fueling the engine—initiating, planning, and carrying out projects that will improve their villages. These projects include improving roads, waterworks, canals, and sewerage in Egypt's rural areas.

AID is taking a decentralized approach to training Egyptians responsible for the project. Thirty-six officials representing all parts of Egypt are attending an AID-funded rural development management program at the U.S. Department of Agriculture's graduate school. Many of them are first-time visitors to the United States.

The 12-week training program which began in October offers a broad range of management, technical, and supervisory skills to government officials, training administrators, and engineers to help them carry out the project. The program involves rural development management training, technical training, training methodology, and on-site visits to successful rural development projects in California and Kentucky, as well as in Korea, India, and Saudi Arabia.

The 36 participants have been divided into three groups—senior government officials, training administrators, and engineers—for much of the training. Following course work in Washington, the 12 senior managers will take part in a traveling study seminar where they will look at different types of integrated rural development projects. In California they will examine two types of projects: high-tech, and low-tech, low-energy, low-cost



A new water system and a retaining wall are two of many improvements that Egyptian villagers are making under AID's Basic Village Services project. The 36 U.S.-trained Egyptians will help initiate, plan, and carry out future projects.

projects in water sanitation, irrigation, and dirt road construction. While at the sites the Egyptians will meet with project supervisors and local city, state, and town officials with similar responsibilities.

"Many of the Egyptian managers hold political posts as well and, as such, have a dual responsibility to their constituencies and to the development project," says Kenneth L. Hawkins, USDA's Middle East projects coordinator. "We want to give the Egyptian managers a chance to discuss alternative managerial decisions about development projects with others who face the same kinds of decisions."

In addition, the managers will travel to integrated rural development projects in Korea, India and Saudi Arabia before returning to Egypt.

Hands-on technical training in potable water systems, drainage and sanitation systems, dirt road construction, and irrigation is the heart of the program for the 12 civil and mechanical engineers. This group will participate in a training program at the Bluegrass Consortium in Lexington, Kentucky, which includes the Bluegrass Area Development District and Morehead State and Eastern Kentucky Universities. Among other things, each engineer

will visit a project related to his specific field before returning to Washington for the final phase of the training program.

When the engineers return to Washington, they will join with the training program administrators who are responsible for the further education of people at state and village levels. The group will finish their training in a skills laboratory, designing potential rural development projects.

"The beauty of it all," says Hawkins, "is that they will design and have in hand potential projects ready for implementation when they step off the plane in Egypt." ■

WID Takes Center Stage at Title XII Seminar

In October, AID's Office of Women in Development (WID) and BIFAD co-sponsored a one-day seminar in Washington, DC on "AID Project Development Procedures" for over 120 faculty members of Title XII institutions.

Speaking before representatives of universities from as far away as Hawaii, California, and South Dakota, AID Deputy Administrator Jay Morris emphasized AID's commitment to increase women in development concerns throughout Agency activities—including those by Title XII institutions.

The seminar was designed especially for individuals from Title XII institutions to present the project steps—from conception to evaluation. After recent visits to a number of universities, AID's WID office became aware that many faculty members in a variety of technical fields interested in women in development lack detailed information about AID project development procedures. Therefore, it is difficult for these faculty to affect AID projects being designed and implemented on their own campuses.

Fred Schieck, deputy assistant

administrator of AID's Bureau for Program and Policy Coordination, spoke about the factors influencing the project design process. He described the budget cycle and the role of AID internal project documentations. He also discussed the importance of appropriate host country policies and the role of the host country in the project process. Projects done in a developing country, he explained, must be wanted by that country, and reflect local realities. Projects should address real constraints and have a good understanding of the sector involved. The design should take the financial and managerial capabilities of local institutions into account and must adhere to AID's policy framework.

Schieck also reviewed how and where Title XII universities can fit into the project process.

Other speakers included Paula Goddard, former WID office director, who highlighted AID's policy paper on women in development. Albert Brown, rural development division chief of AID's Latin America and the Caribbean bureau, discussed contracting pro-

cedures; and Jean Weidemann, chief of BIFAD's institutional and human resource division, reviewed BIFAD's role in AID's agricultural development efforts and stressed the importance of women.

James Cowan, director of international programs and studies at the National Association of State Universities and Land Grant Colleges (NASULGC), also spoke briefly on NASULGC's support for women in development. He pointed out NASULGC's advocacy role in generating increased activities for Title XII institutions, and explained that the association serves as a communications link between the various university communities and Washington contacts.

Over the past four years, AID's WID office has spent almost \$1 million to institutionalize WID concerns with Title XII schools. The office believes it is imperative that these schools be in the forefront of incorporating women in development issues into all phases of project design, implementation, and evaluation. This workshop is another strategy toward achieving this goal. ■

LESSONS LEARNED

Spin Offs Pay Off in Tunisia

by Thomas W. Casstevens
and Lily Willens

In 1945, a 16-year-old shepherd left his flock and went to Tunis, Tunisia's capital city, to attend school. But, because of the chaos left in the wake of World War II which had swept across the French protectorate, he was unable to enroll. Instead, the boy read voraciously in libraries and then passed an exam to be a teacher. For six years, he taught in schools on the edge of the Sahara Desert.

In 1956, using his savings for a one-way ticket, he went to England. For the next two years, he attended night school to perfect his English, supporting himself by shovelling coal. At the age of 28, he became a freshman at the University of London. He completed a degree in economics with honors at the University of Nottingham. At his professors' urging, he pursued and was awarded an economics doctorate at Brown University in Providence, RI.

In 1972, he returned to Tunisia to join the faculty of the first graduate school of business administration in North Africa—the *Institut Supérieur de Gestion* (ISG) at the University of Tunis. In 1981, the former shepherd, Abdesattar Grissa, became ISG's third dean.

Dean Grissa's career is a striking example of the commitment to education in modern Tunisia. ISG itself is part of this national commitment; it also was the centerpiece of AID's Management Education and Executive Development Project. The project, begun in 1966 and completed in 1981, aimed to improve the efficiency of both public and private enterprises by creating a graduate school of

business management in the University of Tunis. The results are impressive in the judgment of a team from AID's office of evaluation that visited Tunisia in August and September of this year.

The project was embedded in the country's only university. Founded in 1960, the University of Tunis had more than 40,000 students by 1983. This growth and concomitant

clerical and semi-skilled jobs in the lower echelon of the colonial administration. French had become the language of government and commerce as well as education by the time of independence.

In 1958, the Republic of Tunisia recast its system of education. The new system was to be unified, national, adaptable, and democratic. Arabic became the language of in-



About 40% of the students at the management school are women.

growth in elementary and secondary school enrollments reflect the Tunisian government's substantial expenditures on educational development. The education budget is about one-third of the national budget and about five times the size of the defense budget. Education has been a priority since independence.

Education in Tunisia is modelled broadly on the French system. Since Tunisia was a French protectorate from 1881 to 1956, this was inevitable. When elementary and secondary schools were created in the late 19th century for the growing French and European communities, French was the language of instruction. Occasionally, a very limited number of Tunisians were permitted to attend these schools, and some graduates furthered their university studies in France. Franco-Arabic schools were later instituted for Tunisians who then filled the

struction in all elementary schools, but French still is used in some secondary school courses and most university courses. Today, Arabization of education is in progress, and most teachers are Tunisians with degrees from the University of Tunis or foreign universities (usually French).

The University of Tunis has three types of degree programs or cycles—first, second, and third, in successive two-year blocks. Diplomas are awarded after completion of each cycle. A *Doctorat d'Etat* takes an indefinite number of years after the third cycle. The university is authorized to grant this degree, but does not yet do so.

ISG began with a third cycle program in 1969. By design, this program was strictly comparable to the American masters' degree in business administration (MBA). The AID project focused on this program, aiming for 25 to 30 graduates

a year by the end of the 1970s. The Ministry of Education, however, apparently had a different priority—namely, to upgrade and expand management education at several levels in several locations.

ISG today has programs for the first and second cycles in addition to the third cycle. A Faculty of Economics and Management also has been founded in the city of Sfax; its dean is a former ISG dean. In addition, ISG faculty have been siphoned off to become deans and teachers at the old Institute of Advanced Commercial Studies and the new Faculty of Law, Economics, and Politics. ISG third cycle graduates have become a distinctive cadre of junior faculty in these units of the University of Tunis.

AID contracted to provide U.S. professors to teach at ISG and to place Tunisian students in doctoral programs in the United States. The American professors were to be replaced in due course by returning Tunisians.

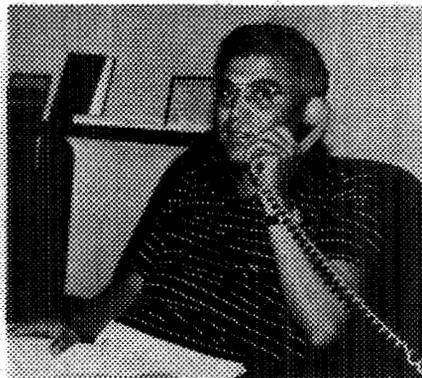
Tunisian students did complete doctorates and did return under this project. Tunisia did *not* suffer a "brain drain." The returnees, however, often were diverted or dispersed by opportunities in their homeland. There also was some difficulty in gaining recognition of their U.S. doctorates. The degree equivalency problem was solved finally by a policy dialogue between the U.S. ambassador and the Tunisian prime minister.

The U.S. professors on contract from the University of Illinois were withdrawn in 1974. Tunisians express regret at the "early" termination of that contract team, which was never more than three professors. Some Tunisian students in the United States at that time continued their studies with AID funding until 1981.

ISG, nevertheless, continued not only to exist but to expand: from its beginning, the bulk of its staff and

funding has been Tunisian.

Academic leadership has been provided by Tunisians with American doctorates. Their careers illustrate the multiple demands on doctoral faculty of ISG. Abdellatif Khemakhem, with a doctorate from Ohio State University, was the first ISG dean. He concurrently was the



Abdellatif Khemakhem, ISG's first dean.

director of the National Institute of Productivity and then dean of the new Faculty of Economics and Management in Sfax. Mahmoud Triki, who also received a doctorate from Ohio State University, succeeded him as ISG dean in 1978. In 1981, when Triki became director of the Scientific Mission of Tunisia in the United States, Abdesattar Grissa became the third ISG dean.

ISG has the best faculty of business administration in Francophone Africa. This faculty also is its greatest weakness: it is spread too thin, and three-fourths are junior faculty without doctoral degrees. No mechanism exists as yet to replenish doctoral faculty who have transferred to other institutions.

Faculty teaching loads consist of one or two courses each semester. Tunisian textbooks and teaching materials are rather scarce, so reading assignments are made from foreign textbooks and professional journals. These materials must be supplemented by extensive lecture notes. Faculty members also guide the students in the preparation of

undergraduate and graduate theses, as well as assist them in adapting to the business cultures of the United States and France. The teaching situation is further aggravated by the diversity of assignments. The teachers, at times, teach outside their areas of expertise and at various cycle levels.

The teaching loads favor the senior faculty. Faculty members with doctoral qualifications, on the average, teach fewer hours and smaller classes. The junior faculty's teaching loads are twice as heavy. There is a shortage of senior faculty with doctoral degrees in all fields with none available to instruct in the fields of accounting and management information systems.

ISG students—about 40% of whom are women—are top graduates of secondary schools, primarily in mathematics and science. Most are from low-income families: four-fifths attend with the help of modest government scholarships. Admission is selective at each level.

First-cycle students graduate with the technical skills to become accounting clerks, computer operators, or management assistants. Half take jobs in government or industry. The other half are admitted to the next level. Second cycle graduates are sought after and are eminently employable. Few are admitted to the next level. Third cycle graduates are in demand in government and industry, but many become university teachers in the expanded system of management education. The second and third cycle programs are augmented by transfer students from elsewhere in the University of Tunis or Francophone Africa.

In 1971, the first degree was granted to Tunisian President Habib Bourguiba. By the graduation of the class of 1982, almost 2,000 graduates had passed through ISG: 1,274 from the first cycle, 486 from the second cycle, and 179 from the third cycle. These graduates



AGRICULTURAL RESEARCH IN INDONESIA

A Tale of Perceptiveness and Perseverance

Story and photos by Steven Singer

We in the development business frequently stress the long-term nature that must characterize our activities if they are to bear fruit. However, we seldom have a sufficiently long overview to prove our point. Instead we must confront justifiably skeptical policy makers who demand to know why, if it has not worked in two years, it will indeed work in four, or eight or 100. AID's Agricultural Research Project in Indonesia from 1972-1982 represents a useful case study of an effort in which a modest amount of resources (\$3.3 million) intelligently applied in the right setting over an extended period of time can make a

significant difference in a country's development. The project's successes and the reasons behind them have been well documented, and may have wider applicability than agricultural research.

First, what has this project achieved that makes it worthy of study? It is not merely that agricultural research has enabled Indonesia to increase its food production. What is remarkable is the concrete proof that significant progress toward food self-sufficiency is possible even in the face of population growth. Rice production in Indonesia increased from 16 million to 22 million tons between 1977 and 1981. In 1968, Indonesia with a

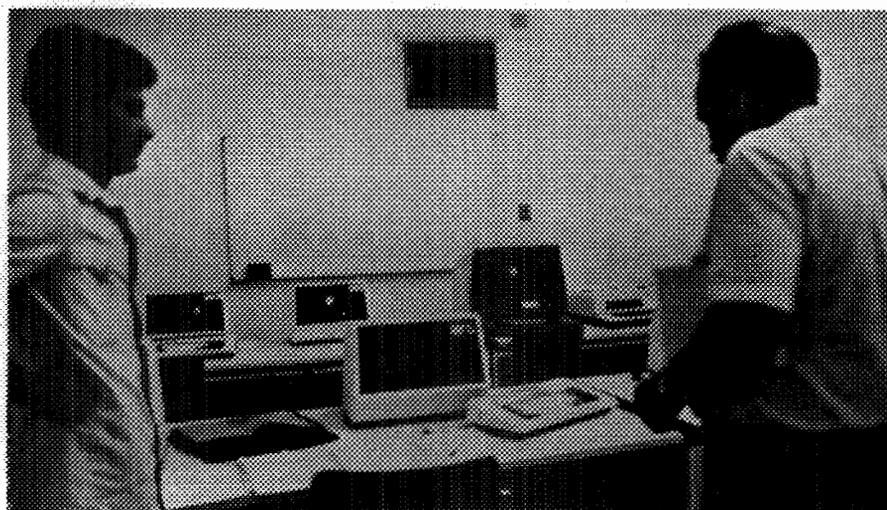
have a good reputation and do well, but it is too early to gauge their impact. A Tunisian (private) business executive remarks: "We hire management graduates for various tasks to be performed with competence and versatility. We believe that the graduates' strength is the ability to analyze complex situations." But, he continues, their contribution cannot be evaluated "in less than five years."

Four constituencies have major stakes in management education: government, students, faculty, and employers. Despite agreement on some points, each stakeholder has a distinct perspective in Tunisia.

The government of Tunisia sees management education as a problem and opportunity for national development. The students see management education as a passport to good jobs. Faculty members see it as an appealing career. Employers, public and private, see management education as a source of good employees. In Tunisia, where family businesses are only beginning to emerge as complex organizations, large enterprises are the main employers. The banking sector is most interested in management graduates, and the agricultural sector is least interested. This pattern is similar to that in the United States.

The evaluation team drew several conclusions and lessons from this project.

The project is an example of successful institution building. ISG was the forerunner and standard for the reform and expansion of the entire management education system in modern Tunisia. This flourishing growth is a sign of the project's success, but it also shows the length of time necessary for successful institution building. ISG itself has not yet achieved homeostasis: no mechanism is in place for the renewal of the senior faculty. The evaluation team endorsed the



Current dean, Abdesattar Grissa, talks with an upper classman in ISG's computer center.

current efforts to upgrade the qualifications of the management faculty.

The project is an example of the transfer of an appropriate technology. Tunisia was a middle-income country with a rapidly growing economy. Management education was a felt need. The United States also had a comparative advantage in management education, although the official recognition of that fact was dependent upon a policy dialogue at the highest levels.

The project's ultimate purpose, "to increase productivity and profits in both public and private enterprises," is an inobservable goal. Tunisian academic accountants cannot get information about productivity and profitability from friends who are enterprise managers. Obviously, the project improved the personnel of public and private enterprises. Employers, public and private, are pleased with the graduates of the system. Almost all graduates get jobs, although the overall unemployment rate in Tunisia is about 15%. Furthermore, since most graduates come from low-income families, the project significantly improved many individuals' futures.

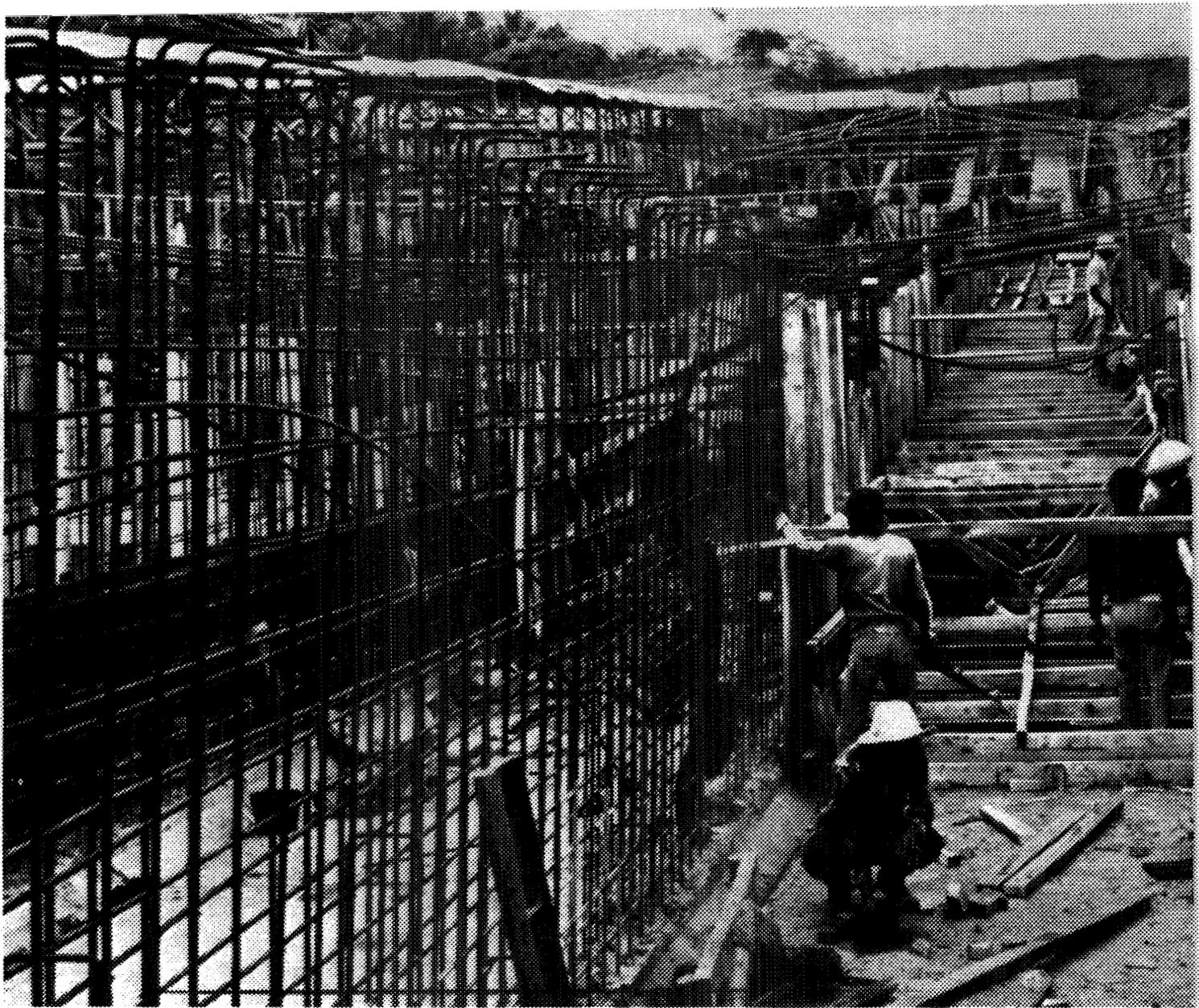
The project was a catalyst. AID

contributed \$1.7 million—an amount that would comfortably endow two professorial chairs in the United States. In Tunisia, it created not only a graduate school, but also a whole system of management education. The Tunisians themselves bore most of the start-up costs and bear virtually all of the recurrent costs. AID, thus, used its funds as leverage.

The project's basic objective, to establish a *graduate* school of business administration, has been achieved. The secondary objective, to have at least 25 graduates a year, has not been achieved. ISG itself now aims for 10 to 12 a year from its third cycle program. A viable institution is notoriously likely to depart from the original plans in the long run. Tunisians, in this case, chose to spread their resources on the expansion of management education at several levels in several locations rather than concentrate them on one graduate school. ■

Thomas W. Castevens is a special adviser to the AID Administrator. Lily Willens is a program analyst in the East African affairs office of AID's Bureau for Africa. Both were on the evaluation team that visited ISG in August and September, 1983.





population of 115 million produced 93 kilos of rice per person. In 1980, when the population approached 150 million, rice production was 137 kilos per person. A measure of the project's contribution is that 80% of the land producing rice uses varieties and technology developed and introduced under the project.

As the area under cultivation has not increased by much over 15% in the last 10 years, we can infer that a concrete and measurable increase in the well-being of 160 million people can be attributed to the project.

Although most of these gains are in the last four years, their antecedents stretch back into the sixties. In 1969, the Indonesian government and AID established a joint research effort, the precursor of the Indonesian Central Research Institute

for Food Crops (CRIFC), to take "... inventory of the resources available, identify problems inhibiting their use, and recommend principles and programs to establish a research capability commensurate with the needs of an industry as vast as Indonesia's agriculture."^{*}

This approach presaged success: The project arose out of an inventory of what was available and what was needed commensurate to the role the sector in question was expected to play. The open-ended, pragmatic, and intellectually honest approach identified a problem—a "bottle-neck" in an important sector. What could be done about it?

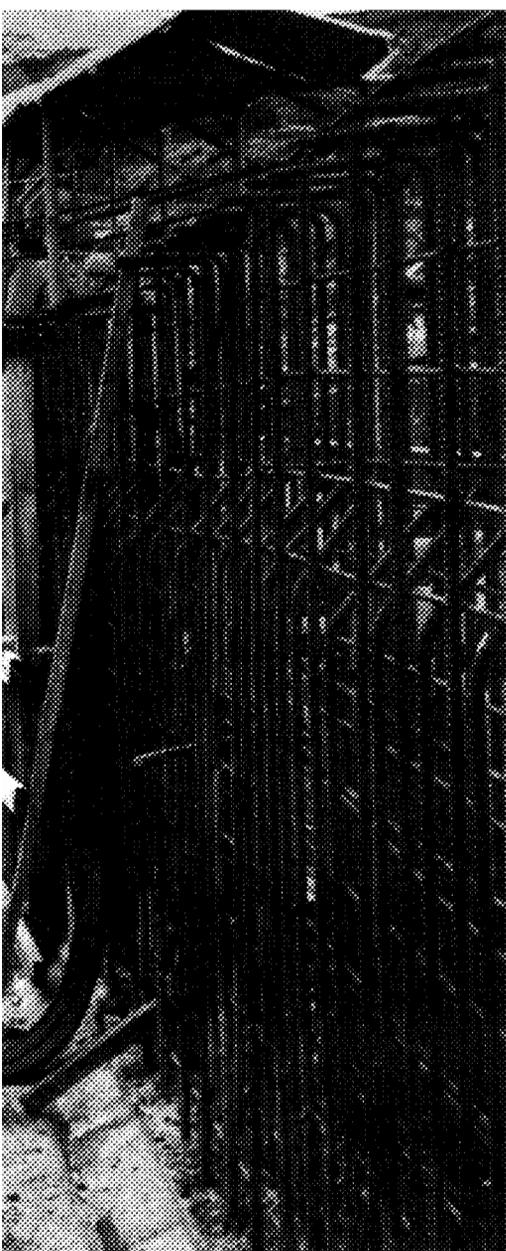
What was to be done was greatly

^{*}All quotes from IRR's Agricultural Research Resume of GOI/IRRI/USAID Projects 497-0198 and 487-1310, prepared June 1982.

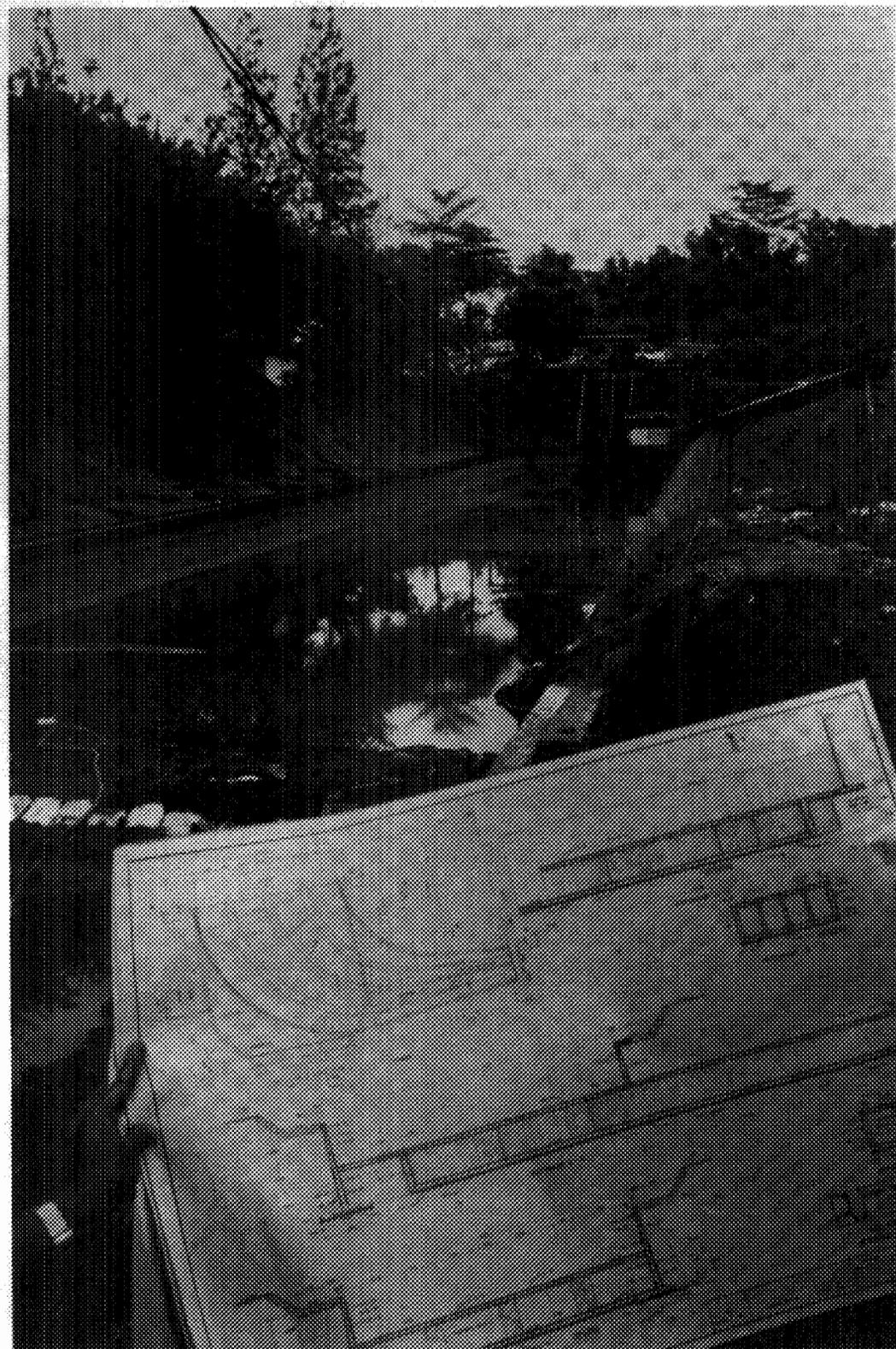
influenced by the findings of a subsequent AID-sponsored mission sent from the International Rice Research Institute (IRRI) in 1971 to survey rice-growing conditions and problems in Java and Bali.

They found, in general, rice production and management practices used by the Indonesian rice farmers were perhaps some of the best in tropical Asia. Seldom did they find a weedy or poorly managed field. They noted that Bali and Java were endowed with good soils and abundant water resources.

In other words, the project was no attempt to turn a sow's ear into a silk purse. When the experts surveyed the situation, they discovered fertile ground, both figuratively and literally, on which to do agricultural research. Both the natural and human



Intervention is critical to improve yields. These irrigation works are situated in the Cauca Valley. The works pass to the left carrying irrigation water below the Cauca River. The works below are designed to flush silt from the canals.



resource bases were good, thus the limiting variables of seed varieties and new techniques could be concentrated on, at least initially.

One might conclude that we should maximize success by only attacking easy problems, those in which one or two factors constitute the limiting variable. This lesson is not entirely facetious. Confronting the development problem, one is frequently overwhelmed by deficiencies in many areas, not knowing where to act first. Perhaps more often than we think, though, there is a key variable which will impinge on many others if we have the imagination to find it. When some of us in AID evaluated a rural roads project in Colombia in 1979, we noted that the project not only fulfilled its income objectives, giving the farmers access to markets and

encouraging agricultural production, but also had important health and education benefits. Access was the limiting variable in that case, amenable to attack with a relatively cheap and straight-forward project. Once the farmers had access, they largely solved their own education and health problems.

A similar case in Africa: in Benin there were herding tribes and farming tribes. When the Food and Agriculture Organization (FAO) and Peace Corps advanced credit for the farmers to buy draught animals from the herders, and instituted a training program to show the farmers how to improve their plowing, agricultural production increased. The ingredients were all there. It just took someone wise enough to combine them correctly. All of which is not to discourage holism; the IRRI team surveyed the *entire* situation before deciding what the limiting variables were.

Aside from the setting and careful spadework before the project commenced, what were the other characteristics of the Indonesia project that contributed to its success?

One seems to be the quality, longevity and demeanor of the IRRI experts AID supported. They were introduced into the CRIFC as co-workers. It is true that they took a leadership role while CRIFC scientists were abroad being trained, but it is also true that they were integrated into the Indonesian organizations rather than dispensing wisdom from on high. This integration was possible because of long tenures on the part of the expatriate scientists. One stayed the entire 10 years, another for nine. Tenures of three or four years were not uncommon.

These individuals also had long experience in their areas of expertise before their assignments to Indonesia. Some expatriate technicians had from 30 to 40 years of rice breeding behind them before they appeared at CRIFC, including 10 years' experience in Indonesia in other capacities. In ad-



dition to nine resident scientists, IRRI sent a number of specialists out for 168 person-weeks of short-term problem-solving. The project was favored with an excellent mix of long-term, highly qualified technical assistance and ample specialized help as needed, making it perhaps a model of what a technical assistance effort should be.

CRIFC was a weak institution when the project started. For example, it had only one person with a doctorate; now there are more than 20, many trained under the project. The conventional wisdom within AID is to work with dominant institutions rather than create new ones. This project essentially worked counter to this credo. Given the U.S. system of land grant universities, it also is more

common for AID to reinforce agricultural universities than central research institutions. It is questionable if the conventional approach would have provided a strong enough impetus to research in Indonesia. The project as it stands is a successful, but, by AID standards, unconventional example of institution-building.

The training element of the project has been alluded to above. Over 100 young scientists have been trained at IRRI while 116 have completed courses in Indonesia. The courses were designed by the project. The training component evolved out of needs of the project as it developed.

It is fair to generalize that a project must be sufficiently flexible to meet needs that arise during implementation. Although this statement



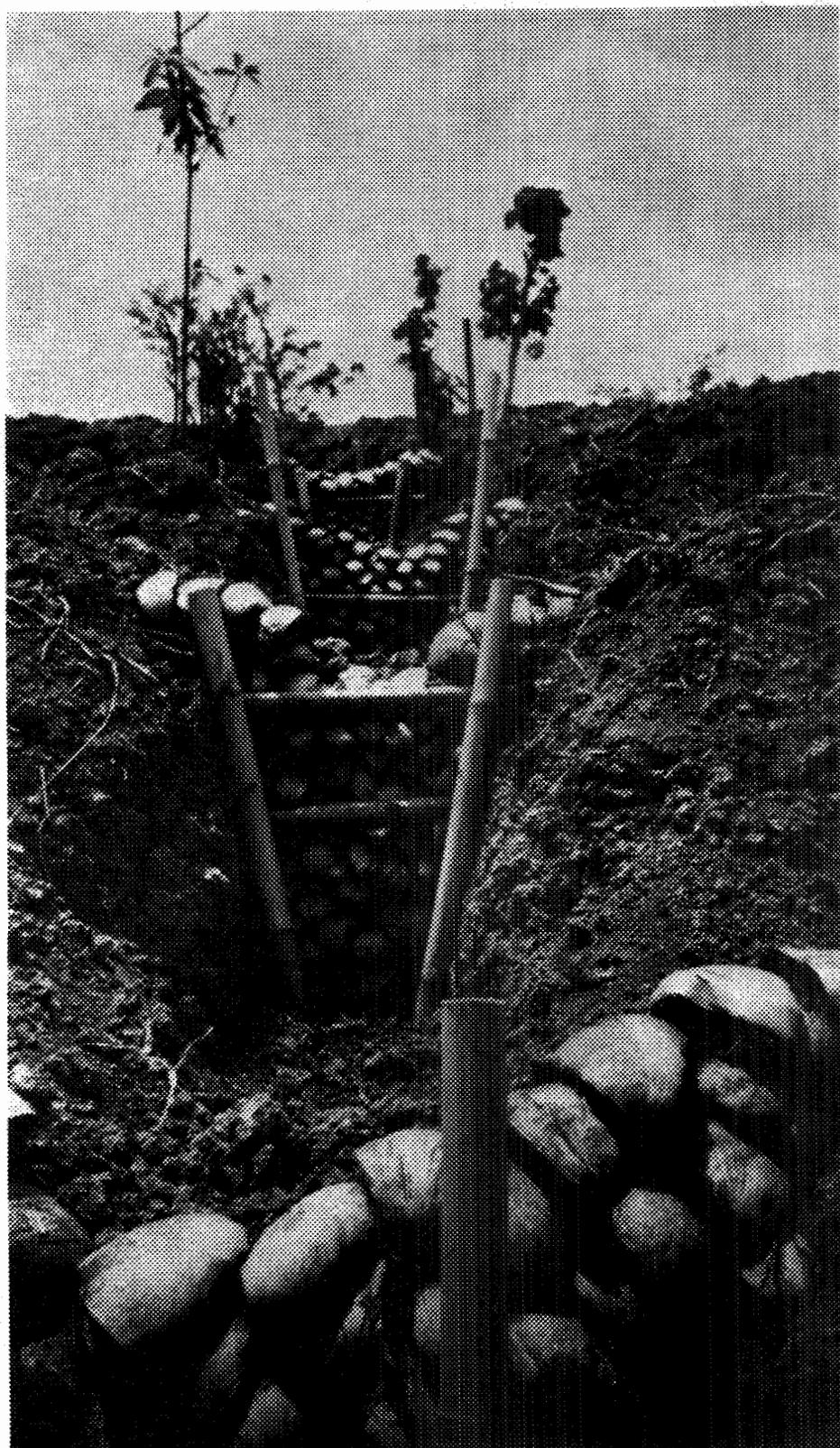
is acceptable to all in the abstract, its implications lead to one of the classic conflicts in development administration. The aid agency's home office wants to know as much as it can before it commits funds to an endeavor, and frequently must pass on changes in what it has approved. The experienced administrator in the field knows that no matter how carefully he designs a project, unanticipated problems and opportunities will arise. He needs flexibility to deal with them.

The field manager frequently feels it more important to get the right personnel than to refine project design endlessly. He believes that the design must necessarily evolve as the project is carried out. The Indonesian project tended toward field autonomy, and succeeded admirably.

In IRRI's final evaluation of the project, tribute is paid to the continuing and active interest of the AID mission in the project. As originally planned, the project was to have been terminated in 1977. A new AID mission director and agricultural officer appeared on the scene, however, evaluated the project, realized its potential, and decided to continue it. This renewed and positive support by the mission encouraged CRIFC and IRRI, and was instrumental to the project's ultimate success. It is only in the last few years that project activities have translated into significant productivity gains. Without the continuation the mission insisted upon, the project might have been abandoned before it found its feet, and been ultimately judged a failure.

The project gave farmers the wherewithal to grow more while using traditional practices.

This variety detail, lined with rubber trees, prevents erosion and salination, its diversified counterparts. It is an imaginative example of appropriate technology in the rain-fed uplands.



AID relies on its field staff more than most donors. This project illustrates why.

Leaving the realm of administration, and looking at the technical aspects of the project, we find two major programs: cropping systems and varietal improvement. Both of these programs were carried out in an inter-disciplinary manner.

The cropping systems aspect evolved a pattern whereby the principal crop, rice, could be multi-cropped with various secondary crops, thereby optimizing land and water resource use. The varietal improvement program has produced sub-species that now represent 80% of the rice cultivated in Indonesia with more varieties constantly under development to reduce the chance of catastrophic infestations. Both these efforts were initiated at two test sites that have now expanded into 20. Indonesia has clearly built on its successes here.

"Inter-disciplinary" has become something of a catch word in development circles. In this case, project personnel meant it. For example, in the varietal improvement sub-project, plant breeders were joined by agronomists, plant pathologists, entomologists, physiologists, and cereal chemists. The people running the project thus combined flexibility of response with rigor of application. Not many stones were left unturned in the search for valid technologies. Since the People's Republic of China was considered a leader in the use of hybrid rice, Indonesian scientists were sent there. Since Indonesia was rich in wild resources of rice germ plasm important in creating new varieties, great care was taken to collect and preserve these strains. The socio-economic aspects of technological change also were investigated in such CRIFC studies as "Consequences of Farm Mechanization," "Constraints to Research and Crop Management," "The Role of Economics in a Biological Research Institute," and many others.

The last factor in the equation was the Indonesian farmer. Once he had

seen the new varieties and techniques in action, he leapt upon the band wagon with such abandon that the perils of using a single variety too widely are feared. There is an instance already of one of the new strains being killed by the virus tungro. The response to the problem typifies the close cooperation between IRRI and CRIFC. Three tons of new disease-resistant varieties were sent from IRRI to Indonesia. They had become 400 tons at the end of one season, and were available commercially where needed. Epidemic was averted.

So we have a project that has made a difference to 160 million Indonesians at a cost of \$3.3 million. How much of it is transferable to other countries and other types of projects?

The long-term nature of AID involvement is a lesson that clearly can be generalized. Given the time necessary to gear up a development assistance endeavor, and the logistics, personnel, and technical difficulties involved in implementing it, it is unreasonable to expect results in a couple of years. This message is hardly a new one, so the value of the project is perhaps more in the graphic illustration it provides than in the insight. An evaluation at the five-year point—not an uncommon benchmark—would have not shown much over 3% annual rice production increases; the last four years of the project have seen nearly a 40% increase. The project does not show how to tell the winners from the losers, but only that winners may take a while to bloom.

The value of experienced personnel would seem unexceptionable, at least so long as a project is replicating experience gained elsewhere. A more general question is raised here: Is the developmental process only iterative, or can it be innovative, doing what has never been done before? It is clearly safer to repeat what has worked elsewhere. This project illustrates that replicating a good thing, like research facilities for a

There are no "one-size-fits-all" solutions in agricultural research. New varieties constantly must be developed to meet different soil, water, and insect conditions. Research continues to these days in the Philippines.



staple food, can also be extraordinarily beneficial. Maybe, given our very limited resources, replication is what the development business should be about: helping developing countries tread the paths developed countries have already beaten. This example shows that a project need not be innovative to be very valuable.

The long association of technicians with the project also cuts two ways. Here it worked, but we have all seen moribund managers administrating moribund projects. The private sector does much better here. A private sector chief of project is often given much broader control of his operation than his public counterpart. He can be and is fired if he does not deliver. Perhaps the expected ac-

complishments of a foreign assistance official could be similarly precisely defined and he too held accountable.

We see that generalizations do not come so facilely. Here, it is easy to say after the fact that good people working for an extended period of time on a carefully researched and basically sound idea in a friendly and receptive environment will succeed. When put in this light, the project's success seems a foregone conclusion. "All" we have to do is know 10 years in advance that these conditions will exist. Their number and complexity indicate the fragility of the development process. ■

Steven Singer is AID's Indonesian desk officer.

BANKING ON DEVELOPMENT

By Robert Parra

AID's investment chief offers one approach to reconcile private banks' interests with development needs.





Throughout the developing world, U.S. companies are conducting outreach programs. Among the many activities they support are crop, livestock, and poultry improvement, agricultural research, and local marketing endeavors.

In any co-financing with U.S. private banks, there are significant opportunities to leverage AID resources with other resources to effectively implement private sector projects. The following is one approach that may encourage private sector intervention consistent with the basic human needs requirements of the 1973 Foreign Assistance Act, as amended. The approach to project design, emphasized by AID's Bureau for Private Enterprise (PRE), offers a way to reconcile commercial objectives of private banks and development criteria of AID.

Let's look at a hypothetical example. Two U.S. banks agree in principle to provide \$2.5 million each. Another \$2.5 million is provided by AID. This pool of \$7.5 million in external resources will fund the long-term debt portions of private, primarily agroindustrial, subprojects in a selected country.

The success of the \$7.5 million co-financing arrangement depends on a clear understanding from the outset of what the banks are *not* likely to agree to do. U.S. banks will *not* ordinarily:

- agree to originate the subprojects;
- focus on subprojects directly linked with agricultural production;
- lend to small- and medium-sized enterprises, particularly those just starting;
- extend fixed-rate credit; *nor*
- assume risks on a given subproject beyond a five-year horizon.

These bank restrictions seem to offer limited possibilities for AID collaboration. However, AID has at least two ways of appealing to banks when structuring a co-financing arrangement:

- 1) Banks have a traditional interest in acquiring new customers, particularly if the banks do not have to work too hard to do so.
- 2) Banks are seeking to learn more about U.S. government agencies to expand their participation in existing or new programs of interest. Many U.S. banks with branches overseas

want to increase selected access to the U.S. Export-Import Bank, Overseas Private Investment Corp., or, to cite an AID example, counterpart funding in support of their local currency operations.¹

Those banks interested in developing a longer-term relationship with AID are likely to express an interest in subprojects which generate dollars, expand existing successful indigenous businesses, and attract the interest of a U.S. joint venture partner(s).

These prerequisites improve the creditworthiness of commercial undertakings, particularly if there are firm marketing arrangements with the U.S. joint venture partner(s) in respect to the production.

The collaboration also is attractive because of the potential for private financial institutions to establish *three* new banking relationships with each subproject: the foreign shareholder, the indigenous shareholder, and the joint venture partner. It also can offer fee-based (in addition to interest differential) services—such as letters of credit and payment confirmations—to the joint venture covering its exports. The effect of both is to increase the banks' yield.

To insure that credit extensions by the pool are consistent with the foreign assistance legislation, AID and the private banks must agree that the banks make term loans only to those joint ventures which have technical and other outreach services directed toward small, local suppliers. A firm that processes cocoa beans into butter cake, for example, can offer its small farmer suppliers direct working capital, and assistance in areas such as financial planning, product quality control, and using raw materials.

The concept of technical outreach—aiding the surrounding community—is, of course, not new. What makes it particularly timely is that many developing countries curtailed their agricultural extension services to small farmers because of budgetary problems brought on by the world recession. Therefore, a good opportunity exists for private companies to

step into this gap in some countries. From the standpoint of any joint venture, providing extension services to small farmers makes a good deal of economic sense. It replaces the need for the producer to assure supply of needed raw materials by investing in a plantation of its own.

There are other examples of outreach which are less commercially motivated. Some U.S. multinationals, for example, have been instrumental in setting up cottage industries to provide supplemental income to residents living near the processing plants. In their overseas ventures, firms such as Singer Company have adapted their equipment to local embroidery and knitting skills and trained village women in its use. In both Jamaica and Egypt, Singer also has supplied machines on long-term, low-interest credit terms, so the surrounding population can buy the machines to produce goods to sell in local and regional markets.

It is somewhat surprising that not much is known about the role of U.S. multinational firms in sponsoring corporate extension programs. For this reason, the Conference Board, an international research organization, recently surveyed corporate practices of 200 U.S. firms in 12 PRE target developing countries. The survey, supported by PRE funds,² found that many firms believe the primary way to help development is to bolster agricultural productivity and self-sufficiency. Aside from the example noted earlier, the Conference Board concluded that "outreach" being practiced by these firms falls into four other principal categories.

Establishing Agricultural Research Centers and Services

Several of the companies surveyed have either established their own or have supported national groups in establishing centralized agricultural research centers that focus on the country's macro-agricultural production problems. Issues such as climate variations, total arable land available, nutrient sources, water supply, and



possibilities for irrigation are examined in these programs. IBM Corp., for example, has established 13 such research centers. Castle and Cooke, and several other firms, also have contributed significantly to agricultural research stations established by Asian and Central American countries to help improve crop production. This help includes support funds, provision of technical personnel, and the establishment of scholarship and agricultural intern programs in the United States for qualified indigenous personnel.

Specific Crop Improvement Programs

A number of firms have focused on a particular crop—such as rice, pine-



Good community and worker relations are important to U.S. businesses overseas. In addition to providing jobs, many firms set up programs to provide counseling, extension services, or help develop cottage industries.

apples, bananas, and peanuts—and have attempted to improve the yield and quality of these crops grown by local farmers.

Among the companies that have been involved are Caltex, Massey Ferguson, Royal Dutch Petroleum, Castle and Cooke, and Kaiser Aluminum. Not all of the firms are agribusiness companies; that is, they will not necessarily purchase farm output, although this is often the case.

The focus of these efforts has been to find strains or seed that are resistant to local diseases; to encourage changes in planting and fertilizing practices to take maximum advantage of crop growth potential, and to improve the ways in which the crops are harvested, stored, and shipped.

Specific Livestock Improvement Programs

Locally raised livestock, ranging from pigs and chickens to cattle, is the principal protein source for many citizens in host countries. U.S. multinationals have been involved in several projects aimed at improving the quality and quantity of livestock. In Peru, for example, Carnation has been active in a program designed to increase the quality of high-production milk cows through a selective breeding program and by introducing superior breeding stock. Shell Oil has had a program for developing a "super pig" in Asia and making this new strain available to the numerous Asian and island nations that depend on pigs for

protein. Even the honey bee has not escaped the attention of livestock improvers. Chevron Oil, for example, has a beekeeping demonstration project in Indonesia designed to increase the quality of honey produced by local beekeepers in regions where Chevron has operating facilities.

Firms such as Ford Motor have designed smaller tractors to meet the smaller plot size of many farms in developing countries. Other agricultural equipment producers, such as John Deere and International Harvester, have special programs to teach farmers better methods of land clearing, plowing, and planting, and to acquaint them with soil conservation practices best suited to local agricultural conditions. They also help train farmers to maintain their own equipment. The latter is important because of the relative scarcity of dealer networks to service equipment.

In addition to providing field equipment, U.S. firms also help teach local farmers how better to process, store, and transport their output. Ball Corp., for example, has had small-scale food processing and canning operations in 25 separate locations in developing countries to help local farmers preserve the food they grow. The company has since donated the system to Food Preservation Systems, a nonprofit church group.

Supporting Local Agricultural Markets

A number of the firms surveyed by the Conference Board say they have taken steps in their LDC operations to assist in marketing local produce.

Some provide free transport on company trucks to assist local farmers in moving products to central markets. In other cases, especially those involving road construction, the building of the infrastructure helped local farmers to move perishable products quickly from the fields to local and regional markets. In still other cases, firms like Kaiser, Reynolds, United Brands, Mobil and Castle and Cooke have provided counseling services to local farmers

on better ways to pick, package, and market their products.

One conclusion of the Conference Board was that in the overwhelming majority of cases, the firms surveyed regard these programs as cost-effective. But many are unable to document this evaluation. Despite the lack of hard evidence, the U.S. companies report that they expect to continue—and in some cases, significantly expand—their assistance programs. The underlying assumption is that the perceived gains in employee productivity and community relations will continue to outweigh the costs.

TRANSFORMING THOUGHT INTO ACTION

AID might follow these steps in developing co-financed projects:

1. The AID mission identifies a province where outreach is necessary either because unemployment is high or farmer productivity is low.
2. Considering the resource base of the province, AID and the Joint Agricultural Consultative Corp. (JACC) agree on commercially viable subprojects which have potentially high development outreach profiles as well as technology transfer, and foreign exchange generation benefits;
3. JACC, in consultation with its members, determines whether planned outreach is feasible and realistic;
4. JACC identifies local investor or U.S. joint partner, develops business plan, submits these to pool; and the project is off to a good start.

Getting Banks Interested in Co-financing

Banks interested in co-financing selected subprojects with AID may not be aware that outreach by U.S. firms or their joint ventures is increasingly regarded as an enlightened business practice. As pointed out earlier, very little rigorous research has been done in this area. For this reason, PRE has commissioned a second study by Business International to evaluate 10 specific case studies of corporate outreach programs.³

It is fair to conclude that the banks will be uneasy if asked to originate—find—the subprojects with technical outreach. Instead, they may expect AID to undertake this responsibility and perceive their role as limited to evaluating the creditworthiness of each joint venture and, once funds are obligated, monitoring the pool's resulting portfolio of subprojects. A third party responsible for originating the subproject has to be found.

Creating Subprojects

Finding a third party to originate subprojects is the most difficult component of the project design. The banks will *not* engage generally in co-financing commitments unless they feel the proposed solution to this problem is a credible one. Often, they perceive that reconciling creditworthiness and developmental criteria greatly reduces the number of subprojects that might qualify under the best of circumstances for funding from the pool. Many banks would rather not be involved in a co-financing arrangement rather than risk a public relations failure in the implementation stage—even if that failure is partial.

Thus, banks have to be satisfied that the party responsible for subproject origination has:

- the capability to identify commercial opportunities;
- a vested economic interest to execute its role;
- a known skill for attracting joint venture partners; and

• an ability to mobilize additional resources to fully capitalize a given subproject. A typical agribusiness project, particularly a labor-intensive one, will often require 33% of its capitalization in long-term foreign currency loans to finance capital equipment imports. The remaining 67% is split approximately evenly between working capital financing from indigenous banks and equity from the shareholders.

The Joint Agricultural Consultative Corp. (JACC) is one example of an entity that might pass the above test.



Incorporated in Washington, DC, as a non-profit organization in 1982, the JACC functions primarily as an intermediary, a catalyst, and, in particular, an adviser to U.S. member firms that are not yet large enough to afford foreign-based offices or foreign investment scouting missions but that are interested in joint ventures overseas. Its present membership of more than 40 U.S. corporations is expected to reach 200 within a few years.

JACC's credibility with private banks springs from the perceived mandate which the membership gives

to the JACC for finding worthy investments overseas. Similarly, the banks will expect that the JACC and its membership or both will involve themselves only in understandings where the outreach is realistic and enhances the commercial viability of the subprojects. Otherwise, the outreach would neither be desirable nor self-sustaining.

Advantages to AID in Using this Approach

There are numerous advantages for AID in using this project design.

Among the more important:

- Considerable leveraging potential. The \$2.5 million contributed by PRE would result in approximately \$22.5 million in capitalization for subprojects—a 9-to-1 factor under the assumptions outlined above.

- An alternative to almost total dependence within AID on intermediate financial institutions as delivery vehicles for AID private sector projects. The development impacts of intermediate financial institutions are often too diffused to properly evaluate; the suggested intervention is more narrowly directed and lends itself, subsequently, to more rigorous evaluation of development impacts.

- It mobilizes the private banks to do that which they excel at—case by case evaluation of creditworthiness, monitoring or remedial action as necessary; at the same time, AID may judge case by case on expected development impacts of a given subproject.

- A means to develop gradually a constituency among U.S. businessmen by involving them in AID activities, something AID has not done before.

- Most important of all, it is an intervention which allows AID to take an *active*, rather than passive role in identifying subprojects with high developmental benefits. ■

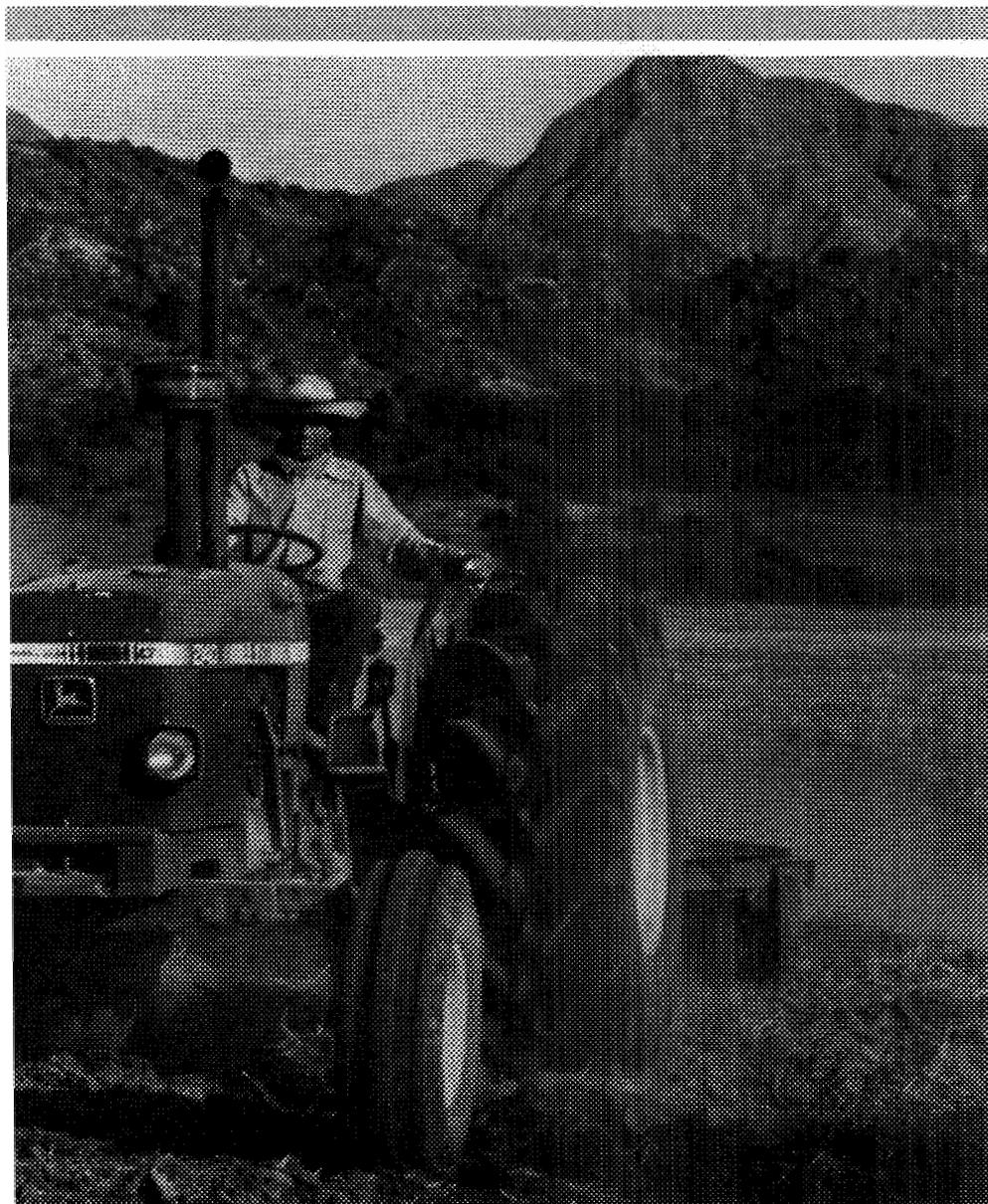
Robert Parra is director of the office of investment in AID's Bureau for Private Enterprise.

Notes and References

1. *Washington's Best-Kept Secrets: A U.S. Government Guide to International Business*, released by OPIC, details the various U.S. government programs available to U.S. companies wishing to do business overseas.

2. McGuire, E. Patrick, *Corporate Aid Programs in Twelve Less Developed Countries*, Report no. 834, Conference Board. Founded in 1916, the Conference Board is a global information and research network on management, economic, and public policy issues.

3. The first two of these involving corporate aid case studies in India and Turkey have been completed. The balance of the report will be completed by next month.

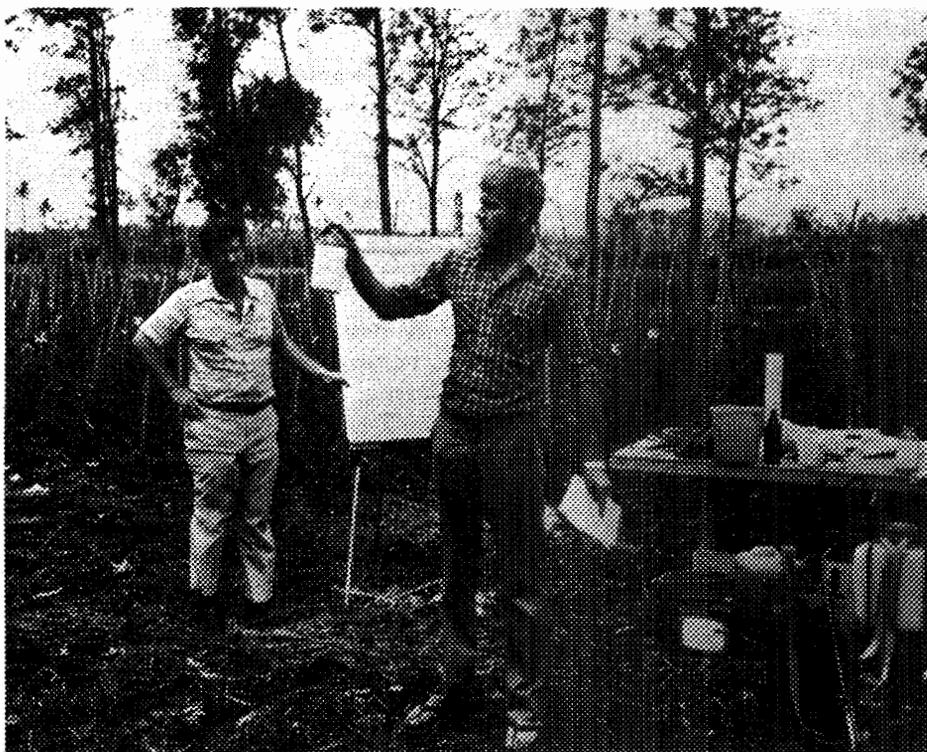


U.S. firms, such as the John Deere Co., design machinery especially for the smaller farms common to developing countries.

PESTS, PESTICIDES, & PEST by Robert M. Altman and Carroll Collier MANAGEMENT

By following sound policies and proper precautions, developing countries can produce more food *and* protect their people and the environment.





Experts predict that developing-country farmers will meet the increasing demand for food by shifting from current agricultural patterns to monoculture. As more farmers turn to growing a single crop, the natural balance of pest populations will change. Pests that previously went unnoticed will become problems. While total food production may increase due to intensified agriculture, the relative amount lost to pest damage will likely increase.

Farmers in the humid tropics of Latin America and Asia use pesticides to reduce crop losses. Unfortunately, there is little regulatory control of the chemicals; the general attitude is to let the buyer beware—in this case, the farmer. Farmers typically get information on how to use pesticides by word of mouth. The original source of this information frequently is a local vendor or pesticide supply store. Unlike in the United States, where pesticides are sold in special departments set away from foodstuffs, it is common in developing countries to find pesticides on the same shelf with packages of flour and sugar or children's clothing. Many of those pesticides are extremely toxic.

DDT, banned in the developed world for all but uses directly related to human health, often is sold to developing country users as a general "cure all" for urban and rural problems. Parathion, a deadly organophosphate, sold only to specially trained and certified applicators in the United States, is readily available as a 50% concentrate in a wide assortment of makeshift containers in developing countries. Less than a teaspoon of parathion can kill a healthy adult.

Frequently, pesticide container labels fail to alert users to safety measures, provide instructions on what to do in case of accidental poisoning, or explain how long to wait between treatment and harvest. Even where there is a proper label, the farmer may not be able to read it.

Other problems:

- Farmers often concoct special "home recipes," mixing several different types of pesticides.
- If a farmer gets information on using pesticides from the local pesticide store, it often is incorrect and biased in favor of the pesticide that offers the greatest margin of profit to the seller.
- Recommended rates and frequency of application may have no bearing on actual need.
- More often than not, farmers use pesticides after the pest has attacked the crop rather than on the basis of a threatened pest problem.
- Local entrepreneurs purchase bulk quantities of properly labeled pesticides from large, reputable suppliers conforming to local government regulations, and repackage them in smaller quantities. Typical containers for liquids are soft drink and beer bottles. Dusts and granular formulations are put in brown paper sacks or used plastic bags. The repackaged pesticides usually have inadequate labels or none at all. Repackaging is widespread and extremely difficult to regulate. In addition, the product the farmer buys is frequently diluted by the repackager for greater profit. Sometimes, the chemical is not the one represented by the seller.
- Farmers use pesticides without wearing protective clothing or using proper application equipment; they apply granular pesticides with their bare hands or spray liquids from defective, leaking sprayers. Rubber gloves, respirators, boots, aprons, and measuring equipment are virtually nonexistent.
- Storage areas for pesticide containers are rarely locked and often are in the same room where people eat or children play. Spray equipment is often rinsed in the same water used for bathing and drinking. Empty pesticide containers are re-



A common scene in rural areas in the Yemen Arab Republic.

cycled to store food or drinking water.

- If a farmer or member of his family is poisoned by pesticides, the local hospital or clinic may misdiagnose his symptoms. Pesticide-related deaths often go undetected. Statistics on pesticide poisoning in developing countries are conspicuously absent. There is reason to suspect, in some situations, that the perceived need for pesticides is so



Mixing incompatible pesticides, measuring imprecisely, and not wearing protective clothing are common mistakes.

great that reporting is less than honest for fear that special restrictions might be placed on the pesticide, thus making it difficult to obtain.

Adding to the magnitude of pesticide-use problems is escalating pest resistance. When a pesticide is used over a long period, especially in multiple applications at high rates, a gradual selection for resistance occurs. For example, since the introduction of DDT in the 1950s, more than 100 vector species of public health significance have become resistant to DDT and other pesticide groups.

As pests slowly develop resistance to pesticides, farmers apply increasing amounts to achieve results. The benefit-cost ratio of crop production to pesticide input is reduced and the farmer finds himself on a "chemical treadmill"—using more and more pesticides as crop yield diminishes.

This is the situation and these are the challenges facing AID as it tries to help developing countries increase food production.

In the early 1960s, AID policy stated that a sovereign state eligible



A poisonous mist lingers as fungicides are sprayed on cucumbers in a greenhouse in Jordan. The sprayer dangerously follows the same application practices regardless of chemical toxicity.

for U.S. foreign assistance should be able to purchase, with AID funds, any pesticide it desired and to dictate how the product should be used within its own borders. The policy assumed that recipient countries were willing and able to assume responsibility for protecting their citizens,

resources, and national interests. The policy did not take into account that pests and pesticide problems transcend national borders.

In the mid-1960s, a strong movement concerned with the quality and preservation of the environment began in the United States and other

countries as the effects of indiscriminate use of chemical pesticides received public attention. AID's request to the National Academy of Sciences (NAS) to review certain aspects of the U.S. bilateral aid program as to possible environmental effects resulted in general recom-

mentations for the agriculture and public health areas.)

In 1978, based on findings and recommendations presented in an AID environmental impact statement, and spurred by U.S. environmental groups, AID developed a pesticide policy which basically declared that it would help establish integrated pest management systems and procedures in which pesticides "will be used only when necessary. . . ." Guidelines also declared that it is AID policy to:

- "help develop infrastructures of developing countries for pest and pesticide management.
- "exert a greater degree of international leadership by communicating U.S. policies and experience on pest control and pesticide problems to other nations and international organizations.
- "discourage requests for pesticides unless they are to be used in economically and environmentally sound integrated pest management systems.
- "promote the use of available supplementary methods of vector control as well as development of new and improved supplementary or alternative methods which do not depend on the use of persistent pesticides, including such methods as source reduction, water management, larviciding, and biological control."

At the same time the policy was issued, AID developed regulations stating that when pesticides were to be used in a project, it would weigh risks against benefits and evaluate the effect of the pesticides on human health and on the environment. This is done for every AID agricultural project in which pesticides are involved.

To accomplish these goals, AID, through its Bureau for Science and Technology's Office of Agriculture, established the Pest Management and Related Environmental Protection project under contract with the

WHAT IS IPM?

Integrated Pest Management (IPM) is the use of a variety of methods to reduce pest damage to acceptable levels in crops while minimizing the overall unfavorable effects of various practices. IPM employs a wide range of biological, cultural, mechanical, and chemical techniques and offers maximum protection to the environment.

IPM programs are developed for each situation and are flexible. The design of the program depends on the pest complex, the crop being protected, and the resources available.

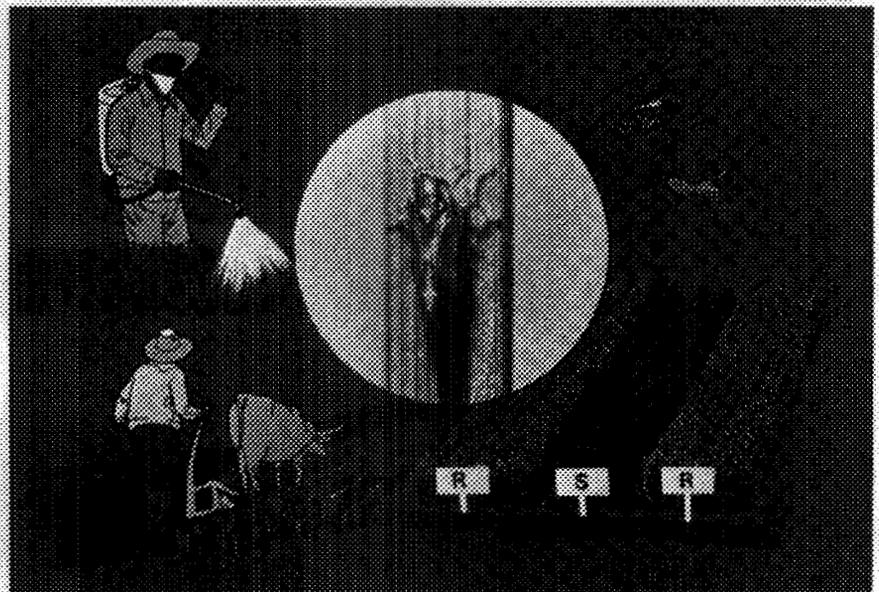
In developing a crop protection program, the pests that require attention must be determined. While a pest may be broadly defined as any organism that is not wanted in a given situation—viruses, bacteria, large woody plants, birds, and mammals—the major crop pests are weeds, insects, and diseases.

In any field crop situation, a

wide range of pests are always present and their numbers remain fairly stable over a long period. The population of each pest fluctuates around a level called the equilibrium position—an average density, which depends on the effects of parasites, predators, disease, weather, competition, food, and other factors. Fortunately, many pests do not cause enough damage to justify control.

Pests that frequently reach a high enough level to cause significant crop loss are called key pests. The key pests are identified by making assessments of the crop losses. Other pests may sometimes cause enough damage also to merit control; these are called secondary pests.

After identifying the key pests, the farmer considers the various control methods available and their relative effectiveness and cost. Ultimately, the decision to control the pest should depend on the economics of the situation.





Disregard for storage and disposal of containers could lead to tragedy.

shops are planned for Africa and Asia.

In addition to seminars and workshops, AID supports pesticide safety training programs such as the one developed by the University of Miami School of Medicine to train trainers to recognize and treat pesticide poisonings. Originally developed for medical and paramedical personnel, the course was pilot-tested in Jamaica and St. Lucia. Jamaica formed the Jamaican Agromedical Association, with members from the public and private sectors in the health and agriculture areas, to promote in-country pesticide safety programs. Jamaica recommends this approach to other developing countries.

AID also sponsored a "train-the-trainer" course aimed at subsistence farmers in developing countries. These farmers usually cannot read or write. Thus, labels and other written instructions are of little use. The training program, developed by Texas A&M University, makes liberal use of film strips and photographic materials to get the message across. Other training programs emphasizing pesticide safety in developing countries have been developed

by the World Health Organization and private sector organizations within the international agromedical community. Recently, AID co-hosted a workshop with the State Department and the National Agricultural Chemical Association in Washington, DC, where the results of these various training efforts were presented and plans made to exchange information.

AID also helps developing countries develop their capability to analyze pesticide residues in various environmental substrates, including human tissues and food samples. Chemists from AID-assisted countries take a six-week, intensive course in pesticide residue analysis at the University of Miami Pesticide Residue Analysis Facility. Back home, they participate in an international quality control program, submitting their analysis of specially prepared "unknown" samples to a central facility which informs them how well they identified the quantity, number, and identity of residues. Participating laboratories have code numbers; only the quality control coordinator knows their true identity.

In addition, AID is helping provide developing country regulatory

officials access to up-to-date technical information on toxicity, environmental properties, efficacy, and use information by collecting, collating, and indexing this type of information.

Several countries have expressed interest in standardizing pesticide registration requirements. Currently, each country develops its own laws and regulations relating to the impact, manufacture, formulation, distribution and use of pesticides. Some Latin American countries have agreed on uniform pesticide labeling, including the use of color codes to denote the toxicity category of the formulation. Other meetings, held by the Andean Pact countries and by Central American countries, have been sponsored by the InterAmerican Institute for Agricultural Science. Last year, the Food and Agriculture Organization sponsored an international conference.

Agriculture increasingly depends on pesticides for production and to reduce post-harvest food loss. It is apparent that problems related to the use of pesticides will continue to challenge agriculturalists and other scientists. Sound policies, proper precautions and procedures, new and better chemicals and cooperation between the government and the private sector will assure the protection of people and the environment while more food is grown to meet demand. ■

Robert M. Altman and Carroll Collier are pest management specialists in AID's Agricultural Production Division, Office of Agriculture, Bureau for Science and Technology.

Notes and References

1. See "Environmental Impact Statement on the AID Pest Management Program," Vol. 1 - Environmental Impact Statement, May 13, 1977, pp. 11-14.
2. Levine, R.S. and Davies, J.E. "Pesticide Toxicity and Mode of Action," *An Agromedical Approach to Pesticide Management, Some Health and Environmental Considerations*, pp. 92-98, edited by John E. Davies, Virgil H. Freed, and Fred W. Whittemore. Consortium for International Crop Protection, Berkeley, CA, 1982.

CONSORTIUM FOR INTERNATIONAL CROP PROTECTION

AID officers or contractors who need information about pesticides and pest management can call on the Consortium for International Crop Protection (CICP). CICP also can send—on very short notice—short- or long-term technical consultants to help design, coordinate, carry out, and evaluate pest management programs or troubleshoot problems concerning the handling and use of pesticides.

CICP, an AID-assisted nonprofit consortium of U.S. institutions was founded in 1978 to advance economically efficient and environmentally sound crop protection in developing countries. It is an outgrowth of an AID-sponsored University of California project, "Pest Management and Related Environmental Protection." It carries out its responsibilities in collaboration with AID, developing country institutions, and international organizations, such as the UN Food and Agriculture Organization, or one of the international agricultural research centers.

The consortium's specific objectives are:

- to increase and disseminate knowledge and understanding of integrated pest management, and the economic, social and education aspects of international crop protection;
- to promote a coordinated interdisciplinary approach toward improving pesticide management programs through the combined expertise of medical, nutritional and agricultural sciences; and
- to develop and maintain an overview of crop protection needs

and problems in developing countries with the objective of anticipating damaging pest outbreaks.

CICP draws from member institutions to provide technical assistance to help developing countries improve their institutional capability to develop and carry out effective crop protection programs. Experts include entomologists, plant pathologists, weed scientists, nematologists, vertebrate control specialists, agronomists, economists, system analysts, epidemiologists, and other health specialists, pesticide experts, chemists, and toxicologists. A computerized personnel data bank of more than 700 names is used to identify specialists to carry out tasks that demand the services of individuals with skills in given disciplines that have specific language capability, experience in a particular geographical region, and familiarity with a given crop or pest.

Other CICP services include a library of literature emphasizing international crop protection in developing countries, a comprehensive library of 35mm color slides, and a series of videotape cassettes on selected pest management topics. The consortium publishes a quarterly newsletter, *Pest Management News*, in Spanish and English and distributes it to 150 countries.

Member institutions include the Universities of California, Florida, Hawaii, Illinois, Maryland, Minnesota, Puerto Rico, and Purdue, Cornell University, North Carolina State University, Oregon State University, Texas A&M University, the Miami School of Medicine (Florida), and the U.S. Department of Agriculture.

For more information, contact Dr. Ray F. Smith, executive director, Consortium for International Crop Protection, 2288 Fulton St., Suite 310, Berkeley, CA 94704.



CICP trainers teach a short-course in pesticide safety in Tonga.

TECH TRANSFER

Wood-Saving Stove: A Hot Item

by Tom Lavell

A simple, portable metal stove developed in Upper Volta may soon be taking its place in the ranks as an important tool for helping West Africans reduce their fuelwood consumption. Wood in Sahelian countries is used mainly as fuel for cooking.

The UN Food and Agriculture Organization estimated 1975-level wood energy requirements in the Sahel at 16 million cubic meters. By the year 2000, this figure will more than double, with fast-growing Sahelian populations lacking the means to substitute petroleum-based fuels for wood. Efforts to reverse these trends have included planting trees and protecting them from animals; using pricing, regulatory and enforcement mechanisms to control wood production, marketing, and consumption (such as laws requiring commercial wood collectors to obtain permits); and encouraging families to use wood more efficiently in cooking.

Technicians from donor agencies and local sociologists have teamed up since the late 1970s to develop stove models that use less wood for cooking, are affordable, and do not require radical changes in cooking practices.

The portable metal stove, an offshoot of a traditional design used throughout Africa, and a similar model made of the same fired clay as traditional clay pots, have compared favorably with other models in efficiency tests. The tests were conducted at the Voltaic Institute for Energy in Ouagadougou, Upper Volta, with the assistance of Dr. Sam Baldwin, Volunteers in Technical Assistance (VITA) regional coordinator for the Permanent Interstate Committee Against Drought in the



Sahel (CILSS) stove program.

The new stove appears to be not only more energy efficient than most of the designs tested at the institute, but also may be easier to get into popular use since it can be marketed by traditional metal stove makers.

Variations of four major stoves were compared with the traditional three-stones used in Upper Volta and other West African countries to hold cooking pots over an open flame. The four models included two lightweight, chimneyless stoves, one made of sheet metal and the other ceramic, and three versions of "massive" stoves, which are hollow cement and clay structures or mud-sand forms carved with holes for one, two, or three pots.

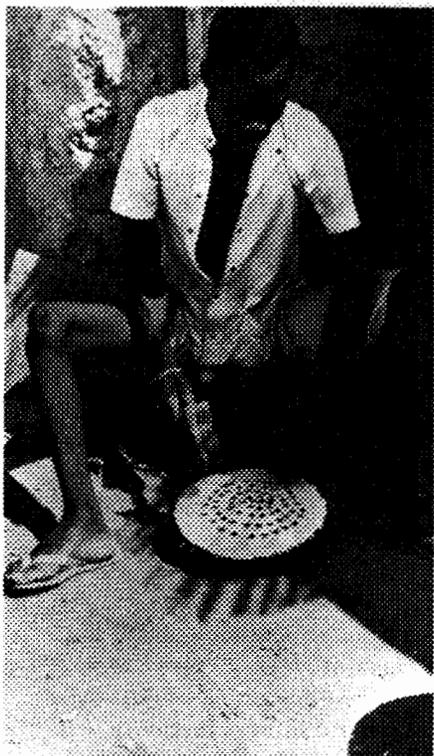
All the alternatives to traditional stoves were developed in Upper Volta, with support from AID and other donors, as part of a broad effort by countries of the Sahel region to deal with desertification and drought.

The improved stoves, whether

massive or portable, use cooking fuel more efficiently. Their walls focus more of the fire's heat onto the cooking pot than the three-stone system does. The stove walls also protect the fire from winds that make it burn less efficiently.

The metal stove design consists of a cylinder with a grate inserted above the stove bottom. The cooking pot rests on supports imbedded in the cylinder wall. These supports keep the pot about 5-6mm away from the cylinder wall, which, Baldwin says, permits heat rising from the stove fire to surround the pot and cook more efficiently. As wood burns on the grate, the air rising through the grate helps the fuel burn more efficiently.

The fired-clay stove is made with techniques that local craftspeople use to make the clay pots traditionally found in the West African countryside for storing water or cooking food. The stove is a cylinder, flared at the top where the pot rests. As in the metal stove, the fire is laid on a grate above the



bottom of the stove. Airholes are cut into the stove wall below the grate.

Laboratory tests were made to determine how efficiently different "massive" stove models could boil water. A stove's efficiency rating, called the percentage of heat utilized (PHU), is calculated by using the following formula:

$$PHU = \frac{(\text{Change in water temperature}) \times (\text{weight of water})}{(\text{initial weight of water}) \times 4.186 + (\text{evaporated}) \times 2,260} \div \frac{(\text{weight of wood burned} \times 18,000) + (\text{weight of charcoal}) \times 29,000}$$

The formula assumes that the latent heat of water evaporation is 2,260 Joules per gram, that the specific heat of water is 4.186 Joules per gram-degrees Celsius, and that the heat values of wood and charcoal are 18,000 and 29,000 Joules per gram, respectively. Weights are given in kilograms and all temperatures are given in Celsius.

The Voltaic energy institute tests showed a range of efficiencies. One-hole massive stoves demonstrated an average efficiency of 17%, a level that can be reached



Metal stoves can be easily produced by local artisans. A Voltaic woman tests the final product.

with the traditional three-stone fire. A group of two- and three-hole stoves with chimneys were found to average 22% efficiency. A two-hole massive stove without a chimney registered 27% efficiency.

These multi-hole stove test results may be misleading. The efficiencies of all the burners are added to obtain the total efficiency. In actual

use, cooking requirements may not allow full use of all the burners on these stoves, and, therefore, their effective efficiency may be considerably less.

The improved metal stove had an average efficiency of 29%—a significant improvement over the efficiency of traditional metal models which can be as high as 19%,



Part of the solution to dwindling fuelwood supplies in the Sahel is developing more efficient stoves.

according to Baldwin. The portable fired-clay model had a 36% efficiency rating.

The PHU test rates the model on boiling water, says Baldwin, not on how efficiently it cooks food. Since much of the cooking traditionally done on a three-stone fire involves bringing water to a boil, however, this test is used as one of several in the stove design process to characterize performance. In separate cooking efficiency tests, the improved metal stove showed a 40% wood economy, with 161 grams of wood needed to cook a kilogram of food. The traditional three-stone stove had a 268 gram wood/kilogram food ratio or 9%, while one- or two-hole massive stoves ranged between 242 gram wood/kilogram food and 551 gram wood/kilogram food.

While the metal and fired-clay stoves showed comparable efficiency ratings, Baldwin prefers the metal

stoves because they can be easily produced and are less likely to break than the fired-clay stove.

A report by Baldwin and Voltaic technicians Issoufou Ouedraogo and Georges Yameogo cites advantages that the portable stoves have over other models:

- The stoves are portable so that they may be moved indoors when it rains, or carried to other locations. (Massive stoves are built in place and are immobile.)
- The stoves are relatively easy to produce and sell. A single worker can make 12 to 15 improved metal stoves a day, compared with two or three massive stoves. The improved metal stoves may be easiest to sell in local markets, where traditional metal stoves are already available.
- Quality control is easier to maintain. While massive stoves must be constructed at the sites where they will be used, metal stoves can

be produced in a workshop, where their quality can be checked frequently. Improved metal stoves can be produced with the same techniques used to make traditional metal stoves. Producing massive stoves and fired-clay models requires specially trained workers.

• The relative cost of the stove is low. The improved metal stoves cost about \$2.85. By comparison, massive stoves with reinforced cement cost about ten times as much. Cost is likely to be the most compelling factor for residents of Voltaic cities, who may spend about 60 cents a day for wood. For villagers who collect their own wood, fuel costs are not a consideration, so market demand for the metal stoves may prove to be lower. Test-marketing of improved stoves to rural users therefore will emphasize the fuel economy and rapid cooking capability of the lightweight model.

Testing of improved stove designs continues. For example, a series of tests is underway to improve the lightweight models. Ways being examined are stove insulation to increase the amount of heat reflected onto the pot, and controlled airflow into the stove.

The technician's principal role at this point is to develop even more efficient prototypes. Institutions and individuals are already in place to assist with fabrication, marketing, and dissemination of the efficient stove models already developed. ■

Tom Lavell is a VITA volunteer. As a Peace Corps volunteer in Kaya, Upper Volta, Lavell helped publicize possible solutions to the fuelwood problem. Sam Baldwin's work is funded by AID's Office of the Sahel through a Renewable Energy Cooperative Agreement with VITA managed by AID's Office of Energy in the Bureau for Science and Technology.

BOOKCASE

Reorienting Development Agencies

Bureaucracy and the Poor: Closing the Gap

Edited by David C. Korten and Felipe B. Alfonso, Kumarian Press, West Hartford, CT, 1983; 258 pp. \$9.95 (paper).

A review by George Carner



After a decade of generally disappointing results, one may well wonder whether bureaucracies in developing countries are up to the task

of promoting broad-based development.

This book addresses this question from a management perspective and provides new insights into why development agencies have had difficulty in effectively reaching the poor.

The book is particularly timely given the current dissatisfaction with bureaucratic performance and questions about the public sector's role in development. It is especially relevant to understanding the institutional development challenges of the 1980s.

The authors in this collection of case studies document developing country experiences with implementing poverty-focused programs in Asia, Latin America, and Africa. Collectively, they illustrate how ill-suited conventional institutional structures and procedures are to the demands of broad-based development strategies. The authors explicitly challenge the prevailing organizational model "which assumes that the major planning decisions will be made centrally based on economic analysis pre-

pared by highly trained technicians, resulting in project plans which will be implemented by subordinate agencies according to predetermined schedules and procedures." They advocate a fundamental re-orientation of current structures and procedures in ways that support people's efforts to help themselves. These reforms are not to be grafted uniformly on to all institutions but "evolved" from within each institution in line with its experience, capacities, and needs.

People are viewed as both the central focus and the prime resource for development. With this focus in mind, the authors provide specific guidelines based on field experience on how to build within development agencies the new capacities required to work in a people-centered way.

The book is well organized around several key themes that facilitate a synthesis of the rich case material presented.

Part I looks at the imperfect fit between "holistic" rural development strategies as applied in Central America and the structures of the implementing organization. It introduces the broad outline of what is needed to make improvements.

Part II compares India's experience in health systems organization and the Philippines' experience with communal irrigation development on how to make individual implementing agencies more responsive to their clientele. One important conclusion is that an explicit strategy of organizational change must be formulated in order to align procedures and personnel incentives to the demands of more responsive development strategies.

Part III identifies the new role for development managers in implementing programs that involve several agencies. Whether as minister of agriculture in the Philippines or district officer in

India, the case studies suggest that the development manager must assume the role of systems manager. The effective systems manager relies on "skills in reducing a complex system to its constituent elements, recognizing the logic of their interaction and locating the point of maximum leverage to alter the system's functioning. . . ." The systems manager in coordinating activities across several organizations has to look beyond formal authority to mobilize needed support. The middle manager cannot function simply as a messenger in this system. The systems manager must see that agency personnel become facilitators and capacity builders for action by their clients.

Part IV explores the reforms needed at the highest levels of management to ensure a conducive framework for rural development policy and action. Drawing on Indian and Tanzanian experiences, a strong case is made for decentralizing project choices to the lowest possible levels. This allows plans to be derived from a detailed understanding of the local determinants of poverty affecting defined target groups. Attention to differentiating client groups is important in dispelling the common misconception that the poor are homogeneous with needs that can be addressed through standardized programs. Effective programs must be tailored to the specific needs and resources of different groups.

Part V exposes the biases in current planning frameworks (urban vs. rural, experts' knowledge vs. people's preferences, economic vs. social needs). The case of Indian food distribution and production serves to illustrate how programs might be more effective if the poor were viewed as consumers as well as producers.

Part VI underscores a central theme of the book—that "government action must be oriented less to doing things for the poor and more to encouraging and facilitating their efforts to do more for themselves." This involves designing interventions that build upon the knowledge, resources, and needs of the intended beneficiaries.

One article lists the obstacles to participation found within implementing agencies, communities, and other institutions in the broader society and suggests ways to overcome them. While the other article in this section presents examples of different planning methodologies and a learning process approach to participatory development.

Part VII serves as a postscript. It focuses on the management institutes that have supported the research reported in this volume. It recommends re-examination of their roles and structures so they can better support development agencies in furthering people-centered development strategies. It challenges the management institutes to create more appropriate research methodologies and management technologies which may not fit the new strategies.

For all the diversity in the case studies in this volume, the wealth of ideas, and the many critical issues raised, there is a powerful message in them all—development requires more than favorable policies and investment allocations. It requires new programming methodologies, new institutional capacities, imaginative leadership, new management technologies and continuous learning from experience. This recognition has implications not only for developing country governments but for donors as well. ■

George Curner is a program officer in AID's Asia Bureau.

CARD CATALOGUE

Costs of Agricultural Lending, Institutional Viability, and Lender Behavior in Jamaica

Obène Owusu Nyanin
Ohio State University; AID, Bureau for Science and Technology
1982, 159 pp.

Documents lending costs of Jamaica Development Bank's (JDB) Self-Supporting Farmers' Development Program (SSFDP). Assesses the financial viability and credit rationing behavior of SSFDP in light of interest rate controls and inflation. Results show high costs with low interest rates have compromised SSFDP's financial viability and growth potential. Author abstract included.

Paper copy \$23.40
Microfiche \$ 2.16
PN-AAL-822

Biology and Culture of Tilapia

R.S.V. Pullin; R.H. Lowe-McConnell
International Center for Living Aquatic Resources Management
1982, 432 pp.

The conference proceedings of biologists and culturists who reviewed data and research on *tilapia*, an African fish which is a major source of protein. Research needs for improving *tilapia* culture are defined. A list of future research requirements, references, conference participants, and a general index are included.

Paper copy \$56.81
Microfiche \$ 5.40
PN-AAK-986

CHEMRAWN II: Conference Handbook and Abstracts

International Union of Pure and Applied Chemistry; International Rice Research Institute
1982, 114 pp.

The second conference on Chemical Research Applied to World Needs addressed technical, political, environmental, and human aspects of the world food problem. Topics include using chemistry and

biochemistry in improving animal production systems, developing new and improved food systems, and processing and storing food.

Paper copy \$15.21
Microfiche \$ 2.16
PN-AAL-952

Comparative Analysis of Cropping Systems: An Exploratory Study of 11 Rainfed Sites in the Philippines

T.R. Paris; E.C. Price; S.K. Jayasuriya
International Rice Research Institute
1982, 17 pp.

Data, collected at 14 sites in four agroclimatic zones in the Philippines, were analyzed using tabular analysis, multiple regression and other statistical techniques to examine the adaptation of cropping systems to the environment. An author abstract is included.

Paper copy \$2.34
Microfiche \$1.08
PN-AAL-860

Workshop for the Provincial Waterworks Authority of Thailand: Team Building for Management

Daniel B. Edwards
AID, Bureau for Science and Technology
1983, 100 pp.

A workshop held for executives of the Provincial Waterworks Authority (PWA) to address problems of water distribution and management. Topics include staffing, decision making, role clarification, communication, performance guidelines, and assessing training needs. A team building/training model for PWA's use at top management and regional levels is given.

Paper copy \$14.17
Microfiche \$ 2.16
PN-AAL-984

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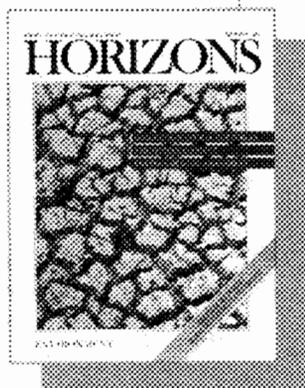
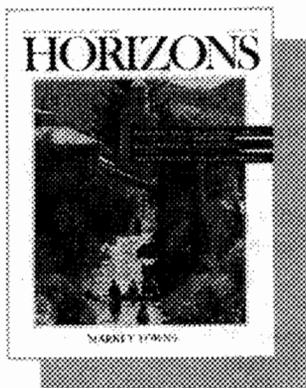
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by M. Peter McPherson
(May)

Integrating Women into Development
by Deborah Ross Purcell
(July/August)

Policy Profiles
by Edwin L. Hullander
(July/August)

Social Sciences and Public Policy in the Developing World
Edited by Laurence D. Stifel, Ralph K. Davidson, and James S. Coleman
Review by Ann Van Dusen
(January)
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Strengthening Agricultural Research in Developing Countries
by Josette Murphy

(June)
Lessons Learned

U.S. Foreign Aid—An Assessment of New and Traditional Development Strategies
by Elliott R. Morss and Victoria A. Morss
Review by Salvatore Schiavo-Campo
(January)
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POPULATION

New Population Director Named
(June)
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PRIVATE ENTERPRISE

AID Helps Launch Latin American Investment Firm
(November)
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AID Loan Helps Private Investment in Agriculture
(June)
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AID Loans Boost Business and Development
(December)
Business

AID's Private Enterprise Bureau Issues Annual Report
(November)
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Assistance By-Products
by Melvin G. Blase
(April)
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Banking on Development
by Robert Parra
(December)

Caribbean Investment Missions Accomplished
(February)
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Changing Employment Pattern in the Developing World
(September)
Business

Consultants As Exports
(July/August)
Business

Data Banks for Development Mean Business
by Ellen Clifford
(November)
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Developing Income-Generating Opportunity for Rural Women
by Martha Lewis
(January)

Egypt and International Harvester Sign \$5.2 Million Truck Contract
(July/August)
Business

Egypt's Al Ahram to Buy U.S. Equipment
(March)
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Existing, Not New Businesses May Show Most Profit
(January)
Business

Firms Show Interest in Haiti
(March)
Business

Food Aid Means U.S. Business
(October)
Business

Guinea: Ripe for Investment
by Pamela Stallsmith
(October)
Business

Honduras: Setting the Stage for New Markets
(February)
Business

International Corporate Courting
(February)
Business

International Terrorist Information
(February)
Business

LDC Experience with the Private Sector Conference
by Rose Jourdain
(January)

Much of AID Funds Tied to Private Sector
(February)
Business

Partnership, Participation and Profits: Formula for Success in Turkey

by Thomas W. Casstevens
(July/August)
Lessons Learned

**Pedal Pushing Ped-
diers and Other Small
Businessmen**
by Michael Farbman
(April)

**Private Enterprise
Pamphlets**
(January)
Business

Rice Husks Into Logs
by Jerry Lundquist
(September)
Tech Transfer

Setting Sights High
by Paulyette Rogers-Hunter
(September)

**Teamwork: Making
Business Grow**
(November)
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**Technology Fair Gen-
erates New Business**
(January)
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**Toning Up Business for
the Health of It**
(December)
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**Turning a Profit on
Tradition**
(January)
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**Urban Informal Sector
in Developing Coun-
tries—Employment,
Poverty and Environ-
ment**
Edited by S.V. Sethuraman
Review by Michael Farbman
(February)
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**U.S. Companies Help
Food Processors**
(March)
Business

**U.S. Company Restor-
ing Phones in Lebanon**
(July/August)
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**U.S. Firms in Fight
Against Pollution**
(March)
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**U.S. Foreign Aid Pro-
gram Will Help Link
Chicago Businesses
with Caribbean Basin**
(January)
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Volunteer Executives

**Troubleshoot for LDC
Firms**
by James F. Bednar
(May)
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**Women Given Start in
Small Business**
by Sally Rudney
(June)
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**Workshops Spotlight
Tech Transfer Process**
(July/August)
Business

PRIVATE VOLUNTARY ORGANIZATIONS

**Four U.S. Coopera-
tives Receive \$3.15
Million in AID Grants
(March)**
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**Grant to Catholic Re-
lief Services Helps
Lebanon Rebuild**
(July/August)
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**McPherson Appoints
New Members to Advi-
sory Committee on
Voluntary Foreign Aid**
(April)
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**PVO Advisory Commit-
tee Takes A First-Hand
Look**
by Angela Wright
(May)

PUBLICATIONS

**Adventure in
Applied Science—A
History of the Inter-
national Rice Research
Institute**

by Robert F. Chandler Jr.
Review by Wall Rockwood
(June)
Bookcase

**AID's Private Enter-
prise Bureau Issues
Annual Report**
(November)
Business

**Bureaucracy and the
Poor: Closing the Gap**
Edited by David C. Korten and
Felipe B. Alfonso
Review by George Carner
(December)
Bookcase

**Development and
Underdevelopment in**

**Historical Perspective:
Populism, Nationalism
and Industrialization**
by Gavin Kitching
Review by Marijes Backhaus
(February)
Bookcase

**Energy Planning in
Developing Countries:
A Study of Bangladesh**
by Russell J. deLucia, Henry
D. Jacoby et al.
Review by Robert Ichord Jr.
(November)
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**Food for Peace: U.S.
Food Assistance to
India**
by Devki Nandan Prasad
Review by Donald G.
McClelland
(April)
Bookcase

**Hair Sheep of Western
Africa and the Ameri-
cas: A Genetic Re-
source for the Tropics**
Edited by H. A. Fitzhugh and
G. E. Bradford
Review by Charles E. Haines
(July/August)
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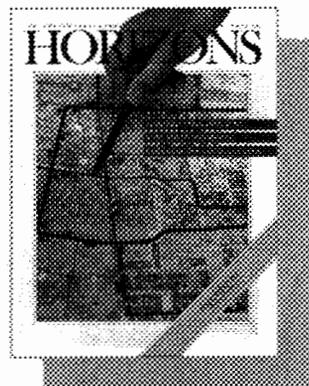
**Livestock in Asia:
Issues and Policies**
Edited by Jeffrey C. Fine and
Raiph G. Lattimore
Review by Douglas W.
Butchart
(March)
Bookcase

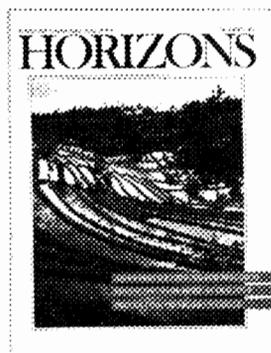
**Managing Induced
Rural Development**
by Jon R. Moris
Review by Stephen M.
Goldstein
(April)
Bookcase

**Nutrition Bibliograph-
ies from Canada**
(February)
Academe

**Pakistan: Energy Plan-
ning in a Strategic
Vortex**
by Charles K. Ebinger
Review by Robert Ichord Jr.
(November)
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**Progress in Rural Ex-
tension and Communi-
ty Development**
Edited by Gwyn E. Jones and
Maurice J. Rolfs
Review by Eric Chetwynd Jr.
(September)
Bookcase





Redesigning Rural Development: A Strategic Perspective

by Bruce F. Johnston and William C. Clark
Review by L. Richard Meyers and Kenneth G. Swanberg
(March)
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Social Sciences and Public Policy in the Developing World

Edited by Laurence D. Stitel, Ralph K. Davidson, and James S. Coleman
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Structure of Wages in Latin American Manufacturing Industries

by Jorge Salazar-Carrillo, with Juan J. Butfari, Francisco J. Ortega, and Aldalberto Garcia Rocha
Review by John R. Eriksson
(July/August)
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Urban Informal Sector in Developing Countries—Employment, Poverty and Environment

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RURAL DEVELOPMENT

AID/Africare Enter Final Phase of Rural Development Project

(January)
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Integrating Rural Development in Niger

by Roger Wall
(May)

Issues in Rural Development

by Donald G. McClelland
(February)

Managing Induced Rural Development

by Jon R. Moris
Review by Stephen M. Goldstein
(April)
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Progress in Rural Extension and Community Development

Edited by Gwyn E. Jones and Maurice J. Rolls
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Regional Analysis, Market Towns and Rural Development

by Eric Chetwynd Jr.
(January)

SCIENCE AND TECHNOLOGY

Adventure in Applied Science—A History of the International Rice Research Institute

by Robert F. Chandler Jr.
Review by Walt Rockwood
(June)
Bookcase

AID Funds Maintenance Training in Latin America

(May)
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Biotechnology: Accelerating Development

by John Daly
(November)

Chemistry and the World Food Supply

by John Daly
(March)

Expanding Opportunities For A Healthy World

by Alexanderina Shuier
(November)

Information Revolution

by John Daly
(February)

Joint Indo-U.S. Scientific Task Force to be Formed

(January)
AID Bulletin

Miracle Trees: Reality or Myth?

by Michael Benga
(June)

“New” Biotechnology in International Agricultural Development

by Walt Rockwood
(November)

Pumping Made Easier, Cheaper

(June)
Tech Transfer

Science Fair First

by Sharon Isralow
(March)

Space Age Technology Explored

(April)
AID Bulletin

Windmills Enter the Computer Age

by David Jarmul
(October)
Tech Transfer

Wood-Saving Stoves: A Hot Item

by Tom Lavell
(December)
Tech Transfer

WOMEN IN DEVELOPMENT

Developing Income Generating Opportunity for Rural Women

by Martha Lewis
(January)

First Annual Conference Reviews WID Experience

(December)
AID Bulletin

Integrating Women into Development

by Deborah Ross Purcell
(July/August)

Women Given Start in Small Business

by Sally Rudney
(June)
Business

WID Takes Center Stage at Title XII Seminar

(December)
Academe

Women—Partners in Development Program to Provide Training Skills

(January)
AID Bulletin

INTERNATIONAL CALENDAR

DECEMBER

15-16 Advisory Committee on Voluntary Foreign Aid, State Department, Washington, DC. The two major themes are development education and PVO/corporate relations. Contact: Sherry Grossman, 235-2708, Room 227, SA-8, AID, Washington, DC 20523

JANUARY

International Symposium on Post-harvest Technology of Agricultural Products, Taipei, Taiwan. Contact: Council for Agricultural Planning and Development, 37 Nanhai Rd., Taipei, Taiwan; or Food and Fertilizer Technology Center for the Asian and Pacific Region, 5th floor, 14 Wenchow St., Taipei, Taiwan

3-5 Conference on Weed Control and Vegetation Management in Forest and Amenity Areas, sponsored by Nottingham University, U.K. Contact: D. J. Turner, ARC Weed Research Organization, Begbroke Hill, Yarnton, Oxford, U.K. OX5 1PF

4-5 Board for International Food and Agricultural Development (BIFAD) meeting, sponsored by AID, Washington, DC. Contact: John Rothberg, AID/BIFAD, Room 5318, Washington, DC; telephone (202) 632-0228

9-12 International Workshop on Mosquito Ecology, sponsored by Welaka Research and Education Center, University of Florida, Welaka, FL. Contact: Mosquito Ecology Workshop, Florida Medical Entomology Laboratory, 200 9th St. SE, Vero Beach, FL 32962; telephone (305) 562-5435

13-Apr. 18 Seventh International Course on Seed Technology for Vegetable Crops, sponsored by the University of the Philippines, Los Banos, the Philippines. Contact: The Directorate, International Training Program on Seed Technology, PO Box 430, College, Laguna 3720, the Philippines

23-29 AID Africa Mission Directors conference, Kigali, Rwanda. Contact: Charles Christian, AID/AFR/PMR, Room 2744, Washington, DC 20523; telephone (202) 632-1783

26-27 Computers for Health workshop, sponsored by the National Council for International Health, Washington, DC. Contact: NCIH,

2100 Pennsylvania Ave. NW, Suite 740, Washington, DC 20037; telephone (202) 466-4740

FEBRUARY

1-2 Board for International Food and Agricultural Development (BIFAD) meeting, sponsored by AID, Washington, DC. Contact: John Rothberg, AID/BIFAD, Room 5318, Washington, DC; telephone (202) 632-0228

6-9 ASEAN Horticulture Working Group meeting, Kuala Lumpur, Malaysia. Contact: ASEAN Food Handling Bureau, Syed Kechik Foundation Building, Bangsar, Kuala Lumpur, Malaysia

6-10 Weed Science Society of America annual meeting, Miami, FL. Contact: C. J. Cruse, Executive Secretary, 425 Illinois Building, 113 North Neil St., Champaign, IL 61820

16-18 Health Promotion in the Workplace workshop, sponsored by the National Council for International Health, Orlando, FL. Contact: Barbara Kohl, Conference Coordinator, NCIH, 2100 Pennsylvania Ave. NW, Suite 740, Washington, DC 20037; telephone (202) 466-4740

19-24 Fourth International Conference of the World Federation of Public Health Associations. The theme is "Quest for Community Health: Experiences in Primary Care," Jerusalem, Israel. Contact: WFPHA Secretariat, c/o American Public Health Association, 1015 15th St. NW, Washington, DC 20005; telephone (202) 789-5690

20-24 Second Congress of Integrated Pest Management, Guatemala City, Guatemala. Contact: Edgar Rios Munoz, Conference Coordinator, 30 Calle 11-42, Zona 12, Guatemala City, Guatemala

23-24 Joint Committee on Agricultural Research and Development (JCARD) meeting, sponsored by AID, Washington, DC. Contact: John Stovall, AID/BIFAD, Room 5316, Washington, DC 20523; telephone (202) 632-8532

27-Mar. 9 Pre-departure Orientation workshop for university faculty, administrators, and others involved in designing, managing or carrying out

AID technical assistance projects in developing countries, sponsored by AID and the Board for International Food and Agricultural Development, Honolulu, HI. Contact: Harold McArthur, College of Tropical Agriculture and Human Resources, University of Hawaii, 3050 Maile Way, Honolulu, HI 96822; telephone (808) 948-6441

MARCH

Seminar on "Unaccompanied Refugee Children," sponsored by the European Consultation on Refugees and Exiles, and hosted by the German branch of the International Social Service, Federal Republic of Germany. Contact: The European Consultation on Refugees and Exiles, Singel 106, 1015 Amsterdam, the Netherlands

5-30 U.S. Geological Survey course in Geologic and Hydrologic Hazards, sponsored by U.S. Geological Survey and AID's Office of Foreign Disaster Assistance, Denver, CO. Contact: AID/OFDA, Room 1262, Washington, DC 20523

6-8 ASEAN Fish Working Group meeting, Singapore. Contact: ASEAN Food Handling Bureau, Syed Kechik Foundation Building, Bangsar, Kuala Lumpur, Malaysia

6-8 Eleventh Vertebrate Pest conference, Sacramento, CA. Contact: Richard W. DeHaven, Dixon Field Station, DWRC, 6924 Tremont Road, Dixon, CA 95620

7-8 Board for International Food and Agricultural Development (BIFAD) meeting, sponsored by AID, Washington, DC. Contact: John Rothberg, AID/BIFAD, Room 5318, Washington, DC; telephone (202) 632-0228

12-21 Thirty-third meeting of the technical advisory committee (TAC) of the Consultative Group on International Agricultural Research (CGIAR), Rome, Italy. Contact: CGIAR Secretariat, 1818 H St. NW, Washington, DC 20433

Any additions or corrections should be sent at least three months in advance of the event to International Calendar, Horizons, Room 4890 NS, Washington, DC 20523 or telephone (202) 632-4330.

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