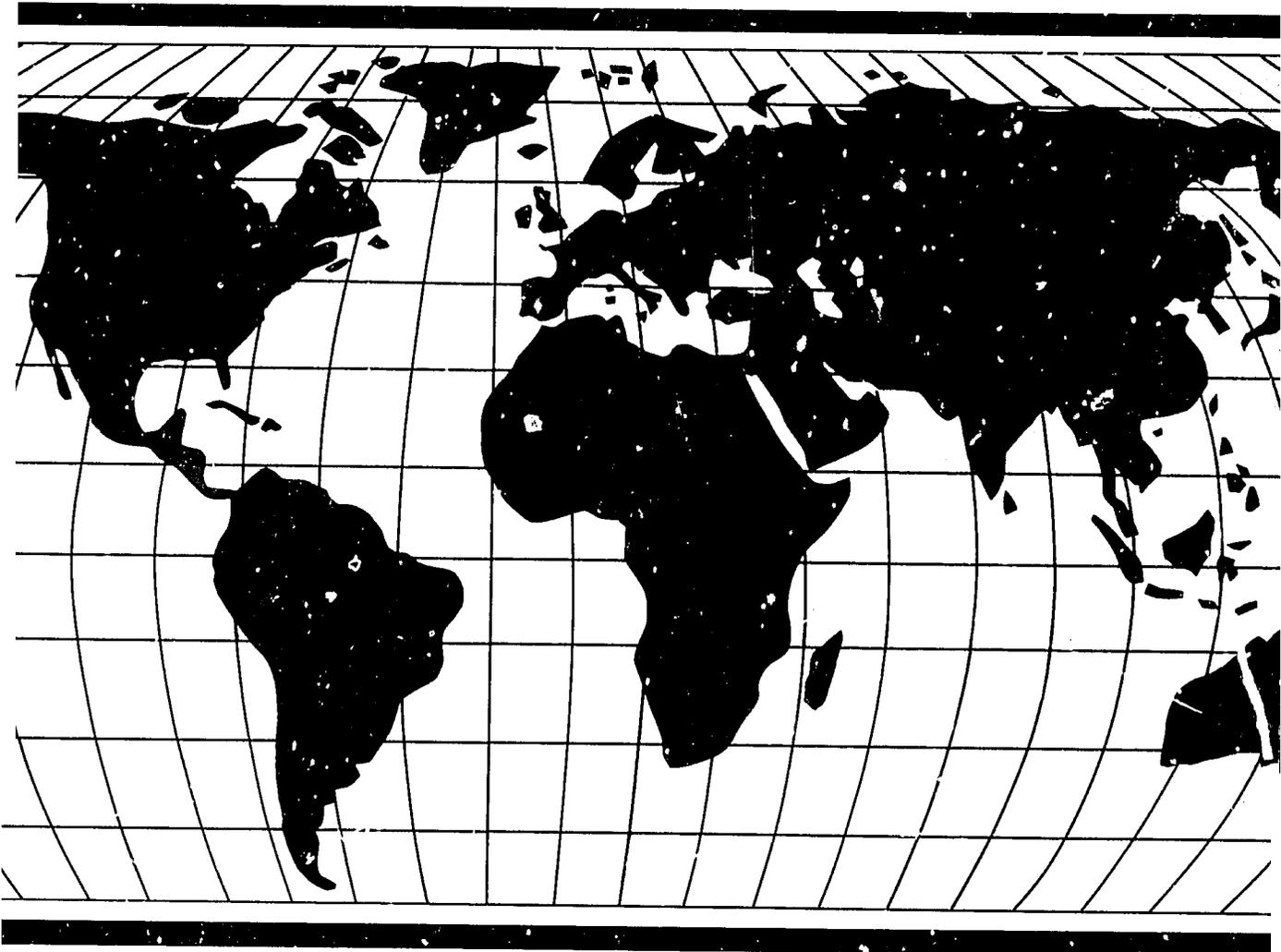


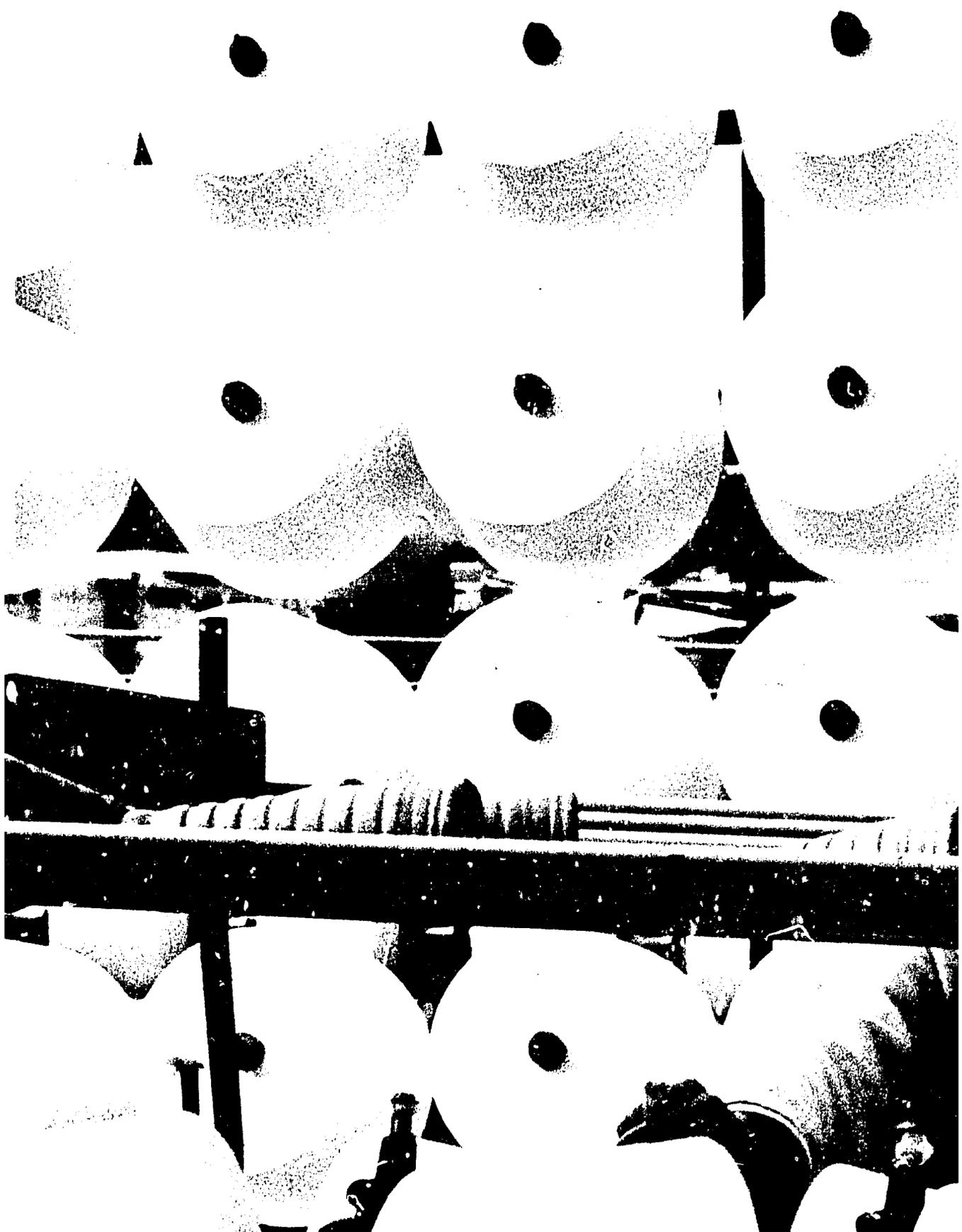
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iaods

Report/1980



**INTERNATIONAL AGRICULTURAL
DEVELOPMENT SERVICE**



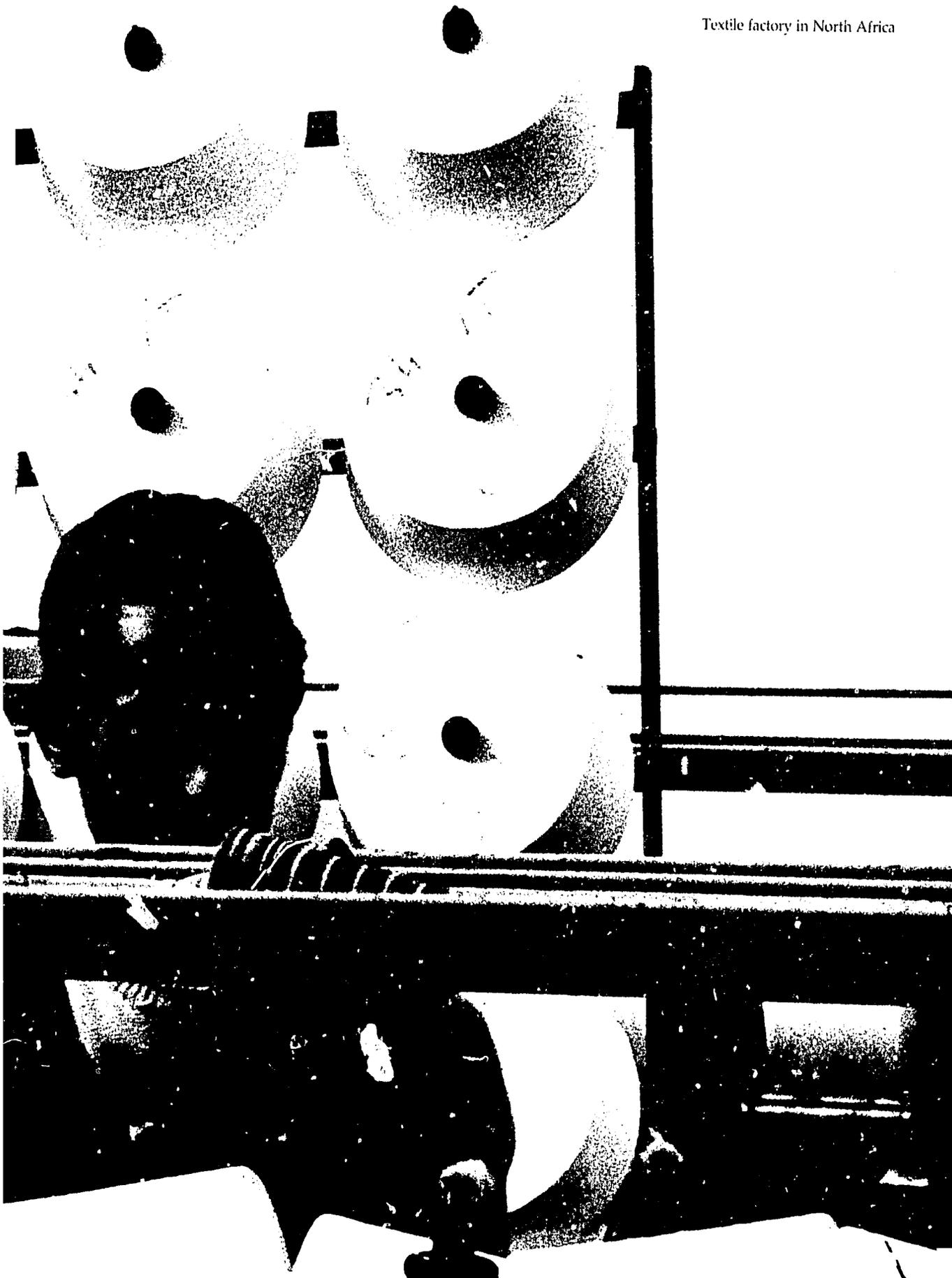


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1981

International Agricultural Development Service
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11

**INTERNATIONAL AGRICULTURAL
DEVELOPMENT SERVICE**

Report/1980

Preface

In 1980, the International Agricultural Development Service completed its fifth year. IADS is a nonprofit organization devoted to helping developing nations increase production of crops and livestock and raise rural incomes. It offers assistance in agricultural planning, strengthening research systems, training personnel, and implementing production programs.

During 1980, about 30 specialists supplied by IADS were working for national agencies in Bangladesh, Botswana, Ecuador, Indonesia, and Nepal. In addition, IADS provided about 60 short-term consultants to 17 countries.

IADS can consult with governments, on request, without charge. Other services can be provided at cost when a government requests them, provided that IADS capabilities are appropriate, that there is an agreed program of work, that suitable financing is available, and that the IADS Board of Trustees approves.

IADS may receive funds from any source to assist any nation or to support developing nations collectively through programs of research, training, and information exchange. IADS is autonomous and nonpolitical.

In this, the fifth annual report of IADS, the essays were written by Bill C. Wright, Francis C. Byrnes, Sterling Wortman, and Edward L. Felton, jr. and John Edmunds.

If you have comments or questions about the activities of IADS, I invite you to write to me.

A. Colin McClung, *president*

11

Contents

IADS: The first five years	1
Trends in development assistance for agriculture	13
Business, industry, and agricultural development	21
Improving the climate for private-sector participation in agricultural development	29
IADS in 1980	43
Bangladesh	48
Botswana	51
Brazil	52
Colombia	52
Dominican Republic	53
Ecuador	54
Egypt	59
Ghana	60
Haiti	60
Indonesia	60
Morocco	66
Nepal	67
Peru	74
Philippines	74
Sierra Leone	75
Swaziland	75
Turkey	75
Uganda	75
Leadership development	76
Publications	80
Liaison	85
Administrative developments	89
Financial statements	93

LISTS

Trustees, <i>vii</i>
Staff, <i>viii</i>
Food shortages, 1980, 3
Countries served by IADS, 1975-80, 6
Consultants, 44
Bangladesh research review team, 48
Brazil project preparation team, 52
Peru ministerial team, 75
Philippine research management review, 75
Uganda agricultural assessment, 75
Authors of papers, Yogyakarta workshop, 76
Fellowships, 78



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November 1980

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From left:

Rodríguez Adame, Hardin, Yeutter
Trietz, Havener, Harrar, Pino
Barco, Schultz, Hannah, Camus
Drilon, Wortman, McClung

Vii

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John Bolton, agronomist
Danilo G. Malabuyo, administrative specialist
D. N. Sharma, agricultural engineer
Kent Shortt, assistant agronomist
Lyle C. Sikka, potato specialist
Don Sternitzke†, assistant agricultural engineer
C. Geoffrey Swenson, agricultural economist
Roger Whaley‡, assistant agronomist

Botswana

Kristian Oland, director, agricultural research

Ecuador

Gustavo A. Morales, project supervisor; specialist in poultry pathology
Saul Camacho, specialist in fruits
Loyd Johnson, rice specialist
Sam Portch‡, soils specialist
Wilfredo Salhuana, biometrician

Indonesia

National agricultural research

Edwin B. Oyer, project specialist
Emiterio V. Aggasid, administration and civil works officer
Ernesto B. Farre, financial officer
Mason Marvel, research specialist
J. Keith Templeton, program specialist (rubber)
J. A. T. Woodford, research specialist (entomology)

Sumatra agricultural research

F. Jameson Bell, project specialist; team leader
Genaro D. Revilleza, administrative officer
Jack D. Traywick, farm development specialist

Nepal

Integrated cereals project

Wayne H. Freeman, project supervisor
M. Akram Khan, agronomist (wheat)
A. Hugo Manzano, senior cropping systems agronomist
Eduardo R. Perdon, senior production agronomist
Shiro Samoto, plant breeder (rice)
Kenneth Sayre, agronomist (maize)
Marlin G. Van Der Veen, agricultural economist

Seed project

Russell H. Bradley, project supervisor

USA

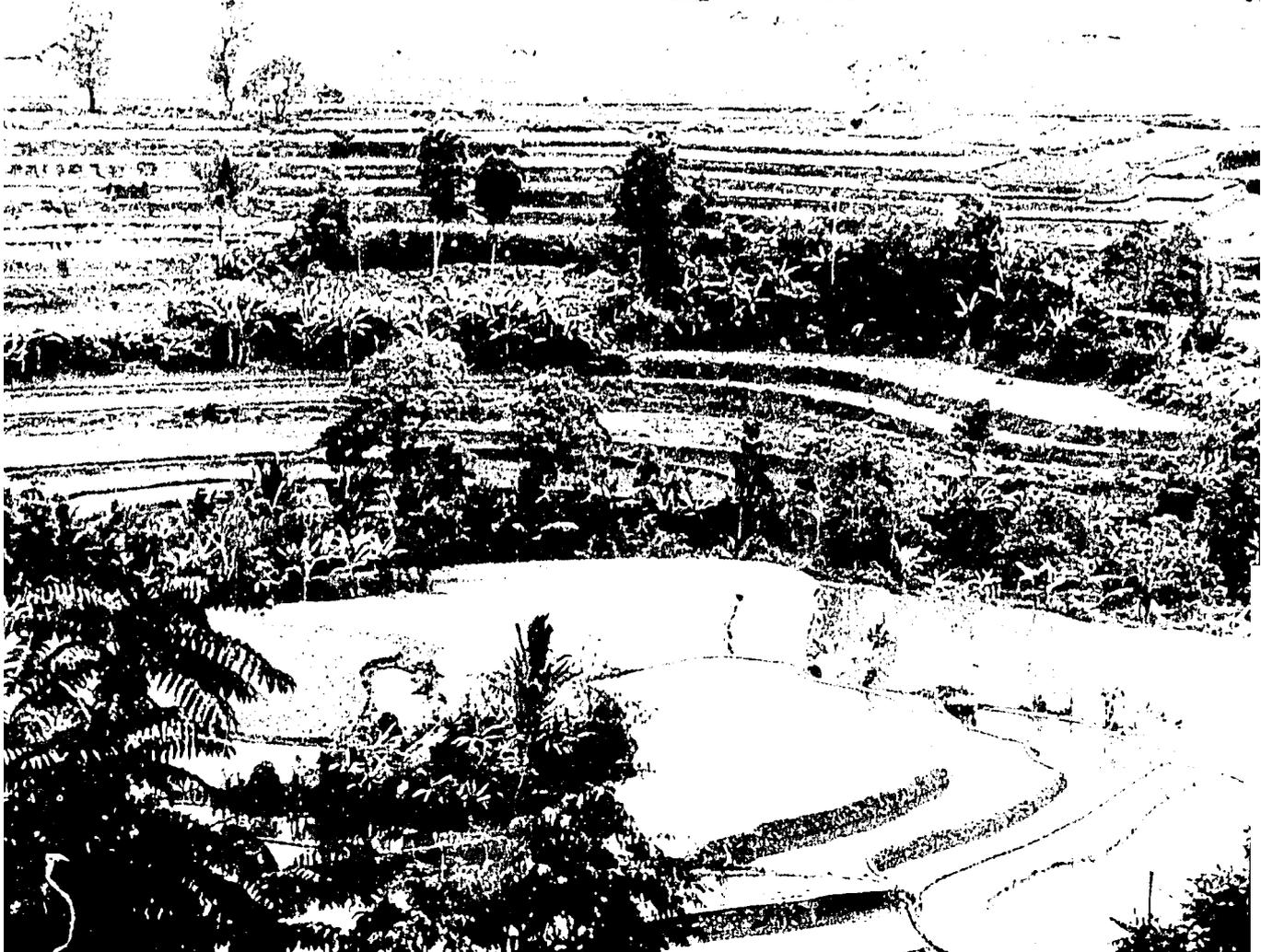
U. J. Grant, on assignment at Oklahoma State University

* Based in Kenya.

** On part-time assignment from the Rockefeller Foundation.

† Assigned under IADS agreement with the Mennonite Central Committee, USA.

‡ Assigned under IADS subcontract with Agro-Science Environmental Institute, USA.



IADS: The First Five Years

(facing) Cropping patterns in Sumatra are as varied as the terrain.

The generation and spread of technology is recognized as a critical element for increasing agricultural productivity and rural incomes.

IADS began operation in 1975. In the 5 years since then, IADS has undertaken a wide variety of services for developing countries and for organizations that assist developing countries. The following vignettes illustrate the kinds of services IADS has performed.

Eight hours into the African night, the caravan—two minibuses and a Land Rover—stopped at a small hotel in the Kenyan highlands near the Uganda border. The 10 travelers, including three consultants engaged by IADS, had left Nairobi at dusk, stopping on the outskirts to purchase a month's supply of cheese and other nonperishable foods.

It was 3 a.m., January 18, 1980. Just 4 days earlier the IADS consultants had landed at Nairobi to prepare for the mission. The Kenya capital was serving as the staging area for missions to Uganda as most airlines had not yet restored regular service to Entebbe. Communications between the ravaged country and the outside world remained erratic. Besides, it was prudent to bring in food to avoid competing for scanty supplies in the markets of Uganda.

"The challenge is to listen to, and learn from, farmers, encouraging them to express their categories, meanings, and priorities, and treating them not just as professional colleagues and collaborators, but as teachers."

Robert Chambers

After a few hours of sleep, the group continued its journey, crossed the border into Uganda, and arrived at Kampala, the capital city, in early afternoon.

For the IADS consultants, it was the beginning of an arduous 4 weeks during which they visited 20 of the 33 districts of Uganda and produced a 400-page draft assessment of the agricultural situation. At the end of the period, the team leader went directly from East Africa to IADS headquarters in New York, where he edited the draft report and wrote a 60-page summary. The finished documents reached Nairobi by air on March 8. From the day that IADS was asked to put together a group of high-level consultants for Uganda until the report was delivered, less than 14 weeks had passed.

The start was a meeting in late November 1979 in New York between the mission director of the newly opened office of the U.S. Agency for International Development in Uganda and IADS. AID urgently needed an expert survey of the agricultural situation of Uganda to help set priorities for resuming assistance to the war-ravaged country. On December 12, the mission director called Washington, D.C., from Nairobi, and asked AID headquarters to contract with IADS to assemble a team of consultants and have them in East Africa in 1 month.

Without waiting for the contract, IADS immediately began getting commitments from the needed specialists, compiling relevant documents, and obtaining visas and travel reservations. On January 11, 1980, AID approved a waiver to negotiate a contract with IADS on the basis of predominant capability and advised IADS by telephone that it "looked O.K. to send people to Nairobi." Seventy-two hours later, three of the consultants landed in Nairobi and were joined within a few days by the rest of the seven-man team.

IADS had mobilized a team of knowledgeable agriculturists, six of whom had previously lived and worked in Africa; in fact, four had once been residents of Uganda. They converged on Kampala: a development administrator from Mexico, a research institute director from Colombia, and agricultural economist from Botswana, and a university administrator, a plant breeder, a marketing economist, and an animal production specialist from the USA.

Collectively, the team brought to the task years of relevant experiences in Botswana, Burma, Cambodia, China, Colombia, Ethiopia, India, Iran, Iraq, Kenya, Korea, Mexico, Nigeria, Pakistan, Paraguay, the Philippines, Tanzania, Turkey, and Uganda.

None of these experiences, however, prepared them for the severity of the situation, which was totally lacking in every kind of facility. The new government of Uganda had inherited a ruined economy, chaotic social conditions, and demoralized administrative structure. Needed data were not available, or easy to get. Looting of government offices had nearly paralyzed the civil service. The USAID records for Uganda from 1960 to 1979 were incomplete. Only four donor agencies other than AID had opened Kampala offices: the European Economic Community, United Kingdom, United Nations Development Programme, and World Bank.

Lack of public transportation and a shortage of autos and fuel tied Ugandan officials to their desks. They had little information about agricultural conditions beyond Kampala or Entebbe.

Normal working conditions did not exist anywhere. The AID office lacked telephone service until the final week of the mission. AID's sole secretary had to cope with the clerical demands of some 15 visiting consultants working on at least four surveys.

Members of the team, along with other consultants, did their own housekeeping. They lived in a six-apartment building rented and furnished by AID. There was running water, but no one would attest to its potability. They boiled water for drinking, or dropped chlorine tablets into whiskey bottles filled with the uncertain water. Team members took turns at preparing food, doing dishes and laundry, and cleaning the apartment. They supplemented the food carried in from Nairobi with fruits and vegetables acquired on field trips outside the city. The team leader commented that the situation took on the atmosphere of men roughing it on a fishing trip. No one recorded the total weight loss of the team, but the leader dropped 7 pounds in 5 weeks.

Ignoring the difficulties and displaying a level of teamwork, which the leader described as "pretty remarkable," the team completed its mission as described in the terms of

Food shortages, 1980

Countries reported to have experienced a shortfall in basic food supplies below usual consumption requirements, caused by crop failures, interruption in imports, or disruption of internal distribution at some time during 1980.

Country	Population (millions)
<i>Africa</i>	
Angola	6.7
Cape Verde	0.3
Chad	4.5
Djibouti	0.4
Ethiopia	32.6
Gambia	0.6
Guinea	5.0
Guinea Bissau	0.6
Kenya	15.9
Lesotho	1.3
Mali	6.6
Mauritania	1.6
Mozambique	10.3
Senegal	5.7
Somalia	3.6
Sudan	18.7
Tanzania	18.6
Togo	2.5
Uganda	13.7
Upper Volta	6.9
Zaire	29.3
Zambia	5.8
<i>Asia</i>	
Kampuchea	6.0
Vietnam	53.3
<i>Latin America and Caribbean</i>	
Haiti	5.8
Nicaragua	2.6

reference: "To conduct a survey of the agriculture and livestock sector; to identify constraints, to establish priorities for development activities, and to formulate a strategy and program for agriculture and livestock development."

* * *

The opportunity for IADS to undertake the Uganda survey grew out of IADS's first contract, the AID-supported integrated cereals project in Nepal, which was signed at Kathmandu in 1976. The AID agricultural officer in Nepal, then, was assigned in 1979 as mission director to Uganda. Familiar with the professional approach and orientation of IADS, he proposed it to conduct the agricultural sector survey of Uganda.

In Nepal, as in Uganda, IADS has demonstrated the combination of characteristics and abilities with which it has sought to provide developing countries and assistance agencies with superior services. These include a commitment to increasing both food production and incomes in rural areas, orientation to the importance of making available relevant agricultural technology, administrative flexibility that permits rapid response, organizational ability to identify and mobilize outstanding professional talent throughout the world, and, finally, efficient completion of assignments within time and budget specifications.

The Nepal project, one of six major implementation projects in which IADS was engaged in 1980, provides technical assistance and services to strengthen agricultural research and extension relating to improvement of cereal production and farming systems. The project's foreign staff (seven persons, recruited by IADS from five countries) is working with Nepalese scientists on wheat, maize, and rice agronomy and breeding; farming systems; agricultural economics; research organization; and training of extension workers. By the end of the contract, 1981, IADS will have supplied 39 man-years of specialists (in residence and as consultants) and managed 38 man-years of advanced degree training and 43 man-years of other training, most of this within the country.

Pre-production surveys are desirable in order to assess the interest of farmers, their needs, and knowledge of new technologies.

As part of his field training, an extension worker in Nepal interviews farmers to establish a village profile.



**Countries served by IADS
1975-80**

Africa and Mideast

- Botswana
- Cameroon
- Egypt
- Ghana
- Kenya
- Morocco
- Nigeria
- Saudi Arabia
- Senegal
- Sierra Leone
- Somalia
- Sudan
- Swaziland
- Tanzania
- Turkey
- Uganda

Asia and Pacific

- Bangladesh
- Indonesia
- Malaysia
- Nepal
- Philippines
- Sri Lanka
- Western Samoa
- Thailand

Latin America

- Bolivia
- Brazil
- Colombia
- Dominican Republic
- Ecuador
- Haiti
- Honduras
- Panama
- Paraguay

-
- Countries to which IADS has supplied personnel to staff national programs.

Experiences in Nepal led to the signing of a contract in January 1980 with the Agriculture Inputs Corporation, Nepal, to establish a labor-intensive system of producing, testing, processing, storing, and distributing seed for major food crops, and for storing and distributing inputs necessary to the production of these crops.

This was the first IADS contract oriented to production factors rather than development of a research program or system.

* * *

From its founding, IADS has sought contractual opportunities across the spectrum of the organization's broad mandate: to provide services to developing countries wishing to strengthen their agricultural *research* and *development* programs. The preface to the first report of IADS stated:

IADS is particularly concerned with the rapid identification and application of effective approaches to the acceleration of agricultural productivity. It places emphasis on those crops and animal species which provide the livelihood of large numbers of rural families, including those with small land holdings, and on strengthening institutions crucial to developing technology, training personnel, and implementing production programs.

In translating its mandate into action, IADS divided its activities into two broad fields: *direct services* to individual developing countries, and *indirect* or collective services intended to support the overall development efforts of countries and assistance agencies. Direct services initially undertaken involved agricultural research, but recently, requests for activities related to agricultural and rural development have increased markedly. At the same time, out of a broad range of possible indirect services, the Board of Trustees and staff have identified three for primary attention: leadership development, development-oriented literature, and liaison.

In IADS activities, there has been a surge in short-term planning missions. While increasing the number of implementation projects in which it was engaged, IADS completed 12 short-term missions in 1980 as compared with eight in 1979 and five in 1978.

Since 1975, IADS has provided services to 33 countries. These have ranged from informal explorations of development problems and potentials to formal or contractual arrangements, classified, in turn, as advisory, brokerage, planning, project preparation, and implementation. Some informal discussions led to a specific one-time mission, while others set in motion continuing interactions. Examples of these activities illustrate the flexibility of IADS in responding promptly to country requests or invitations.

Discussion. In 1976, two businessmen from the Dominican Republic visited IADS headquarters to inquire about possible cooperation in identifying ways to increase output of some of the country's major agricultural commodities and to develop its economically depressed hill areas. Following an invitation from the Dominican Secretary of Agriculture and a subsequent visit to New York of five Dominicans representing business and government, three representatives of IADS spent a week visiting agricultural regions and institutions in the Dominican Republic. They climaxed their tour by reviewing with the President their recommendations that the country: (a) organize commodity production programs, beginning with rice, and (b) establish area development projects, with the latter being jointly planned by representatives of government, education, industry, and local organizations.

Dominican authorities have vigorously implemented these recommendations. An intensive rice program, featuring training of production specialists, resulted in significant increases in rice yields and production. The area program, Plan Sierra, became operational in 1979. Concurrently, attention turned to training in management for agricultural and rural development, and a center for this purpose is being established within the Instituto Superior de Agricultura.

Brokerage. The Botswana government asked IADS to assist in filling the post of Director of Agricultural Research, which had been vacant for 2 years. A three-man team visited Botswana in 1976. When no person already in the system was found to fill the post, IADS suggested that Botswana request the Norwegian Agency for International De-

Increased agricultural output through higher yields can be an important means of raising the income of rural families.
Planting sugarcane in Morocco.



velopment to assign Kristian Oland. This was agreed and Dr. Oland took up his duties in 1977. He also serves as a representative of IADS in the area and IADS has helped in an analysis of the country's research needs and facilities.

Advisory. Upon request of the Malaysian Agricultural Research and Development Institute, IADS provided a senior consultant to review the institute's research programs and priorities, to determine the extent to which these are aligned with national development goals and strategies. The consultant, who began his assignment in July 1978, submitted his recommendations in September 1978.

Planning. In 1978 IADS supplied four consultants to collaborate with Senegalese scientists in a review of agricultural research and to prepare a report on research priorities and long-range plans.

In 1979, the government asked IADS to help prepare a project proposal to be submitted to the World Bank for funding to strengthen Senegal's agricultural research. Six scientists provided through IADS prepared the proposal. It covered research programs, staffing patterns, training activities, administrative organization, equipment needs, and construction requirements for improving research on the principal food crops, groundnuts, farming systems, and animal production systems.

Later, a World Bank team, which included two IADS staff members, appraised this project proposal in Senegal.

Project preparation. In 1976 the government of Panama created a national agricultural institute, IDIAP, to generate technologies aimed at increasing productivity with special attention to small and medium-sized farmers. The institute's organization and program were designed on the basis of informal discussions with IADS and later with the assistance of consultants provided by IADS with funding from the U.S. Agency for International Development.

Subsequently, IADS assigned a specialist to help IDIAP guide its development within the proposed framework. The objective was to assist in organizing IDIAP, to plan, coordinate, and implement a national agricultural research and

"We have listened to advice about the location specificity of agricultural research . . . but too often forget about the location specificity of the scientist. A research network will be only as good as the product it produces, and its product will depend on the skill and imagination of the researchers. It is not easy, even in a national research system, to persuade top scientists and research managers to move to remote locations where social services are poor even though the research facilities are excellent . . ."
Sadikin, S.W.

technology transfer program, and to help Panama mobilize internal and external resources for this purpose. By the time IADS had completed its contract in 1979, USAID had approved a loan/grant of US\$6 million to IDIAP with implementation to begin in 1980 through a U.S. university.

Leadership development. Through conferences and workshops IADS has facilitated the exchange of ideas and experiences among officials of developing countries and representatives of technical assistance agencies on such topics as accelerating agricultural development, strategies for rapid agricultural growth, and preparation of professional staff for national agricultural programs. A typical example was a workshop in October 1979 at which participants considered the implications for national agricultural research systems of defined-area agricultural projects and the mounting attention to farming systems research. Among the 35 participants, were officials from national programs with which IADS works, experienced area-project leaders, and members of the headquarters' and field staff of IADS.

Development-oriented literature. IADS is making a sustained effort to produce books and other documents on topics related to agricultural development that are authoritative, credible, and easily read. The objective is to help officials in developing countries improve their understanding of principles and potentials of agricultural development, and to point out sources of additional information and technical help.

Four books on commodity or production factors have been produced, the first being *Rice in the Tropics* by Robert F. Chandler, Jr., former director of IRRI. This book reviews the scientific advances in tropical rice and outlines the implications for nations that are organizing to help farmers grow rice more productively. The book, published by Westview Press in 1979, was selected as one of the year's outstanding books by the Association of College and Research Libraries.

Liaison. IADS maintains an active program with the goals of informing appropriate agencies in both the developed and developing countries of the program and objec-

tives of IADS; identifying project opportunities; and focusing attention on the problems of increasing world food production and improving rural standards of living.

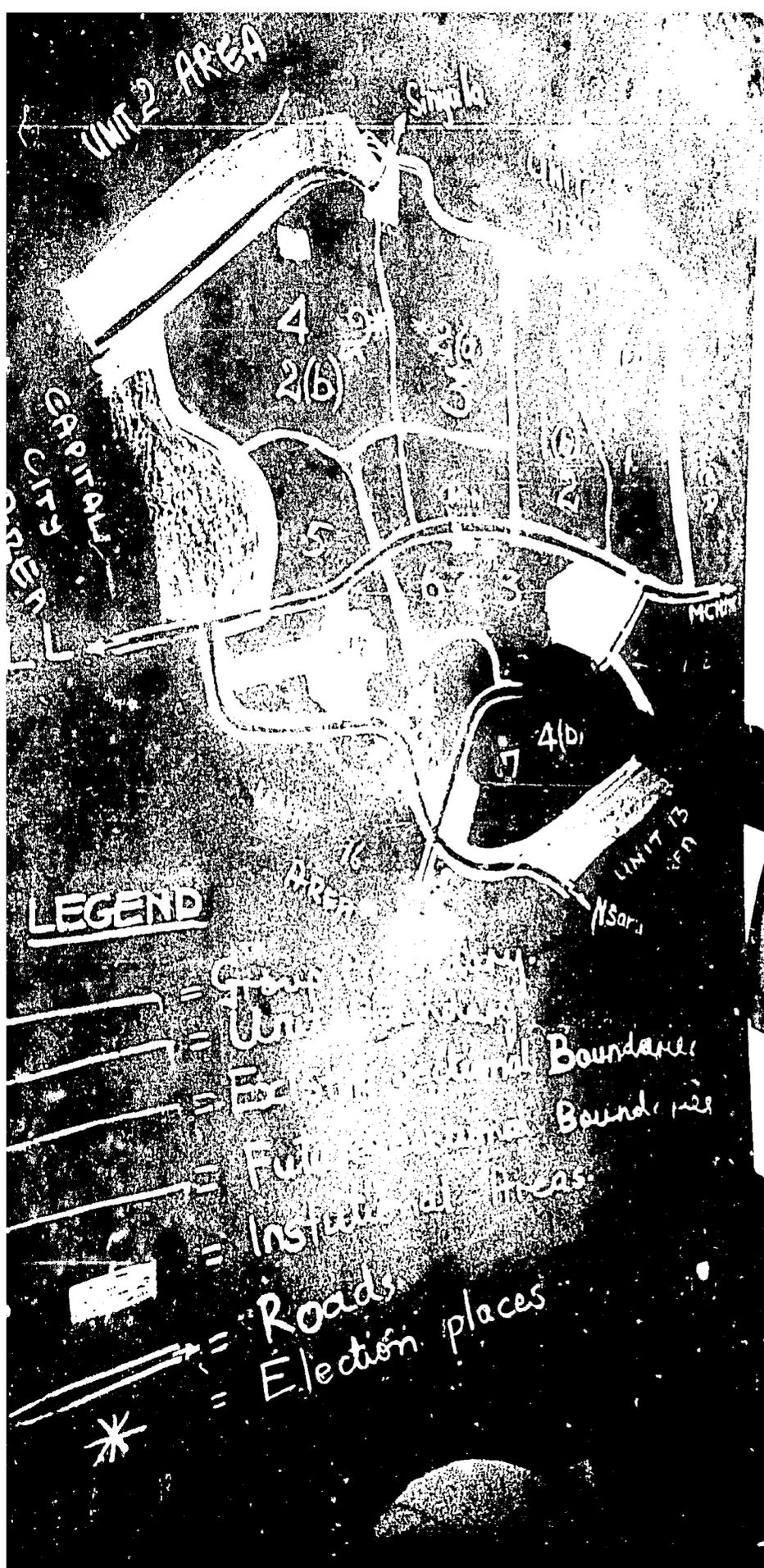
One such activity, in November 1977, brought together the leaders of national agricultural research systems of 20 developing countries. Participants identified potentials and approaches for cooperation among national systems. One outcome was the formation of the International Federation of Agricultural Research Systems for Development.

* * *

Most current activities of IADS relate to only a few of the services developing countries seek. The opportunities for contracted services to developing countries tend to fall into six broad fields: (a) research and extension; (b) production projects based on commodities and farming districts; (c) production services (inputs, credit, marketing); (d) rural industry, infrastructure, and institutions; (e) resource management (land use and water); and (f) public policy and planning. IADS has provided extensive services in helping national research and commodity programs strengthen research on new varieties and cultural practices. Improvement of extension services has been integral to many of these efforts.

The increasing demand for short-term missions reflects the need for planning and project preparation more oriented to agricultural and rural development than to the more limited, but important, goal of strengthening national agricultural research systems. But IADS intends to sustain its work with agricultural research systems because their viability and performance are critical to the success of development projects and the progress of nations.

Whatever the future focus, the experience of IADS makes clear that it must continue to be a flexible, rapid response source of short-term services as well as an implementer of long-term programs.—F.C.B.



Trends in Development Assistance for Agriculture

(Facing) Planning session in a rural development project in Malawi.

There is a growing tendency in many countries for the boundaries to become blurred between research units, extension agencies, and miscellaneous public organizations that provide production support services to farmers.

In the past few years the patterns of financial and technical assistance available to and demanded by developing nations have been shifting. These changes result from new policies formulated by assistance organizations and from the new attitudes of developing countries toward aid. The most evident changes have occurred in the funding available for development projects, in the activities these projects emphasize, and in the availability of personnel, both foreign and national, to implement development projects.

More money for agricultural development

The decade of the seventies saw a substantial increase in the total amount of assistance funds directed toward agricultural development. According to the Development Assistance Committee (DAC) of the Organization for Economic Cooperation and Development, the total net resources received annually by developing countries from all sources quadrupled to US\$79,600 million between 1970 and 1979.

From 1977 to 1978 total external resource flows directly committed to food and agriculture rose by one fourth to reach \$5000 million in constant 1975 prices. DAC member countries increased commitments to the agricultural sector from \$2270 million in 1978 to \$2830 million in 1979; U.S. government funding rose from \$666 million in 1978 to \$761 million in 1979. Within the World Bank and International Development Association, agricultural and rural development absorbed the greatest share of commitments in 1980—30 percent of the total. These increases were partly in recognition that an overwhelming majority of the world's poor derives its existence from agriculture.

In the agricultural sector, the generation and spread of technology is recognized as a critical element for increasing agricultural productivity and rural incomes. Rural development projects, in Africa in particular, are showing poor results because there is little improved agricultural technology to give to the farmers to permit them to raise production and thus their incomes. Research organizations are often poorly staffed and inadequately funded. Few improved genetic strains of plants and animals, better production techniques, or improved implements have come from such research institutions. Or, when they have, extension services have been so poorly manned, funded, and organized that the improved technology hasn't reached the user—the farmer. As a consequence, more and more funds are being provided by assistance organizations for agricultural research and extension projects. The World Bank, for example, proposes increasing annual funds for research and extension projects from \$330 million in 1979 to \$550 million by 1984.

There is also evidence that developing countries are spending more of their own resources on agricultural development, although this is difficult to document. Preliminary FAO and World Bank data from 23 developing countries show that, in real terms, funds for agriculture increased in 17 of the countries between 1971 and 1976. In several of the countries, the percentage of total investment funds spent on agriculture increased.

Emphasis on small, poor farmers

There has been a notable rise in enthusiasm for agricultural development projects. Perhaps led by the World Bank, agricultural development projects are more and more aimed at improving the plight of the poorer segments of society. The proportion of World Bank lending for development of infrastructure dropped from 60 percent at the end of the 1960's and to 30 percent at the end of the 1970's. Nearly 50 percent of lending now goes to projects in agriculture, rural development education, population, urbanization, and small-scale industries. The International Fund for Agricultural Development, too, has targeted the landless rural poor in many of its recent projects.

The United Nation's declaration of a "Decade for Women" is one indication of the rising awareness of the critical role of women in agriculture in developing countries. Women constitute half of the world's population and 28 percent of its work force, but receive only 10 percent of the income and own less than 1 percent of the world's property. In Africa it is estimated that women do 60 to 80 percent of all agricultural work plus half of all animal herding and nearly 100 percent of the food processing. Clearly these women must have access to new and improved technology.

In 1973 the U.S. Congress passed laws which require U.S. bilateral aid projects "to give particular attention to those programs, projects and activities which tend to integrate women into the national economies of foreign countries, thus improving their status and assisting the total development effort." The U.S. Agency for International Development created the Office for Women in Development in 1975 to ensure that assistance projects address women's role in agriculture and other segments of the economy. The World Bank, regional banks, U.N. agencies, and other assistance organizations, public and private, have adopted strategies for specifically including women in their development projects.

Too few adequately trained agriculturists

Lack of trained personnel in developing countries is probably the biggest barrier to development, especially in Africa. Even though the number of qualified personnel in agricultural development in developing countries has increased significantly in the past two decades still there are woefully too few. The International Food Policy Research Institute estimates that developing countries need to increase the number of extension personnel three times and the number of research personnel six times by 1990.

On the other side of the ledger, universities and training centers in developing nations are improving in number and quality. Moreover superior universities that function as regional post-graduate centers are gaining strength. The University of the Philippines at Los Baños, some of the Indian agricultural universities, the American University at Beirut, Nigeria's Ibadan University and Amadhu Bello University, and the Post-graduate College at Chapingo, Mexico, are examples of institutions that have important regional roles. The training programs of the international agricultural research centers also contribute to producing more capable administrators and technicians in developing countries. Other institutions such as the Economic Development Institute of the World Bank and the Netherland's International Agricultural Center are important sources of training, too. Significant as these developments are, lack of trained personnel is still the most serious constraint to agricultural development in much of the world, especially in Africa.

The demand for foreign technical assistance personnel is undergoing change. Many developing countries have built up a nucleus of well-trained agriculturists who are reexamining their countries' technical assistance needs. Many are concluding that they need fewer long-term foreign specialists and more short-term consultants. Developing countries are also increasingly reluctant to use borrowed funds to pay foreign technical assistance personnel because they believe the costs are too high. On the other hand, donor organizations appear to recognize this and are becoming more willing to grant funds to pay for technical assistance, especially in expensive projects co-financed by several assistance agencies.

Most of the research projects in which IADS is engaged are structured so that, as they progress, the involvement in development (promotion of production) becomes substantial. Rice planted by new settlers at a transmigration site in Sumatra.



Developing countries, moreover, are raising their standards for foreign technicians. More so than ever before, foreign consultants have to be highly qualified technically and have to have wide experience in developing countries. As a result of these trends, demand for foreign specialists is rising more slowly than the increase in availability of funds for agricultural development.

Regrettably, the pool of experienced, qualified personnel available for foreign assignments has contracted since the 1960's. The USA, probably the largest source of foreign assistance personnel in the 1950's and 1960's, now has far fewer qualified persons who are available to work in developing nations. The number of technical agricultural specialists in the U.S. Agency for International Development has reached an alarmingly low level, affecting its ability to adequately direct the flow of funds, let alone implement projects. Among other bilateral agencies, only Germany, France, and, to a lesser degree, the U.K. staff their projects from within their own organizations. Some countries such as Canada and northern European countries maintain flexible arrangements with universities and government and trade organizations to recruit technical personnel. By and large, however, most technical assistance, including the largest portion financed by the development banks, is provided *ad hoc* from universities and private organizations.

The decline in qualified technical assistance personnel is partly due to the scarcity of organizations that can provide long-term employment opportunities in international agricultural development. For U.S. citizens, new tax laws have also made such work less attractive. In addition there are few ways young persons can obtain experience in the international arena. A chicken-and-egg syndrome has developed: interested young persons cannot get employment in international development projects because they do not have the required experience, and they are not experienced because they cannot get the right jobs. If funding for agricultural development increases at the rate expected, there will be a severe shortage of qualified foreign technicians to assist in these efforts. This will be especially true in Africa where trained agriculturists are in particularly short supply and where the need for development is great.

For many countries, the 1970's were a decade of achievement in introducing better agricultural technology and increasing the pool of trained personnel. Developing countries are justified in being reluctant to accept advisors who are less qualified and less experienced than their own people. Whether bilateral and multilateral agencies will be able to provide agricultural specialists in the 1980's who meet the rising standards of developing countries remains to be seen.—B.C.W.

"The key to success of every research institution must be the involvement of the research workers in a continuous contact and dialogue with their main clients, the farmers, for the creation of new technology must not be a one-way street."

Eliseu Alves



Business, Industry, and Agricultural Development

(facing) Members of an Indian dairy cooperative deliver their milk and receive payment on the spot.

There must be easily accessible local markets to which the farmer can deliver and sell products at an acceptable level of profit.

Since World War II a substantial number of bilateral and multilateral assistance organizations have been created to assist poorer countries. They generally provide governments with funds and technical assistance to strengthen public-sector institutions, such as agencies of government, government-owned corporations, universities, and banks, as well as the programs carried out by them.

There have been sporadic attempts to involve business and industry in the agricultural sector of the economies of developing countries. The initiatives have arisen both within public agencies (usually unsuccessful) and among a few industry executives (some quite successful, some not). An irony of the current world situation is that while the success of agricultural production, processing, marketing, and trade depends heavily on entrepreneurs ranging from individuals (beginning with farmers) to corporate leaders (local and international), the critical roles of business and industry in agriculture are still poorly appreciated.



Loading export crops at a port in Brazil.

Increasing rural prosperity is essential to overall national economic advance.

Recognition of the contribution that a vigorous commercial sector can make is important to efforts to alleviate hunger and poverty. An expanding role for business and industry appears also to be essential to overcome global economic stagnation. The world's economic well being hinges on expanding the purchasing power of hundreds of millions of rural poor.

Role of food production. Increased food production is essential, in all countries, not only to meet the requirements of farm families, but to supply nonfarm people in both rural and urban areas. For the large numbers of less affluent nations, it is especially important that, to the extent feasible, national requirements for staple foods be produced by their nation's own farmers, for several reasons:

- Acquisition of food on world markets is costly and most developing nations are short of foreign exchange.
- Local production provides employment for the nation's own farm people, which in most countries constitute a large proportion of the population.
- Increasing rural prosperity is essential to overall national economic advance: it builds markets for goods and services of urban business and industry, providing employment for nonfarm people.
- Adequate local food production is essential to national security: no government can afford to be dependent on unpredictable foreign sources of such a politically sensitive item as food, or to allow local shortages to force food prices up to the point that consumers revolt.

But, food production—essential as it is—is only part of the solution to the hunger problem. The hungry must have access to it.

The only lasting solution is to enable the poor to increase their power to purchase—to raise their incomes through improved farming or other economic activity. Provision of costly food free or on a subsidized basis on the scale required is beyond the financial means of governments, either of poor countries or of the more affluent.

The generation of wealth. Poverty clearly is a primary cause of hunger. And, the only antidote for poverty is

the generation of wealth through higher productivity, whether for an individual, a community, or a nation. Fortunately, increased agricultural output through higher yields can be an important means of increasing the income of rural families, localities, and nation.

Other potential sources of greater wealth in a locality may include extractive industries (e.g. mining, forestry), processing and other forms of manufacturing, tourism, or the income of locally based individuals on the payrolls of external agencies or firms (e.g. school teachers, postal or utility workers, representatives of national agencies). All bring funds into a community where some is spent. This in turn generates local demand for many types of goods and services. It provides the cash flow required to support wholesale and retail trade and provides a source of income to those supplying any of a wide array of services—the multiplier or “ripple” effect of generation and circulation of wealth.

Subsistence farmers or others with low productivity must be enabled to raise output, to participate in the market economy.

The farm, a wealth-producing business. Practically all farmers will adopt higher yielding—more productive—farming practices provided four sets of conditions exist:

- There must be more productive and more profitable farming systems available that are known to work in the farmer's locality and on his farm.
- There must be a means for showing how the more productive system can be used successfully—and profitably—on local farms.
- All inputs required (seed, fertilizer, pesticides, equipment, credit) must be easily available to the farmer when needed and at a reasonable price (i.e. permitting a profit).
- There must be an easily accessible local market to which the farmer can deliver and sell products at an acceptable level of profit.

Virtually all more productive farming systems require some additional expenditures by farmers on such things as seed, fertilizers, pesticides, or equipment, or feed, feed supplements, vaccines. The need for credit increases, too. To sell the farmer must buy, and vice versa. He becomes part of the

“The most important item on the agenda of development is to transform the food sector, create agricultural surpluses to feed the urban population, and thereby create the domestic basis for industry and modern services.”

Sir Arthur Lewis

nation's market economy. Farm purchases and sales contribute to the community cash flow, to the multiplier effect of the movement of money. And added family income will go for consumer goods and services as well—for health care, clothing, better housing, greater varieties of food, for education, for household items and entertainment.

Enlarging domestic markets. The generation of wealth with its multiplier effects can be observed wherever large numbers of farmers have adopted more productive farming practices. It is most readily apparent in the heightened prosperity of rural trade centers, where business thrives and employment opportunities increase, and in the living standards of rural families.

As rural communities of a nation begin to prosper, there are beneficial effects for the cities. The domestic market for urban business and industry expands providing new urban employment opportunities there. And in some countries, quickened economic activity in outlying communities may result in movement of people back to the rural areas and trade centers, easing the population pressure on overcrowded cities.

The importance of infrastructure. To permit the elaboration of the market economy in each locality, there must be transport and communication systems to link it with larger markets and with sources of supplies and equipment. Transportation by road or water is essential to link each farm with the rural trade center, and to link trade centers with each other and with larger towns and cities. There will be need as well for extension into rural areas of electrical grids, fuel supply, and telephone and radio systems.

Establishment of wholesale and retail businesses to supply local communities with goods for both production and consumption will be required, preferably through competitive private enterprise. Few government agencies or corporations are as efficient or reliable as those in the private sector.

The development of facilities for processing, storage, and distribution are exceptionally important, for they can provide the farm community with reliable outlets for sales of

products—a common missing link in the farm-to-consumer system in most countries.

A national economic view. The development strategy of many poor countries has been to invest in transport and communications systems, and to promote urban business, with extractive industries (for export), manufacturing (often for export), and tourism being the major means of generating wealth. The productivity of the rural sector, of farming, frequently has been accorded low priority. The result in many countries is a small and relatively affluent population concentrated in central cities, a larger and increasingly restless rural sector, and stagnant growth of the country's domestic market. Such nations are in a precarious position both politically (because of internal unrest) and economically (because of a small domestic market base).

In *The Evolution of the International Economic Order*, Sir Arthur Lewis notes:¹

In any case the individual LDC does not have to be so dependent on exports in its development strategy. It should look more to the home market. What limits industrial production for the home market is the small agricultural surplus of that 50 percent or more of the labor market that is engaged in growing food for home consumption. Transform this mass of low level productivity, and the whole picture changes. The LDCs cease to have to import food, and instead penetrate the rising world market for cereals, beef, and feeding-stuffs. The factorial terms of trade move dramatically in favor of the traditional tropical agriculture crops and the home market for industrial products and high level services becomes the engine of growth. These countries, upon becoming richer, would do absolutely more trade than they do at present, but it would be more varied, and would also be in smaller proportion to national income, if the import propensities of today's rich countries are any guide.

To transform the rural sector, to create the domestic market, it is essential that farmers have the incentive to produce and that input and marketing systems (purchasing, processing, storage, transport, sales) flourish. The incentive to produce, the only one which works anywhere, is profitability, to compensate the farmer for extra work, innovation, and risk. This calls for farms operated by owners—and usu-

¹Princeton University Press, 1978.

ally these must be relatively small farms in densely populated countries. Such owner-operators generally will seek maximum income through highest feasible productivity and they will re-invest in long-term improvements in land, buildings, and equipment. Tenants cannot, and moreover a tenant system with low wages does not, build a domestic market. Large-scale mechanized farms—whether owned by individuals, governments, or corporations—clearly are not an answer, for similar reasons.

Most of the input supply and marketing activities can best be handled by local companies and entrepreneurs, as can wholesale and retail trade. Government monopolies in these areas generally are not efficient, and they stifle the innovation that is characteristic of competitive business.

The role of business and industry. The stimulation of prosperity in rural regions of developing countries, and of their entire economies, can be greatly speeded by elaboration of businesses engaged in agricultural input supply and marketing, and in provision of consumer goods and services generally. But that can occur only if there are substantial numbers of increasingly profitable farms, marketing ever greater surpluses. Given freedom to innovate and to operate profitably, people will create businesses to serve the varied needs of prospering populations.

Local businesses will, if desirable, tie into activities of national or regional firms, creating networks of economic activity. Some will need to link with international companies.

Finally, on the national scene, the creation of infrastructure (roads, railways, ports, coastal shipping, airways), the elaboration of communications systems, the diversification of manufacturing and of extractive industries, the promotion of tourism, and even the modernization of small farms will create demands for goods and services available only or in part from the industrial countries.

The alleviation of hunger and poverty clearly involves expansion of the world market economy with involvement of business and industry at every level, from small farm to the international corporation facilitating international trade and finance.

A major goal for the 1980's should be to greatly elaborate and strengthen networks of commercial activity to complement the strength of the public agencies—national, bilateral, and international. This will require cooperation of the public agencies, which should encourage and facilitate involvement of private enterprise; otherwise, the public agencies are likely to fail in their missions. And far greater cooperation among commercial entities and with public agencies will be required, if the world economy is to expand and longer term prospects for business, everywhere, are to brighten.—S.W.



PART XII
INDONESIA

PART XII
INDONESIA
GUMBUK
TOP 24

Improving the Climate for Private-Sector Participation in Agricultural Development

For agricultural development to proceed, barriers to greater and more innovative private-sector participation must be overcome or eliminated. The tantalizing feature of the major barriers is that they are largely attitudinal. One major barrier, the difference in points of view between people in the private and public sectors, can be traced to lack of understanding of strategies for rapid development. Too frequently public officials and private business managers dwell on their differences instead of recognizing their shared interests and essential interdependence.

Many public officials zealously seek evidence of commercial exploitation or excess profit, while private managers passionately deplore any hint of overstaffing, inefficiency, or partiality to narrow political interests. This inclination to see each group's failings instead of its legitimate and potential contributions has resulted in a chronic lack of confidence and cooperation between the public and private sectors.

(facing) Preparing bales of tea for export.

An irony of the current world situation is that while the success of agricultural production, processing, marketing, and trade depends heavily on entrepreneurs ranging from farmers to corporate leaders, the critical roles of business and industry in agriculture are still poorly appreciated.

View from the ministry. Government planners in developing countries have generally been ambivalent toward business in agricultural development, whether local business or multinational corporations. They see that local business can serve small farmers at relatively low cost, bringing them inputs and buying their output, and can efficiently transport, store, process, and distribute farm products. At the same time, they perceive local merchants as conspiring to rig prices so that the farmer receives too little and the consumer pays too much, while the middleman pockets the difference. They see the businessman's profit motive as running counter to the needs of the rest of society. They also accuse the local private sector of limiting the competition and entry, freezing social mobility, perpetuating and reinforcing the status quo, exploiting the poor, exporting capital, and encouraging conspicuous consumption.

Equal if not greater ambivalence exists in relation to international companies. Government planners grant that multinationals offer access to scarce resources—technology, markets, management skills, financing—which are critically scarce in their economies. At the same time, they fear the multinationals, which they perceive as seeking to control not only the ventures in which they are involved, but also other, perhaps unrelated, activities, and ultimately to extend their embrace to the entire economic and political system.

Further, they regard many of the multinationals' activities as aggravating nations' frequently severe dependency on foreign capital, technology, and staff. Most often this is seen in the importation of packaged plant designs, with no adaptation from capital-intensive to labor-intensive situations. This practice perpetuates the need of the developing country for foreign capital, provides no model for local adaptation, and does nothing about the chronic unemployment and low rate of domestic capital formation in the country.

Multinational firms often concentrate on plantation crops. Since the country itself needs domestic food crops, government planners see this practice as a kind of inadvertent "nutrition raid," a diversion of land to crops for export, leaving less land to grow food for the local population. The result for the country is that the poor eat less and the local elite enjoys the proceeds of expanded exports. In effect, the

countries believe the multinationals accentuate the inequality in the distribution of income, and strengthen the grip of the oligarchy.

Finally, the governments see the multinationals as benefiting only themselves, remaining insensitive to local difficulties and developing little or no loyalty to the countries in which they operate.

Who benefits. This harsh perception of multinationals by developing countries is based in large part on misconceptions about how the companies operate. Frequently, for example, countries object to the repatriation of profits by foreign companies. Many otherwise well-informed people in developing countries are under the impression that multinational companies are family owned, with managers hired to take orders from family members, as is usual in local firms in developing countries. They feel that these families are already fabulously wealthy and could well afford to leave the profits of local subsidiaries in the country.

If government policy makers were to look at the facts, they would find that the vast majority of multinationals are owned by thousands of shareholders, most of whom need dividends and insist on having them. Management groups who suspend payment of dividends are quickly replaced. The managers of multinationals must repatriate profits, not only to replace equipment and to finance expansion, research, and development, but to give the stockholders a return on their investment.

Policy makers' priorities. The managers of multinational corporations could benefit from a corresponding effort to perceive situations through the eyes of government officials of developing countries. When a minister of finance blocks the importation of machinery for a proposed plant, he may be motivated by the design's capital intensity and scale. He probably does not know how much design and engineering time it would take to produce an alternative, more suitable plant design, nor how difficult and costly the plant start-up and shakedown periods would be. He probably does not recognize how complicated the task would be for engineering and production personnel already familiar with the cur-

rent design. Instead, he is probably concerned whether his foreign exchange reserves are adequate, whether this project would be a net drain on, or a net generator of, foreign exchange, what each job created would cost, measured in domestic resources and foreign exchange, and so on.

If government policy makers and business managers attempt to understand the other's priorities and reasoning, many negotiations can be concluded successfully, and more projects can get under way.

Cooperation vs. confrontation. The most reliable way to overcome attitudinal barriers is to bring the alienated parties together, so that each can see how much they have in common. This can be accomplished in a work environment, by launching public/private projects, in which decision makers from both sectors work together. Both sectors might try to increase the number and size of these joint ventures. Government banks could buy shares in private corporations or exchange shares in public corporations, to increase the number of companies that have both public and private representation on their boards of directors.

Alternatively, a more informal proximity can be achieved by organizing management seminars in which decision makers from both sectors discuss cases and participate in management, organizational, and psychological exercises. Management seminars remove participants from their accustomed environments. By leaving their work places, the seminar participants often shed some of their more rigid attitudes and preconceptions, and get to know other participants as individuals rather than as representatives of organizations.

Once the mixed-economy approach has helped attenuate barriers between government and the private sector, these two sectors will need to work together to overcome the second major attitudinal barrier to private-sector participation: suspicion of the private sector among farmers. This group's distrust of anyone from the city, regardless of whether he works for the government or for a private company, can be overcome only through informal education and the experience of fair dealing. Input-supply firms and processing firms, with their distribution networks and their extensive contacts in rural areas, can strengthen the record of fair deal-

Transportation by road or water is essential to link each farm with the rural trade center, and to link trade centers with each other and with larger towns and cities.

Road building in Ethiopia.



The increasing participation in diverse phases of the development process is part of IADS' long-range strategy.

Packing melons in Peru



ing by providing market and price information, and by providing stiff competition to local middlemen and landlords. Education in this respect is a task for everyone who deals with small farmers.

Here are some ways in which governments in developed and developing countries could encourage balanced private/public participation in agricultural development.

Proposals for governments of developed countries

Change depreciation accounting to encourage the adaptation of technology to labor-intensive situations.

Under current regulations, it is often rational for multinational firms to employ inappropriate production technology in developing countries. They may duplicate a U.S. or European factory because engineering costs appear to be high and uncertain, and it is less risky to use a proven design. Also, labor appears much more expensive than its social opportunity cost because of minimum wages, social benefit payments, lifetime employment practices, etc. Capital appears cheaper than its social opportunity cost because financing is often available on concessionary terms. This is especially true of financing to buy capital equipment. Working capital, which is required to finance a larger work force, usually must be obtained at higher rates.

Current depreciation accounting practices contribute to this problem. Multinational firms are allowed to use accelerated depreciation when they consolidate their subsidiaries' financial statements. This reduces the reported earnings of the subsidiaries and consequently reduces the multinationals' tax liabilities. If, in reporting the results of subsidiary operations, multinationals were required to use straight-line depreciation, their stated earnings would be higher and their tax liabilities would rise. Thus, the purchase of new capital equipment in their subsidiaries would become less attractive. It would be more in their interest to adapt technology to the labor-intensive economies in which they are operating.

Provide concessionary food aid only in emergencies.

Outside its legitimate place as a humanitarian measure in emergency situations, food aid has proved at times to have unexpected, severe, and long-lasting negative effects on the countries to which it has been provided.

Local private-sector incentives often are fragile and insufficient. A sudden influx of grain or powdered milk into the local market can inflict severe financial losses and discourage further investment in agriculture, damaging prospects for long-term agricultural development.

Food aid has an impact on agricultural prices in both the donor and recipient countries. It can also affect the distribution of income and investment—incentives in the recipient countries.

Encourage developing countries to couple food imports with matching purchases of technical assistance.

Many of the less-developed countries increasingly depend on food imports. At the same time, they have agricultural potential that remains unexploited for lack of money to pay for as much agricultural technical assistance as they would like and could absorb.

A developing country that imports food should be encouraged to set up a counterpart fund to pay for agricultural technical assistance. The exporting (developed) country could channel part of its export revenue into a fund to provide technical assistance. Between them, these two funds would finance the cost of sending technicians to the food-deficit developing countries. Thus as food exports to the developing countries rise, agricultural technical assistance would rise in step.

Take steps to reduce the risk of investing in agricultural development activities.

The risk of investing in agricultural development could be reduced through existing government programs in developed countries and usually the cost would not be nearly as great as the tax revenue generated.

Several U.S. agencies, for example, are able to encour-

age the expansion of successful organizations that operate with private participation, such as the Latin American Agribusiness Development Corporation, the Private Investment Company for Asia, and Technoserve. An organization such as the U.S. Agency for International Development could provide a loan guarantee (perhaps taking appropriate collateral), and in this way mobilize up to five times as much capital as its own investment. This capital would flow to agricultural development projects for which the principals themselves could not assume the risk. Again, small increases in the budgets of the U.S. Export-Import Bank and the Overseas Private Investment Corporation could lead to major increases in the amount of international development activity the private sector can fund and initiate.

Finance industry research on labor-intensive alternatives for manufacturing and production.

Generally, industry in developed countries is oriented to capital-intensive methods of production, because labor is scarce and expensive. As a consequence, industry's own research is directed at reducing production costs and increasing efficiency under situations quite different from those that it may encounter in the developing countries.

If governments of the developed countries wish to encourage industrial development of the private sector in the less-developed countries, they may find it useful to finance, wholly or in part, research to develop manufacturing, processing, and marketing technologies more appropriate for such situations.

Promote agricultural development programs.

A joint U.S.-EEC statement should be made advocating agricultural development programs in developing countries. The statement could commend U.S. and European private-sector participation in implementing development projects, endorse the legitimacy of developing-country efforts in the same regard, and commit the U.S. and Europe to lower barriers to agricultural trade. After such a statement, private participation would increase in response to the improving investment climate.



A tubewell pumphouse in Bangladesh. For many countries, the 1970's were a decade of achievement in introducing better agricultural technology.

Proposals for governments of developing countries

Establish clear long-range goals for the development of agriculture.

Unless a country makes clear what it wishes to accomplish in terms of income and output goals, the relevant components of the public and private sectors lack a basis for planning and taking action. Moreover, the existence of such goals forces each component to consider the entire system, which must be invigorated, and to arrange its activities accordingly.

Delineation of practical goals requires communication and cooperation among the many components and activities—planners, research, extension, education, business and industry, and farmers, as well as a broad base of understanding within the general public.

Differences in technical and economic feasibilities must be taken into account. Goals need to be specific, indicating what the country wishes to achieve, with what commodities, where, in what period of time, and involving what groups of farmers and others. Overall, the goals must reflect strategic, development-oriented planning and project appropriate strategies for action.

Give priority to reorienting and synchronizing public and private activities, in support of agricultural development, nationally and locally.

Too frequently, the farmer—the person upon whom increase in agriculture depends—cannot act because of the unavailability, where and when needed, of the goods and services necessary to adopt new varieties and practices, or conversely, to move and process his production at harvest.

Public and private activities should be synchronized to provide, simultaneously, in each locality throughout the country, all the materials, services, and conditions farmers need to adopt productive systems. This means horizontal collaboration of units of government at each level, the vertical integration of activities of local and district units involved in specific programs with those of regional and national

units, and cooperation between government and industry. It is the responsibility of government to establish a climate that fosters such synchronization.

Encourage decentralization of industry and business to rural areas.

Synchronization of services is impossible in rural areas where services simply do not exist. Farmers cannot act in desired ways if they lack inputs, credit, and processing and marketing facilities. This lack further deprives the landless and small farmers of off-farm employment opportunities. They leave rural areas, seeking work in the cities.

When governments take the initiative to build roads and bridges and to encourage development of transportation systems, decentralization occurs.

Adopt policies and actions designed to make living in rural areas more attractive.

In most countries, migration of people from rural to urban areas continues at a rapid pace. This creates unemployment and social problems in the cities and deprives agriculture of labor needed to increase productivity and production.

To reduce the rate of migration, various government actions are needed. Some steps are to increase the profitability of agricultural production, to generate more employment in rural areas, to raise the average level of income of rural people, and of extreme importance, to remedy inadequate social services (education, health, recreation, etc.) in rural areas.

Political and industrial leaders can collaborate to identify the kinds of policies and actions most needed in specific areas. It is a complex issue, and must be addressed positively.

Review and restructure policies relating to prices, taxation, protection, and infrastructure with regard to their net impact on agricultural development.

In many countries, built-in biases in policies reduce the profitability of investment in agriculture and thus discourage

the participation of local businessmen. For many years policies in developing countries have favored manufacturing and service activities at the expense of agriculture. Furthermore, some policies pertaining to agriculture promote agricultural production, while others discourage it.

As a result, local businessmen are confused, unable to discern consistent signals. Many lose interest and go into manufacturing, commerce, or service.

Restructured government policies, consistent and oriented toward the needs of agricultural development, will encourage business participation.

Review and redesign policies controlling internal trade in agricultural products.

The aim of internal trade policies in most countries has been to control speculation by middlemen. But these policies have often weakened the incentives for local business participation or have reduced competition. Redesigned policies can induce new entries, encourage additional investments, and intensify competition in internal agricultural trade.

Rewrite regulations affecting multinational businesses to be clear and consistent.

Regulations concerning the activities of multinational corporations are often ambivalent, reflecting the different views about multinationals that have prevailed at various times. Developing-country governments can begin to set policies that will help them obtain the resources that multinationals can bring to agricultural development efforts, while simultaneously controlling the participation of multinationals to avoid the negative aspects that have sometimes been associated with their presence.

Recognize and work with the interdependency between government and business activities.

Political leaders control the gates through which commerce flows. Without proper catalysts from government, the private sector, which is powerless to supply its own catalysts, will stagnate. Thus government is largely responsible for the success or failure of private-sector growth.

"Most exploration has been aimed at finding petroleum and scarce minerals rather than fertilizer raw materials, which have relatively low value on the world market, but which might be quite valuable to a country that is planning a fertilizer industry."

Travis Hignett

When the proper catalysts are present—that is, when government policy is understandable and consistent, and sustained long enough to elicit the full private-sector response—the response of the private sector can be rapid, strong, and precise.

This power to affect private commercial activity is particularly strong in the area of agricultural input supply and research, where many government activities can induce quantum leaps of private activities. Government can control the prices of agricultural inputs, such as fertilizer and insecticides, and also set the direction and emphasis of agricultural research. Such decisions can result in dramatic swings in cropped area, yields, and surpluses and deficits.

By placing a small subsidy on fertilizer or by releasing a particularly responsive variety or by emphasizing a particular commodity in their research activities, government can affect thousands of business decisions taken each season by farmers, traders, processors, and every other private participant.—E.L.F. and J.E.



IADS IN 1980

(facing) Farmer in rice paddies in Central Luzon, Philippines.

To transform the rural sector, to create the domestic market, it is essential that farmers have the incentive to produce and that input and marketing systems (purchasing, processing, storage, transport, sales) flourish.

In its publications the International Agricultural Development Service has emphasized the many factors that bear on agricultural development. It has expressed a conviction that rapid development can be expected only when a great many actions, both public and private, are undertaken simultaneously and are properly synchronized with one another and with external conditions. IADS has further stated in its broad terms of reference that it stands ready to assist the developing countries to obtain services in many of the aspects of development.

Strength in research. During its first 5 years, IADS has provided only some of the services that developing countries seek. Its direct services have been concentrated on agricultural research and extension. It is assisting a number of national research and commodity programs with the organization of research systems and the development and adaptation of new varieties and cultural practices. Most of its short-term missions also are concerned with identification, preparation, or evaluation of research-related projects.

Consultants arranged through IADS in 1980

Bangladesh

S. Biggs, *research review*
T. Bloch, *library sciences*
A. A. Johnson, *research review*
J. C. Madamba, *research review*
A. H. Moseman, *research review*

Brazil

G. B. Baird, *research planning*
R. P. Bates, *research planning*
R. Desrosiers, *research planning*
E. Duncan, *research planning*
R. Etheredge, *research planning*

Colombia

E. Venezian, *national agr. research*
A. Grobman, *national agr. research*
G. Levine, *irrigation*
U. J. Grant, *irrigation*

Dominican Republic

F. C. Byrnes, *organization development*

Ecuador

S. M. Katz, *financial administration*
H. Munger, *vegetable research*

Egypt

L. F. Hesser, *agricultural assessment*
R. W. Richardson, *agricultural assessment*

Ghana

B. C. Wright, *research development*

Haiti

G. B. Baird, *research development*

Indonesia

S. Cooper, *organ planning*
R. W. Cummings, Jr., *agricultural economics*
R. L. Cushing, *organization development*
R. R. Harwood, *farming systems*
S. M. Katz, *financial administration*
J. C. Moomaw, *vegetable research*
U. Scholz, *agricultural economics*

Morocco

M. B. Russell, *national agr. research*

continued

This focus reflects staff abilities and the needs of the developing countries in research and extension. However, it falls short of the long-term intentions of our founders. Moreover, this focus does not meet the full needs of the developing countries. During 1980 IADS took steps to broaden its program and laid plans for future action. We believe, nevertheless, that it is appropriate for IADS to maintain its expertise in research, to remain aggressive in seeking opportunities to provide services in support of research, to develop innovative approaches to meet the research needs of developing countries, and to continue to be as influential as we have been. We must be constantly alert to changes in the requirements for these services.

Expansion into development. IADS' broadening involvement in development activities in several countries is a consequence of a logical evolution that was planned when the research projects were designed. In Bangladesh, during 1980, numerous production trials were carried out in farmers' fields. As noted below, these trials were supported by agro-economic data, and the stage is being set for major production drives. Farmer adoption of truly outstanding research findings is developing momentum of its own, but the time is approaching when production and area development drives can have a significant impact.

In Botswana, the research effort is closely tied to farms, and numerous opportunities are arising to move from research into commodity production drives with both crops and animals.

In the Dominican Republic, IADS consults on a range of development subjects that go well beyond research to include not only technology adoption but rural roads, small-scale industry, small-scale irrigation, and agro-forestry.

In Ecuador, INIAP, with which IADS is working, aims to transfer technology to farmers as rapidly as possible. Thus IADS specialists and their Ecuadorian counterparts work with poultry farmers on record-keeping, ration formulation, and other factors that facilitate production. Similarly with fruit production, the INIAP/IADS staff works with farmers on orchard management, disease control, and other applied

aspects. The rice program goes much further in the "development" direction and is centered on water control and intermediate-level technology to foster rice production in the low-lying Guayas River basin.

In Indonesia the need to assemble and train a large and diversified research team and to construct research facilities has dominated staff attention. Nonetheless, the research effort is closely coordinated with transmigration programs and agro-economic surveys that facilitate rapid farmer adoption of new technology arising from the research program. These activities have contributed to the strongly rising trend in Indonesia's agricultural production.

The planned integration of the research effort with all phases of the cereal production systems of Nepal has reached the point that, in 1980, the Nepal/IADS team was deeply involved in pilot production programs. These programs, based on prior research in agronomy, on farming systems, and in economics have high potential benefit-cost ratios. Results of these pilot schemes, in which 700 farmers were involved in 1980, have been encouraging and are to be expanded substantially in the coming years.

Meshing research and development. The objective of the foregoing comments is to make two points. First, there is probably no better place to enter the agricultural development process than through research. Production campaigns that are only marginally based on sound research have much less chance of success than do those that are based on the planned application of research results. Second, we believe that there is a growing tendency in many countries for the boundaries to become blurred between research units, extension agencies, and miscellaneous public organizations that provide production support services to farmers. In the past, territorial or functional possessiveness of different agencies retarded development. Many of the practitioners and their administrators are coming to recognize that research and production services are much more effective if the process is seen as a continuum in which all the players work as a team to support the farmer.

In addition to cooperation in research and extension,

Consultants, continued

Nepal

- R. Cuyno, *training*
- C. Hittle, *soybeans*
- R. Ramanathan, *financial administration*
- J. Sinclair, *soybean diseases*
- O. Sison, *manpower development*
- S. W. Wortman, *national agr. research*

Peru

- R. W. Cummings, Sr., *ministerial organization*
- A. Tanco, *ministerial organization*
- C. Thurber, *ministerial organization*

Philippines

- R. L. Cushing, *research review*
- R. L. Lovvorn, *research review*
- J. C. Moomaw, *research review*
- A. H. Moseman, *research review*
- J. A. Rigney, *research review*
- L. W. Zuidema, *research review*

Sierra Leone

- P. Jennings, *rice review*

Swaziland

- A. C. McClung, *cropping systems and extension*
- K. Oland, *cropping systems and extension*

Turkey

- J. Harrington, *vegetable seed*
- R. Mills, *seed production*

Uganda

- H. Hanson, *agricultural assessment*
 - H. Kriesel, *agricultural assessment*
 - R. Nelson, *agricultural assessment*
 - J. Nickel, *agricultural assessment*
 - K. O. Rachie, *agricultural assessment*
 - N. Raun, *agricultural assessment*
-

IADS DIRECT SERVICES TO DEVELOPING NATIONS 1980

	Review of development opportunities	Assistance in project preparation	Appraisal for assistance agencies	Provision of agricultural consultants	Provision of agricultural leaders	Programming advanced scholarships related area development	Implementation of technology commodity programs	Implementation of national commodity programs
BANGLADESH					●			●
BOTSWANA					●	●		
BRAZIL			●					
COLOMBIA		●						
DOMINICAN REPUBLIC					●			
ECUADOR					●		●	●
EGYPT		●						
GHANA				●				
HAITI					●			
INDONESIA					●		●	●
MOROCCO		●						
NEPAL					●		●	●
PERU					●			
PHILIPPINES					●			
SIERRA LEONE					●			
SWAZILAND				●				
TURKEY					●			
UGANDA	●							

the developing countries seek many other types of services in their programs aimed at increasing agricultural production and improving rural standards of living. We note requests for help in production projects based on commodities and defined areas; production services (inputs, credit, marketing); rural industry, infrastructure, and institutions; resource management (land use and water); and public policy and planning. There are increasing opportunities for IADS to expand its activities into other aspects of agricultural and rural development, as its original mandate provides.

During 1980, IADS undertook, participated in, or planned several activities that brought it into phases of development that are not directly a part of the research process. In Nepal, IADS signed an agreement to provide services leading to the development of a national system to supply better seeds to farmers. In Turkey, IADS provided consultants to help plan a project to increase supplies of quality seeds of several cereal and vegetable species. In Uganda, an IADS team carried out an agricultural sector assessment with the aim of identifying areas most urgently in need of attention in that country's efforts to improve production. In Peru, another IADS team helped develop recommendations for a proposed long-term study aimed at restructuring the Ministry of Agriculture.

A broader program. The increasing participation in diverse phases of the development process is part of IADS' long-range strategy. Without reducing efforts in research (and development which grows out of research involvement), we believe it important that IADS be prepared to assist nations in a variety of ways.

In expanding its activities, IADS must add to the breadth of competence of its staff. In broadly based development projects, as in those related to research, IADS must be prepared to be a flexible, rapid-response source of short-term services as well as an implementer of long-term programs. It is becoming apparent that there are more short-term opportunities with potential for influencing agricultural development than is the case with implementation projects. In addition, short-term project identification, preparation, and evaluation missions lay the base for long-term implementa-

IADS services to Bangladesh

Objectives: To help establish a well-supported and well-staffed agricultural research programs for wheat, grain legumes, vegetables, and oilseeds, and cropping systems by strengthening the Bangladesh Agricultural Research Institute, and to assist the growth of the Bangladesh Agricultural Research Council.

Magnitude: The US\$1.7 million contract provides for 156 man-months of senior specialists (in residence, and as consultants) and 108 man-months of junior specialists through a subcontract with a voluntary organization. The contract, which was effective November 1977, will be completed in June 1981.

Basis: Contract between the People's Republic of Bangladesh and IADS.

Funds: USAID grant to Bangladesh.

Murray Dawson, *project supervisor*

Bangladesh research review team

A. H. Moseman, *team leader*

S. D. Chaudhuri, *planning*

D. L. Plucknett, *agronomy*

A. J. Pritchard, *crops*

T. Madamba, *livestock*

M. A. Mannan, *research administration*

S. D. Biggs, *economics*

A. A. Johnson, *extension*

tion contracts for some of which IADS may wish to compete. Short-term planning and review projects place heavy demands on the headquarters' staff.

During 1980, IADS undertook an analysis of the present staff composition, which led to the conclusion that we need to add several full-time program officers in areas where IADS is now deficient. Some modifications in staff can be achieved by filling vacancies that occur from time to time with officers with different backgrounds and capabilities. It will be necessary also to add new staff over time. Within reasonable limits, each officer would deal with contractual matters as well as serve as a specialist on a specific topic or area.

But this would be only a part of our approach. We can substantially improve our ability to respond to the wide range of development opportunities by arranging special appointments for the services of outstanding individuals on a part-time basis. Some might have joint appointments with a university. Others might be consultants who would reserve 1 to 3 months a year for IADS on a retainer basis.

The following pages of this report describe the current status of various programs on which IADS worked in 1980.

BANGLADESH

Under the recently announced Second Five-Year Plan, Bangladesh will strive for a higher degree of self-sufficiency in food by aiming to achieve a target growth rate of 7.2 percent a year in agriculture. Achieving self-sufficiency is an urgent need in a country where two-thirds of the 90 million people are malnourished. Much of the responsibility for reaching the target rests with agricultural researchers.

During 1979/80 Bangladesh imported 2.8 million tons of food grains, more than double the amount imported a year earlier. Two-thirds of the imports were consumed and the rest were held by the government as a buffer stock.

Wheat production has increased spectacularly. The area and production of wheat doubled in 1979/80, compared with a year earlier, and in the last 7 years production has risen 800 percent.

During 1980 the Bangladesh Agricultural Research

Council (BARC), at the request of the Planning Commission, prepared the first 5-year National Agricultural Research Plan, which focuses on major constraints and priority research needs in all subsectors. Priority areas for research on crops, fisheries, livestock, socio-economics, and farming systems with special attention to soil and water management are identified.

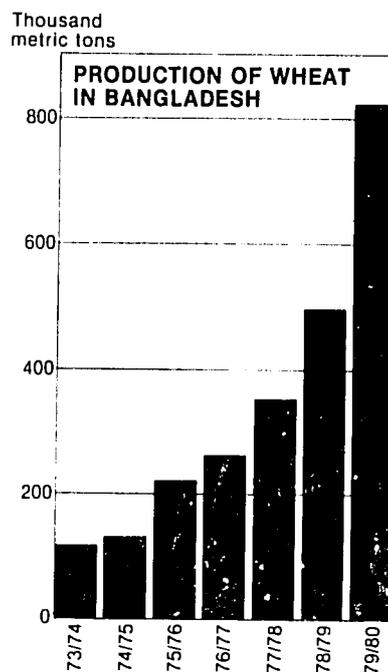
A review team led by A. H. Moseman of IADS, with representatives from USAID, World Bank, and the Bangladesh government reviewed the Bangladesh agricultural research system. An assessment of progress, identification of constraints, and resolution strategies were presented in a report to the Minister of Agriculture and Forestry.

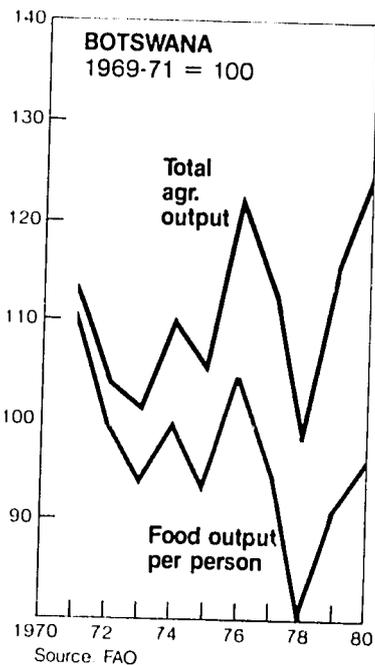
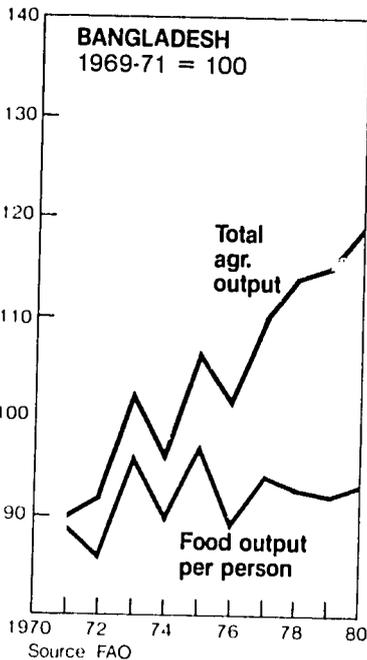
Research highlights. The role of BARC in the planning, coordination, monitoring, and funding of agricultural research is growing. Research projects have been scrutinized and funded in relation to the priorities of the 5-year research plan, and an effective technical and budget management and monitoring system has been developed. All foreign assistance to agricultural research is now reviewed by BARC.

The IADS team has provided assistance in both developing and implementing the program of the Bangladesh Agricultural Research Institute. BARI plant breeders have developed several new lines of wheat, maize, pulses, oilseeds (especially mustard), and vegetables. Agronomic and economic studies have been concurrently conducted on these crops.

Maize is proving to have a high potential for increasing agricultural production as well as raising incomes to farmers. In two series of trials in farmers' fields in the spring (aus) season, maize yields (3900 kg/ha) were double the yields from direct-seeded rice grown in the same experiments. Especially large economic returns were obtained when green maize ears were sold. In similar trials during the winter (rabi) season, maize averaged 5000 kg/ha.

Long-term on-station cropping system trials are under way at Joydebpur and all four regional stations. At Joydebpur, during the first year, the most productive (but most expensive) system, measured in calories and protein, was





rice-potatoes-maize, rather than continuous rice. The trials also revealed that sulfur is a critical nutrient for continual high yields, especially of rice.

Cropping system studies were started at sites near two regional stations of BARI. At each site, baseline agro-economic surveys have been completed in seven villages and some superimposed trials started in farmers' fields. These studies are the BARI contribution to a national cropping system program coordinated and financed by BARC.

Valuable results were also obtained on the returns from mixed cropping or intercropping of wheat with chickpea, lentil, or mustard, and maize with various pulses, and on nitrogen response curves for wheat, potatoes, and maize with different, accurately controlled, levels of irrigation. Potato research has been given special attention by the potato specialist working in the IADS team.

In addition to the economic analysis of maize trials and baseline economic surveys in the cropping systems program at BARI, farm level economic survey studies were also carried out for wheat, potatoes, and sweet potatoes. These studies are beginning to help researchers at BARI set priorities for research as well as being useful for policy makers in the government.

Research facilities and services. During 1980, much progress has been made in developing the research facilities of BARI. Delivery of most of the farm implements, laboratory instruments and workshop equipment is expected in 1981.

Land development and drainage improvement have continued at an accelerated pace. In the winter, another 30 hectares were leveled in approximately 4 hectare blocks. The main drainage system was almost completed and field drainage was improved. During this development, a newly formed survey team was trained for similar work at other stations of BARI. The IADS agricultural engineer with his BARI team have now been assigned the task of land development at all research stations of BARI.

The irrigation system designed with the help of an IADS consultant last year will be installed in 1981.

Improvement in machinery maintenance together with

the move of staff and equipment to new workshops at Joydebpur have greatly assisted experiment station field operations.

Library services have much improved at the new complex and many books have been purchased. An IADS library consultant who visited BARI for 6 weeks gave considerable help in reorganization and planning.

BOTSWANA

Botswana's weather was generally satisfactory during 1980. The cereal harvest was the third or fourth best ever, but the country continues to import large quantities of food.

Livestock raising is the major agricultural enterprise-- Botswana has more cattle per capita than any other country. Exports of beef are booming. Despite the large numbers of cattle, however, there is hardly any commercial milk production, and imports of dairy products are rising rapidly. As a result, the government is launching a milk production research scheme.

Attention to crop production is increasing. Multiplication and distribution of seed has increased greatly in the last two to three years. Perhaps a fourth of the country's crop plantings are done with improved seed.

Recent efforts to improve contacts between researchers and farmers, and to better understand farmers' physical, social, and economic circumstances are beginning to pay off in the development of improved technology for farming systems.

A notable advance is the development of an ox-drawn plow-planter. In Botswana's semi-arid climate, cereal yields are not uncommonly measured in hundreds of kilograms per hectare. With such scanty yields, large areas have to be planted at very low cost. The new plow-planter makes that possible. It allows the farmer to plow and plant in one operation and leaves the soil with a rough surface, which will retain rainfall. The manufacturing cost of the plow-planter will, it is estimated, be less than US\$100. A drawback of the implement, however, is that it uses more seed than ordinary row planters.

IADS services to Botswana

Objectives: To assist the government of Botswana in furnishing leadership to the agricultural research organization. In this unique arrangement, the Norwegian Agency for International Development (NORAD) provides the services of the director of agriculture research for the Botswana Ministry of Agriculture. At the same time, the director is an IADS representative, and IADS furnishes him with supporting services and a small amount of discretionary funds used to support research in Botswana.

Magnitude: NORAD has posted the director of agricultural research for approximately 5 years. IADS provided US\$14,000 in 1980 in addition to support activities by the IADS headquarters staff.

Basis: The government of Botswana and IADS agreed to cooperate with this project through personal visits and exchange of letters.

Kristian Oland, *representative*

Brazil project preparation team

G. B. Baird, *research administration*
R. P. Bates, *food technology*
R. Desrosiers, *perennial crops*
E. R. Duncan, *semi-arid agriculture*
R. W. Etheredge, *architecture and planning*

BRAZIL

Under a subcontract from IICA (Interamerican Institute for Agricultural Cooperation), IADS provided five consultants in 1980 to EMBRAPA, Brazil's national agricultural research agency. They helped prepare a proposal for strengthening research in 20 programs involving commodities, farming systems, and agricultural-support services. The proposal will be submitted by EMBRAPA to the World Bank for financing.

COLOMBIA

At the invitation of HIMAT, the Colombian agency responsible for irrigation development, IADS provided two specialists who studied ways to improve the utilization and effectiveness of the country's irrigation systems.

Another two-man team of consultants examined Colombia's overall agricultural development programs and made recommendation to the Minister of Agriculture about subjects of high priority that would benefit from technical assistance from abroad.



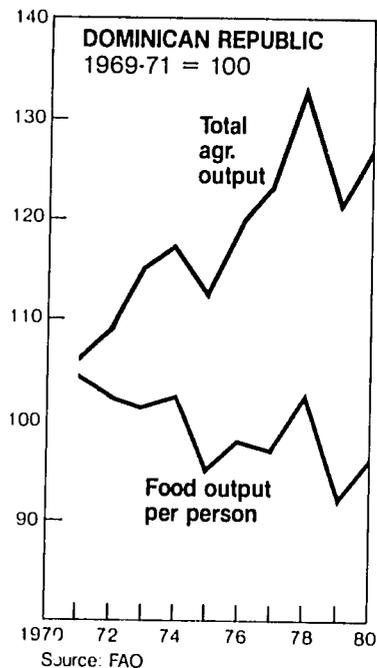
New plow-planter allows Botswana's farmers to plant their land faster. Farmer adoption of truly outstanding research findings is developing momentum of its own, but the time is approaching when production and area development drives can have a significant impact.

DOMINICAN REPUBLIC

Plan Sierra, funded completely by the government of the Dominican Republic, has a total budget of US\$21 million for 4 years. Work is progressing on agro-forestry systems for the hillsides. Plan Sierra is building rural roads and small irrigation systems, and has started 15 nurseries with a production capacity of 29 million plants annually. Workers are promoting health and education through 400 organized groups, and small farmers have received \$1.9 million in loans.

The 200-square-kilometer area covered by Plan Sierra is the watershed of 14 rivers that provide water for agricultural and industrial production in the intensively cropped Cibao Valley. Thus the project serves both people in the hills and in the valley.

The project was recommended to the Dominican government in 1976, following a visit by a small group of IADS representatives. Subsequently, IADS staff members helped design the project. In 1980, the Dominican Republic contracted with IADS for consulting services for a 3-year period to help plan organization and staff development activities.



IADS services to the Dominican Republic

Objectives: To assist the management and staff of Plan Sierra in organizational development, training, and related activities. Plan Sierra, an area development program in a mountainous central region of the Dominican Republic, brings together the government agencies working on health, agriculture, and education. It is administered by the Secretariat of State for Agriculture.

Magnitude: IADS is providing up to 30 days of consultant services a year for a 3-year period, beginning in 1980, at an estimated cost of US\$45,000.

Basis: Contract between the Dominican Republic and IADS.

ECUADOR

IADS services to INIAP, the national agricultural research agency, continued in rice technology with a staff member located in Guayaquil. Under the INIAP/IADS contract signed in 1979, three long-term specialists collaborate in fruit crops, poultry, and biometrics. A soil specialist joined the group in 1980. The work is supported in large part by loan funds from the Inter-American Development Bank.

Fruit program. The estimated 765,000 tons of fruit produced annually in Ecuador play an important role in the agricultural economy. But productivity is low. Significant improvements could be achieved through the proper use of available technology, thus increasing the output of fruit for local and export markets.

In 1980, the Minister of Agriculture and the General Director of INIAP signed agreements enabling the program team to expand activities from one station to four stations, which cover the wide range of climatic conditions under which fruit is produced in Ecuador.

During 1980 an inventory of Ecuador's fruit tree germ plasm was concluded. Twenty-five imported and 10 native species were identified.

At the station in Tumbaco, the performance of 20 avocado and 12 apple varieties is being studied; apple dwarfing rootstock were also introduced to the Pillaro experiment station, which will be propagated and used in extensive trials with apple growers.

A major problem for temperate fruit production in the country is the absence of temperatures low enough to meet the chilling requirements of most varieties. The well-known technique of spraying trees with compounds to break dormancy and stimulate uniform flowering is being tested.

In avocado orchards, a root rot apparently caused by *Phytophthora cinnamomi* is severe. Trials in farmers' fields and at experiment stations are showing the recovery of trees treated with certain fungicides.

In citrus a common sight is twig die-back and death of small branches. In humid areas this disease may kill the entire tree. The phytopathology department of INIAP in col-

laboration with the fruit program has identified the agent as the fungus *Colletotrichum* spp. The team is obtaining excellent results controlling the disease with products already on the market.

The fruit team is helping Central Ecuatoriana de Servicios Agrícolas introduce temperate fruit trees in a dry area of the Province of Chimborazo, where 900 families now depend on the production of agave fiber. Farmers are being taught basic principles of orchard management. The community is constructing a 26-kilometer water channel to irrigate 1200 hectares by next year.

Four Ecuadorian professionals are being instructed to initiate activities in the two coastal experiment stations. In addition, two undergraduate students are working on their thesis projects.

The program began publication of a newsletter to inform extension workers and farmers about ideas generated in experiment stations and elsewhere.

Poultry program. Poultry growers in Ecuador have 28 million birds, of which 60 percent are in the hands of small farmers. The industry is rapidly growing, but Ecuadorians annually consume only 2.9 kilograms of poultry meat per capita and 78 eggs per capita.

The current objective of the program is to adapt, evaluate, and validate different combinations of existing poultry technology among small farmers in the Ecuadorian highlands where the shortage of protein is acute. Much of the work is concentrated in Puellaro, 60 kilometers north of Quito, where 41 families own 100,000 laying birds and 5,000 broilers. As poultry raising increases, it is changing from subsistence farming to commercial family operations.

The poultry team and the biometric unit have surveyed factors limiting poultry production and compared farmers' and technicians' perceptions of those factors. Out of 10 factors, farmers ranked the high price and low quality of commercial feedstuffs as the number one problem, while technicians ranked it number four. Technicians ranked lack of sufficient technical assistance as the number one problem, while farmers ranked it number five. Farmers ranked lack of knowledge about poultry management as number ten, while

IADS services to Ecuador

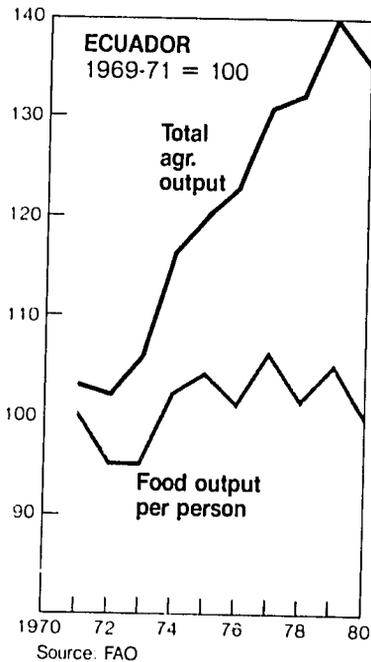
Objectives: 1. To assist the government of Ecuador in a regional project in the Guayas River Basin where rice is the principal crop. 2. To assist INIAP, the national agricultural research institute, in strengthening its research programs in vegetables, fruit, and poultry.

Magnitude: Under an agreement made in 1976, IADS has provided a representative for rural development work. At the request of INIAP, IADS also provided a rice production specialist to work in the Guayas River Basin. A research contract with INIAP, amounting to US\$2.6 million, calls for 402 man-months of specialists (in residence and as consultants) over a 3-year period, beginning May 1979.

Basis: Agreement between the government of Ecuador and IADS for work in rural development projects; a contract with INIAP for technical assistance.

Funds: IADS funding for a representative on rural projects; World Bank funding for a rice specialist; Interamerican Development Bank loan to INIAP for contract technical assistance.

Gustavo Morales, acting representative and project supervisor



technicians ranked it number three. The sharp differences in rankings indicate why designing proper poultry technology for small farmers in the area will be a demanding task.

Prior to starting trials in Puellaro, the team is teaching farmers record-keeping and basic principles of poultry production. The training also includes direct help to farmers who want to create their own balanced poultry rations.

An inventory of diseases was initiated with three professionals and one undergraduate trainee. Dead and sick birds are examined and a macroscopic study made of all cases. Blood and tissues are taken for further studies to the National Institute of Health, with which INIAP has a collaborative agreement. Vaccination against Newcastle disease, the major disease in the area, has begun, as has treatment against chronic respiratory disease.

The poultry team organized three seminars and one roundtable discussion at national level. In addition six field days were held in Puellaro.

Training of three professionals and one undergraduate



student assigned to the program continued. They have been involved in all activities concerned with the Puellaro project. Two took a short course in poultry production at Oklahoma State University (USA).

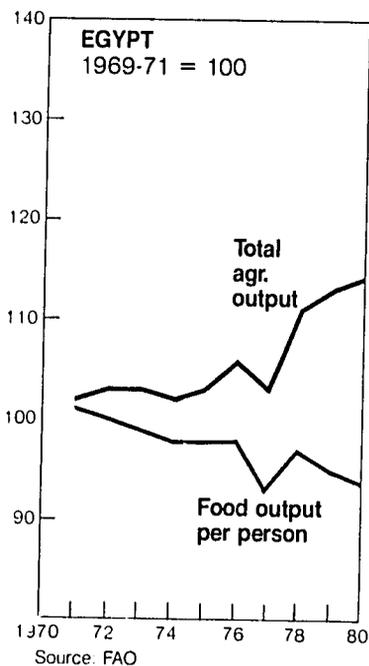
The program team published 15 extension bulletins for small farmers and 10 newsletters for veterinarians, newspapers, and large poultry producers. A booklet on classification of eggs was translated into Spanish in collaboration with FAO and distributed to extension veterinarians and small farmers.

Soils program. The soils program of INIAP is devoted to the study of problems related to management of soils for maximum economic production. The IADS specialist assists soils sections at the six INIAP experiment stations.

At the Santa Catalina station, sites were selected and preliminary research concluded on soils to be used in a study of methods of applying rock phosphates for pasture and other crops. The project is in collaboration with CIAT.



Juan Leon, head of Ecuador's fruit program, working with a trainee. Lack of trained personnel is still the most serious constraint to agricultural development in much of the world.



Soil and water salinity continued to be studied along with rice varieties in the Samborondon area. Salinity affects rice production in the area.

At the Pichilingue station, a trial on application of nitrogen to banana showed that frequent broadcasting is the best method. This will cut labor costs, allowing for the possibility of fertilizing by irrigation or airplane.

At the Portoviejo station, off-station fertility research has been hampered by low rainfall. On-station research with tomato and pepper provided good information with regard to plant population and nitrogen responses.

Financing was procured by INIAP to send two professionals to the USA to take short courses on soil conservation. Another staff member participated in a fertilizer short course at CIAT. Four professionals are in Mexico, working on M.S. degrees. Also, a Ph.D. assistantship was procured for the head of the soils department to study soil conservation at the University of Minnesota.

Biometric unit. During its first year of service, the biometric unit helped plan, design, analyze, and interpret experiments carried out by INIAP at the Santa Catalina station. The support service will extend to all six INIAP experiment stations next year. A microcomputer is available for training in storage and processing of data.

The volume of data generated in the past by INIAP research programs is large enough to justify the creation of a data bank and the formation of a computing center. While the former has been started, a feasibility study has been presented for the latter. The unit prepared a manual entitled "Combined Analysis of Experiments" to guide researchers in the planning, design, and analysis of data.

Samborondon rice project. Most of Ecuador's rice is grown near Guayaquil in a large, irregular floodplain. With excess water, at times, and fertile soils, the region has the potential for substantially increased agricultural production. Several government agencies (INIAP, INERHI, MAG) are working with a regional development agency to solve the region's major problems: water control and low-level agricultural technology.

During the yearly floods, farmers typically plant rice in high spots in fields when they believe maximum water depths have been reached. As the water level drops, newly exposed land is planted. At the same time farmers try to block culverts and channels to keep the water from escaping too fast.

During 1980, detailed contour mapping of the project area was completed. This mapping will be used to guide the placement of gates to control the flow of water, the construction of canals (several of which were completed during the year), and the positioning of pumps. Large pumps are being manufactured in Guayaquil and some are already in use to lift water from low-lying areas to rice fields and in some instances during the dry season to provide water for livestock and domestic purposes. During a drought late in the year, project pumps were employed to supply fresh water to the Guayaquil water works.

For the second year, deep-water rice varieties from Asia were tested. These varieties can survive in water one or two meters deep, or more, because their stems elongate as flood waters slowly rise. In Asia farmers sow such varieties just before the floods, thus taking advantage of the full period of abundant water. In 1980 trials in the Samborondon area, late rains delayed seeding, then a sudden surge in water levels—50 centimeters in 4 days—submerged and killed all 100 varieties tested.

In trials of varieties for areas with more moderate water depths—up to 60 centimeters—all varieties survived and yields were high. In one trial without irrigation, fertilizers, or other inputs, the average yield was 3400 kg/ha.

Studies of rainfall, stream flow, and tides in relation to flood levels and salinity continued. There are indications that long-term prediction is feasible.

EGYPT

Under a subcontract from Dames and Moore, a private consulting firm, IADS carries out agricultural studies in the Sinai region of Egypt. These studies will be part of a plan for developing transportation, water resources, tourism, manufacturing, mining, agriculture, and fisheries in the Sinai.

IADS services to Egypt

Objectives: To help the government of Egypt prepare a long-term plan for agricultural development in the Sinai. Under a subcontract from a private consulting firm, which is preparing a development plan for the economy of the region, IADS has been retained to plan agricultural development. The work began in November 1980 and is scheduled to be completed by February 1982.

Magnitude: IADS will furnish approximately 12 months of headquarters staff and consultants' time. Almost \$125,000 is available for this project.

Basis: IADS is a sub-contractor.

Leon E. Hesser, IADS team leader

In 1980, an IADS program officer and an outside consultant visited Egypt to make an initial evaluation and to prepare plans for future work and the staffing of several short-term development projects that are ready for implementation.

GHANA

Ghana's Councils for Scientific and Industrial Research held a workshop on multidisciplinary projects, which was attended by a panel of scientists and planners assembled by the U.S. National Academy of Sciences. The panel was led by an IADS program officer. The report of the workshop made suggestions for improving the planning, implementation, coordination, and evaluation of research projects.

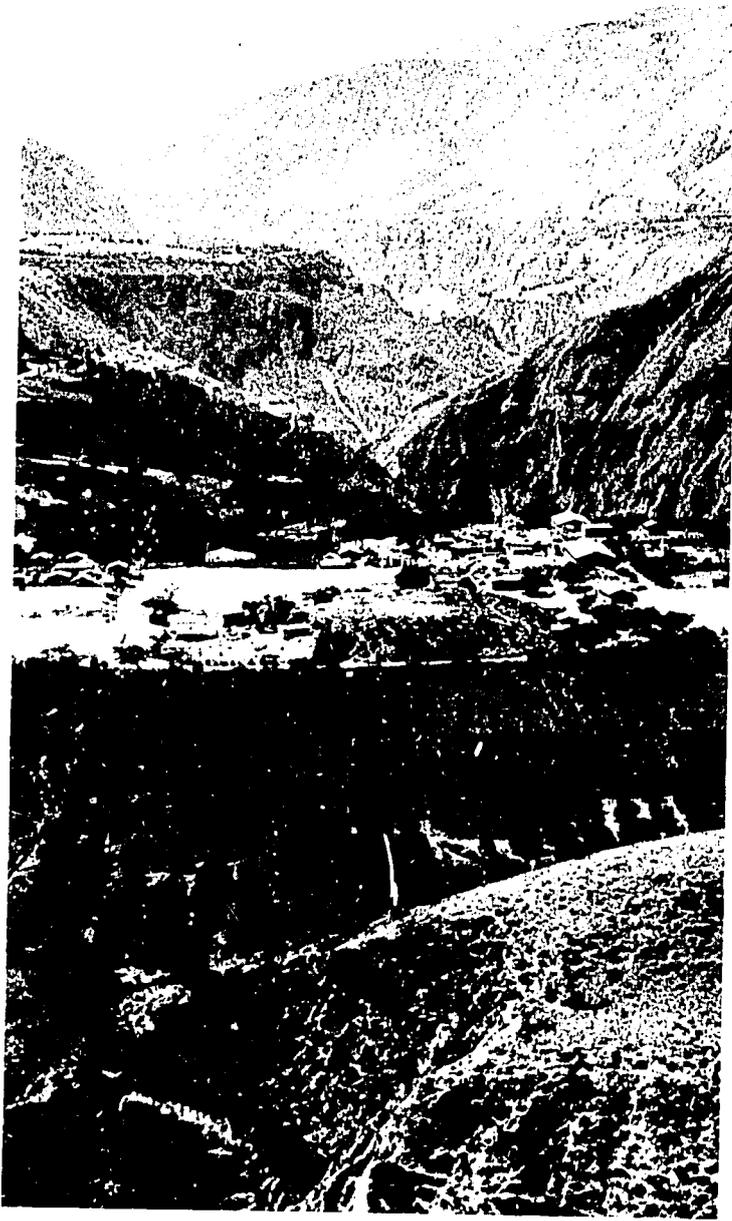
HAITI

An IADS program officer visited Haiti at the request of the head of the country's northern development organization. The consultant assessed farming systems and, in particular, methods for producing roots and tubers such as cassava, yams, sweet potatoes, and taro. He prepared a report on steps to improve agricultural research for the region.

INDONESIA

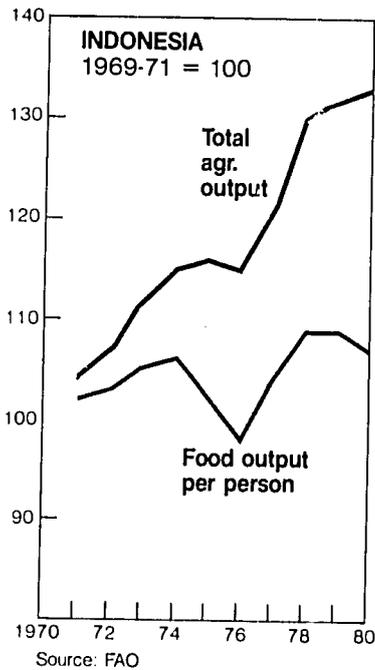
Strengthening national agricultural research

Agriculture is the livelihood of half of Indonesia's 140 million people. Under the Department of Agriculture, the Agency for Agricultural Research and Development is responsible for seven central research institutes (for soils research, agro-economic research, food crops, industrial crops, forestry, animal husbandry, and fisheries) plus two management boards (estate crops research and sugar research). It has 1500 employees with university training (compared with under 700, 5 years ago). Recruiting and training research scientists is AARD's highest priority; in 1980 nearly 70 AARD staff members were studying abroad and 268 were working on advanced degrees in Indonesia.



Town in the Ecuadorian highlands where fruit and poultry raising are thriving enterprises.

There is probably no better place to enter the agricultural development process than through research.



One of the objectives of Indonesia's Third 5-Year Development Plan—self-sufficiency in food—moved a step closer to realization in 1980 when the rice harvest reached 20 million tons, 2 million tons more than in 1979. Among the reasons for this record harvest were the continuing research on new technologies, widespread planting of varieties resistant to insect pests, favorable weather, more irrigation, incentives to farmers for increased production, and improved extension work. The new responsiveness of the reorganized research system has also been demonstrated by the development of control measures for a disease of fish raised in ponds and the rapid multiplication of rice varieties that are resistant to serious tungro virus disease.

The bright picture of increased food production extends to two secondary crops, groundnuts and soybeans, but much remains to be done with such crops as maize, cassava, sweet potato, and vegetables.

Indonesia has a massive program to relocate families from overcrowded islands to other areas of the archipelago. Most of these families will derive their livelihoods from agriculture in their new settlement sites. AARD provides significant support to the transmigration effort through evaluation of transmigration sites for agricultural production.

Additional resources. During 1980 AARD, as executing agency for the government of Indonesia, negotiated with the World Bank for a credit and loan of approximately US\$65 million in foreign currency to be supplemented with US\$35 million in local currency for additional support to Indonesia's agricultural research from 1981 to 1989. A quarter of the project funds will be for rehabilitation and extension of AARD's physical research network while one fifth will support a portion of the required technical assistance and the continued training of scientists.

A research project is also being negotiated for USAID funds to strengthen the network agricultural stations in Kalimantan, Sulawesi and the Maluku Islands.

Training. The cooperative AARD-IADS fellowship program supported by the first World Bank loan has nearly

reached its goal of sending 60 Indonesian scientists abroad for advanced degrees. Eight fellows have received degrees and returned to assignments in Indonesia. Thirty fellows are currently pursuing the Ph.D. and 18 the M.S. degree. Only four have failed to achieve their degree objectives.

Two additional contributions of IADS to the AARD's manpower development are noteworthy. One is the assistance in short-term fellowship programs, with 33 of the 44 planned fellowships already under way or completed. AARD has recently requested assistance from IADS in short-term training programs in five additional commodity and skill areas. The program of English for Agricultural Training continues. Three intensive sessions to prepare fellows for the TOEFL examination were held during 1980. A total of nine sessions have been conducted to date.

Consultants. Two consultants were supplied through IADS during 1980. An agricultural economist, Ralph W. Cummings, Jr., assisted in the Center for Agro-Economic Research for one month. His main assignment was preparing an English summary of the Sumatra Consultation which had been held in 1979. The Consultation provided data on the physical production resources of Sumatra as well as the human resources, input situation, and market infrastructure, etc. The summary features the implications for agricultural research. It will be published as a special issue of the *Indonesian Agricultural Research and Development Journal*.

The IADS program officer for Southeast Asia spent 3 weeks consulting on research administration with the national vegetable program.

Vegetable program. Staff changes in the vegetable program were the departures of H. W. Younğ and K. M. Graham. J. A. T. Woodford assumed the position of research specialist in entomology. Both the central research facilities and staff housing facilities for the vegetable research program were completed in 1980. AARD and the International Potato Center held an international symposium on potato production in the humid tropics at Bandung. The IADS research specialists working in the vegetable program assisted in the local arrangements and symposium program.

IADS services to Indonesia

National agricultural research

Objectives: To provide the Agency for Agricultural Research and Development with technical assistance and services for strengthening national production-oriented research on rice, rubber, vegetables, and upland crops.

Magnitude: The contract provides for 62 man-years of specialist services from February 1977 through December 1981, and US\$8.9 million in estimated costs. Of this, \$2.4 million is allocated for 133 fellowships providing 225 man-years of training.

Basis: Contract between Republic of Indonesia and IADS.

Funds: World Bank loan to Indonesia and local currency from government of Indonesia.

Edwin B. Oyer, *project specialist*

Agricultural research in Sumatra

Objective: To help the Central Research Institute for Agriculture develop and expand nine research stations in important food crop production zones of Sumatra.

Magnitude: A US\$2.5 million contract provides 21 man-years of professional assistance from October 1979 through April 1984 and consultant services for 24 man-months. Sixty fellowships for study in Indonesia and abroad plus nondegree training and conferences will cost an additional \$1.2 million.

Basis: Contract between the Republic of Indonesia and IADS.

Funds: USAID grant and loan to the Republic of Indonesia; local currency from the government of Indonesia.

F. J. Bell, *project specialist*

Rubber program. The IADS rubber specialist, is preparing a report on the research needed to support the rubber replanting programs planned by the Directorate General of Estate Crops. This report will identify the links between the research and production programs that are essential to support the national rubber development effort.

Research workshop. Another cooperative activity of AARD and IADS was a 5-day workshop in Yogyakarta on increasing the productivity and impact of agricultural research. It was preceded by lectures in Jakarta and Yogyakarta by Theodore W. Schultz, Nobel laureate in economics. Dr. Schultz' lectures on the subjects of "Economic dynamics of agricultural development" and "The entrepreneurial function in agricultural research" provided an appropriate focus. The workshop had participants from Bangladesh, Brazil, Indonesia, Nepal, the Philippines, Thailand, and the U.S.A.

Financial administrator. Another personnel change is the appointment of Ernesto B. Farre as financial administrator in the project in Indonesia.

Agricultural research in Sumatra

The island of Sumatra has a vast potential. It is lightly populated. It has a tropical rainy climate and diverse landscape—mountains, foothills, plains, and tidal swamps. Under Indonesia's Third 5-Year Development Plan, CRIA is responsible for improving food crop technology for Sumatran farmers. As a result of government programs fostering transmigration from the more densely populated islands to Sumatra, new land is rapidly being cleared. In addition, the productivity of existing farms needs to be raised.

CRIA's activities in Sumatra are supported by government research funds plus a development loan and a technical assistance grant from the U.S. Agency for International Development. IADS is under contract to CRIA to provide technical assistance.

This was the first year of implementation of the Sumatra project, other than training, which began in 1978. Committees of CRIA staff members, including IADS person-

nel, have been formed to work on planning, budgeting, implementation, evaluation, and reporting. A 5-year plan for the project has been completed. Revisions will be made annually as progress warrants. The goals are creation of a research network that focuses on solving farmers' production problems, filling planned positions with well-trained individuals, having buildings completed, and equipment in use, and establishing a means for transferring new technology.

Farming systems research. With the help of a consultant, Richard R. Harwood, a multidisciplinary committee reviewed the research program, staffing pattern, and climatological and soils data, and produced an organization chart and research approach for conducting food-crops farming systems studies on the problems of the small farmer. The group identified 16 agro-production complexes in which to find farming systems research sites.

A multidisciplinary team that includes extension service workers is making initial surveys to identify local cropping systems and resources. These activities form the basis for selecting sites for the farming systems research program.

Another multidisciplinary team, which includes one Soils Research Institute scientist, has started cropping systems research at a transmigration site. Plant establishment, soil erosion, cropping sequence, and soil fertility are the main areas of study.

Staff development. A consultant and the heads of the CRIA divisions in Sumatra have produced a revised staffing plan and training schedule to better match the scientists who are trained with the future needs of CRIA.

Forty-five persons are learning English. A British teacher of English has joined the Indonesian teachers of English at the Institute and he is offering a special course for individuals who are preparing for advanced degree studies abroad.

Staff members of CRIA in Sumatra are beginning to return to their posts after completing their training. One has completed the requirements for the M.S. degree at Institute Pertanian Bogor; another returned with a Ph.D. in agronomy from Iowa State University.

Sixteen participants are studying for the M.S. degree

in Indonesian universities and three for the M.S. degree at University of the Philippines, Los Baños. One participant is studying for the Ph.D. degree at Iowa State University.

Short-term training. Observation travel and short-term training was provided for staff members involved with such topics as deep-water rice for floodplains (Thailand, Bangladesh), dryland crops research (ICRISAT, India), agricultural library management (Philippines), agricultural project implementation (U.S. Department of Agriculture), vegetable research and intensive vegetable farming systems (AVRDC, Taiwan), research station facilities and management (India, Thailand, Taiwan, Philippines), entomology research management (AVRDC, Taiwan), and horticulture (Malaysia).

Administration. The IADS administration specialist and the heads of the administration divisions of CRIA in Sumatra have begun an innovative program to draw up forms and procedures for integrating the control processes of the project and those of CRIA.

Facilities and equipment. The Bogor dormitory and apartment complex to house trainees from Sumatra has been completed. At the Sukarami experiment station, design for the first phase of construction was finished; construction will begin in 1981. Soil surveys of the station have been completed. Eight vehicles have been received.

Library. Plans have been made to improve the holdings of the library, to improve the physical facilities, and to make greater use of the services of Bibliotheca Bogoriensis.

Technology transfer network. A plan has been developed for CRIA in Sumatra to develop technology for the training and visit network of the extension service.

MOROCCO

IADS provided a consultant in research administration to Morocco, which is planning to form a national agricultural research institute, with support from the World Bank.

NEPAL

In the 1980 crop year, timely rains benefited all crops. As a consequence, Nepal may export 100,000 tons of rice in 1981. This sharply contrasts with the food deficit of 1979-80, estimated at about 200,000 tons. Over 40,000 tons were air dropped or portered into the hills to supply deficit areas.

Inflation continued to erode buying power, making staple foods more costly. At the same time the good rice crop in the plains area depressed prices, which was not only a disincentive for rice production, but affected the succeeding wheat crop by reducing the cash that farmers had for purchasing fertilizer.

Fertilizer prices were increased about 30 percent in October, but nearly 50 percent of the selling price was still subsidized. Transport costs into the hills were further subsidized to encourage use in these areas. The subsidized price is slightly higher than prices in India to discourage sales across the border.

IADS is involved in two projects in Nepal. The Integrated Cereals Project of the Department of Agriculture has seven staff members supplied through IADS. During 1980, Shiro Samoto joined as rice breeder and Kenneth Sayre joined as maize agronomist. In the seed project of the Agriculture Inputs Corporation, Russell Bradley began work as project supervisor this year.

Integrated cereals project

Production programs. Pilot production programs were initiated in 1980. As a result of several years of cropping systems research, improved cropping patterns have been identified that can increase the yields and profits of small hill farmers without requiring large investments in inputs. A cropping pattern is the 12-month cycle of crops and cultivation techniques a farmer uses on one parcel or field. Typically, a farmer tills several parcels, which vary in soil fertility and moisture supply. He uses different cropping patterns for different parcels. Taken together, all the cropping patterns a farmer employs are his cropping system.

IADS services to Nepal

Integrated cereals project

Objectives: To provide technical assistance and services to Nepal for strengthening national production-oriented agricultural research and extension activities related to cereal crops and cropping systems.

Magnitude: Estimated contract costs are US\$4.5 million for work to be completed by September 30, 1981. IADS will provide up to 468 man-months of specialists (in residence, and as consultants). The training component includes 456 man-months of advanced degree training, and 540 man-months of other training.

Basis: Contract between His Majesty's Government of Nepal and IADS.

Funds: USAID grant to Nepal.

Wayne H. Freeman, *project supervisor*

Seed production and input storage

Objective: To establish a labor-intensive system for producing, testing, processing, storing, and distributing seed of major food crops, and for storing and distributing other inputs used in the production of these crops.

Magnitude: The contract is funded for 5 years beginning January 1980 at a total cost of US\$2.6 million. It provides for 79 man-months of specialist (resident and short-term) services. Other services include training and procurement of equipment. Ten Nepalese will receive training at the master's level and 28 will receive nondegree in-service training abroad.

Basis: Contract between His Majesty's Government of Nepal, acting through the Agriculture Inputs Corporation, and IADS.

Funds: USAID grant to Nepal.

Russell H. Bradley, *project supervisor*

Recent efforts to improve contacts between researchers and farmers are beginning to pay off in the development of improved technology for farming systems.

Agricultural development officer in Nepal discussing village production program with farmers.



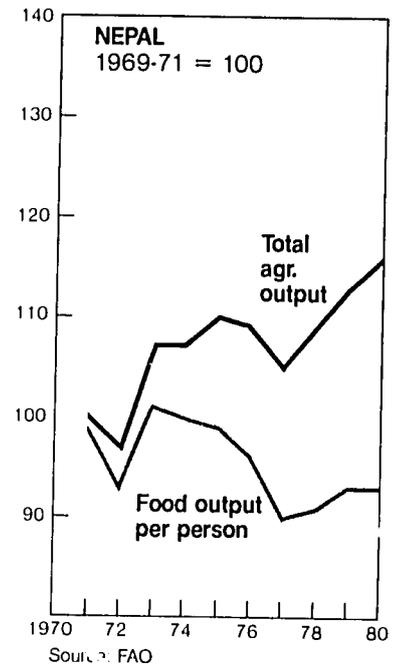
Pilot production programs were introduced in the villages primarily in the Hills where four of the five cropping systems research sites have been located for several years. The production programs are based on fitting new technologies into the patterns that most farmers use. The new technology usually consists of an improved variety, moderate use of cash inputs, and better crop management including pest and disease control. Changes in the patterns farmers use are practical only if the farmers' fields have sufficient moisture or if additional inputs are available.

The agronomic performance and economic feasibility of the technologies had previously been measured. Substantial increases in production and benefit-cost ratios of up to ten- to twenty-to-one are possible. In research trials, varieties and cultural practices were tested in farmers' fields and the farmers did the work themselves. Supervision and collection of yields and other crop performance characteristics, and socio-economic information, was done by the cropping systems team and extension personnel interacting with farmers to determine the suitability of technology, both agronomically and economically.

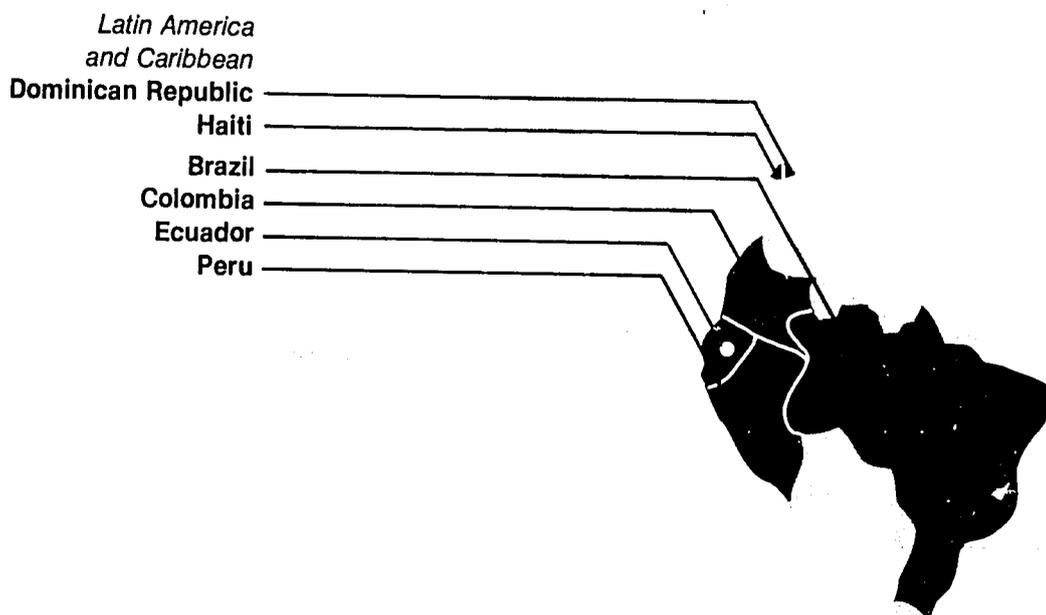
The first pilot production program was launched during the monsoon season in a village in the Hills where maize-based cropping patterns predominate. The recommended pattern had unirrigated maize as the base crop with a relay crop of finger millet followed by wheat. Wheat is possible in fields that have good soil.

An aim of the pilot production phase is to evaluate technologies with numerous farmers to determine performance and acceptance in preparation for larger scale production programs. Although one objective of the pilot production phase is an increase in production of participating farmers, it has a research component—to examine the technology's dependability and feasibility, its economics, its acceptability to large groups of farmers, and its compatibility with markets, input supply, and credit services. It also permits evaluation of the methodology of extension and the effectiveness of cooperation among the various agencies that should serve farmers.

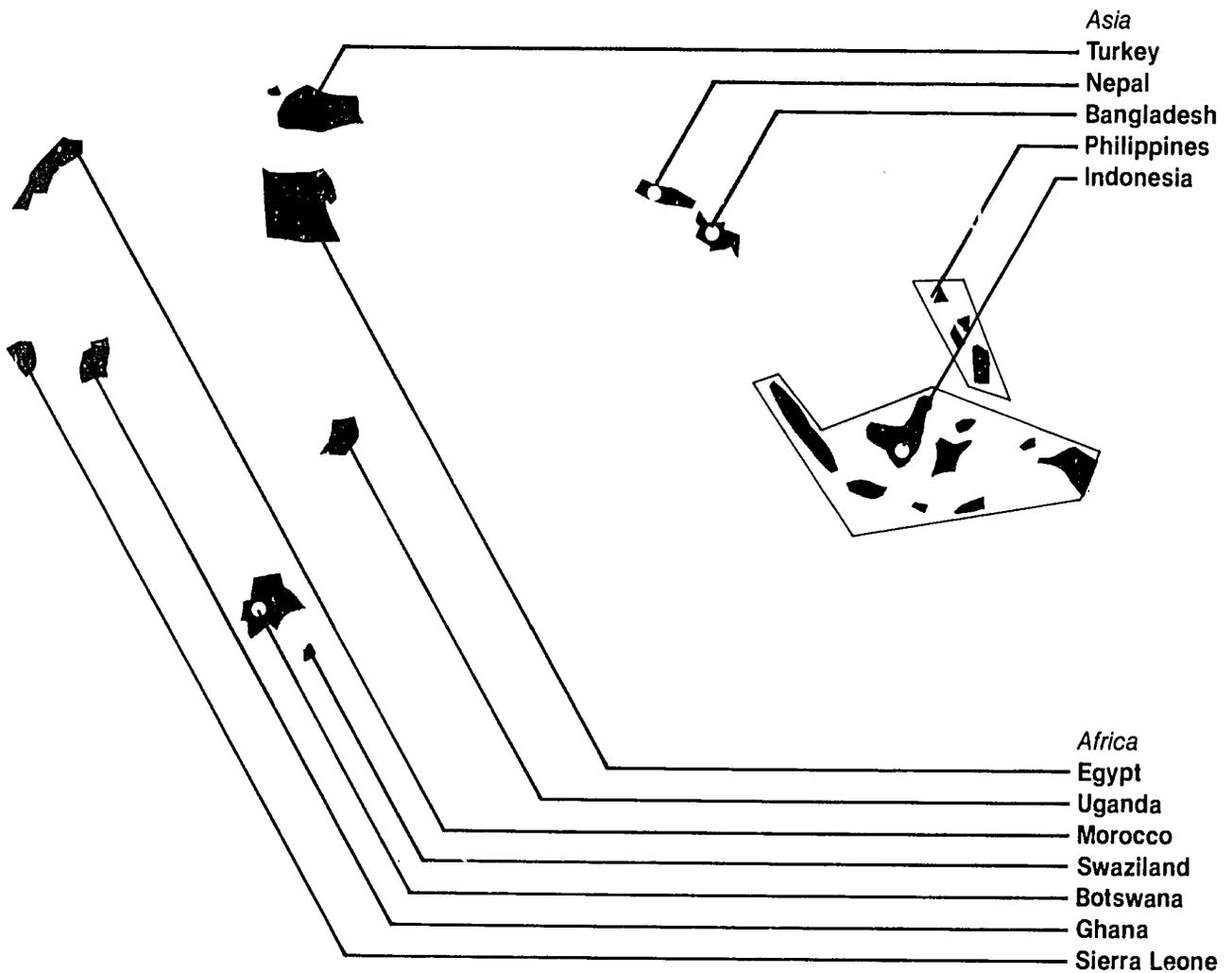
Many things were learned in the monsoon-season production program. Some components of the technology were



DEVELOPING
COUNTRIES
SERVED BY
IAIS, 1980



- **Bangladesh:** Bangladesh Agricultural Research Council and Bangladesh Agricultural Research Institute
- **Botswana:** Department of Agricultural Research
- **Brazil:** Instituto Interamericano de Ciencias Agrícolas
- **Colombia:** Ministerio de Agricultura and Instituto Colombiano de Hidrología, Meteorología y Adecuación de Tierras
- **Dominican Republic:** Department of Agriculture
- **Ecuador:** Instituto Nacional de Investigaciones Agropecuarias



Egypt: Ministry of Development and New Communities

Ghana: U.S. National Academy of Sciences

Haiti: Organisme de Développement du Nord

- **Indonesia:** Agency for Agricultural Research and Development, and Central Research Institute for Agriculture

Morocco: World Bank

- **Nepal:** Department of Agriculture, and Agriculture Inputs Corporation

Peru: Ministry of Agriculture

Philippines: Philippine Council for Agriculture and Resources Research, and U.S. Agency for International Development

Sierra Leone: United Nations Development Programme

Swaziland: U.S. Agency for International Development

Turkey: FAO

Uganda: U.S. Agency for International Development

- Resident IADS personnel assigned to national programs

accepted better than others. For example, most farmers continued to sow maize behind the plow instead of using the recommended hand-operated "jabber" planter, which gives better crop stands. More research information on each component of the technology is needed, particularly on its contribution to productivity, its economics, and its social acceptance.

There were difficulties in adequately explaining the new technology and its benefits to farmers. Farmers should be more thoroughly acquainted with technologies if they are to benefit. This is also true of the extension staff since they must be the primary agents disseminating information. A possible solution is more common use of combined research/demonstration plots during the research phase.

Another problem was ensuring that both credit and supply of inputs were available. Without the cooperation of agencies responsible for credit and inputs farmers cannot gain the benefit of new technologies.

Pre-production surveys are desirable in order to assess the interest of farmers, their needs, and knowledge of new technologies. For example, in areas where farmers periodically leave the land for off-farm employment, technology that requires close management cannot succeed.

Results of the pilot program were encouraging. Maize yields were 25 percent higher than those of farmers who were not participating. The added fertilizers helped the millet crop, which was relayed into the maize. Most farmers planned to continue with the wheat phase of the cropping pattern.

These results led to the launching of pilot production programs at other sites in the cropping systems program. Pre-production surveys were conducted at these sites in preparation for the wheat season (1980-81).

Nearly 700 farmers were contacted at all the sites. Farmers who had participated in the research phase tended to be more receptive and willing to devote more land to a production program. This was a significant indication of the confidence of farmers in the technology and in the staff of the cropping systems program. One of the main reasons for interest in a production program was the desire to increase

food supplies; farmers said any increase would be about equally divided between consumption and sales. The success of the wheat phase will not be known until harvest in 1981.

Crop research. Commodity research during the year was better organized to identify farmers' problems and to develop research to provide solutions. Problems noted by the cropping systems group, and others, were being relayed to the commodity programs. In response to the need for an earlier maize variety, the maize program has identified Arun, a variety capable of 3000 kg/ha yields in 90 days. Three new rice varieties are being tried in the Hills. They incorporate blast resistance and fertilizer responsiveness, which will allow farmers in the Kathmandu Valley to make more effective use of the fertilizer they apply. In wheat an attempt to increase fertilizer efficiency is being made by incorporating limited quantities of fertilizer in the seed furrow rather than broadcasting.

Mini-kits. Research has increasingly been influencing production. Mini-kits containing four new rice varieties adapted to varying conditions in the Terai (the plains) were distributed extensively this year. Mini-kits allow farmers and their neighbors to compare the new varieties with traditional varieties. New varieties that perform well will spread from farmer to farmer.

Training. Training activities advanced this year with the development of a 6-week course for agricultural extension officers and personnel from other agencies who have similar academic backgrounds. This program was built on three earlier programs of management skills training and problem-oriented training for planned changes in extension. These two types of training had been incorporated into one Extension Program Planning and Implementation Course.

As part of the longer training program each trainee develops a reentry plan, in which the trainee determines how he would use his training on return to his post. The performance of each individual will be followed up by a task force, which will visit trainees on the job.

Seed project

Under a contract with Nepal's Ministry of Food and Agriculture, IADS is helping the Agriculture Inputs Corporation establish a labor-intensive system for producing, testing, processing, storing, and distributing seeds of the Kingdom's major food crops. The project focuses on the Hills where transportation is difficult.

The project began in 1980. During the year, plans for mini-seed processing plants and small warehouses were developed and construction will begin in 1981. Seed processing and handling equipment has been ordered, which will serve as models for local fabrication. Drum-type seed treaters have already been fabricated, as have manual seed cleaners.

Training courses have been held for technicians and officers of the Agriculture Inputs Corporation, as well as for Peace Corps volunteers.

PERU

For the Ministry of Agriculture of Peru, IADS formed a team of consultants to examine the organization of public-sector agricultural activities. The three men provided by IADS worked with a group of Peruvian officials in making a preliminary assessment of the functional relationships between the Ministry of Agriculture, the national agricultural research organization, agricultural lending institutions, universities, and other organizations. The team helped develop recommendations for a proposed long-term study aimed at restructuring the Ministry of Agriculture.

PHILIPPINES

At the request of the Philippine Council for Agriculture and Resources Research, IADS provided a six-person team to evaluate activities that are supported by a loan from the U.S. Agency for International Development and PCARR's overall activities.

For the loan review, the team assessed PCARR's progress in developing facilities, purchasing research equip-

ment, and training personnel from 1975 to 1980. It also recommended steps for implementing future projects financed by USAID loans.

For the PCARR corporate review, the team identified the major achievements of PCARR since its founding in 1970, evaluated research management procedures, and made recommendations for future objectives, organizational arrangements, and management techniques.

SIERRA LEONE

For the United Nations Development Programme, IADS arranged for a rice specialist to serve on a team which evaluated an FAO/IITA rice project in Sierra Leone.

SWAZILAND

At the invitation of the U.S. Agency for International Development, two IADS staff members reviewed a proposed project on cropping systems research. The consultants studied the local farming situation and institutional capabilities and made recommendations for modifying the project.

TURKEY

FAO asked IADS to provide specialists to help develop a seed production project in Turkey. IADS arranged the services of two consultants who planned a project to increase production, processing, and marketing of synthetic maize varieties, forages, and several vegetable species.

UGANDA

IADS formed a team to help the U.S. Agency for International Development in Uganda set priorities for bilateral assistance to the country. The six-man team, assembled on short notice, prepared an assessment of the ecological, economic, administrative, and technological situation in Uganda, and made suggestions for the topics that most urgently needed USAID assistance.

Peru ministerial team

R. W. Cummings, Sr., *research planning*
A. Tanco, *public administration*
C. Thurber, *public administration*

Philippine research management review

A. H. Moseman, *team leader*
F. A. Bernardo, *research administration*
R. L. Cushing, *research management*
R. L. Lovvorn, *research management*
J. C. Moomaw, *research management*
J. A. Rigney, *research management*
J. Valerio, *planning*
L. W. Zuidema, *agricultural education*

Uganda agricultural sector assessment

H. Hanson, *team leader*
V. F. Amann, *agricultural economist*
H. C. Kriesel, *marketing economist*
R. E. Nelson, *agricultural education*
J. L. Nickel, *research administration*
K. O. Rachie, *plant breeding*
N. S. Raun, *livestock husbandry*

**Authors of papers at the
Yogyakarta workshop,
November 9-14, 1980**

E. R. de A. Alves, EMBRAPA, Brazil
A. T. Birowo, BAPPENAS, Indonesia
F. C. Byrnes, IADS, USA
G. M. Collado, Estates Training
Institute, Indonesia
R. R. Harwood, Organic Gardening and
Farming Research Center, USA
F. Kasryno, BAPPENAS, Indonesia
I. C. Madamba, Development Specialists
International, Philippines
A. C. McClung, IADS, USA
A. H. Moseman, IADS, USA
Sadikin S. W., AARD, Indonesia
T. W. Schultz, University of Chicago,
USA
L. Yeganiantz, EMBRAPA, Brazil

LEADERSHIP DEVELOPMENT

Indonesian research workshop

Three organizational issues continue to compete for attention in agricultural development agencies such as IADS:

- How to foster dialogue between planners and agricultural scientists on national development goals and the design and execution of agricultural programs to reach those goals.
- How to encourage synchronization of activities and communication among agencies, public and private, in providing the policies, services, and support necessary to the success of agricultural programs.
- How to manage the limited human, financial, and physical resources available to each organization engaged in the development process from research to marketing and processing.

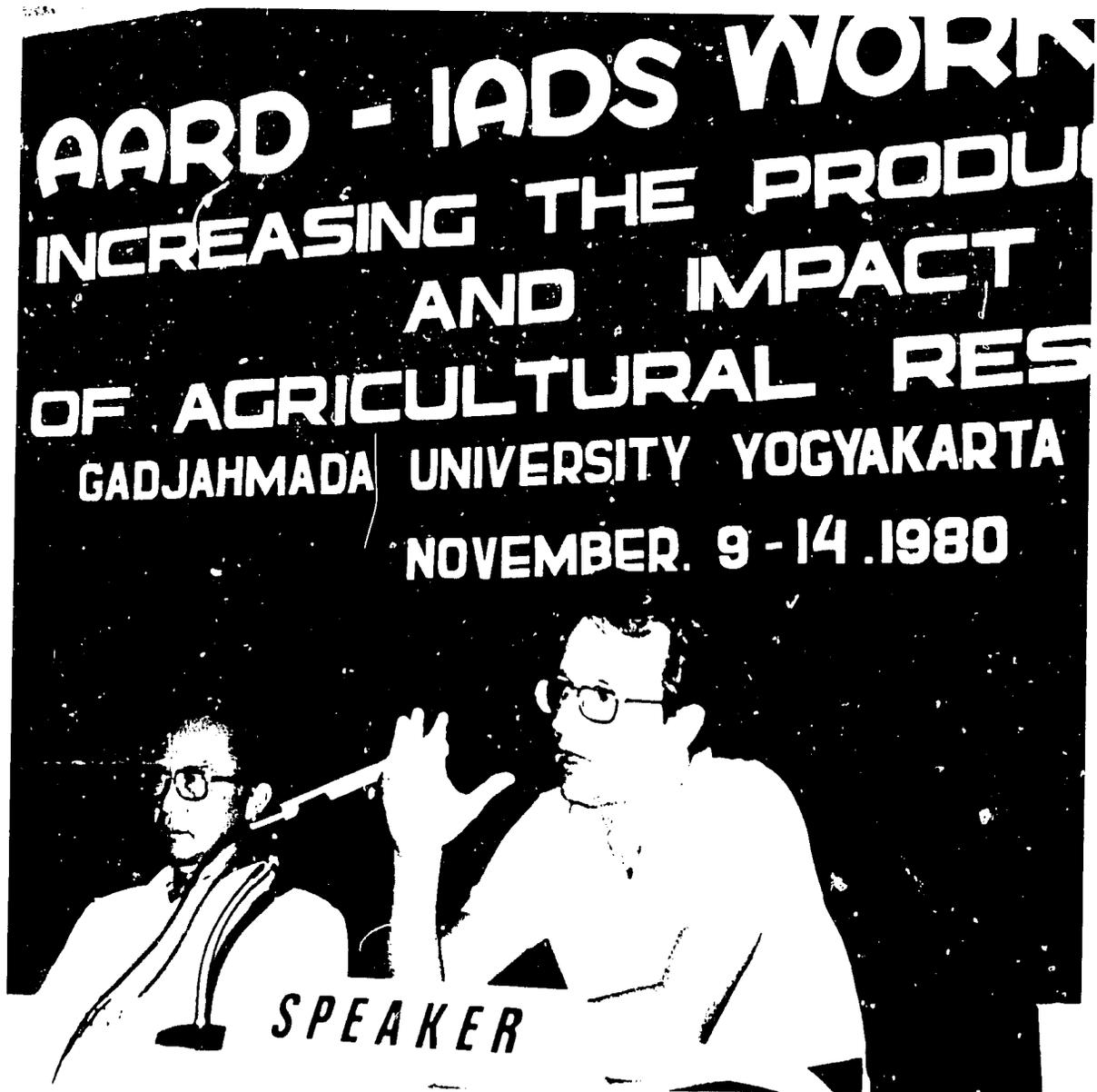
The major effort of IADS in this area in 1980 was to cooperate with the Indonesian Agency for Agricultural Research and Development (AARD) in organizing a workshop on "Increasing the Productivity and Impact of Agricultural Research." In this workshop, held at Yogyakarta in November, 10 agricultural research administrators from five countries—Bangladesh, Brazil, Nepal, Philippines, and Thailand—exchanged views and experiences with some 40 scientists, administrators, and educators from Indonesian ministries, universities, special agencies, and the component institutions of AARD.

Prior to the workshop, T. W. Schultz, Nobel laureate in economic science and a member of the IADS Board of Trustees, delivered a public lecture in Jakarta on "Economic Dynamics of Agricultural Development." He also met with a number of cabinet officers, including those in science and technology, agriculture, and the environment. In his presentation, he reviewed recent developments affecting the potential economic productivity of agriculture:

The favorable developments include: (a) Less subsidization of industry at the expense of agriculture, (b) improvements in health, (c) gains in the comparative advantage of agriculture, (d) more and better schooling, and (e) advances in agricultural research. There is an unevenness in economic develop-

Through conferences and workshops, IADS has facilitated exchanges of ideas among officials of developing countries.

At a workshop in Indonesia, Sadikin Sumintawikarta, head of Indonesia's national agricultural research agency listening to Eliseo Alves, head of Brazil's national agricultural research agency.



Fellowships

Individuals under programs administered by IADS in 1980, their field of study, and degree pursued.

Indonesia

Univ. of Akron (USA)

Budiman Tirtawidjaja, polymer science, Ph.D.

Univ. of Arkansas (USA)

Mansur Lande, agronomy, Ph.D.

Auburn Univ. (USA)

Sweta Rabegnatar, fisheries, Ph.D.

Cornell Univ. (USA)

Marsum Dahlan, plant breeding, Ph.D.

Sulton Arifin, agr. economics, Ph.D.

Univ. of Florida (USA)

Farid Bahar, agronomy, Ph.D.

Ridwan Dereinda, extension, M.S.

Yoyo Taryo-Adiwiganda, soil science, Ph.D.

Univ. of Illinois (USA)

Novianti Sunarlim, agronomy, M.S.

Iowa State Univ. (USA)

Budiman Hutabarat, agr. economics, M.S.

Sridodo, soil fertility, Ph.D.

Sumarno, plant breeding, Ph.D.

Louisiana State Univ. (USA)

Muhammad Mahmud, plant pathology, Ph.D.

Roberto Soenarjo, plant breeding, Ph.D.

Michigan State Univ. (USA)

Abdul Madjid, plant breeding, Ph.D.

Univ. of Minnesota (USA)

Anggoro Hadi Permadi, plant breeding, Ph.D.

Chairil Rasahan, agr. economics, Ph.D.

Memed Gunawan, agr. economics, M.S.

Soesilowati Hadisoesilo, entomology, M.S.

Muhammad Kosim Kardin, plant pathology, Ph.D.

Sudarwohadi Sastrosiswojo, entomology, M.S.

continued

ment within countries which gives rise to difficult agriculture problems in location economics.

Agricultural production is adversely affected (a) by markets that are impaired by governments, (b) by distortions of public investments in physical and human capital, and (c) by private economic activities of farmers that are not optimum as a consequence of the distortions in agricultural incentives.

He concluded his address with a reminder to government leaders:

In national capitals, the farmer is the forgotten man. Yet it is he who produces our food. It is he who knows his parcel of land and the terraces that protect his soil. He knows that the rains, the winds, and the sun are indifferent whether or not he and his family survive. Pests, insects, and diseases are ever hostile to his crops. Nature is niggardly.

This forgotten farmer is an indispensable economic agent in the modernization of agriculture. He calculates his marginal costs and returns to a fine degree. He is no less concerned about improving his lot and that of his children than we are. The dynamics of agriculture in no small measure depend on the incentives and opportunities that farmers have to increase their production.

Workshop presentations, panel discussions, and small group deliberations addressed aspects of the issues cited above. In addition, participants discussed how to make productive use of expatriate personnel and effective interaction between national research systems and international agricultural research centers.

In his keynote address, "The Entrepreneurial Function in Agricultural Research," Prof. Schultz concluded:

When it comes to organizing, staffing, and providing incentives for those who do research, there are a number of unsettled issues.

1. In the abstract, the concept of a research system has a strong intellectual appeal. In application, however, it leads to an approach that is all too mechanical because organized agricultural research is a program that evolves out of learning from experience. . . .
2. Agricultural research that is financed by governments in-

volves a minimum of three sets of research entrepreneurs: (a) Top government officials, (b) administrators in charge of experiment stations and research laboratories, and (c) the agricultural scientists who do the research. It is necessary that each of these negotiate with the others because each possesses special information that is essential in making research decisions. What is all too often omitted in considering the organization of agricultural research is an orderly arrangement that provides opportunities for these negotiations.

3. When it comes to salaries of agricultural scientists, low income countries face a difficult, and in large measure, unsolved issue. There is an international market for the services of competent agricultural scientists. Accordingly, low income countries must compete with the high income countries for these highly skilled individuals. Similar to professional athletes who are often paid much more than the manager who is in charge of the team, first-rate agricultural scientists in countries where prevailing salaries are low may require salaries that are far higher than the going salaries in the country.
4. The issue of who is competent to evaluate the competence of agricultural scientists when it comes to promotion must be faced. Surely this cannot be done by the legislature or by top officials in government. Universities that do not have a strong research faculty are not qualified to participate in the evaluation of the competence of those who do agricultural research. The process of making promotions is an important part of incentives that matter.
5. Agricultural research is a long-term process. It must have both stability and continuity over time. In paying for it, I have serious doubts that low income countries should rely on foreign aid. Although foreign aid may help at a particular juncture, it lacks stability and continuity, both of which are essential in financing viable, long-term agricultural research enterprises.
6. Although money, facilities, and competent agricultural scientists are all necessary for worthwhile research, agricultural research is not a routine activity. It is, indeed, a subtle, elusive human activity that is difficult to foster, promote, and maintain.

Fellowships, *continued*

Tjeppy Soedjana, agr. economics, M.S.
 Achmad Sudjana, agronomy, M.S.
 Toga Silitonga, forestry, Ph.D.
 Winarno, crop production, Ph.D.

Univ. of Nebraska (USA)

Kabul Pamin, agronomy, Ph.D.

North Carolina State Univ. (USA)

Haryatno Dwiprabowo, operations research, M.S.

Abdul Karim Makarim, soil science, M.S.

Nong Alwi, statistics, M.S.

Widjaja Hadisoeganda, nematology, M.S.

Oregon State Univ. (USA)

Asril Darussamin, biochemistry, Ph.D.

Sabam O. Manurung, plant physiology, M.S.

Texas A and M Univ. (USA)

Hasnam, plant breeding, Ph.D.

Univ. of Washington (USA)

Soetarso Priasukmana, forestry, Ph.D.

Sumpeno Putro, fisheries, Ph.D.

Univ. of Wisconsin (USA)

Setyawati Hadi, forestry, Ph.D.

Fathan Muhadjir, plant physiology, M.S.

Univ. of the Philippines at Los Baños

Al Sri Bagyo, agr. economics, M.S.

Rasidin Azwar, agronomy, M.S.

Hasan Basri Iswandi, agronomy, M.S.

Zainal Lamid, agronomy, M.S.

Amsir Rifin, plant breeding, M.S.

Mohamad Soedibyo, horticulture, Ph.D.

Marudin Sianturi, communication, M.S.

Sjaifullah, horticulture, Ph.D.

Sunarwidi, horticulture, Ph.D.

Univ. of the Philippines at Leganes

Alie Poernomo Tirtoredjo, fisheries, M.S.

Polytechnic of North London (UK)

Theresia Hartini, librarianship

Univ. of Aston (UK)

Eddy Amir, polymer tech., Ph.D.

Suharto Honggokusumo, polymer tech., Ph.D.

continued

Fellowships, *continued*

Univ. of London (UK)

Djasman Pardede, entomology, M.S.

Univ. of Southampton (UK)

Nana Supriana, entomology, Ph.D.

Univ. of Adelaide (Australia)

Djiman Sitepu, plant pathology, Ph.D.

Catholic Univ. (Belgium)

Haeruddin Taslim, soil fertility, Ph.D.

Dalhousie Univ. (Canada)

Purwito Martosubroto, fisheries, Ph.D.

Institut Agronomique Méditerranéen de Montpellier (France)

Endang Setyawati Thohari, agr. economics, M.S.

Nepal

Univ. of California, Davis (USA)

Ganga P. Deo, soil science

Dhruba N. Manandhar, entomology, M.S.

Ram Narayan Saly, soil science, M.S.

Univ. of Florida (USA)

Bimal Kumar Baniya, agronomy, M.S.

Univ. of Illinois (USA)

Juji Bhai Manandhar, plant pathology

Kansas State Univ. (USA)

Kaushal K. Lal, agronomy, M.S.

Kishore K. Scherchand, agronomy, M.S.

Univ. of Missouri (USA)

Raghendra Mishra, soil microbiology, M.S.

Rutgers Univ. (USA)

Bikram Khadka, agr. meteorology

Univ. of Wisconsin (USA)

Dip Narayan Sah, plant pathology, M.S.

Univ. of the Philippines at Los Baños

Jagadish Raj Baral, agr. education, Ph.D.

B. K. Gyawali, entomology, M.S.

B. B. Mathema, plant breeding, Ph.D.

S. L. Shrestha, cropping systems, M.S.

Seoul National Univ. (South Korea)

Gyan Lal Shrestha, agronomy, M.S.

Professional register

The IADS register, a compilation of biodata of professionals in agriculture and related fields who have experience in development, became operational during 1980. It currently contains the names of more than a thousand persons. The register helps IADS and other organizations locate personnel for diverse assignments such as reviewing a manuscript, serving on a project appraisal team, or filling a long-term post within a developing nation. It also enables individuals with expertise and experience to make themselves known to the international development community.

Data about new participants are continually added. To ensure that the information is accurate and current, participants review their files and are invited to revise the data periodically.

Since the information is stored in a computer, IADS can quickly locate the names of experts in relevant specialties, and obtain a printed profile. The register speeds the search for specialists in many disciplines. Through the use of a checklist, the qualifications of the ideal candidate can be specified to narrow the search to a few persons.

Advanced degree fellowships

IADS, on request, manages arrangements for foreign advanced degree training for scientists and specialists, under contracts that include training funds. In 1980, IADS handled fellowships associated with contracts in Indonesia and Nepal. The fellowship office of the Rockefeller Foundation cooperates with IADS in these efforts and, in 1980, a total of 71 students were enrolled at 31 universities in seven countries outside their homelands.

PUBLICATIONS

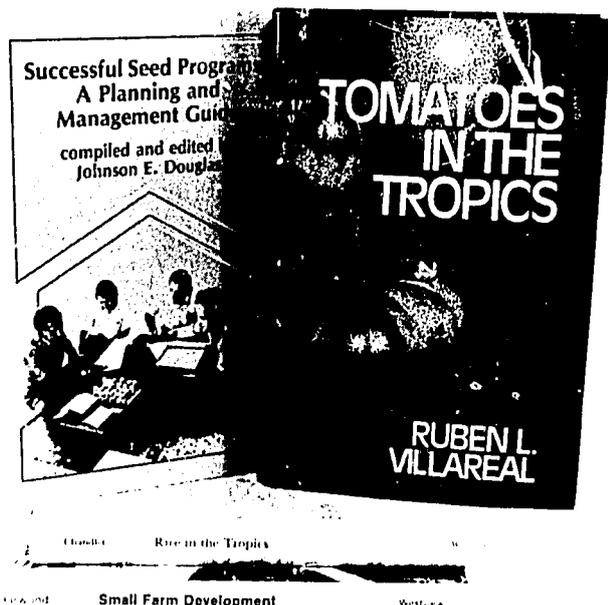
Development-oriented literature

The IADS development-oriented literature series attempts to bridge the knowledge gap that separates decision makers from agricultural specialists. By producing informa-

tion that is reliable, thorough, and clearly written, IADS believes that better agricultural policy making will result.

During 1980, **Successful Seed Programs: A Planning and Management Guide** was published by Westview Press, Boulder, Colorado. The book was compiled and edited by Johnson E. Douglas, coordinator of the seed unit at the Centro Internacional de Agricultura Tropical. The book addresses the problems of planning and operating seed programs in developing countries. It covers crop breeding research, seed multiplication, quality control, extension and marketing, and staff development from the seed program administrator's point of view. The development of the book was supported in part by a grant from the German Agency for Technical Cooperation.

The seed book is already widely used in training courses throughout the world. IADS has granted Spanish translation rights to CIAT, and Tata McGraw-Hill, New Delhi, is publishing a special Asian edition.



Two new books in the series developed by IADS are *Successful Seed Programs* and *Tomatoes in the Tropics*.

Another addition to the development-oriented literature series during the year was **Tomatoes in the Tropics**. It was written by Ruben L. Villareal of the Asian Vegetable Research and Development Center, and published by Westview Press. Tomatoes are probably grown by more farmers in the tropics than any other vegetable. They are a significant source of cash income for many smallholders. Villareal's book details the opportunities that new, more heat-tolerant and disease-resistant varieties offer developing nations. It also makes suggestions for organizing research and development programs for tomatoes.

During the year, numerous reviews of the books published in 1979 appeared in the agricultural press. The new magazine *International Agricultural Development* said, "There are plenty of books around about the ways and means of improving production on small farms. But **Rice in the Tropics: A Guide to the Development of National Programs** can claim to be the first to gather together all the information relevant to the improved production of a single crop." *Agriculture World* called the rice book, "A very valuable reference." *Rice in the Tropics* was written by R. F. Chandler, Jr.

A "feature review" of **Small Farm Development** in *Rural Sociology* commented, "All chapters reflect an ability to think with smallholders and make their problem-solving strategies intelligible." The book, the reviewer said, is "eminently readable," and "may mark the beginning of more meaningful interaction between the agronomic and social sciences." *Tropical Animal Health and Production* said that Richard R. Harwood, the author, "has a deep insight into the problems of small farm development."

A Spanish translation of *Small Farm Development* is being done by the Interamerican Institute of Agricultural Cooperation, which will publish it and make it available in Latin America.

Para Alimentar Este Mundo, a Spanish edition of **To Feed This World** by Sterling Wortman and Ralph W. Cummings, Jr., was published during 1980 by Editorial de Belgrano, Buenos Aires. The English edition, published by Johns Hopkins University Press, Baltimore, went into its third printing, bringing the number of copies in print to 15,000.

There is evidence that developing countries are spending more of their own resources on agricultural development.
Loading a bumper crop of wheat in Turkey.



Occasional papers

Two new occasional papers were issued by IADS. "Understanding Professionals: Small Farmers and Scientists" explores the reasons researchers have difficulty thinking like small farmers. And it suggests ways to overcome the problem. It was written by Robert Chambers of the University of Sussex.

Relating a country's agriculture, economy, and infrastructure to an appropriate fertilizer industry is the subject of "Planning the Development of a Fertilizer Industry." It was written by Travis Hignett of the International Fertilizer Development Center. It discusses estimating demand, natural resources, types of production facilities, plant location, marketing and distribution, and legislation and regulation.

Other publications

IADS published the third edition of **Agricultural Assistance Sources**. This publication describes the major international organizations that provide financial assistance for agriculture in developing countries, or that, without charge to the recipient, are able to provide technical specialists, services, or training. The new edition contains chapters on 18 assistance organizations and the bilateral programs of 16 nations. Covered for the first time are

- Arab Bank for Economic Development
- Arab Fund for Economic and Social Development
- Kuwait Fund for Arab Economic Development
- Saudi Fund for Development
- OPEC Fund for International Development
- Australia
- Ireland
- Israel
- New Zealand

Agricultural Development Indicators: A Statistical Handbook was also revised and updated. This publication compares 140 developing countries on the basis of 23 statistical indicators.

A list of IADS publications is available on request.

LIAISON

IADS seeks to increase the efficiency of its operations through liaison with countries, agencies, institutions, and individuals concerned with agricultural and rural development throughout the world. The process is intended to increase the staff's knowledge and understanding of problems, activities, and plans, to make information available about IADS, and to facilitate communication and cooperation within the system.

Each staff member of IADS has specific liaison responsibilities and shares the experience and information gained, both inside and outside IADS. Through the publication, *Agricultural Assistance Sources*, IADS makes some of the information widely available. Other less generally visible liaison activities include those reported below.

Developing countries

Work continued in cooperation with the American Council of Voluntary Agencies for Foreign Service, to prepare profiles on the ways developing countries coordinate and facilitate the work of voluntary agencies. When completed, the results will be made available to all interested.

Plans were initiated for a workshop, to be co-sponsored with the International Service for National Agricultural Research, on opportunities for cooperation among national agricultural research systems. A similar conference sponsored by IADS in 1977 led to the establishment of the International Federation of Agricultural Research Systems for Development.

IADS assisted the United Nations Development Programme in identifying authors for and in reviewing papers describing technical cooperation among developing countries on agricultural technology.

Assistance agencies

During 1980, representatives of IADS and the Inter-american Institute for Agricultural Cooperation (IICA), met at San Jose, Costa Rica, to discuss activities of mutual interest

and identify opportunities for cooperation. Later, the organizations completed a memorandum of understanding as a basis for future activities.

Meeting with the group for Concerted Action for Development in Africa, IADS staff members advised on support needed for agricultural research in Africa.

At the request of BIFAD (Board for Food and Agricultural Development), IADS helped develop materials for use in BIFAD's resource inventory of "Title XII" (U.S. agricultural) universities. The experience of IADS with its professional register provided a base for the design of a similar instrument for inventorying faculty members.

Continuing its efforts to become familiar with the technical cooperation activities of developed countries, a staff member of IADS visited Japan for meetings with the Japan International Cooperation Agency, the Ministry of Agriculture, Forestry, and Fisheries, and the Tropical Agricultural Research Center.

IADS was represented at the annual meeting of the International Fund for Agricultural Development in Rome.

Industry and business

Activities begun in previous years were continued with particular emphasis on identifying ways private firms might participate effectively in support of development.

A staff member served as moderator for a panel on emerging new agricultural technologies at the Agri-Energy Roundtable in New Orleans. Discussions continued with the Agribusiness Council, International Executive Service Corps, the Industry Council for Development, and other organizations on possible future efforts.

Institutional cooperation

An IADS program officer serves on the Board of Science and Technology of the U.S. National Academy of Science. The board is responsible for a number of activities in developing countries, mainly sponsoring seminars, providing teams of scientists to focus on specific problems, and publishing books.

At a workshop on distribution of technical publications in developing countries, an IADS staff member spoke on special problems with scientific material. The workshop, organized by the Center for Integrated Development and held at the Brookings Institution, was attended by commercial publishers, representatives of non-profit organizations, inter-governmental agencies, and U.S. government bureaus.

IADS staff members conferred frequently with the worldwide university and experiment station community on technical matters, placement of graduate students, and identification of personnel for technical assistance missions, either being mounted by IADS or one of the institutions. In addition, IADS staff members served as panelists, speakers, or consultants in programs at several institutions, including Cornell University, Michigan State University, North Carolina State University, Oklahoma State University, University of Minnesota, and Virginia Polytechnic Institute. Topics discussed included international communication, educational needs for agricultural development, and the role of universities in an interdependent world.

Similarly, active communication continued between IADS and the international agricultural research centers, and related organizations such as the International Fertilizer Development Center, the International Food Policy Research Institute, and the Secretariat of the Consultative Group for International Agricultural Research.



Administrative Developments

(facing) Tilling land in the Andes.

Agricultural development projects are more and more aimed at improving the plight of the poorer segments of society.

Trustees

At its May meeting the Board of Trustees elected **A. Colin McClung** as president of IADS. He had been acting president during the previous 12 months. The board also elected **Sterling Wortman**, **Robert D. Havener**, and **Clayton Yeutter** as trustees, and reelected **Virgilio Barco** and **Guy Camus**. Wortman is the former president of IADS. Havener is the director general of the International Maize and Wheat Improvement Center. Yeutter is the president of the Chicago Mercantile Exchange.

At the November meeting, the board elected **Abdoulaye Sawadogo** as a member. He is an economic geographer who has been minister of agriculture of the Ivory Coast and has held numerous other policy making posts.

Headquarters staff

There were several changes in the IADS headquarters officers during 1980. **Leon Hesser** was appointed as a pro-

gram officer. He is an economist and was the director of the Office of Agriculture in the U.S. Agency for International Development. Part of his IADS responsibilities involves liaison with organizations in the Washington D.C. area and he participates in overall program development. **Guy B. Baird** was appointed executive officer. He continues as program officer for Latin America. **Ralph W. Cummings, Jr.** returned to the staff of the Rockefeller Foundation. **Asrat Felleke** completed a 2-year assignment as program officer for Africa and the Mideast.

Field Staff

Nine specialists joined the IADS field staff during 1980. Six of the staff members filled new posts and the rest replaced individuals who left during the year.

Lyle Sikka was assigned as potato specialist with the IADS project in Bangladesh. He had been seed production specialist associated with the International Potato Center.

In Ecuador, **Gustavo Morales**, specialist in poultry pathology, was appointed project supervisor. **U. J. Grant** completed his assignment as IADS representative in 1980. **Wilfredo Salhuana** joined as biometrician. He was previously chief scientist of the Information Sciences Genetic Resources Program at the University of Colorado. Under a subcontract from IADS to the Agro-Science Environmental Institute (USA), **Sam Portch** joined as soils scientist.

J. A. T. Woodford accepted the post of research specialist in entomology under the Agency for Agricultural Research and Development in Indonesia. Woodford had been a senior research entomologist with the Scottish Horticultural Institute. **Ernesto B. Farre** took the post of financial officer. He has been an executive of businesses in Indonesia and the Philippines.

Jack D. Traywick joined the IADS Sumatra team as farm development specialist. Previously, Traywick had been the research administrator of the IADS contract in Panama. **Genaro D. Revilleza** was appointed administrative officer of the project. He has held a number of administrative posts in research organizations in the Philippines.

In Nepal's Integrated Cereals Project, **Shiro Samoto** assumed the responsibility of rice breeder. Samoto had been head of the rice breeding laboratory of the Hokuriku National Agricultural Experiment Station, Japan. **Kenneth D. Sayre** took the position of maize agronomist. He has been associated with both CIAT and CIP.

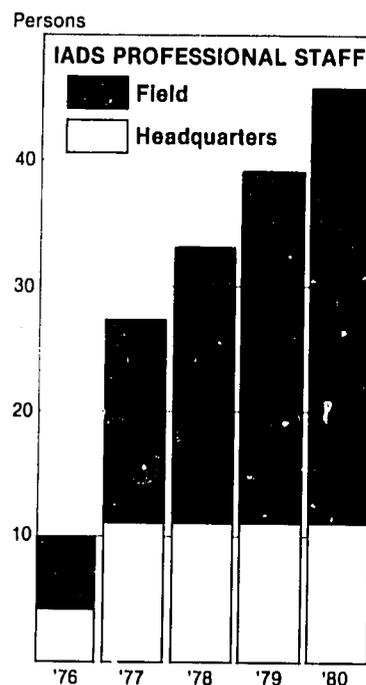
Russell Bradley was appointed supervisor and seed production and management specialist of the seed production and input storage project in Nepal. Bradley worked on seed projects in Korea, Brazil, and Uruguay.

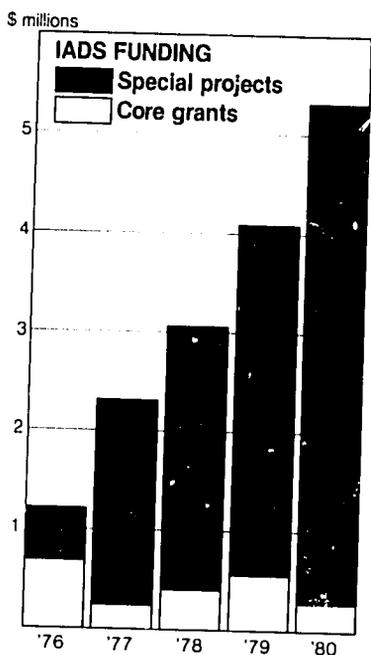
Budgetary Procedures

The IADS program is supported by a "core" budget and by "special project" funds. The core budget is calculated to meet the basic costs of maintaining the headquarters group at a level necessary to arrange programs but not to implement them.

This means that basic support is provided along with sufficient funds to travel and otherwise to develop programs. Thus, there are funds for an editorial staff to accept publication responsibilities or for a country program officer to discuss problems and interests with developing country officials. But the editorial group has funds to commission publications only if a donor provides special project funds for the purpose. These would normally be of grant origin. And the country program officer can commit funds only if a special project is arranged for this purpose. Normally, this would be through a contract with the developing country.

The same arrangement exists for any project that may be undertaken. In each, whether the project is a small, grant-funded one or a large, contractual one, all direct costs are charged to the special project concerned, along with a fair share of indirect or overhead costs. If a headquarters officer undertakes specific work for a special project the time spent is recorded and costs assigned accordingly. The objective is that each special project activity shall be fully self-supporting but with no excess charges. During the start-up period, core grants have been obtained to meet headquarters costs not recoverable from projects.





Funding

During 1980, the major sources of IADS funds were the following:

<i>Contracts and service arrangements</i>	
Department of Agriculture (Nepal)	\$1,405,000
AARD (Indonesia)	1,058,000
Bangladesh Agricultural Research Council	617,000
CRIA (Indonesia)	380,000
Agriculture Inputs Corp. (Nepal)	348,000
INIAP (Ecuador)	330,000
U.S. Agency for International Development	112,000
Interamerican Institute of Agricultural	
Cooperation	87,000
PCARR (Philippines)	69,000
Government of Egypt	27,000
Ministry of Agriculture, Peru	26,000
FAO	26,000
<i>Grants</i>	
Rockefeller Foundation	683,000
GTZ (West Germany)	35,000
CIMMYT	16,000
<i>Other</i>	
Interest Income	150,000
Gift	10,000

Financial Statements

ARTHUR YOUNG

ARTHUR YOUNG & COMPANY
277 PARK AVENUE
NEW YORK, NEW YORK 10172

The Board of Trustees
International Agricultural Development
Service, Inc.

We have examined the accompanying balance sheet of International Agricultural Development Service, Inc. at December 31, 1980 and 1979 and the related statements of support and revenue, expenses and changes in fund balance and changes in financial position for the years then ended. Our examinations were made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

As more fully described in Note 3, International Agricultural Development Service, Inc. has material transactions with The Rockefeller Foundation.

In our opinion, the statements mentioned above present fairly the financial position of International Agricultural Development Service, Inc. at December 31, 1980 and 1979 and the results of operations, changes in fund balance and changes in financial position for the years then ended, in conformity with generally accepted accounting principles applied on a consistent basis during the period.

Arthur Young & Company

March 18, 1981

BALANCE SHEET

December 31, 1980 and 1979

	1980	1979
ASSETS		
Cash (primarily interest bearing accounts)	\$ 797,298	\$ 831,366
Short-term securities, at cost	880,000	850,000
Grants receivable	—	13,724
Accounts receivable including unbilled receivables	1,742,601	973,187
Advances	195,249	289,221
Office equipment and furniture, at depreciated cost	18,726	18,195
Total assets	<u>\$3,633,874</u>	<u>\$2,975,693</u>
 LIABILITIES AND FUND BALANCE		
Accounts payable	\$ 201,145	\$ 192,485
Advances received on contracts	2,180,139	1,683,474
Deferred support—grants (Note 3)	<u>675,193</u>	<u>573,656</u>
Total liabilities	<u>3,056,477</u>	<u>2,449,615</u>
Fund balance:		
Designated reserve	558,671	507,883
Undesignated	<u>18,726</u>	<u>18,195</u>
Total fund balance	<u>577,397</u>	<u>526,078</u>
Total liabilities and fund balance	<u>\$3,633,874</u>	<u>\$2,975,693</u>

See accompanying notes.

STATEMENT OF SUPPORT AND REVENUE, EXPENSES, AND CHANGES IN FUND BALANCE

Years ended December 31, 1980 and 1979

	1980	1979
SUPPORT AND REVENUE		
Contracts and service arrangements	\$4,516,112	\$2,870,789
Grants (Note 3)	733,363	1,375,538
Investment income	150,387	109,346
Other	<u>12,158</u>	<u>3,577</u>
Total support and revenue	<u>5,412,020</u>	<u>4,359,250</u>
EXPENSES		
Contracts and service arrangements	3,698,468	2,503,603
Non-contract programs and projects:		
Service to individual countries	190,644	290,612
Leadership development	150,833	95,765
Development-oriented literature	152,993	103,930
Liaison and interchange	<u>130,151</u>	<u>273,885</u>
	<u>624,621</u>	<u>764,192</u>
Program support:		
Country programs	444,023	222,929
Communication	<u>82,269</u>	<u>106,310</u>
	<u>526,292</u>	<u>329,239</u>
General administration	<u>511,320</u>	<u>477,750</u>
Total expenses	<u>5,360,701</u>	<u>4,074,784</u>
Excess of support and revenue over expenses	51,319	284,466
Fund balance at beginning of year	<u>526,078</u>	<u>241,612</u>
Fund balance at end of year	<u>\$ 577,397</u>	<u>\$ 526,078</u>

See accompanying notes.

STATEMENT OF CHANGES IN FINANCIAL POSITION

Years ended December 31, 1980 and 1979

	1980	1979
SOURCE OF FUNDS		
Excess of support and revenue over expenses	\$ 51,319	\$ 284,466
Add: Depreciation	<u>2,928</u>	<u>2,256</u>
Total from operations	54,247	286,722
Increase in advances received on contracts	496,665	1,064,149
Decrease (increase) in advances	93,972	(161,041)
Increase in accounts payable	8,660	70,206
Increase (decrease) in deferred support	<u>101,537</u>	<u>(318,439)</u>
	<u>755,081</u>	<u>941,597</u>
APPLICATION OF FUNDS		
Securities transactions:		
Purchases	4,547,981	3,650,000
Redemptions	<u>4,517,981</u>	<u>3,350,000</u>
	30,000	300,000
Increase in grants and accounts receivable	755,690	261,827
Purchase of office equipment and furniture	<u>3,459</u>	<u>4,551</u>
	<u>789,149</u>	<u>566,378</u>
Increase (decrease) in cash	(34,068)	375,219
Cash balance at beginning of year	<u>831,366</u>	<u>456,147</u>
Cash balance at end of year	<u>\$ 797,298</u>	<u>\$ 831,366</u>

See accompanying notes.

NOTES TO FINANCIAL STATEMENTS

December 31, 1980 and 1979

1. Summary of accounting policies

Contract accounting

All contracts provide for reimbursement of costs incurred by the International Agricultural Development Service, Inc. (IADS) up to specific limits and include provision for overhead expenses or management fees. Revenue is recognized as related expenses are incurred. Accounts receivable include \$929,279 of unbilled costs under contracts in 1980 and \$549,765 in 1979.

Advances received on contracts

Advances received on contracts are used to finance contract operations. These advances are to be used to offset billings at various stages of each contract. Three contracts require the maintenance of separate bank accounts for advance funds not immediately required for operations. Funds on deposit in these interest-bearing accounts totalled \$275,368 at December 31, 1980 and \$624,767 at December 31, 1979.

Recognition of grant support

Grant awards are recorded as receivable and deferred support when formal notifications of such awards are received from grantors. Deferred support is recognized as revenue when program costs and administrative expenses supported by grant funds are incurred. At the end of the grant period unexpended grant funds remain as deferred support unless the terms of the grant specify that unexpended amounts revert to the grantor in which case they are reflected as a liability.

Designated reserve

Grant support, totaling \$436,000, provided by the Rocketteller Foundation in prior years was designated by the IADS Board of Trustees (with the approval of the Rocketteller Foundation) as a fund balance reserve to meet temporary cash-flow needs and possible future obligations of IADS. Interest income is allocated to the designated reserve annually.

Office equipment and furniture

Office equipment and furniture are depreciated on the straight-line basis over the estimated 10-year useful life of the assets.

2. Tax status

IADS is exempt from U.S. federal income tax under Section 501(c)(3) of the Internal Revenue Code and has received an extended advance ruling from the

Internal Revenue Service that it will not be treated as a private foundation as defined in Section 509(a) of the Internal Revenue Code. No federal excise tax on investment income has been accrued as IADS is expected to comply with the conditions of the advance ruling and will therefore be exempt from such tax.

As a not-for-profit organization, IADS is also exempt from New York State and New York City income, sales, and occupancy taxes.

3. Grant support

During 1980 IADS was awarded grants amounting to \$800,000 by the Rocketteller Foundation for program and administrative expenses, and \$34,400 from Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) toward the cost of a publication.

The Rocketteller Foundation 1980 grant plus deferred support of \$532,320 from 1979 were available for use in 1980. Of these combined grants, \$682,958 was spent or committed in 1980 leaving a balance of \$69,362 unexpended at December 31, 1980. The foundation has authorized the use of this amount in 1981 as explained in note 4; accordingly, it is shown as deferred support in the balance sheet.

The \$34,900 grant from GTZ was fully utilized during 1980. Also available in 1980 were \$41,336, the balance of a 1979 publication grant from Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT). Of the funds provided by CIMMYT, \$15,505 was spent or committed in 1980, leaving \$25,831 unexpended, which is available in future years and is shown as deferred support in the balance sheet.

The Rocketteller Foundation provides certain services (primarily personnel and office space) and makes other disbursements (travel, office, and miscellaneous expenses) on behalf of IADS. The foundation charged IADS \$896,855 in 1980 and \$826,206 in 1979 for these services and expenses. Amounts payable to the Rocketteller Foundation at December 31, 1980 and 1979 were \$6,595 and \$14,080, respectively.

4. Subsequent event

In January 1981 the Rocketteller Foundation informed IADS of a grant of \$300,000 toward the costs of operations for 1981. This grant is in addition to the unexpended balance of the foundation's grant for 1980, and the combined funds are available for use during the period ending December 31, 1981.

Brazilian cattle



