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Report/1984



**INTERNATIONAL AGRICULTURAL
DEVELOPMENT SERVICE**

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DEVELOPMENT SERVICE**

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Preface

This is the ninth and last annual report of the International Agricultural Development Service. IADS is merging with the Agricultural Development Council and the Winrock International Livestock Training and Research Center to form a new nonprofit organization: Winrock International Institute for Agricultural Development. The headquarters will be in Morrilton, Arkansas, and the IADS office will become the new organization's Washington D.C. office.

The new organization will have all the capabilities of IADS enhanced by greater staff depth. An account of the development of IADS and the steps leading to the merger are given in the essay "The IADS experiment," written by A. Colin McClung, president of IADS. The second essay, "Recent trends in agricultural research investment," was written by D.S. Athwal, vice president of IADS.

During 1984, nearly 50 resident specialists provided by IADS were working for national agencies in Bangladesh, Botswana, Indonesia, Pakistan, Philippines and Nepal. IADS also supplied 79 short-term consultants to 12 countries and administered overseas fellowships for 150 scholars from Bangladesh, Indonesia, and Nepal.

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Gary T. Todd, data processing specialist
Marty Westhoven, secretary
Beth C. Wilson, receptionist

Bangladesh

Agricultural Research Project
David M. Daugherty, project supervisor
Harvey Carr, maintenance specialist
Dorsey Davy, training specialist
Russell D. Frazier, * agronomist
Carlos Garces, agricultural engineer
Travis Everett, entomologist
David Gisselquist, water management
extension specialist
Brook Greene, agricultural economist
Hugh E. Henderson, * livestock specialist
P. Theodore Hutchcroft, information specialist
A. K. Kaul, crop specialist
Timothy G. Kelley, * associate production agronomist
Dale T. Krigsvold, plant pathologist
Rogelio C. Lazaro, water management specialist
Edward Loomis, horticultural specialist
R. N. Mallick, associate production agronomist
A. Hugo Manzano, farming systems specialist,
deputy project supervisor/advisor
Sam Portch, soil fertility specialist
Edward Rosentel, II, administration specialist
D. N. Sharma, * farm development specialist
Leopoldo Villegas, associate production agronomist
Potato improvement
Lyle C. Sikka, potato specialist

Botswana

Kristian Oland, * director agricultural research

Indonesia*National agricultural research*

William R. Young, project supervisor
Emiterio V. Aggasid, administration and
civil works officer
Christopher Bennett, coconut pathologist
Saul Camacho, fruit specialist
Kee-Chai Chong, aquaculture economics specialist
Ernesto B. Farre, financial specialist
David G. Hill, scientific information specialist
Paul Mundy, junior specialist, research
communication
Ralph H. Retzlaff, training coordinator
C. Geoffrey Swenson, production economist
Clive Topper, cotton entomologist

Sumatra project

Pierre P. Antoine, project specialist
Aroon Jugstujinda, soil and water
management specialist
Douglas H. Perry,* agricultural economist
K.O. Rachie,* project supervisor
P. S. Srinivasan, administrative officer
Jack D. Traywick, farm development specialist

Nepal*Integrated cereals project*

Carl N. Hittle, project supervisor
Kenneth D. Sayre, cropping systems agronomist

Seed project

S. S. Bal, project supervisor
Robert N. Iltis, field supervisor

Hill food and agricultural extension projects

M. Kalim Qamar, extension communication specialist

Pakistan

Murray D. Dawson, advisor

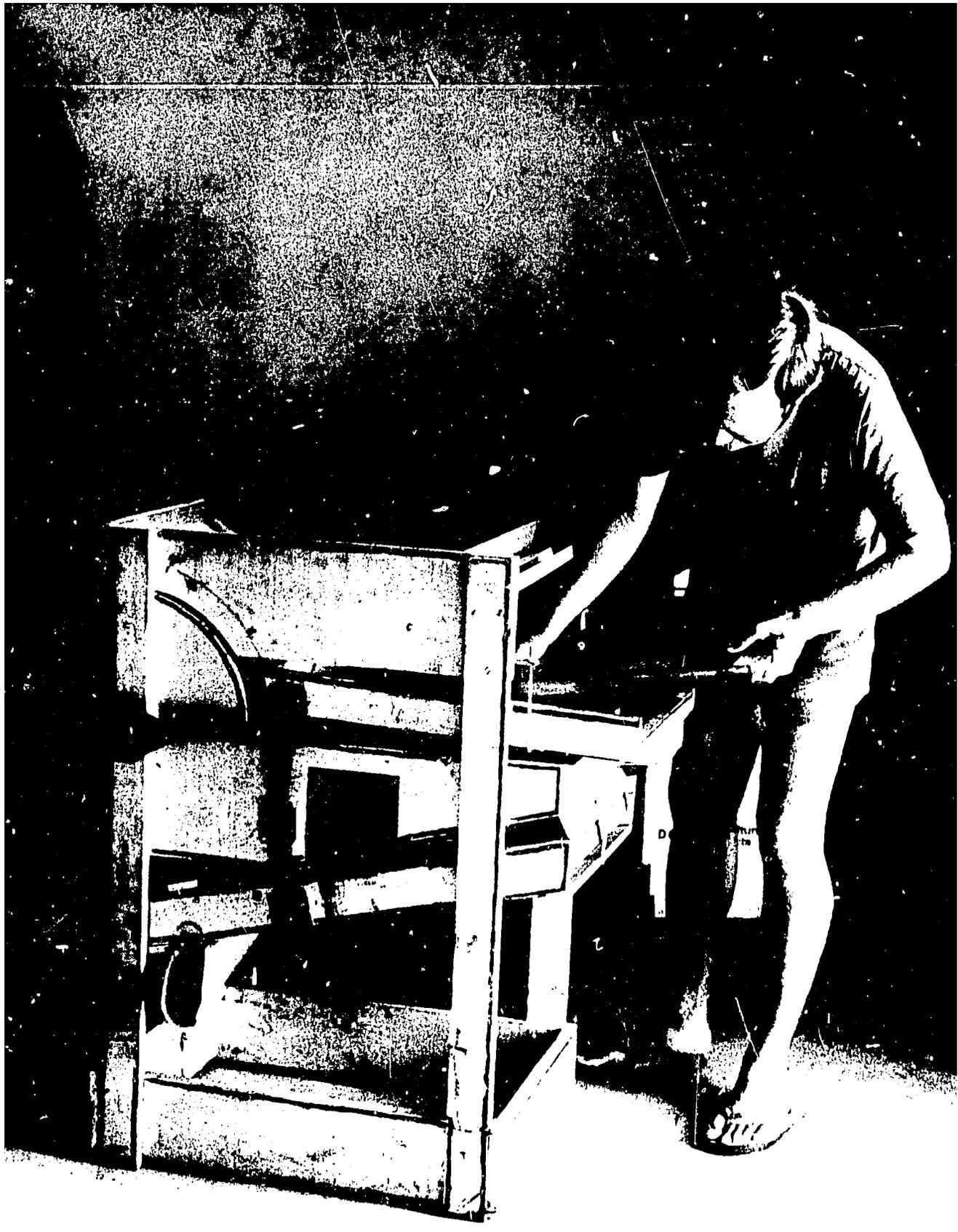
Philippines

Inocencio C. Bolo, farming systems specialist

Corporate officers

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A. Colin McClung, president
Steven A. Breth, secretary and treasurer
Gary L. Howe, acting comptroller

*Left during the year.



X

The IADS Experiment

(facing) A Peace Corps volunteer working with the IADS seed project in Nepal adjusts a locally made seed cleaner.

In April 1975, Clifford M. Hardin, J. George Harrar, and John H. Knowles applied for incorporation of the International Agricultural Development Service in the State of New York; in June the application was approved. Now, IADS is in the final countdown leading to a merger with two other organizations to form a new institution, the Winrock International Institute for Agricultural Development. Before June 30, 1985, it is expected that the State of New York will have given formal approval to conclude the existence of IADS as a corporate entity. The intervening years have been busy ones characterized by decisive actions. Though there have been many changes around the globe and in the circumstances facing this small experimental organization, the basic goal of IADS has been constant: to be able to offer the services needed and desired by developing countries and to provide them on a thoroughly professional, non-political, non-profit, and cooperative basis.

The merger of IADS into the newly created Winrock International Institute for Agricultural Development is viewed by the trustees of IADS, by its officers, and by its

IADS consulting assignments 1976-84

<i>Assignment</i>	<i>Missions</i>
agricultural engineering	1
agricultural assessment	13
agricultural credit	2
agricultural economics	11
agricultural education	3
agriculture planning	7
agronomy	4
anthropology	1
biological energy sources	1
biological nitrogen fixation	1
biometrics	6
cassava	1
cereal crops	1
coconut	1
coffee and cocoa	1
communication	6
communication and training	1
cotton	3
crop research	1
experiment station development	8
extension	3
farming systems	9
fertilizer economics	1
fertilizer research	2
financial management	10
fisheries research	6
food policy	3
forestry	3
fruit research	4
institutional organization	8
irrigation	13
laboratory facilities	3
land development	1
landless farmers	1
legume crops	1
library science	2
livestock	10
maize	7
personnel development	3
plant breeding	1
poultry	1
procurement	1
program planning	1
publications	6
rainfed land development	1
research and extension	3

continued

scientific staff as the appropriate step in sustaining this objective. We see being created a professional, non-profit organization capable of providing a broad range of services and able to do so from an endowment base that will allow establishment of some long-term institutional goals that are not possible without secure core funding. This is then an appropriate occasion to examine the conception and ramifications of the IADS approach to international agricultural development.

The Rationale

The International Agricultural Development Service was established in 1975 after a series of discussions between Rockefeller Foundation officers and representatives of other donor agencies. The dominant figure in these discussions was Sterling Wortman, then vice president of the foundation. The discussions centered on the worsening outlook for world food supplies relative to population, the struggle of developing countries to produce better technology and transfer it to farmers, and the complexity of the agricultural development process and the concomitant need for attention to many factors other than research in order to raise food production and standards of living. Many of the participants in these discussions had been involved in the intensive activities that led to the formation of the Consultative Group for International Agricultural Research (CGIAR), which now coordinates the funding of the international agricultural research centers.

As a group, the CGIAR members were concerned about the world food and nutrition situation and they certainly recognized the important role of technology development and transfer in resolving food problems. They knew that many national agricultural research systems were poorly developed or in a state of stagnation, which had to be altered in order for the research work of the international centers to be utilized efficiently. The CGIAR was also aware of the interactions of research with social and economic factors in development. However, the CGIAR members saw difficulties in broadening CGIAR activities to include direct involvement in assisting national research systems. It

seemed even less likely that they could extend their mandate to include non-research aspects of development. Rockefeller Foundation officers were prepared in principle to consider an organization that could involve itself in any of these areas. Their associates in the donor agencies were at this point inclined to address only international agriculture research issues. The concern of the donor agencies was that applying the CGIAR's cooperative approach to national program needs would expose it to a potentially immense and open-ended financial commitment. The IADS concept avoided these problems.

IADS was conceived not as a funding source, but as an organization that could put together programs and provide services when a developing country asked for them and when funds were available from the country or an international, bilateral, or multilateral source. The financial commitment of agencies sponsoring IADS would be limited to support for a small professional group that would work with national agencies on a reimbursable basis. Discussions with leaders of national programs about their needs might be conducted without charge and smaller, poorer countries could be given special consideration, but the net cost of core operations was seen as being no greater than that for one of the smaller international centers.

Officers of the Rockefeller Foundation took the initiative in these discussions as they had in those leading to the formation of CGIAR. The donor representatives supported the ideas put forth by the foundation's officers, but they were hesitant to use the CGIAR, their newly acquired mechanism for collaboration in international agricultural research, to embrace national problems, even though they saw the national research systems as a crucial part of the world system. When they learned of the blueprint for an IADS, which had been drafted by the foundation's officers, they urged that it be developed and implemented. As a group, they could envision means of subsequently supporting such an agency. They had more difficulty in seeing how the group could itself create the new mechanism. They had already found that it was easier to take over responsibility to support on-going international centers than it was to form them.

Consulting assignments

continued

research evaluation	21
research management	2
research planning	1
research policy	30
research review	1
resource survey	1
rice	5
seed policy	3
seed programs	6
seed technology	3
socio-economics research	1
soil & water development	1
soil fertility	1
soils	2
soybeans	4
sugar research	3
sugar technology	1
swine	2
tea	2
toxicology	1
training	6
transmigration	1
tuber crops	1
vegetable research	7
vegetable seed production	2
water law	1
water management	2
wheat	1

IADS-sponsored workshops and conferences

1976

Accelerating agricultural development. Los Banos, Philippines. Co-sponsored by Southeast Asian Regional Center for Graduate Study and Research.

Accelerating agricultural development. Reading, England. Co-sponsored by University of Reading.

Accelerating agricultural development. Bellagio, Italy.

1977

Issues in technical assistance. Bellagio, Italy.

Training for agricultural and rural development. Ithaca, New York. Co-sponsored by the Agricultural Development Council and Cornell University.

Cooperation among technical assistance agencies. Bellagio, Italy.

Strategies for rapid agricultural growth. Arlie House, Virginia.

Agricultural research and development in Latin America. Villa de la Leiva, Colombia.

Potential for cooperation among national agricultural research systems. Bellagio, Italy.

1978

Private-sector participation in agricultural development. New York. Co-sponsored by the Rockefeller Foundation.

1979

Preparation of professional staff for national agricultural research and related programs. Bellagio, Italy. Co-sponsored by the international agricultural research centers.

Increasing agricultural production for the benefit of the rural poor. Bellagio, Italy. Co-sponsored by the International Fund for Agricultural Development.

continued

The Experiment

In 1975, IADS was incorporated as a nonprofit institution with a broad charter for providing services needed by developing countries in their efforts to improve agricultural production. The Rockefeller Foundation provided start-up funds and expressed willingness, in principle, to provide substantial support for 5 years. This period would allow the idea to be tested and long-term support to be found. Rockefeller Foundation funds would be made available not only to support the core costs, but also some of the donated services that would be the organization's stock in trade. It was expected that special project funds would come in from other sources, primarily contractual, and that additional means of meeting core needs would be developed.

During the first years after the founding of IADS, its leadership gave considerable attention to other sources of grant funding. The Lilly Endowment generously contributed \$500,000 in 1977. A few other private sources were approached, but the emphasis in IADS' search for a sustained financial base was the international community that supports the agricultural research centers. Although those donors were sympathetic to the proposition and eventually established a unit with several of the objectives of IADS, they proved not to be prepared to contribute directly to IADS, a U.S.-based organization identified with a single sponsor. Rockefeller Foundation hence provided the primary grant base for IADS' core costs.

The foundation continued to provide core funding to IADS through 1983; three years more than was originally projected. In 1982, in addition to core support, it provided the sum needed to cover the cost of moving IADS from New York to a new location in Arlington, Virginia. This move was made to allow IADS to work in close proximity to major international development agencies such as the World Bank and the Agency for International Development.

In Retrospect

During the past decade, IADS was able to engage in many, though by no means all, of the activities envisioned by its planners.

It quickly established a number of indirect activities in support of development, which were paid for by grant funds. These were primarily in three broad areas: liaison, leadership development, and development-oriented literature. The first two were dealt with mostly through conferences and visitations.

The "liaison" activities of IADS served as an important means of defining IADS' own programs. They no doubt also influenced the programs of others. For example, in 1980, the CGIAR created an organization, the International Service for National Agricultural Research (ISNAR), which was based on a substantial segment of IADS' charter—that which dealt with research. No doubt the creation of this organization was influenced by the intensive discussions that led to the founding of IADS and the various conferences that were subsequently sponsored by IADS. The CGIAR's decision to create a new organization rather than fitting IADS directly into its network, represented a change from its initial policies. The decision to do this was probably influenced by a problem mentioned earlier; IADS' mandate called for it to be involved in many things other than research, while the CGIAR is by mandate largely restricted to research-based functions.

IADS was equally active in developing associations at the national level. For example, in October 1977, leaders of national agricultural systems in 20 developing countries met at Bellagio, Italy, in a conference sponsored by IADS. This meeting resulted in the establishment of the International Federation of Agricultural Research Systems for Development (IFARD). The goal of the organization, which is increasingly active and is closely associated with ISNAR, is to accelerate agricultural progress by providing an insitutional framework for sustained activity by national agricultural research systems.

In its second annual report, IADS noted that "developing countries need qualified personnel to help manage agricultural research and development programs. Ultimately, national institutions will provide such personnel. In the meantime, countries can build training for national personnel into their programs, arrange for study abroad, and when necessary, obtain the services of expatriate person-

Workshops and conferences

continued

Implications for national agricultural research systems of defined-area agricultural projects. Bellagio, Italy.

1980

Increasing the productivity and impact of agricultural research. Yogyakarta, Indonesia. Co-sponsored by the Indonesian Agency for Agricultural Research and Development.

1981

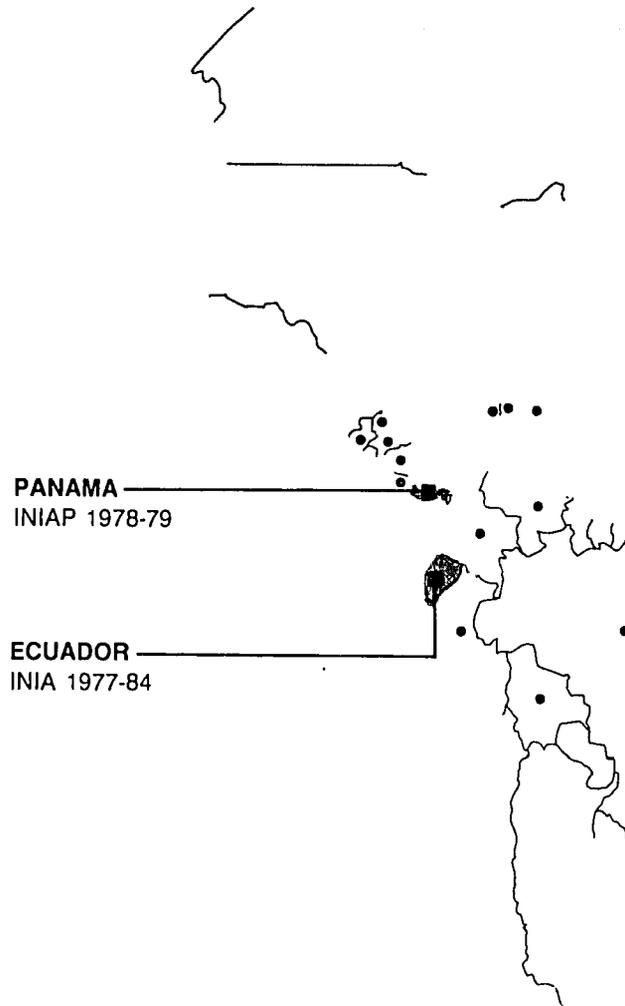
Agricultural communication workshop. Bogor, Indonesia. Co-sponsored by the Indonesian Agency for Agricultural Research and Development.

Role of international associations in helping strengthen national agricultural research. Bellagio, Italy. Co-sponsored by international Service for National Agricultural Research.

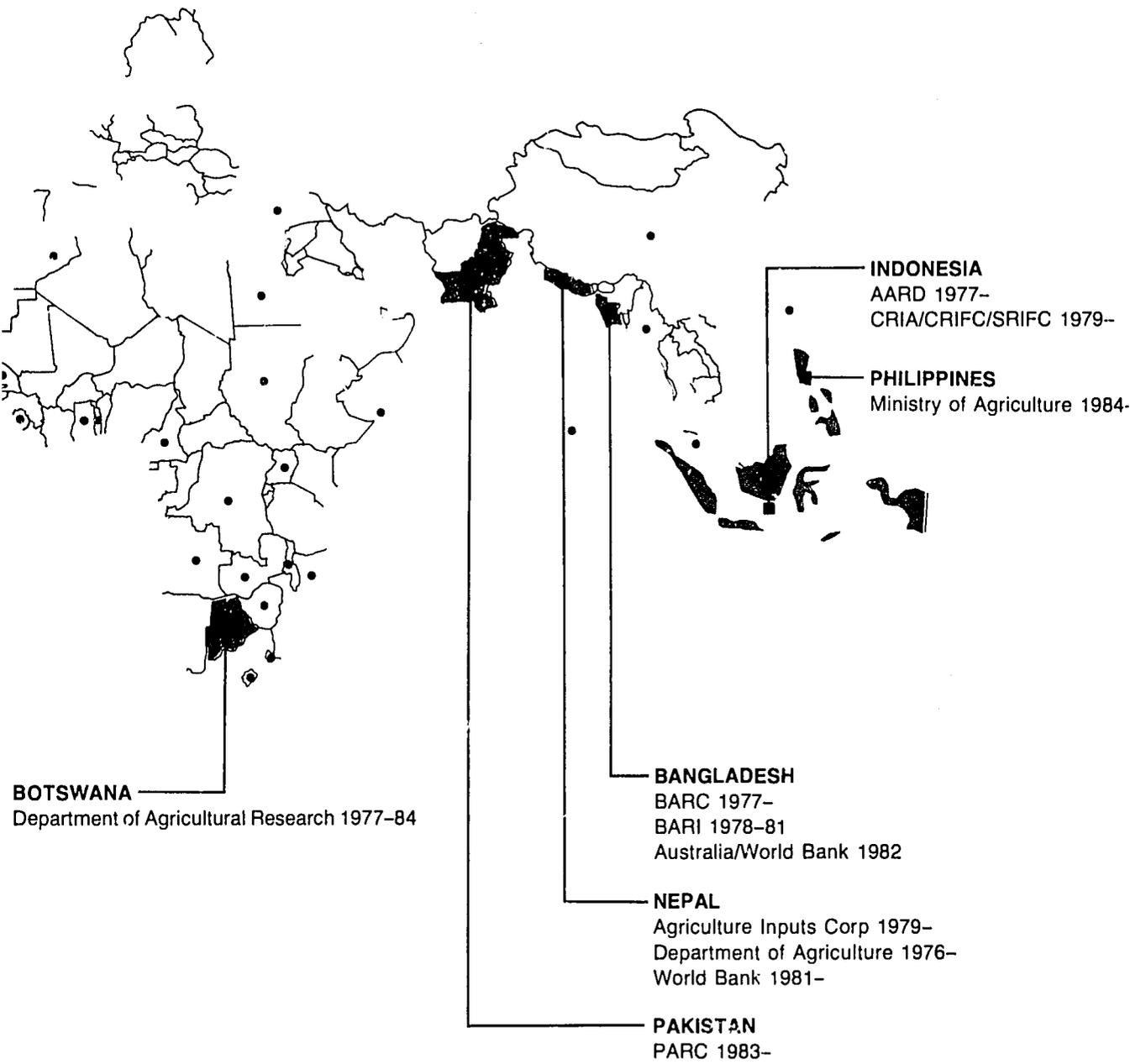
1983

Colloquium on agriculture in China. Washington, D.C. Co-sponsored by the North American Association of Plant and Soil Scientists.

**DEVELOPING COUNTRIES
SERVED BY IADS
1976-PRESENT**



- Countries and agencies to which IADS has provided resident specialists and short-term consultants
- Countries provided short-term consultants by IADS



Publications developed by IADS

BOOKS

To feed this world: The challenge and the strategy. Sterling Wortman and Ralph W. Cummings Jr. *English edition:* Johns Hopkins University Press. *Spanish edition:* Editorial de Belgrano.

Wheat in the third world. Haldore Hanson, Norman Borlaug, Glenn Anderson. Westview Press.

Tomatoes in the tropics. Ruben Villarreal. *English editions:* Westview Press. *Spanish edition:* Instituto Interamericano de Cooperación para la Agricultura.

Successful seed programs: A planning and management guide. Johnson Douglas. *English edition:* Westview Press. *Asian edition:* Tata McGraw-Hill. *Spanish edition:* Centro Internacional de Agricultura Tropical.

Small farm development: Understanding and improving farming systems in the humid tropics. Richard R. Harwood. Westview Press.

Rice in the tropics: A guide to the development of national programs. Robert E. Chandler, Jr. Westview Press.

Three ways to spur agricultural growth. A.I. Mosher. *English edition:* IADS. *Philippine edition:* Southeast Asian Regional Center for Graduate Study and Research. *French edition:* International Service for National Agricultural Research. *Spanish edition:* Instituto Interamericano de Cooperación para la Agricultura

Cassava: New potential for a neglected crop. James Cock. Westview Press.

Science and rice in Indonesia. William B. Ward. OGH Publishers (In press).

Agricultural assistance sources. IADS.

SHORT PUBLICATIONS

Understanding professionals: Small farmers and scientists. Robert Chambers. IADS

continued

nel." Since then much progress has been made in human resource development. Asia, in particular, has advanced to the point that the external assistance needed is substantially different from that of a decade ago. A collegial relationship between several Asian countries and the more developed countries is indicated. Both parties stand to gain from this mature relationship. At the same time, other countries need the kind of intensive involvement of outside experts that characterized many Asian countries a decade or more ago. Human resource development on all sides remains a key to solving world food problems.

The development-oriented literature series of IADS was based on the concept that many persons are required to exercise leadership on agricultural problems that are not directly within their area of specialization. This series was aimed at providing such decision makers with key information about specific crops and about basic food production problems. IADS has moderated its involvement in this area due to funding restraints, but still finds merit in the concept. Each publication brought out in this series has met with success as attested by reviews and correspondence from individual readers.

The direct services to individual developing countries have dominated the IADS program. Funding of direct ser-

Funding of IADS 1976-1985
(thousands)

Year	Grant core funding	Contract funding	Total funding*	Operating costs	Cum- ulative reserves**
1976	\$1,293	\$ 91	\$ 1,404	\$ 1,192	\$ 212
1977	1,286	991	2,325	2,304	233
1978	1,115	1,858	3,055	3,047	241
1979	1,376	2,871	4,359	4,075	525
1980	733	4,516	5,412	5,361	576
1981	784	4,818	5,852	5,759	669
1982	1,154	6,374	7,636	7,085	1,220
1983	661	9,159	9,927	9,173	1,974
1984	0	10,936	11,107	10,932	2,149
1985 (Est.)	0	12,560	12,725	12,641	2,233
TOTAL	\$8,402	\$54,174	\$63,802	\$61,569	\$2,233

*Including interest income

**Beginning 1982, includes balances from operating grants from the Rockefeller Foundation which have been carried forward

VICES through contracts through 1985 has amounted to more than \$50 million. Grant funding for all other purposes, establishment of a core staff, indirect services, etc., have amounted to less than \$8 million.

The emphasis of the direct involvement of IADS in developing country activities has been on research. One reason is that IADS core staff came from research backgrounds. Another is the level of development in the Asian countries where IADS has been most active. Many of these countries had invested much in human resource development and were primed to take off on development of new or improved research units. Their needs for outside expertise will change substantially in the years ahead. It is expected that the demand for support to research will increase substantially in other countries, particularly those in Africa. The number of qualified personnel to staff research institutions is limited in most of these countries. Attention is needed both to training of professionals and to technical assistance.

The other side of the coin in this distribution of effort is that IADS has gained substantial credibility in research due to the nature of its staff. In areas other than research and research management, its headquarters expertise has been slim. As the merged organization moves ahead it should expand headquarters staff capability in agro-forestry, water management, vocational agriculture training, development planning, area development, and other fields.

The tables, graphs, and lists associated with this report reflect an active program over the IADS' decade and one which has been productive in a wide range of geographic and subject-matter areas. The financial data indicate that IADS was and is a viable concept. In retrospect the views of its organizers were substantially on target. The new organization, that is being created will contain most of the elements of the IADS program.

Operational Procedures

The basic principles that were discussed before IADS was started were followed as regards financing and staff development. The core staff was employed and available to provide services to developing countries, but it undertook

Publications, *continued*

Planning the development of a fertilizer industry. Travis Hignett. IADS.

Science and technology for human needs, rural development and the relief of poverty. A. H. Bunting. IADS

A simplified approach to agricultural systems. Milo Cox. IADS.

The economics of research and agricultural technology. T.W. Schultz. IADS.

Assessing farmers needs in designing agricultural technology. CIMMYT economics staff. IADS

Managing fruit tree nurseries. Saul Camacho-Bustos. IADS

Agricultural development indicators: Statistical comparisons of 139 developing countries. IADS.

such work only when funds were available from special grants or contracts. With either type of support, the core budget was reimbursed for all direct costs and for a fair share of indirect expenses. In 1981, the last year when grant-based core funding was considered a standard operating procedure, funds received by IADS from non-grant sources covered more than 80 percent of the headquarters' cost. By 1985, they were fully covered by non-grant sources. All field staff posts have from the beginning been funded by contract sources.

The flexibility of IADS was substantially changed as a result of the cessation of core funding by the Rockefeller Foundation. During the first 7 years, core funding permitted innovative activities in relation to development and supported indirect services, which were provided without charge to the developing countries. Subsequently, these activities had to be reduced. The financial status, programs, and reputation of IADS were such that it could operate indefinitely as a non-profit professional consulting group. The substantial reserves available at the time of merger attest to its financial soundness. But it could not continue to provide donated services without changes in its basic funding.

When IADS was in the planning stage, considerable thought was given to potential problems with a completely self-sustaining mode of operation such as IADS has come to have. In the first annual report, these problems were mentioned:

“... It was feared that if a private organization were established to operate entirely for overhead or management fees on contracts, it would suffer from major deficiencies. The new organization's representatives could not remain objective in consultations with governments; they would be inclined rather to seek contracts with the organization (to generate income) even if a country did not need expatriate help, or if another public or private organization might be better able to provide the services the country required. Moreover, it was felt that some donated services to national programs collectively would be critical and that these would require grant support.”

IADS has not faced any serious problems of conflict of interest in dealing with developing countries. It has remained objective in selection of projects in which it has be-

Members of the merger committee at work in the IADS conference room.



Field staff specialties, 1976-1984

	<i>person- years</i>
administration	17
agricultural economics	19
agricultural engineering	7
agricultural geography	3
agronomy	29
aquaculture economics	1
biometrics	1
civil works	1
coconut pathology	1
cotton entomology	1
cropping systems agronomy	8
crops research	3
entomology	2
equipment maintenance	2
experiment station development	8
extension communication	3
farming systems	5
financial administration	8
food legumes	3
fruit research	6
horticulture	2
livestock	2
plant breeding	3
plant pathology	3
potato research	5
poultry pathology	5
procurement	5
research management	49
rice improvement	9
rubber research	4
scientific information	4
seed programs	10
soil fertility	3
soils	5
training	7
vegetable research	4
water management	6
wheat research	1

come involved and it has not been forced to enter into contracts simply to generate income. However, the lack of a secure financial base undoubtedly influenced programs. Prudent management required that available funds be used with greatest effectiveness, which tended to reduce the ability of the organization to be innovative. Previously, grant funds could be used as seed money to permit the organization to enter new areas of activity. In the absence of such funds, new fields could be entered only as new contractual opportunities were identified.

An analysis of the consequences of its changed funding base announced in 1981 led the IADS management to recommend to the IADS board in November of that year that the organization enter into discussion directed towards a merger into a new endowment-based organization. This was to be done without any reduction in contract-based programs. The first merger partner approached by IADS was the Winrock International Livestock Research and Training Center. These discussions were later broadened to include the Agricultural Development Council. The merger now being completed is the culmination of more than 3 years of discussion.

IADS sees the basic mixture of donated services from an on-going, core-funded staff and program, coupled with contract-supported activity, as a sound approach. Contract activities do not simply make for a larger program: more important, they permit the organization to participate in and to influence programs that are far too costly to enter into from a modest financial base. It causes the organization to remain closely associated with the developing countries' own institutions. It will be a partner with them, not a patron. Increasingly this is what the developing countries seek.

The potential for the endowment-based, non-profit organization now being established surpasses the original hopes of the IADS group. When first discussed in 1981, it seemed a logical and moderate step toward greater flexibility and stability. At the end of IADS' tenth year, the merger has essentially been accomplished and the potential for the new organization is excellent. Winrock International Institute for Agricultural Development will have an endowment

in the range of \$60 to \$70 million and a staff of about 100 professionals. It will be able to provide the kind of services to developing countries envisioned for IADS by its planners, but to do so at a much more substantial level.—
A. Colin McClung.



RECENT TRENDS IN AGRICULTURAL RESEARCH INVESTMENT

(facing) Preparing a rice field for planting in Sumatra.

The dramatic spread of modern wheat and rice varieties in the 1960s drew attention to the exceptional payoff possible from investment in research on staple food crops in the developing world. Analyses published by such economists as Theodore Shultz, Vernon Ruttan, and Robert Evenson were instrumental in building support for agricultural research among political leaders and development officials.

The launching of the Consultative Group for International Agricultural Research in 1971 was a milestone. Its formation established a means for donor agencies to contribute funds for the expansion of the international agricultural research centers. But less obviously, it signalled recognition by the broad donor community that national research programs must be strengthened as well; otherwise the full benefit of research at international centers would not be realized.

National research programs are the weak links in global agricultural research efforts. Substantially enlarged support to agricultural research is vital for sustaining the gains in productivity already achieved and for making fur-

ther advances. The rate of return on investment in research amply justifies greater research expenditure.

Robert Evenson (1981) has summarized the internal rates of return reported by different studies of investment in agricultural research. The rates generally range from 20 to 100 percent per year. Such returns are extraordinarily high in comparison with other public and private sector investments. Of the 62 rates of return, Evenson reports, only 4 were below 20 percent, 9 were in the 20 to 30 percent range, 14 were at 30 to 40 percent, and 35 exceeded 40 percent. Twenty-three studies of research programs in developing countries show these programs yielding rates of return as high as, or higher than, those reported for research in developed countries.

Donors' shifting priorities

Two major donor agencies, the World Bank and the U.S. Agency for International Development (USAID), have greatly increased their support to national agricultural research systems in recent years. The World Bank now plays a leading role in mobilizing financial support for national agricultural research. World Bank policy analysts believe that the allocation of finances for research should be considerably increased to strengthen national programs and to complement any further expansion of international systems (World Bank, 1981). The target investment in research suggested for many countries with poorly developed agricultural research systems is an annual expenditure equivalent to about 2 percent of agricultural GDP. Moreover, the bank advocates a 10 percent annual growth in expenditure on agricultural research in developing countries over the next few years.

The bank has projected that its lending for research and extension would increase from \$330 million to more than \$550 million between 1979 and 1984. This would mean that the share of research and extension would rise from 9 percent to 12 percent in relation to total lending for agriculture and rural development. The bank also expected that by 1984, the research-extension mix would be about 50:50 in contrast to the 30:70 ratio in 1979. The changing emphasis

stems from evidence that economic returns from research expenditure are higher than returns from extension and that agricultural research contributes significantly to the achievement of key development objectives.

Although, historically, support of agricultural research has been a low priority item for USAID (Crawford, 1982), the situation has changed in recent years. From 1978 to 1981, USAID's funding of agricultural research rose from \$85 million to \$144 million, or from 12.8 percent to 19.5 percent of its appropriations for agriculture, rural development, and nutrition.

Together the World Bank and USAID provide half of the funds contributed by the international donor community for national agricultural research. Other large donors are UNDP, France, InterAmerican Development Bank, Canada, West Germany, EEC, IFAD, Japan, Netherlands, Australia, and Belgium. *Agricultural Assistance Sources* (IADS, 1982) contains information on donor organizations that provide financial or technical assistance for agricultural activities in developing countries.

In constant 1980 U.S. dollars, donors' funding of national agricultural research institutions rose from \$372 million in 1976 to \$749 million in 1980 (Oram and Bindish, 1981). In addition, during this period, their funding of institutions under the Consultative Group on International Agricultural Research increased from \$93 million to \$146 million. Table 1 gives some idea of external funding for agricultural research by region during 1980. The overall external support for agricultural research in the Third World, including international and regional institutions was \$895 million in 1980, a seven-fold increase, in real terms, since 1971.

Geographic choices

Most donors fund agricultural research in all the developing regions of the world, but some focus on specific regions. For example, Australian aid goes mainly to Asia, and French and Belgium aid to Africa. Of the \$895 million contributed by donor agencies in 1980, Africa, received 38 percent, Asia received 27 percent, Latin America received 24 percent, and the Near East received 11 percent. On per cap-

ita basis, Asia received only \$0.11 compared with the Near East, \$2.80; Africa, \$1.27; and Latin America, \$0.88.

The rising international support for agricultural research has been brought about by (i) the awakened interest

Table 1: Donor agencies, funding for agricultural research in developing regions, 1980 (\$ millions)

Donor	Africa	Asia	Latin America	Near East	Total ^a 1980
Australia	--	11.7	--	0.5	12.2
Belgium	8.5	2.4	0.6	1.0	12.5
Canada	10.6	6.8	7.8	2.5	27.8
France	64.4	0.1	4.0	--	68.6
Japan	0.5	8.6	3.2	0.2	12.3
Netherlands ^b	8.1	2.1	1.8	1.5	13.5
New Zealand	--	0.3	--	--	3
Norway	2.9	0.1	--	--	3.1
Sweden	2.7	1.3	1.0	0.5	5.5
Switzerland ^{b,c}	0.4	0.5	1.7	--	2.6
West Germany ^c	7.4	7.7	3.4	4.3	22.8
United Kingdom ^c	0.5	0.2	0.9	0.03	1.5
United States	110.2	26.0	38.3	30.6	205.1
Other	0.1	0.4	--	--	0.5
Total bilateral	216.2	68.4	62.7	41.1	388.4
IFAD ^d	0.7	15.0	0.6	0.9	17.1
EEC	13.3	0.2	0.6	3.5	17.5
IBRD	28.3	89.1	44.9	9.2	171.5
IDB	--	--	30.8	--	30.8
UNDP ^e /FAO ^f	35.7	32.1	26.5	29.4	123.7
Total multilateral	78.0	136.4	103.3	43.0	360.6
Total bilateral and multilateral	294.2	204.8	166.0	84.1	749.1
CGIAR system ^d	42.0	33.0	47.0	14.0	146.0
Total	336.2	237.8	213.0	98.1	895.1
\$ per Capita ^g	1.27	0.11	0.88	2.80	

^a Excludes base costs of technical assistance organizations of donor countries or agencies.

^b Including contribution to CGIAR.

^c Includes some global projects not identified by region.

^d Figures obtained from Oram through personal communication. The sum of regional figures is less than total because some of the funds cannot be assigned to any one region.

UNDP data for regions apply only to FAO; additional allowance for non-FAO projects included in totals.

^g Calculated by author.

Adapted from: Oram and Bindlish (1981) (Figures converted from 1975 U.S.\$ to 1980 U.S.\$ by multiplying with 1.531).

of new donors in supporting agricultural research, (ii) the increasing contributions from international and regional funding agencies, especially development banks, and (iii) substantial increases in funding national agricultural research by some large traditional donors.

These trends are not uniform, however. There has been in recent years an apparent downturn in contributions by some donors and a leveling off of contributions by some others. Oram and Bindlish (1981) warn against complacency about external support for agricultural research because of the critical food shortages many countries face and the need to accelerate agricultural growth as a means of stimulating employment and income. Stable, long-term commitments by national governments as well as donor agencies are vital for building and maintaining national research institutions for sustained economic development.

Comparative investments by developed and developing countries

Comprehensive data on worldwide public research investments are furnished by Judd, Boyce, and Evenson (1983) who estimated that spending on agricultural research increased from a little more than \$2 billion in 1959 to \$7.4 billion in 1980, in constant 1980 U.S. dollars (excluding the \$146 million spent by international agricultural research centers). Of this, only a third was spent in the developing countries, including China.

Table 2 gives agricultural research expenditures by region in absolute terms, as well as a percentage of value of agricultural product, which is termed research intensity. In 1959, research intensity ranged from 0.84 percent in North America to 0.10 percent in Southeast Asia. The high level of spending in Africa, compared with Asia, reflected much higher cost for research personnel, a large share of whom were expatriates, rather than a higher level of research efforts. The level of research intensity in Latin America was similar to that of Africa. By 1980, the pattern had changed substantially. The Asian countries, excluding East Asia, had moved close to a research intensity of 0.5 percent. The research intensity in industrialized countries generally ranged from 1.0 and 2.0 percent and in Africa and Latin America

Table 2: Agricultural research expenditures by region, 1959-1980

Region	Expenditures (\$ millions)			Research intensity ^b (%)		
	1959	1970 ^a	1980	1959	1970	1980
Western Europe	275	918	1,490	—	—	—
Northern Europe	95	230	410	0.55	1.05	1.60
Central Europe	141	563	871	0.39	1.20	1.50
Southern Europe	39	125	209	0.24	0.61	0.74
Eastern Europe and USSR	568	1,282	1,492	—	—	—
Eastern Europe	196	436	553	0.50	0.81	0.78
USSR	372	846	939	0.43	0.73	0.70
North America and Oceania	761	1,485	1,723	—	—	—
North America	669	1,221	1,336	0.84	1.27	1.09
Oceania	92	264	387	0.99	2.24	2.83
Latin America	80	216	462	—	—	—
Temperate South America	31	57	80	0.39	0.64	0.70
Tropical South America	35	129	269	0.35	0.67	0.98
Caribbean & Central America	14	30	113	0.15	0.22	0.63
Africa	119	252	425	—	—	—
North Africa	21	50	62	0.31	0.62	0.59
West Africa	44	92	206	0.37	0.61	1.19
East Africa	13	49	75	0.19	0.53	0.81
South Africa	41	61	82	1.13	1.10	1.23
Asia	260	1,205	1,798	—	—	—
West Asia	24	71	125	0.18	0.37	0.47
South Asia	32	73	191	0.12	0.19	0.43
Southeast Asia	9	37	103	0.10	0.28	0.52
East Asia	141	522	735	0.69	2.01	2.44
China	54	502	644	0.09	0.68	0.56
World	2,063	5,358	7,390	—	—	—

^a Average of 1968 and 1971.

^b Research expenditures divided by value of agricultural output. Adapted from Judd, Boyce and Evenson (1983).

between 0.5 and 1.0 percent. It is apparent that agricultural research expenditure has grown at a much higher rate in most developing countries than in the industrialized countries, especially during the 1970s. This is understandable because industrialized countries had already reached a relatively high funding level, while developing countries are still struggling to attain a desirable level of funding.

The research expenditures in developing and industrialized countries would show even greater disparities if the private sector were taken into account. Private research expenditures are substantial in industrialized countries. It can be estimated that private agricultural research expenditure would be less than 10 percent in developing countries, while in industrialized countries it could range up to 50 percent of the total. For example, the private sector in the United States spent \$1.59 billion out of a total of \$3.0 billion in 1982 (Experiment Station Committee, 1984).

In individual developing countries growth in research expenditures varied widely during the 1970s (Table 3). In Bangladesh research expenditures soared from \$1.87 million to \$26.6 million (in 1980 constant dollars), an annual rate of growth of 37.0 percent. Mexico, Kenya, Brazil, Indonesia, and Nigeria had growth rates ranging from 19.9 percent to 33.5 percent. Syria, Sudan, India, and Thailand showed a moderate growth of 6.2 percent to 9.7 percent. Growth in Nepal, Colombia, and Nicaragua was relatively low, 2.5 to 3.9 percent, while the Philippines showed practically no increase.

These data should be used with caution. Some countries like India, the Philippines, and Colombia started building their research systems well before 1970. Other countries started late and have recently been spending heavily to catch up. Also some Latin American and African countries have relatively high research expenditure because the costs of trained personnel are higher in those countries. Moreover, research expenditures can fluctuate from year to year without corresponding change in the scientific manpower due to allocation of budget for capital improvement. Or, increases in scientific staff may sometimes be obscured by the devaluation of local currency because expenditure is shown here in constant U.S. dollars. This would be particularly

true for the Philippines where the peso was devalued a number of times during the 1970s.

In spite of a significant increase in agricultural research budgets of several countries, research intensity is still relatively low—0.26 percent for Indonesia and Thailand, 0.33 percent for India, and 0.48 percent for Bangladesh (Table 3). Only Mexico, Kenya, and Brazil have achieved a research intensity comparable to that of developed countries.

Resource allocation to agricultural research

An important issue before research managers and government leaders concerns the desirable level of total expenditures for research. In numerous studies of past investments in research, in spite of problems in measurement of benefits and costs, as well as in the models used, the evidence overwhelmingly indicates that the payoff is impressive. Allocation of funds to agricultural research in develop-

Table 3. Agricultural research expenditure in 14 developing countries, 1970-80. (in constant 1980 dollars)

Country	Expenditure (\$ million)			Annual growth (%)	1980 Research intensity ^a (%)
	1970	1975	1980		
Bangladesh	1.9	10.4	26.6	37.0	0.48
Mexico	3.8	21.2	71.0	33.5	1.36
Kenya	2.3	12.2	21.8	27.4	1.19
Brazil	56.6	217.4	245.0	20.2	1.15
Indonesia	9.9	34.4	44.5	20.0	0.26
Nigeria	32.4	89.3	121.9	19.9	0.74
Syria	2.1	2.5	5.3	9.7	0.24
Sudan	6.9	9.7	14.6	8.0	0.57
India	83.1	122.5	154.8	6.5	0.33
Thailand	14.3	23.1	23.3	6.2	0.26
Nepal	2.1	2.5	2.8	3.9	0.20
Colombia	32.8	35.2	48.2	3.3	0.64
Nicaragua	1.6	1.7	2.0	2.5	0.27
Philippines	15.5	14.5	13.4	0.5	0.20

Source: Oram and Bindlish (1981) Annex 2A. Figures converted from 1975 dollars to 1980 dollars by multiplying by 1.531.

^a Oram, personal communication; research expenditure divided by agricultural GDP.

ing countries generally would need to be increased two- to four-fold in order to bring research intensity to a par with that of developed countries. But to maximize the contribution of research to established development goals, available resources must be judiciously allocated among different activities.

In planning research, Vernon Ruttan (1982) emphasizes two basic questions. First, what are the possibilities of advancing knowledge or technologies if funds are allocated to a particular research effort? Second, what will be the benefit to society of new knowledge or technology if the research effort is successful? He examines the "parity" or "congruence" model of research resource allocation, which shows whether funds allocated for research on a commodity (such as rice or wheat) or a production factor (such as soil, water, or agricultural chemicals) are proportional to the value of the commodity or the value of the contribution of a particular factor to production. This approach, if modified by informed judgment and other relevant criteria with appropriate weights, can be a useful tool in reaching decisions on resource allocation for different program categories.

Two stages are involved in research resource allocations, according to Ruttan. One is an initial pre-ordering of research programs based on some judgment of the potential value of the research. The second involves the selection of individual research projects that can contribute to the success of the program most effectively. This second stage may involve use of several formal approaches including scoring models, experimental approaches, and benefit-cost methods. Despite some limitations, these approaches can have useful application in appropriate situations.

Grant Scobie (1984) has reviewed literature on resource allocation and examined the relevance and effectiveness of different approaches. He notes that research managers are expected to design and undertake research programs with multiple goals, thus the simple criterion of economic efficiency is not valid. He concludes that the informed judgment of research managers and scientists who know local circumstances and are responsive to demands of client groups has been the most effective tool for allocating research resources. The quantitative models cannot be a

substitute for the creativity and judgment of knowledgeable participants. In making those judgments, however, some relatively simple guidelines and measures can be used.

In another recent paper, Peter Brumby (1983) reviewed techniques for the evaluation of research priorities and projects and he also concluded that the data requirements, the high cost, and the complexity of the various formal approaches make it prudent not to claim too much for them.

Donor agencies are interested in supporting national projects that are well prepared and focus on high priority research. However, criteria used for establishing research priorities by donor agencies can differ from those of national agencies.

In the 1950s and 1960s, when agricultural research organizations in most developing countries were feeble, the donor agencies provided funds for projects largely conceived by them. Now strong national research systems exist in many countries and they regularly prepare national research plans and set priorities. This gives donor agencies the opportunity to fund projects that are jointly formulated and that fit the overall national research objectives, thus employing funds from domestic and external sources more efficiently.

The World Bank gives priority to projects that focus on improving food production systems, on farming systems in resource-poor areas, on applied and adaptive research directly applicable to farmers' production problems, and on the development of effective organizational structures for research. For low income countries, the bank's financing arrangements include an appropriate portion of incremental operating expenses of national research projects. In assisting national research programs, the bank generally requires the development of an overall strategy for the national research system, adoption of a research philosophy that is oriented toward the practical production problems of farmers, and acceptance by the government of the need to accord appropriate priority to the national research efforts.

USAID's increasing support to agricultural research results mostly from projects funded by AID field missions. AID leaders plan to raise support for research in the belief that the United States is best equipped to help developing

countries improve their capacity for the development and application of science and technology to development problems.

During 1982-83, the USAID research priorities in food and agriculture were reviewed by specialists from within USAID and outside consultants. According to Ralph W. Cummings, Jr., and J. S. Robbins (1984) the group first identified the constraints to the achievement of USAID's objectives for food and agriculture development assistance. Research to relieve those constraints was categorized in terms of commodities, problems, and disciplines. Then AID field missions, together with local research personnel, selected problems that merited priority research support, and the assembled information was further analyzed by outside specialists and AID personnel. They identified seven interrelated research priorities for increased AID support:

- sustained high productivity in areas that have relatively favorable natural conditions, particularly through better irrigation management
- sustained production in less favored areas such as areas with excessive, variable, or deficient rainfall; acidic, low-fertility soils; or steep slopes
- production systems, such as those in the hill areas of Nepal, that permit the farmers to buy no more than a minimum of inputs
- crop and animal protection by cost-effective and environmentally acceptable means
- livestock in mixed farming systems—systems that include crops, livestock, and often agroforestry
- food and agriculture policy, particularly to help build methodology and capacity to evaluate alternative instruments and policies affecting food and agricultural development
- institutional capacity for the generation and application of technology.

Cummings and Robins observed that several approaches to identify research priorities, including in-house judgment by professional staff, external peer-review panels, and mathematical programs, have been used by multilateral and bilateral donors and organizations. No clearly superior

process has emerged, nor is likely to emerge, given the various needs of recipients and different objectives of donors.

Toward stable funding for agricultural research

Usually, the beginning of investment of funds in research and the first flow of benefits are separated by a long gap. Once a research program is initiated, it has to be sustained until the final product in the form of a new or improved technology becomes available to farmers. As farmers begin to achieve higher productivity through use of modern technology, additional research is often needed, not only to protect the gains already achieved, but also to generate still better technology for continuing progress. Building long-term stable funding for research is a great challenge for research managers and scientists.

An essential condition to ensure continuing research support is to demonstrate to the public, government leaders, and donors' representatives that ongoing research programs are yielding new information and technologies capable of increasing agricultural productivity. Research should be conducted with a sense of urgency and clear objectives to develop technologies that are worthwhile for farming communities.

A good research program is rarely deprived of funds. Available funds have to be allocated in a manner that would serve the short-term objective of rapidly creating new technologies through applied research, as well as the long-term objective of relevant basic research to improve the foundation for more problem-oriented research. A balanced long-term approach will ensure continued support and expected progress.

While development of research plans is important, actual implementation of those plans through well-managed projects and experiments is essential to achieve reliable results for practical application in the shortest possible time.

In a recent report, Josette Murphy (1983) delineated conditions favorable to effective research systems on the part of a national government, a donor, a research institution, and a research program. For the government, the most significant condition was a commitment to provide suffi-

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cient resources and favorable policies for research; for the donor, it was integration of its assistance into the entire national research program on a long-term basis; for the research institution, it was emphasis on multi-disciplinary research, maintaining a stable research staff, providing competent management, and maintaining appropriate research-extension links; and for the research programs, it was acquiring adequate knowledge of farming conditions and practices, conducting research relevant to farm problems, and operating on-farm trials to facilitate identification of most appropriate technologies and to foster coordination with extension services.

In achieving long-term stable funding, scientists and research managers bear as much responsibility as the policymakers in national governments and donor agencies who determine allocation of funds for research. The role of research managers is particularly crucial in that they must ensure that the results of research are being used by farmers and that policymakers are made aware of the fact. Thus the multiple challenge to research managers is to deal adeptly with their own government as well as with donor agencies to obtain funds, to be skillful in organizing scientists to make effective use of funds for the generation of improved technology, and to promote the participation of extension workers and farmers in the evaluation and dissemination of technologies. Moreover, they must be persuasive to gain support from political leaders and to convince development and service agencies to cooperate in the dissemination and promotion of new technologies. The research manager thus has the pivotal role in ensuring that research receives adequate funding, that the funds are used for high priority problem-oriented research, and that farmers actually use and benefit from newly developed technologies.—*D.S. Athwal.*

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26

IADS in 1984

(facing) Extension agents inspecting a field of wheat being grown by a farmer-seed grower.

In past annual reports, this section has dealt strictly with activities that took place during the calendar year shown on the cover of the report. This year we depart from that practice and include some events that occurred during early 1985. By mid-year the merger of IADS, the Agricultural Development Council, and Winrock International Livestock Research and Training Center will be completed. The merged organization will be called the Winrock International Institute for Agricultural Development and subsequent reporting on the continuing programs which are discussed here will be carried out by it. In this report two topics need equal attention: the merger and programs.

The Merger

Action leading to the merger has moved steadily forward. By the end of 1983, the boards of trustees of the three merger partners had approved the merger in principle and in substantial detail, but each board specified some conditions to be met before the merger could be completed. These

Consultants arranged through IADS in 1984

Bangladesh

Guy Baird, *research planning*
 Douglas Beck, *biological nitrogen fixation*
 Robert Callahan, *training*
 William Carson, *irrigation and drainage*
 A.N. Choski, *agricultural credit*
 Wilfred Cruz, *aquaculture economics*
 Robert Davis, *biological nitrogen fixation training*
 Ian Paul Emmert, *irrigation policy*
 Dwight Fintrock, *experiment stations*
 Douglas Gross, *biological nitrogen fixation training*
 Anil Gupta, *land-use policy*
 Joseph Hunt, *raided land development*
 John Jarvis, *commodities procurement*
 Robert Kemper, *landless farmers*
 Jagdish Kumar, *experimental design*
 Edwin Magallona, *toxicology*
 Richard McConnen, *irrigation management*
 Barry Nestel, *research assessment*
 Dennis O'Brien, *fertilizer research*
 Theodore Panayotou, *training*
 Eduardo Perdon, *agronomy training*
 Donald Slack, *irrigation management*
 Ben Wallace, *farming systems*

Dominican Rep.

Francis Byrnes, *communication*

Egypt

George Haynes, *livestock assessment*
 Daniel Hillel, *irrigation*
 Richard Howitt, *irrigation planning*
 Richard McConnen, *livestock planning*
 Wes Wallender, *irrigation engineering*
 Thomas Weaver, *irrigation economics*
 E. T. York, *research planning*

Honduras

Jerome Maner, *livestock training*

Indonesia

L.A. Davis, *coconut agronomy*
 Hans Delavier, *sugar technology*
 Robert Evenson, *research economics*
 James Harrington, *seed policy*
 Gene Harris, *fertilizer economics*
 Gabrillo Hechanova, *aquaculture*
 Ieme Hernandez, *vegetable research*

continued

limitations were related to the desire of each board to approve the selection of the chief executive officer of the new organization and to ensure that sufficient endowment would be attained to make the merger viable. In addition, several U.S. government agencies had to approve conditions of the formation of the new organization and the termination of the old ones. All of this had to be built into a carefully constructed plan of merger.

On June 27, 1984, the merger committee, composed of members from the boards of trustees of three merging organizations, approved a plan of merger, articles of incorporation, and bylaws. The documents were submitted to, and approved by, the complete boards of the prospective merger partners.

Following up on the merger plan, a new organization, Winrock International Institute for Agricultural Development, became a legal entity to operate concurrently with three prospective merger partners until the various preconditions had been met. Then three existing organizations would merge into the new one. The merger plan specified that all actions had to be complete by July 1, 1985.

Actions taken by three boards resulted in creation of the following board of directors for the Winrock International Institute for Agricultural Development:

Norman E. Borlaug	Walter P. Falcon	Herbert L. Lucas
William L. Brown	Peter C. Goldmark, Jr.	Max Milam
Marion B. Burton	Clarence C. Gray III	William K. Reilly
Bartley P. Cardon	John A. Hannah	Walter Orr Roberts
Emery N. Castle	Clifford M. Hardin	Winthrop P. Rockefeller
William M. Dietel	Lowell S. Hardin	Clayton K. Yeutter

All have served on the boards of the merging organizations.

In October 1984, the selection of Robert D. Havener to serve as the organization's chief executive officer was approved by mail ballot. Mr. Havener has been in international agricultural work for nearly 20 years. Since 1978, he has served as director general of CIMMYT. From 1966 to 1972, he led the Ford Foundation's agricultural activities in Pakistan. Subsequently, he went to Beirut to initiate the Arid Lands Agricultural Development Program (ALAD) for the Ford Foundation. Under his leadership, ALAD grew to

operate programs in more than 20 Mideast countries. In 1977, he was selected project development officer to form the International Centre for Agricultural Research in the Dry Areas, which assumed many of the functions of ALAD. Since 1980, Mr. Havener has served as a member of the IADS Board of Trustees. His appointment as president of the Winrock International Institute for Agricultural Development became effective February 1, 1985.

The first meeting of the board of directors of the new institute took place November 26, 1984, at the Winrock headquarters in Morrilton, Arkansas. Mr. Havener attended the meeting. Also attending were the presidents of the three merging entities, who spoke on the programs and achievements of their organizations and major issues confronting the new institute.

At that meeting, in addition to the election of Robert D. Havener as president, William M. Dietel was elected chairman of the board; Clifford M. Hardin, vice-chairman; Steven A. Breth, secretary; and Preston Woodruff, treasurer. Neva Rockefeller Goodwin was also elected to the board of directors.

In February, Mr. Havener reported for duty and immediately entered into intensive activity on procedures to be followed before and after the merger.

On March 15, 1985 all necessary approvals were received from the U.S. Internal Revenue Service to permit the new organization to operate as proposed. The remaining actions needed are formalities at the state level in Arkansas and New York that will permit the completion of the merger by June 30, 1985.

On-going and New Programs

The priorities within IADS during 1984 have been, first, to ensure that existing programs operate at a high efficiency and, second, to generate new activities. The former, by the nature of the merger plan are fully compatible with the new organization. That is, the new institute will assume all the duties and obligations of IADS.

As should be evident reports on individual countries, below, the various on-going activities are running smoothly.

Consultants, continued

Theodore Hutchcroft, *publication preparation*
 Loyd Johnson, *experiment stations*
 J. Benton Jones, *laboratory instrumentation*
 Dhayan Kirtisinghe, *tea research*
 Robert Luse, *laboratory instrumentation*
 Franklin Martin, *tuber crops*
 Garth Murphy, *fisheries*
 Luis Navarro, *citrus*
 John Nicholaides, *soils*
 Ernest Nunn, *experiment stations*
 Romeo Opena, *vegetable crops*
 Edwin Oyer, *legume crops*
 Bobby Rentro, *maize*
 R.S. Roberts, *fisheries research*
 H.R. Schmittou, *aquaculture*
 Paul Stangel, *fertilizer research*
 Maynard Steinberg, *fisheries research*
 Warren Vincent, *farming systems*
 Pran Nath Vohra, *poultry research*
 Timothy Whitmore, *forestry*

Morocco

Pierre Antoine, *research planning*

Nepal

Warren Couvillion, *seed price policy*
 Wayne Freeman, *research planning*
 Fred Nichols, *seed processing*

Pakistan

Inocencio Bolo, *extension review*
 Wayne Freeman, *research assessment*

Portugal

Ierome Maner, *livestock research evaluation*

Rep. of China

James Harrington, *seed policy*

Zaire

Pierre Antoine, *research policy planning*

Zambia

Jose Allaro, *research review*
 Loy Crowder, *research review*
 Robert Etheredge, *research review*
 John Fenley, *research review*
 Leon Hesser, *research planning*
 George Hull, *research review*
 Alfred Krezdorn, *research review*
 Eloise Murray, *research review*
 Kenneth Rachue, *research review*
 K.N. Singh, *research review*
 Robert Temple, *research review*

Bangladesh, the largest country program of IADS is at a peak level of activity. There were 21 long-term resident specialists in country during the year and more than two dozen short-term consultants. In addition there was an accelerating tempo of in-country training activities. To manage the countless details, home office, field staff, and host country personnel have developed systems that encourage orderly planning and implementation. We anticipate an ascending curve of development of this project and foresee no problems in transferring responsibility for it to the new organization.

The same can be said regarding the transfer of any other activity. Bangladesh is mentioned specifically only because of its large size and high level of activity. The same program officers will continue to support their projects after the transfer. But the projects will potentially stand to gain from the merger because of the increase in home office staff. The technical home office support staff will be four to five times larger as a result of the merger and the numbers of specialties represented will be much greater. In-house staff will be potentially available to respond to needs from the field.

To further facilitate the transition, the president of the new Winrock is visiting each IADS project along with the IADS president to review work in progress, to consult with host country authorities, and to meet with IADS field staff. In countries that have field staff of the other merger partners, joint meetings are being held.

IADS has been moving systematically to enter in several new program areas—agroforestry (or farm forestry), agricultural development planning, and vocational agriculture training.

A major success in the first of these areas of activity was achieved when a joint proposal of IADS and Winrock International Livestock Research and Training Center was accepted by USAID/Pakistan and the Pakistan authorities. IADS and Winrock, in association with the International Council for Research in Agroforestry, will carry out the Pakistan Forestry Planning and Development Project, which begins in 1985. The first phase (1985-88) calls for six long-term foreign consultants, 14 short-term foreign consultants,

IADS services to Bangladesh

National agricultural research

Objectives: Under the phase II contract, IADS is helping the Bangladesh Agricultural Research Council increase the effectiveness of the national agricultural research system in developing appropriate agricultural technologies by raising capabilities for on-farm research, by strengthening research in selected disciplinary and multidisciplinary programs, by improving coordination of research among institutions, and by improving links with non-research agencies. The Phase I contract, which IADS held, was completed in 1981.

Magnitude: The contract, effective July 1981, is for 5 years. It provides for up to 25 resident specialists for terms ranging from 1 to 5 years, training of 84 individuals in both degree and non-degree programs, and procurement of research and laboratory equipment. The estimated cost of the phase II contract is US\$21.8 million.

Basis: Contract between the People's Republic of Bangladesh and IADS; sub-contract between IADS and Cornell University.

Funds: USAID grant to Bangladesh.

David M. Daugherty, *project supervisor*

Potato specialist

Objectives: Under a separate contract, and in collaboration with the International Potato Center, IADS provides a potato specialist to work with the Bangladesh Agricultural Research Institute in research and training.

Magnitude: The term of the potato specialist began in July 1982 and will end June 1985. This specialist has worked with IADS in Bangladesh, under a prior contract, since April 1980. The total value of the contract is \$692,000.

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

Funds: Australian government grant to Bangladesh.

1 long-term Pakistani consultant, and 17 short-term Pakistani consultants.

This contract establishes IADS in the field of agroforestry, an area of increasing importance to international funding organizations. The new Winrock International has committed itself to strengthening its forestry staff and to developing its capacity in agroforestry. The Winrock Agroforestry Workshop in April 1985 provides a basis for expanding in this field.

Active preparations are also under way to enter into new program activities in agricultural development planning with Agricultural Development Council as a key partner. By the time of the merger a joint program in this area may have been established.

The following pages give some specifics about ongoing projects during 1984.

BANGLADESH

Weather caused considerable hardship for Bangladesh in 1984. A relatively dry spring season was followed by early rains that caused flash floods. The heavy rainfall continued well into the monsoon season, bringing the worst flooding in several decades. Many districts were declared disaster areas. Relief projects for millions of people had to be undertaken.

The weather reduced the size of the spring rice crop as well as slowing the major summer rice planting. This led to late harvests, which delayed the sowing of wheat in many localities. Even with these difficulties, many farmers had good yields due to the application of new technologies. More chemical fertilizers were applied in 1984 than any year before. While food production fell short of the demand, it was sufficient to avert famine.

The national system. IADS has been working in Bangladesh since 1979. Currently it is providing technical support for a 5-year grant by the U.S. Agency for International Development to the Bangladesh Agricultural Research Council. The objective is to strengthen the national agricultural research system. IADS services are focused on BARC which is the coordinating body, and the Bangladesh

Agricultural Research Institute, the largest constituent institute, with research in a wide range of food and industrial crops. IADS specialists also work with administrators and researchers of the other 10 institutes in the system, as well as with 15 organizations and universities that have minor involvement in agricultural research.

The system was reorganized during the year, giving greater authority to BARC and bringing the institutes into a closer working relationship as well as upgrading the roles of key research managers.

IADS worked with BARC on completing the National Agricultural Research Plan for 1984-89, which guides the allocation of research priorities and projects. It is an important contribution to the preparation of the country's third 5-year plan for national development.

Training. Training is a basic element in BARC's efforts to improve the agricultural research system. BARC draws on IADS and other organizations to expand the training opportunities for Bangladesh's scientists. BARC and IADS hosted a seven-country workshop on research program evaluation in cooperation with ISNAR (International Service for National Agricultural Research). The success of this collaboration led BARC to enlist the assistance of ISNAR and IADS in the creation of a long-term personnel development plan. Part of this undertaking will be a regional workshop that will involve Bangladesh research managers and others from abroad.

As a result of emphasis on foreign training, dozens of Bangladesh researchers have been awarded scholarships for graduate degree studies abroad, mostly in agricultural sciences. In addition, many persons have made study trips to observe agricultural research in neighboring countries. Participants have ranged from a group of progressive farmers learning about new technologies in the Philippines to journalists learning how research is reported in the news media of Thailand.

Local training has been expanded, too, and it involves many more people than can be sent abroad. For example, IADS assisted in a series of courses to upgrade the skills of researchers in statistics and experimental design. Other

courses were arranged for support personnel and junior researchers. Emphasis was given to improving the capabilities of the staff members who work in the field and usually carry out the tasks of planting, applying fertilizers and pesticides, allocating water supplies, and harvesting the test plots.

A formal training program for senior research managers was also conducted within Bangladesh. Following a research evaluation workshop, a 3-week course on management of agricultural facilities and organizations, was conducted by consultants arranged through IADS.

Expanding scientific knowledge. The contract research component under the project gives BARC another tool for focusing research on national priorities. BARC grants made to Bangladeshi researchers encourage field-oriented research projects that have promise for increasing agricultural productivity on a wide scale. IADS specialists provide technical assistance in preparing many of the proposals, as well as monitoring the projects once they are funded. By the end of the year, 16 grants had been made with project funds. In addition, IADS specialists advise on other contract research projects funded through BARC by the World Bank and other donors.

Developing a sound information base for agricultural research is another result of the project. Through an intensive search, the irrigation and water management program identified over 600 documents to be placed in the National Agricultural Library and Documentation Center of BARC. It will provide a central source for this important literature. The size of the collection is expected to double by the time the activity is completed and an annotated bibliography published.

Other studies are under way to improve understanding of social systems in rural communities. BARC and IADS consultants are securing data on such groups as farm women and the landless and such issues as migration and land fragmentation.

Publications. The proceedings of the National Symposium on Agricultural Research held to observe BARC's tenth anniversary were edited and are being published. An-

other IADS activity is the production for BARC of the newsletter *AgResearch News*, which reaches over 2,250 researchers and administrators of the systems, as well as other opinion leaders. The newsletter doubled in number of pages during the year.

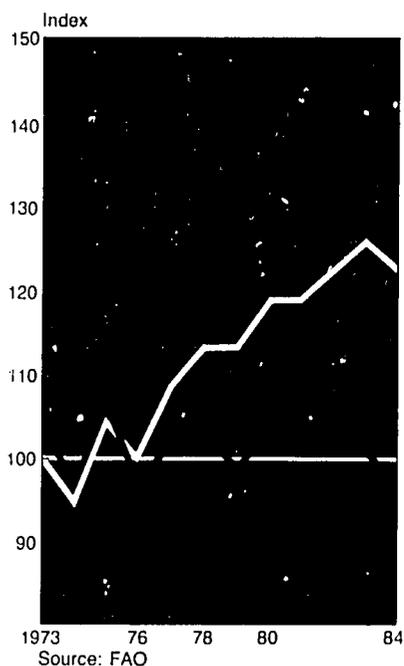
Other project activities resulted in publications, including the proceedings of an international soil science conference and water management symposium. A newsletter was started at a regional experiment station to expedite the dissemination to farmers of the latest research information. It is distributed to extension agents who work directly with the farmers.

A major new service for Bangladesh farmers was the installation of a central service laboratory at BARI for soil, water, and plant analysis. This was developed by IADS and is a basic component of the soil fertility phase of the project. Within a few months after it started, the laboratory was operating at near capacity.

This year the project began giving major consideration to crop protection for the plant diseases and insects that are a significant constraint to increased productivity in Bangladesh. Several researchers were sent abroad for training in crop loss assessment. To better meet the crop protection needs of the farmers, IADS entomology and plant pathology specialists worked with Bangladesh scientists to secure more accurate information by sampling to monitor pest and disease densities and by screening for host-plant resistance.

There are 20 cropping systems research sites in Bangladesh, which are a cooperative venture of six agencies. Farming systems research, a primary activity of the project, combines and adapts on-station research to farmers' situations through work at regional stations and on-farm testing. An important objective is to decentralize research so that farmers can be closely involved in it.

IADS staffing. The IADS team reached a peak of 22 persons at mid-year with the arrival of new specialists and prior to the departure of those who completed their assignments. Joining the project were Travis R. Everett, entomologist; Rogelio C. Lazaro, water management specialist; and Edward C. Rosentel II, administration specialist. Ending



their work in Bangladesh were Hugh E. Henderson, livestock specialist; Russell D. Frazier, agronomist; D.N. Sharma, farm management specialist; and Timothy G. Kelley, associate production agronomist.

The functional terms of reference (job descriptions) of the IADS specialists were reviewed on the basis of 3 years' experience in the project, and recommendations made to make better use of their service and expertise. An improved system for the annual work plan carried the process a step further, binding the IADS services even closer into the objectives of BARC and the constituent institutes.

An IADS service unit was established to expedite project activities, notably the procurement and delivery of commodities for the research institutes, financial accounting, and maintenance of operating equipment. Over \$1 million worth of scientific and technical equipment has been ordered this year to strengthen agricultural research in Bangladesh.

BOTSWANA

During 1984 Kristian Oland completed an 8-year assignment as the Botswana director of agriculture. In 1976, Botswana turned to IADS to help them fill the then vacant post. IADS not only suggested Dr. Oland, an experienced agricultural scientist, it also helped arrange for Norad, the Norwegian development assistance agency, to support Dr. Oland's assignment to Botswana. IADS made a small discretionary fund available to the director during his term in office.

BURUNDI

IADS is a subcontractor to the University of Arkansas and Winrock International Livestock and Training Center under a USAID-funded contract to help Burundi develop institutions to provide improved technology to small farmers. A department of farming systems research and extension will be established within Burundi's agricultural research institute and a farming systems research and extension program will be developed in two communes in Burundi's densely settled central plateau.

The 5-year project will have a technical assistance team consisting of four resident specialists plus 44 person-months of short-term specialists in areas such as soil conservation, agricultural training, microbiology, seed processing, small animal husbandry, and project evaluation. IADS participates as a source of consultants.

DOMINICAN REPUBLIC

For the Instituto Superior de Agricultura, an IADS representative helped the Rural Development Management Center in the improvement of communications modules.

EGYPT

Under a 4-year contract, IADS is working with the Agricultural Economics Research Institute (AERI), part of the Ministry of Agriculture, to strengthen its analytical capacity. IADS help AERI conduct studies on priority development issues identified by the senior agricultural policy advisory group to the AERI.

The first of the studies dealt with the potential for export of fresh vegetables. A related study will be concerned with the economics of production of horticultural crops under plastic.

In 1984 a study on the economics of providing fresh red meat to Egyptian markets was completed. Two reports were issued: "An Analysis of Red Meat Production in Egypt" and "Policy Alternatives: Unified Feed and Red Meat Production in Egypt."

For a study on policy aspects of irrigation in the New Lands area, a four-person team completed field investigation of alternative irrigation techniques.

* * *

As part of the Egypt Research Review the final report "Increasing Egyptian Agricultural Production through Strengthened Research and Extension Programs" was submitted to USAID in early 1984. It was prepared by a six-person team that examined ways to make research results more directly useful to Egypt's farmers.

Egypt Irrigation Team

Richard E. Howitt, *University of California*

Wesley W. Wallender, *University of California*

Thomas Weaver, *University of Rhode Island*

Daniel Hillel, *University of Massachusetts*

Egypt Livestock Team

George Haynes, *Agricultural Management and Economic Consulting Inc.*

Richard J. McConnen, *Montana State University*

A Nepalese seed grower and a government advisor show the high quality maize seed being produced for local farmers.



HONDURAS

An IADS program officer was invited by the Overseas Education Fund to present a 1-week course in Honduras on swine ration formulations. The course was part of a USAID-funded swine production project that is training 150 rural women in northern Honduras and provides credit to them. Participants in the course included technical staff of the fund, the Fundacion Horizontes de Amistad, the Instituto Nacional Agrario, and interested swine producers.

INDONESIA

With rice production in 1984 at a record 25.5 million metric tons, Indonesia is now meeting its consumption needs and storage of reserves has become a problem. Production and exports of commodities such as rubber, coffee, palm oil, tea, shrimp, and fresh fish have also increased substantially.

National research during the fourth 5-year development plan, 1984-1989, is emphasizing commodities that can accelerate economic growth. Until now the country's economic performance and growth has depended largely on oil and rice. The petroleum industry has earned about 70 percent of Indonesia's foreign exchange and provides 65 percent of the government's tax revenues. As world oil prices have fallen in the last 3 years, expanding rice production has employed more than half the labor force, and the agricultural sector as a whole accounts for 25 percent of the gross domestic product. Strengthened research programs have been a large contributor to the success in agriculture.

National Agricultural Research

IADS provides technical assistance and training support to Indonesia under the National Agricultural Research project (NAR-II) through the Agency for Agricultural Research Development (AARD).

Several organizational changes in AARD took place during 1984. The most notable was the retirement of Director General Sadikin, S.W., who led AARD since it was established in 1974. Dr. Gunawan Satari, professor of agron-

IADS services to Indonesia

National agricultural research

Objectives: The services provided to the Agency for Agricultural Research and Development (AARD) by IADS during Phase II of the National Agricultural Research contract include technical assistance and administration of overseas training for AARD staff. Technical assistance involves a set of priority research activities concerned with agricultural economics, estate and industrial crops, vegetables and fruits, forestry, fisheries, and support for transmigration. Also, IADS assists in strengthening research management, information services, civil works, and the institutional framework. Under Phase I, completed in 1982, IADS provided AARD with technical assistance and services to improve national production-oriented programs of research on rubber, vegetables, and agricultural economics. IADS also helped with overseas and in-country training.

Magnitude: The Phase I contract at a cost of US\$5.0 million provided 39 person-years of specialist services from February 1977 through July 1982. The estimated cost of the Phase II contract is \$13.5 million in foreign currency and \$1.7 million in local currency. The contract is for 5 years effective August 1982 and provides for 58 person-years of long-term specialists and consultants, training of 70 persons at the Ph.D. level and 50 persons at the M.S. level, and provides nondegree training for 75 persons.

Basis: Contract between the Republic of Indonesia and IADS

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

William Young, *project specialist.*

Research in Sumatra

Objective: To help the Sukarami Research Institute for Food Crops develop nine research stations and strengthen

continued

omy from Pajajaran University and former dean of the faculty of fisheries at Bogor Agricultural University, was appointed to the post. Under Mr. Sadikin's leadership, AARD grew from 200 professional scientists in 1976 to 1500 now, plus a support staff of 5000. The scientific staff includes 100 Ph.D.'s and 300 master's degree holders. In addition 500 scientists are currently studying for graduate degrees in Indonesia and abroad.

During 1984, in addition to regular research activities, emphasis has been placed on the planning, management, and evaluation of the research programs. A series of comprehensive research reviews was initiated by the AARD secretariat with the assistance of ISNAR (International Service for National Agricultural Research). Three reviews were completed, on horticultural crops, palawija crops (maize, legumes, and tuber crops), and fisheries. The review teams included specialists from abroad and Indonesia, arranged through IADS and the Bogor Agricultural University Research Foundation, the collaborating consulting agency, as well as key staff of the institutes reviewed. Reports prepared by the teams will guide research activity for the next several years. Three other research programs will be reviewed in 1985, and three in 1986. Then the cycle will be repeated.

The year end marked the completion of half the 60 months of scheduled cooperative AARD-IADS training and technical assistance activity under NAR-II. Progress toward the fulfillment of project targets proceeded ahead of schedule in the overseas training program. In short-term training, three-fourths of the targeted 150 person-months of training was completed. In the long-term degree training program, 48 candidates for master's degrees had been sent abroad of the total target of 50. Three have finished and returned home, three are continuing as Ph.D. candidates, and the rest are still working on their degrees. In the Ph.D. program 55 candidates of the projected 70 are now abroad. In addition, of the 33 Ph.D. candidates who were carried forward from the NAR-I program, 22 have now received degrees, 10 are still engaged in studies, and one has returned without receiving a doctoral degree.

The English for Agricultural Training classes were con-

tinued for selected AARD staff before their departure for overseas degree training.

In technical assistance, 29 short-term consultancies to AARD were arranged during 1984. Of these, 11 specialists from Indonesia and abroad were involved in the research reviews, and 18 foreign specialists participated in research activities at AARD institutes and in agency development work within the project implementation unit.

New long-term specialists who joined during the year were K.C. Chong as resource economist in fisheries; P.G.W. Mundy, as junior specialist in research communication; C.P. Topper as cotton entomologist; and C.P.A. Bennett as coconut pathologist.

Sumatra Project

Indonesia's strategy for development has several components including a continued redistribution of labor from the overpopulated islands such as Java to other islands, especially Sumatra, and a movement to a more diversified food crop base to reduce dependence on rice. However, the goal of expanding food production in upland areas where soil nutrient deficiencies, elemental toxicities, and pest infestations severely affect yields, poses a formidable challenge to the Indonesia agricultural scientist.

The Sumatra Agricultural Research Project, designed primarily to tackle these problems, is supported by USAID and executed through a contract between the Indonesian government and IADS for technical assistance and training. It aims to develop the Sukarami Research Institute for Food Crops (SARIF) and its network of experiment stations. SARIF focuses on upland crops and farming systems.

Experiment station development. The new headquarters offices, laboratories, and guest house complex of Sukarami were completed and occupied during 1984. Housing and service center facilities were also completed at the sub-institute of Sitiung (in the central peneplains) and at the Pasar Miring experiment station (North Sumatra).

With the arrival of two large foreign orders of equipment totalling about \$1.3 million (including tractors, electri-

IADS services to Indonesia

continued

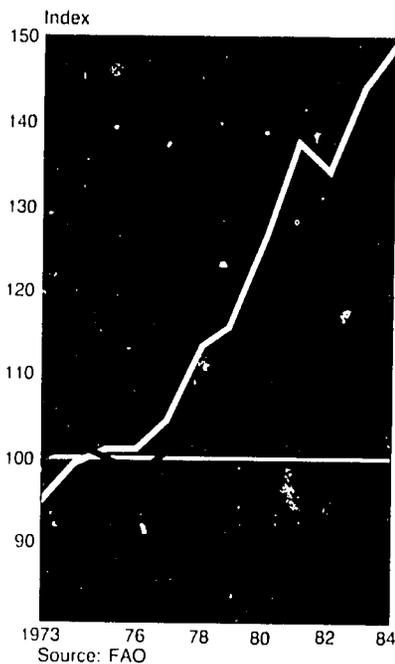
research in important food-crop production zones of Sumatra. Also IADS administers training of Indonesian scientists.

Magnitude: A US\$2.98 million contract, as amended in 1984, provides 25.5 person-years of professional assistance from October 1979 through April 1986 and 29 person-months of consultant services. Fellowships for study in Indonesia and abroad plus nondegree training and conferences will cost an additional \$0.5 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.

Pierre P. Antoine, *project specialist*



cal generators, seed storage, and laboratory equipment), SARIF is now in a position to implement research activities in the field and in the laboratory without being forced to depend on other institutions for equipment and analytical work.

Two project consultants and the resident specialists established a detailed roster of the personnel and an inventory of SARIF's equipment and spare parts on the computer. They also reviewed the final equipment needs of the project and submitted them for tendering.

Training. During 1984, three members of the SARIF staff obtained Ph.D. degrees at the University of the Philippines at Los Banos (one in plant breeding, one in plant physiology, and one in agronomy) and resumed their professional duties at SARIF. Four other staff members obtained master's degrees, and two of them were admitted to doctoral programs abroad. In addition, six SARIF staff members were sent to IRRI, Philippines for short-term training in farming systems research, production and breeding of upland rice, integrated pest management, and one to the U.S. for training in agricultural research management. Another group of 10 attended in-country seminars on office administration and research training.

In-service training of SARIF counterpart staff continued to be carried out by IADS resident specialists and consultants. A special effort was placed on the computer training in the use and application of word processing, inventory systems, and basic statistical programs.

Staff changes. Three expatriate specialists completed their assignments at SARIF during 1984: K.O. Rachie, project specialist, D.H. Perry, agricultural economist, and J.D. Traywick, farm development specialist. P.P. Antoine assumed the duties of project specialist.

Research. SARIF made substantial progress during 1984, both in terms of the development of a strategy for the future and the implementation of research programs. A long-range program to the 1990's was prepared, with the emphasis being placed on defining the national and regional

mandates, future strategies, institutional development and research activities, including on upland cropping systems, upland and high-elevation rice, and other food crops (mostly maize, root crops, and legumes).

Over 250 experiments were conducted at SARIF stations during 1984 and many significant advances were made. Considerable interest was aroused among officials and farmers by the good yields that certain varieties of rice, cassava, sweet potato, and yam produced on peat soils. No-tillage practices appeared to be conducive to better crop yields than traditional deep tillage methods on these soils.

Another research advance was the identification of a promising upland rice, Sitiung I, which gave better yields than Sentani under a variety of soil conditions. This new line is scheduled to be officially released in 1985.

Six cold-tolerant lines of rice which appear to perform better at high elevation than the already successful variety Batang Agam were selected. These lines are now in advanced yield trials in six locations.

Important agro-economic studies on maize in Sumatra and on problems of farmers in transmigration areas were completed.

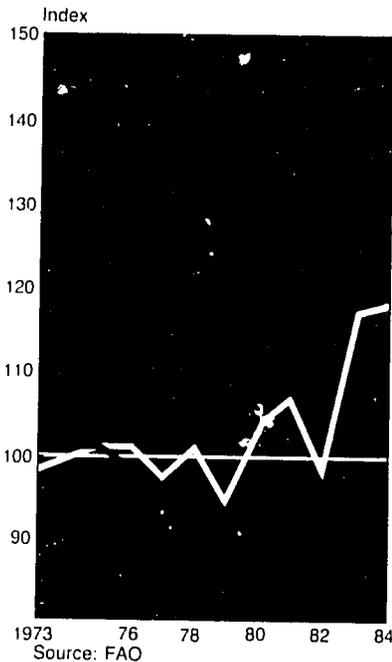
Although further research must be done on rust disease of soybean and blast disease of rice, SARIF was able to establish a relationship between rate of incidence of the diseases and time of planting.

Experiments on the effect of insecticides on the control of the seedling fly affecting upland rice led to useful recommendations for the farmers.

Studies of soil variability in the central peneplains demonstrated that experimental design of field research must adapt to the high heterogeneity and special conditions that prevail in the red-yellow podzolic soils of the area.

Experiments conducted in upland conditions suggested that liming at 1.5 t/ha increases rice, maize, and soybean yields significantly. Beyond that level, crop response is much less obvious.

Several new projects on cropping systems, land management practices, varietal testing of rice and other food crops, seed technology and weed control were also designed or started during 1984. However, it appears that



SARIF must now give high research priority to the control of blast disease in upland rice and to upland farming systems that integrate annual food crops, tree crops, and livestock.

MOROCCO

A team sponsored by ISNAR spent 3 months in Morocco helping develop a masterplan for INRA, the national agricultural research agency. An IADS program officer participated and helped analyze the constraints in the agricultural research system and evaluate the needs of INRA.

NEPAL

Integrated Cereals Project

The integrated cereals project of the Nepal's Department of Agriculture provides a means for proving new varieties and techniques under farmers' conditions, for training extension workers in new methods, and for spreading new practices and better varieties among farmers.

Major crops. Khumaltar 3 (K-39) rice continues to receive good acceptance from farmers in the hills. Because it matures 3 to 4 weeks earlier than local varieties it is popular with farmers who double crop rice or follow a rice-wheat-maize cropping pattern. Several other experimental lines look promising in trials at cropping systems sites. In wheat, Sidhartha and NL297 stood out in trials in the Terai (the plains). The maize varieties Manakamana 1 and Manakamana 2, white- and yellow-grained versions of the same variety, performed well in the hills.

Minor crops. At a nonirrigated site in the Terai, the introduction of a crop of chickpeas or chickpeas plus mustard has given good results. The chickpeas are planted after the rice harvest and farmers' yields averaged 1.2 tons/ha.

Farmers at a few sites who have been planting mungbean before rice in the last several years suffered a setback for the first time when early monsoon rains caused pod rot and lowered yields.

A meeting of village farmers in Nepal.



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\$8.1 million for work to be completed by May 31, 1985. IADS will provide up to 54 person-years of specialists (in residence, and as consultants). The training component includes approximately 45 person-years of advanced degree training, and 50 person-years of other training.

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

Funds: USAID grant to Nepal.

Carl N. Hittle, *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 ending August 1985 at a total cost of US\$2.6 million. It provides for 9 person-years of specialist (resident and short-term) services. Other services include training and procurement of equipment. Ten Nepalese will receive training at the master's degree level and 20 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.

Sharanjit S. Bal, *project supervisor*

Hill food production

Objectives: To provide technical assistance needed to implement the hill food

continued

Attempts are being made to find ways to give some research attention to such crops as soybeans, finger millet, cowpea, and fodder crops. A Peace Corps volunteer is working with ICP in full-time research on finger millet.

Livestock. Plans for crop-livestock research are being made. A social scientist from the Franco-Nepal program has been assigned to work in this area.

Pilot production programs. Pilot production programs are preliminary to full-fledged production campaigns in areas near cropping systems research sites. The approach of pilot production programs has changed as experience has been gained since the first ones were launched in 1980. Each program is organized by a production team consisting of a production officer (college graduate) and two technicians plus assistants. They receive training on a continuing basis from the cropping systems program staff, as well as periodic visits from the staff to assess progress and help solve problems.

At the start, the production team meets with farmers and local leaders to delineate a block of fields to be placed under the pilot production program. The block may range from 5 to 100 hectares. Recommendations to farmers who cultivate fields in the block are made on a cropping pattern basis. The production team provides information to farmers in the block throughout the year. Since seeds of new varieties are often in short supply in the hills, some farmers are selected for special training in multiplying, processing, and storing crop seeds. They then serve as a source of seeds for other farmers in the vicinity.

Production programs. A full-scale wheat production program was conducted in five districts of the Terai in 1983/84. It involved 15,000 farmers and covered 17,000 hectares. Yields averaged 2.5 to 3.5 tons/ha compared with the national average of 1.2 tons/ha. The production program demonstrated that large numbers of farmers are willing to accept new farming practices and can raise their yields substantially, and that with proper management, extension workers can effectively operate large production campaigns.

Shortage of fertilizer and low wheat prices hamper the spread of production programs. When fertilizer is unavailable, extension workers leading the production campaign lose credibility. Consequently, the expansion of production programs must be linked with expanded availability of fertilizer. Wheat prices, too, have disappointed participants in the production program. Prices were depressed by the size of the wheat harvest in Nepal in 1984, by the good crop in India, and by grain brought into Nepal from other countries as food aid.

Verification trials. Pre-production verification trials are the first step in the extension of improved cropping patterns from the cropping systems sites to farming areas. They are an essential precursor to production programs. They serve both to test alternative improved patterns and to familiarize local production workers and farmers with the new technology. Pre-production verification trials are being conducted by 11 agencies in 20 districts in cooperation with the cropping systems program. These trials involve 14 cropping patterns. In all verification trials, the average grain yield of rice-wheat-fallow, to take one pattern as an example, was 7.0 tons/ha with recommended technology and 5.4 tons/ha with farmers' practices.

Female extension workers. A broad survey of farm women and extension workers was made to gather information on the spread of agricultural information among women. The majority of the women interviewed were married, illiterate, and not practicing family planning. They were more likely to send sons to school than daughters. Most had not considered that they needed extension information and have rarely been contacted. Their preference for receiving information would be informal groups organized by a female extension agent who is educated, from the local area, and respectable in terms of age and marital status.

Staff. Inocencio C. Bolo, production agronomist, transferred from the Integrated Cereals Project to the IADS rainfed agriculture project in the Philippines.

IADS services to Nepal *continued*

production project, which will improve agricultural extension and on-farm research, livestock development, input supply services, and infrastructure in four districts in the Hill region. The project is supported by the World Bank through an International Development Association credit to Nepal. UNDP has provided a grant for consultants' services.

Magnitude: Estimated contract costs are US\$586,000 including local currency costs. Between December 1981 and October 1984, IADS provided periodic services by foreign and local consultants, totalling up to 94.5 man-months.

Basis: Contract between World Bank and IADS.

Funds: UNDP grant, with World Bank as the executing agency.

M. K. Qamar, *extension communication specialist*

Agricultural extension and research

Objective: To provide technical assistance to the agricultural extension and research project. The project is designed to strengthen extension services and upgrade applied and adaptive research in 11 districts in the Terai (plains). The project is supported by the World Bank through an International Development Association credit to Nepal. UNDP has provided a grant for consultants' services.

Magnitude: Estimated contract costs are US\$370,000 in foreign currency and \$80,000 local currency. For work between December 1981 and June 1985, IADS will provide on a periodic basis, up to 35 man-months of consultants.

Basis: Contract between World Bank and IADS.

Funds: UNDP grant, with World Bank as the executing agency.

M. K. Qamar, *extension communication specialist*

Seed project

Expanded production of maize, rice, and wheat, the main foodcrops in the hills of Nepal, is hampered by the slow adoption of superior crop varieties, which is a result of the difficulty of moving seed of the new varieties from the plains into rugged mountain terrain. To improve hill farmers' access to good seed, the seed project, started in 1980, promotes decentralized seed production and supply. At widely dispersed sites within the mid-hills, locally produced seed is becoming available to farmers. Henceforth, only a small quantities of foundation seed need be carried into the hills, where it can be increased 20- to 30-fold in a single multiplication.

Mini-seedhouses. Twenty "mini-seedhouses" have been established and, at suitable places, small storehouses have also been built to hold supplies of fertilizer and pesticides. The sites were selected from detailed information assembled in baseline surveys and socio-economic investigations.

Within an area, the seedhouse is a focal point for implementing seed production plans with the participation of surrounding farmers. The seedhouse is a small building divided into sections. In one section is small, hand-operated equipment for cleaning, grading, treating, bagging, labeling, and weighing seed. In the other section, space is available for safety storing 40 tons of seed for 6 to 8 months. Two rooms above the seed store are used for office and supplies. Within the compound fence is a concrete platform for sun-drying high-moisture seeds. A trained junior technician, with help from the seed division of Agriculture Inputs Corporation (AIC), is responsible for operating a seedhouse. Volunteers from the Peace Corps also lend a helping hand as trainers and motivators and they work with the small farmers to grow seed of good quality.

The mini-seedhouse system is aiding in the introduction of superior new varieties. The area under seed multiplication is increasing in accordance with the demand for seed. On the average, each site is producing 15 to 20 tons of high quality seed. All seed is packed in small bags (5 and 10 kg)

At mini-seed houses being constructed in remote areas of Nepal, locally produced seed of improved varieties is cleaned, processed, and stored until the next planting season.



and treated with disease-preventing chemicals. Part of the seed is retained by the seed growers and the rest collected by AIC for supply to other farmers. The Department of Agriculture helps in determining seed quality through laboratory tests for purity and germination. Over 1000 farmers have learned the technique of producing seed and are participating as seed growers. Their well-managed fields, apart from producing seed, serve as demonstrations of improved practices for neighboring farmers.

At some sites the first-generation hand-operated seed cleaner has proved too small for the quantity of seed produced. So, an alternative had to be identified. After trial and error, a lightweight, motorized seed cleaner run by a 2.5 KVA portable genset has been introduced. The genset operates on kerosene, which is usually available even in remote areas. Eventually, other sites will be similarly equipped.

Women's seed enterprise. In Nepal's hilly region, selection and preservation of seed customarily is done by women. With project support, a group of farm women have launched a private seed enterprise in the Rapti zone. They have designated one of the group to run a seed program in the area. The group plans not only to produce, but also market seed without direct intervention by AIC. A successful operation of the kind is likely to pave the way for greater participation by other women.

Training. Eleven officials of AIC and the Department of Agriculture have completed master's degrees abroad. Sixty others have participated in non-academic training and observation tours in other countries. Under in-country training, 275 officials and 1,200 farmers have attended a variety of courses. In addition, at each of the 20 sites, one-day refresher sessions are arranged for seed growers prior to each crop season.

A course on seed storage and quality control for 31 officials from both the public and private sector was held during the year. Three specialists brought to Nepal from Mississippi State University and Kansas State University under the USAID contract conducted the 2-week session.

Miscellaneous. During the year, P.N. Rana left AIC to become secretary of agriculture. His successor is K.B. Rajbhandary, formerly joint secretary in the Ministry of Agriculture.

Agricultural extension and research project

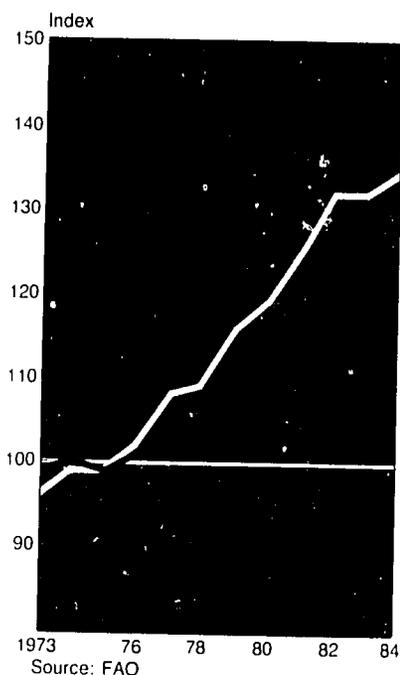
The aim of the Agricultural Extension and Research Project is to bring agricultural extension into a meaningful operational relationship with research agencies. The project, financed by the World Bank and UNDP, is in its fourth year and covers eight districts of the terai (the plains region of Nepal).

The project follows the training and visit system of extension. The extension agents receive fortnightly training at sub-centers by subject-matter specialists and pass on technical recommendations to the farming community through scheduled visits with contact farmers. Research and extension staff collaborate for effective programming through regular bi-monthly meetings and semi-annual workshops. In addition, researchers and extension subject-matter specialists jointly conduct trials on farmers' fields.

One resident specialist and several short-term consultants have been provided to the project by IADS. Short-term consultancies were in the areas of agricultural extension, communication and training, farm development, and research management. The IADS resident specialist has prepared a number of extension and training materials including useful simple manuals on conducting training, supervision, and meetings to foster coordination between research stations and field extension staff. Several Nepalis have been sent for short-term training to the Philippines, U.S.A., India, and Indonesia.

Hill food production project.

Four districts of western Nepal are covered by the hill food production project. The project, now in its third year, employs a modified version of the training and visit system of extension and covers components of crop production, irrigation, and livestock. Subject-matter specialists conduct



monthly training of extension agents who then train field workers. These workers transfer technology by making scheduled visits to contact farmers.

IADS has provided services of expatriate consultants in the areas of agronomy, irrigation engineering, and extension. The IADS extension communication specialist based at the headquarters of Agricultural Extension and Research Project devotes a third of his time to this project. National consultants in the fields of extension, monitoring and evaluation, and agronomy have also been provided by IADS. The technical assistance has resulted in organization of in-service training courses, production of extension and training materials, and a monitoring and evaluation plan to keep track of the project's progress. Two subject-matter specialists were sent to the Philippines for short-term training.

PAKISTAN

Pakistan, a nation where agriculture provides a third of the gross domestic product and supports half of the labor force, has benefited from technological change on its farms. Self-sufficiency has been reached for staple crops like wheat, rice, sugar, and cotton. In some years, there is a small surplus of cereal crops for export, although the value of exports is exceeded by the cost of oilseed imports.

The current 5-year plan envisages that the agricultural economy will move from self-sufficiency to export. To do so in a country whose population is increasing at 3 percent per year demands that agricultural production double within two decades. The increase must be accomplished despite a land resource impaired by salinization, deforestation, soil erosion, and desertification. Nevertheless, the Indus Basin, one of the world's greatest agricultural areas, is still only marginally developed. In addition to the 20 million hectares of cropland, perhaps 12 million hectares of wasteland could be brought under cultivation by improved water management, additional water storage, and introduction of modern farming systems technology. Moreover, considerable potential exists to increase basic crop yields, livestock performance, and fish resource productivity.

Pakistan Agricultural Research Council. Research is considered to be the single most important input to meet the nation's requirements of various agricultural commodities and to transform agriculture from self-sufficiency to export.

Research at both the federal and provincial levels in Pakistan is conducted at institutes with sub-stations and at the agricultural universities. Variety testing and some agro-economic commodity research are their main activities. A few adaptive research stations have also been established recently to support "training and visit" extension projects. Unfortunately vast numbers of farmers are little served by the present research network. Even the emergence of four provincial multi-disciplinary institutes have been, in the main, poorly organized to support the large agriculture sector. Minimal coordination of institute activities has meant virtually unplanned use of scarce national resources.

Since becoming autonomous in 1981, the Pakistan Agricultural Research Council has led efforts to strengthen national agricultural research. PARC provides substantial assistance to provincial institutes and universities through coordinated research programs, contract research, commodity procurement, and training.

National Agricultural Research Center. After 3 years of development the National Agriculture Research Center in Islamabad was inaugurated by President Zia-ul-Haq in 1984. NARC has well equipped laboratories, a reference library, computerized data base, training institute, and technical facilities, situated on a 500-hectare experimental area. NARC is primarily undertaking research on problems of national importance and in areas where provincial research is weak.

Technical assistance provided by IADS has accelerated the development of NARC. The IADS representative has assisted NARC leaders in planning multi-disciplinary research around coordinated programs, and various long-term as well as short-term projects. The research focus is on both mission-oriented studies and on high-risk basic research. With its modern facilities and advanced equipment, NARC has an opportunity to provide support to critical provincial institutions.

A significant development has been the formation of a

IADS services to Pakistan

Objectives: To help the Pakistan Agricultural Research Council strengthen the institutional capability of the National Agricultural Research Center (NARC) in policy formation, program planning, implementation, and evaluation, and program management. IADS provides an advisor to the director-general of the NARC.

Magnitude: The 2-year assignment became effective February 1983; the estimated cost of the contract is \$286,000 in foreign currency and \$80,000 in local currency.

Basis: Contract between USAID and IADS.

Murray D. Dawson, *advisor*

IADS services to Philippines

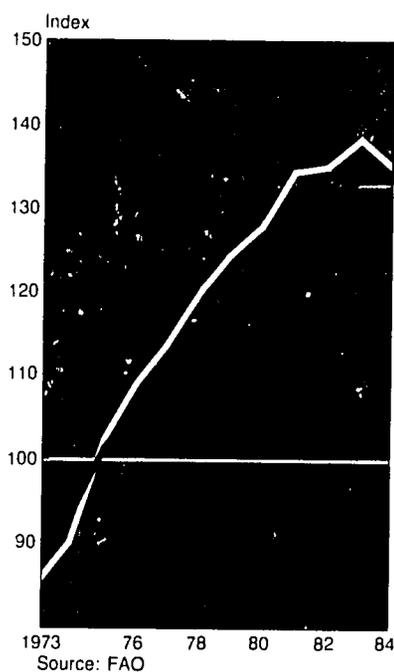
Objectives: To assist the Ministry of Agriculture and other participating organizations in implementing a farming systems approach to research and extension activities within the Bicol region on a pilot basis.

Magnitude: A contract with the government of the Republic of the Philippines amounting to \$611,888 calls for a long-term specialist for 30 months and up to 30 months of short-term technical assistance over a 3-year period beginning September 1984.

Basis: A contract between the Republic of the Philippines and IADS.

Funds: USAID grant to the Philippines.

Inocencio C. Bolo, *farming systems specialist*



well integrated cropping/livestock system at NARC with assistance from the farm machinery institute. Coordination of the various projects at NARC that are supported by various donor agencies constitute an important activity of the IADS representative.

Linkages with international centers such as CIMMYT, ICARDA, IRRI, and ICRISAT has enabled NARC to exchange germplasm, test improved technology and benefit from the training of Pakistani scientists. The IADS advisor has assisted in strengthening country's research system through promoting seminars, workshops and exchange of both scientists and material.

* * *

IADS gives technical assistance to two World Bank/UNDP projects. For the Sind Agricultural Extension and Adaptive Research Project, IADS can be called on to provide 12 months of consultant support in project organization, management, and implementation. For the Punjab Extension and Agricultural Development Project, IADS gives technical assistance in developing soil and water conservation technology and cropping recommendations appropriate to the ecological conditions of the rainfed agriculture in the Jhelum District.

In 1984, one month of consultant services was provided in agricultural extension and two months in agricultural research.

PHILIPPINES

In 1984 the Philippines Ministry of Agriculture awarded IADS the Bicol farming systems component of the USAID-supported Rainfed Resources Project. IADS has assigned Inocencio Bolo as the advisor for the Bicol work. Mr. Bolo transferred to the Philippines from the Integrated Cereals Project in Nepal.

The work in Bicol, a region of southern Luzon, will involve several local agencies in farming systems trials. To work with the researchers, farmer cooperators are being selected in six areas that represent the diverse farming conditions found in the Bicol region.

The broad aim of the Rainfed Resources Project is to develop policies and improve institutions to support a community-based approach to land and water management in especially poor areas such as newly settled forests, nonirrigated areas, and coastal zones.

In addition to providing a long-term advisor, IADS will provide a broad range of specialists as short-term consultants.

PORTUGAL

For the U.S. Department of Agriculture, a livestock specialist on the staff of IADS took part in a team that evaluated the progress of an agricultural production project in Portugal.

Among the recommendations were that farming systems studies be incorporated into the work of the project. The team also recommended that emphasis be given to strengthening regional production and extension systems, that regional production teams be developed composed of production and extension specialists, and that a full-time production agronomist be added.

ZAMBIA

The Ministry of Agriculture and Water Development of Zambia asked IADS to help in preparing a detailed strategic framework and investment program for agricultural research and extension. The work involved 11 short-term expatriate specialists in the field for 6 months in 1984. This team was led by an IADS program officer. In collaboration with Zambian officials, the IADS team prepared three reports, "Strategy for Agricultural Research," "Strategy for Agricultural Extension," and "Investment Program: Agricultural Research and Extension," which will form the basis for detailed discussions between the Zambian government, the World Bank, and other external donors.

Zambia Research and Extension Review Team

Leon E. Hesser, *IADS*

Kenneth O. Rachie, *IADS*

Robert Etheredge, *private consultant*

George E. Hull, *private consultant*

John M. Fenley, *private consultant*

Eloise Murray, *Pennsylvania State
University*

Jose Allaro, *Allaro and Associates*

Loy V. Crowder, *Reckefeller Foundation*

K. N. Singh, *Agricultural Finance*

Corporation

Robert S. Temple, *private consultant*

Alfred Krezdorn, *University of California*

LEADERSHIP DEVELOPMENT

Fellowships

The fellowships administered by IADS expanded by a third in 1984. Under contracts with national agencies in Nepal, Bangladesh, and Indonesia, IADS managed the fellowships of 150 individuals attending 48 institutions in 8 countries.

During 1984 Indonesian students sponsored by the Indonesian Agency for Agricultural Research and Development were visited by Mr. Buahoyo Sukotjo, project implementation director for the National Agricultural Research Project. In the U.S. he was accompanied by IADS staff members and met with 47 fellows who assembled at one of three universities—Minnesota, Michigan State, or North Carolina State. He also travelled to the Philippines where he met with 14 students whose fellowships are administered by IADS and the United Kingdom where he met with 4.

Visitation of fellows by IADS program officers continued in 1984, improving relationships between IADS staff, the fellows, and their academic advisors.

Professional register

Nearly 500 names were added to the IADS register of professionals during 1984. The register is a computer database of individuals with skills and experience in development work. It is used to identify qualified individuals as possible short-term or long-term consultants. It now contains biodata on over 2500 persons. Two thirds are trained in agricultural science, and more than half have doctoral degrees.

PUBLICATIONS

A book on cassava was added to the IADS development-oriented literature series in 1984. *Cassava: New Potential for a Neglected Crop* was written by James Cock, leader of CIAT's cassava program. Like other books produced by IADS for the series, it was designed to improve the quality

New highways in Sumatra make isolated areas accessible to markets and agricultural development.



Fellowships

Individuals under programs administered by IADS in 1984, their field of study, and degree pursued.

Indonesia

Univ. of Arkansas (USA)

Mansur Lande, plant breeding, Ph.D.
Sugiono Moeljopawiro, plant breeding, Ph.D.

Auburn Univ. (USA)

Iauik Ahmad, fisheries, Ph.D.
Fuad Cholik, fisheries, Ph.D.
Sweta Rabegnatar, fisheries, Ph.D.
Achmad Rukyani, fisheries, M.S.

Univ. of California, Davis (USA)

Bess Tiesnamurti, animal science, M.S.

Univ. of Southern California (USA)

Agus S. Prapadisastra, public adm., Ph.D.

Univ. of Florida (USA)

Rusi Harahap, forestry, Ph.D.
Darwinsyah Lubis, animal science, M.S.
Yoyo Tarjo-Adiwiganda, soil science, Ph.D.

Univ. of Georgia (USA)

Didiek Goenadi, agronomy, M.S.
Muhammad Herman, plant pathology, M.S.

Univ. of Hawaii (USA)

Alimin Djsbar, horticulture, M.S.

Univ. of Illinois (USA)

Darnoko, food science, M.S.
Suparyono, plant pathology, Ph.D.

Iowa State Univ. (USA)

Bahtiar Saleh Abbas, statistics, M.S.
Edi Abdurachman, statistics, Ph.D.
Budiman Hutabarat, agr. economics, Ph.D.
Marcellus Rantetana, economics, Ph.D.
Pantjar Simatupang, economics, Ph.D.
Wahyudi Sugianto, agr. economics, Ph.D.
Mohammad Anwar Wardham, agr. economics, Ph.D.

Univ. of Kentucky (USA)

Yusuf Iafarsidik, forestry, M.S.

Univ. of Maryland (USA)

Masdiar Bustaman, botany, M.S.

Michigan State Univ. (USA)

Sulaiman Effendi, food science, Ph.D.
Agus Pakpahan, forestry, Ph.D.
Boen Muchtar Purnama, forest economics, M.S.
Adhi Santika, agr. economics, Ph.D.

Univ. of Minnesota (USA)

Esther Mulyani Adhi, plant pathology, M.S.
Memed Gunawan, agr. economics, Ph.D.
Soesilowati Hadisoesilo, entomology, Ph.D.
Tri Hutomo, plant breeding, M.S.
Kosasi Kadir, forestry, M.S.
Muhammad Kosim Kardin, plant pathology, Ph.D.
Han Rohadi, forestry, Ph.D.
Achmad Sudjana, plant breeding, Ph.D.
Dwi Putra Setiawan, entomology, M.S.

Mississippi State Univ. (USA)

Mein Kaomim, entomology, M.S.
Udin Nugraha, agronomy, Ph.D.
Maharani Tatang, agronomy, Ph.D.

Univ. of Missouri (USA)

Sunendar Kartaatmadja, plant pathology, Ph.D.
Kedi Suradisastra, rural sociology, Ph.D.

Univ. of Nebraska (USA)

Ahmad Dimiyati, agronomy, M.S.

North Carolina State Univ. (USA)

Trip Alihamsyah, agr. engineering, M.S.
Nong Alwi, statistics, Ph.D.
Hariyatno Dwiprabowo, operations research, Ph.D.
Sukarsih Fatchurochim, entomology, M.S.

Budi Haryanto, animal science, M.S.
Mohammad Fatchurochim Masyhudi, crop science, Ph.D.

Akhmad Prabowo, animal science, M.S.

Hardi Prasetyo, animal science, M.S.

Imam Prasadja, entomology, M.S.
Harjosubroto Subagyo, soil science, Ph.D.

Tahlim Sudaryanto, agr. economics, Ph.D.

Achmad Suryana, agr. economics, Ph.D.

Firtoboma, agronomy, Ph.D.

Ohio State Univ. (USA)

Novianti Sunarlim, agronomy, Ph.D.

Oklahoma State Univ. (USA)

Lalang Buana, statistics, M.S.
Kaman Nainggolan, agr. economics, Ph.D.
Tjepny Soedjana, agr. economics, Ph.D.

Ato Suprpto, agr. economics, Ph.D.

Oregon State Univ. (USA)

Asril Darussamin, biochemistry, Ph.D.
Ismeth Inounu, animal science, M.S.
I. Wayan Mathius, animal science, M.S.

Yono C. Raharjo, animal science, Ph.D.

Lilik Setyobudi, entomology, Ph.D.

Sumaryono, crop science, M.S.

Univ. of Rhode Island (USA)

Jacobus Uktolseja, fisheries, M.S.

Sam Houston State Univ. (USA)

Firdhaus Kasim, agronomy, M.S.
Muhammad Jusuf Yakub, agronomy, M.S.

USDA Graduate School (USA)

Siti Paransih Isbagyo, information systems, M.S.
Agus Suryanto, information systems, M.S.

Univ. of Washington (USA)

Abdul Rachman Hanafiah, nutrition sci., M.S.

Djaban Tinambunan, forestry, Ph.D.

Johanes Widodo, fisheries, M.S.

Univ. of Wisconsin (USA)

Ridwan Dereinda, extension, Ph.D.
Adi Widjono, agr. journalism, M.S.

Univ. of Adelaide (Australia)

Djiman Sitepu, plant pathology, Ph.D.

Univ. of Western Australia (Australia)

I. Gede Putu, animal science, Ph.D.

Univ. of New England (Australia)

Djoko Santoso, soil science, Ph.D.

- James Cook Univ.* (Australia)
Tri Budhi Murdiati, toxicology, Ph.D.
- State Univ. of Ghent* (Belgium)
Zulkarnain Poeloengan, land evaluation, Ph.D.
Rachmat Adiwiganda, agronomy, M.S.
- Univ. of Waterloo* (Canada)
Achmad Sarnita, biology, M.S.
- Kyoto Univ.* (Japan)
Fathan Muhadjir, tropical agr., Ph.D.
- NACA SEAIDFC* (Philippines)
Amin Ismail, aquaculture, M.S.
Supriyono Eko Wardoyo, aquaculture, M.S.
- Univ. of the Philippines at Los Baños*
Abdulgan, agronomy, M.S.
Made Oka Adnyana, agr. economics, Ph.D.
Rasidin Azwar, agronomy, Ph.D.
Adi Hanafi, soil science, M.S.
Nusyirwan Hasan, entomology, Ph.D.
Zainal Lamid, agronomy, Ph.D.
Abdul Rasyid Marzuki, agronomy, M.S.
Henny Mavrowani, economics, M.S.
Imam Muhadjir, horticulture, Ph.D.
Amsir Rifin, agronomy, Ph.D.
Argono Setioko, animal science, Ph.D.
Doah Dekok Tarigans, horticulture, Ph.D.
Roosmani Tirtosoekotjo, horticulture, Ph.D.
Soedibyo Tirtosoekotjo, horticulture, Ph.D.
Zulkifli Zaini, botany, Ph.D.
- Univ. of the Philippines at Quezon City*
Tjuk Eko Basuki, statistics, Ph.D.
Surya Mansjur, library science, M.S.
- Asian Institute of Technology* (Thailand)
Sahat Pasaribu, rural sociology, M.S.
- Univ. of Aston at Birmingham* (UK)
Eddy Amir, chemistry tech, M.S.
Ridha Arizal, chemistry tech, M.S.
Suharto Honggokusumo, chemistry, Ph.D.
- Humberside College* (UK)
Suparno, food technology, Ph.D.
- Kingston Polytechnic* (UK)
Hariyadi Mangunwiryo, life science, Ph.D.
- London School of Polymer Technology* (UK)
Rusdan Dalimunthe, polymer science, M.S.
Oerip Siswanto, polymer science, Ph.D.
- Univ. College of North Wales* (UK)
Achmad Fauzi Mas'ud, forestry, Ph.D.
- Univ. of Stirling* (UK)
Santosa Koesoemadinata, aquaculture, M.S.
- Bangladesh**
Univ. of California, Fresno (USA)
Shahabuddin Khan, agronomy, M.S.
- Colorado State Univ.* (USA)
A.J.M. Siragul Karim, agronomy, M.S.
Chowdhury Khan, water mgt., Ph.D.
Parvin Sultana, pest mgt., M.S.
- Cornell Univ.* (USA)
Harun-or-Rashid, research mgt., MPS
Ratiqui Islam Mondal, agronomy, M.S.
- Univ. of Florida* (USA)
Md. Abdul Q. Parvez, agronomy, Ph.D.
- Univ. of Hawaii* (USA)
Monomahan Biswas, horticulture, M.S.
- Louisiana State Univ.* (USA)
Lukmanur Rahman Bhuiyan, agronomy, Ph.D.
- North Dakota State Univ.* (USA)
Kazi Murtaza Kabir, plant breeding, Ph.D.
- Purdue Univ.* (USA)
Mufakkkharul Islam, economics, Ph.D.
- USDA Graduate School* (USA)
Quadir Mahmud, project management, M.S.
- Central Luzon State Univ.* (Philippines)
Liakat Ali, plant breeding, M.S.
Nazrul Islam, entomology, M.S.
Md. Nozrul Islam, agr. economics, M.S.
Rafiqul Islam, agr. economics, M.S.
Abdul Aziz Palwhan, agr. extension, M.S.
Azizur Rahman, agronomy, M.S.
Subjal Uddin, agronomy, M.S.
- Univ. of the Philippines at Los Baños* (Philippines)
Joyal Abedin, agr. economics, M.S.
- Quazi Misbahul Alam, agr. economics, M.S.
Habibur Rahman Chowdhury, agr. engineering, M.S.
Ashraf Khan, plant pathology, M.S.
Mustafizur Rahman Khan, agronomy, M.S.
Syed Salehuddin Kibria, animal science, M.S.
Muslem Uddin Miah, soil science, Ph.D.
Abdur Razzaque, agronomy, Ph.D.
- Asian Institute of Technology* (Thailand)
Wais Kabir, soil mgt., M.S.
Md. Balur Rahman Khan, agr. engineering, M.S.
Nazim Uddin, water management, diploma
- Nepal**
Univ. of California, Davis (USA)
Ram Narayan Sah, soil science, M.S.
- Univ. of California, Riverside* (USA)
Rajendra P. Singh, agribusiness, M.B.A.
- Iowa State Univ.* (USA)
Maheswar Prasad Bharati, agronomy, Ph.D.
- Kansas State Univ.* (USA)
Madhusudan P. Upadhyay, agronomy, Ph.D.
Kishnor Sherchand, agronomy, Ph.D.
- Mississippi State Univ.* (USA)
Rajeshwori Basnyat, seed tech., M.A.
Ramesh K. Mishra, seed tech., M.A.
- North Dakota State Univ.* (USA)
Matuje Lal Jayaswal, agronomy, M.S.
- Gregorio Araneta Univ. Foundation* (Philippines)
B.R. Shakya, agronomy, M.S.
R.R. Sharma, agr. engineering, M.S.
C.B. Shrestha, agronomy, M.S.
K.K. Shrestha, weed control, M.S.
M.N. Shrestha, agronomy, M.S.
S.K. Shrestha, agr. engineering, M.S.
- Univ. of the Philippines at Los Baños*
Nabin K. Rajbhandari, agronomy, M.S.
S.L. Shrestha, cropping systems, M.S.
Basnet B.M. Singh, agronomy, M.S.

of information that development planners and leaders use to make decisions.

This is the first comprehensive work on cassava, one of the major foods of the tropics. The book examines the crop and its uses, assesses the latest production and processing technology, and outlines the critical features of successful development programs involving cassava. Case histories of cassava development programs in India, Colombia, Cuba, and Thailand are also given. *Cassava* includes appendices on estimating production cost, and sources of technical assistance as well as a bibliography and index. The book can be purchased from Westview Press, Boulder, Colorado.

Two publications were produced for the U.S. Agency for International Development. For the AID mission in Nepal, IADS wrote and published *Through Farmers' Eyes*. This publication describes and illustrates how farming systems research is being conducted in Nepal. Because of Nepal's difficult terrain and the complex interaction of cropping patterns and labor use, the research system can serve as a model for problem-solving in other areas. The publication was issued in English in 1984 and distributed by AID. A Nepali edition is in press.

Science and Rice in Indonesia was prepared by IADS as the first book in a new AID series on science and technology. It was written by William B. Ward of Cornell University. Prof. Ward has a long association with Indonesian scientists through consulting assignments with IADS and other organizations. The book explores the elements involved in reducing what were once the world's largest annual rice imports to near zero. Central to that transformation were the development of a strong research system, favorable economic and political decisions, and complementary technical assistance. The book will be published in 1985 by OGC&H Publishers, Boston.

Most books in the IADS development-oriented literature series have been published in Spanish. Spanish translations now under way are *Cassava* at CIAT, *Wheat in the Third World* at CIMMYT, and *Rice in the Tropics* and *Small Farm Development* at IICA. During 1984, the Brazilian extension agency EMBRAPA published a Portuguese edition of *Understanding Small Farmers and Scientists* by Robert Chambers

which originally was published in the IADS occasional paper series.

For IRRI, an IADS program officer helped prepare a book which will be published on the occasion of IRRI's 25th anniversary in 1985.

LIAISON

IADS participated in a meeting in Washington, which was organized by the Swiss Development Cooperation agency and ILCA to discuss seed production in Africa. Other participants included representatives of CIAT, CIMMYT, ICRISAT, and IITA.

There was general agreement that the production of high quality seed is a key factor in the acceleration of agricultural development in most African countries. Training was seen as a primary requirement for improving seed production, and existing international or regional research centers were suggested as logical locations for mounting programs in seed technology.

The participants asked IADS to prepare a background paper on the subject which would be used in a workshop to develop specific measures and recommendations for strengthening the capacity of African countries to produce and use improved seeds. The workshop would be attended by representatives of the seed industry in Africa, international and regional agricultural research institutions, donor organizations, and others. IADS is seeking support for the preparation of the background paper and workshop.



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Administrative Developments

U.S.-based staff

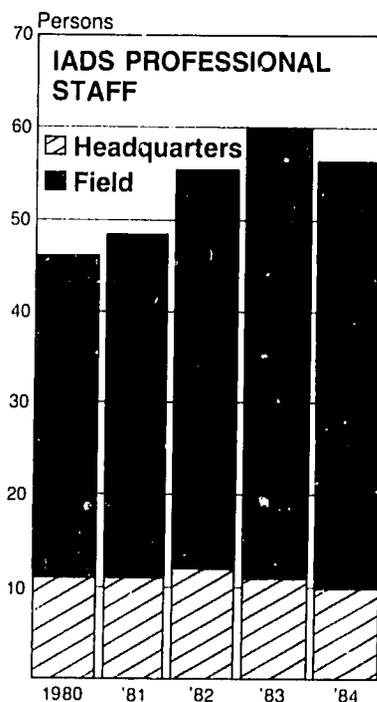
During the year, **Skipwith C. Calvert**, administrative officer, and the comptroller, **Stephen M. Katz**, left IADS. Mr. Katz' position was filled on an acting basis by the chief accountant, **Gary L. Howe**.

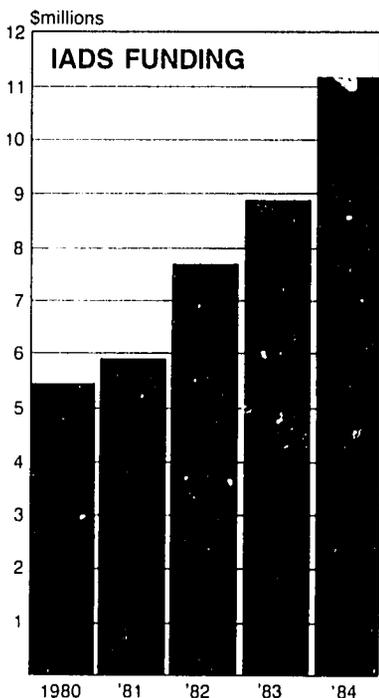
Field staff

In Bangladesh, **Edward C. Rosentel, II**, took the post of administration specialist. He is a certified public accountant who has worked in private industry. As a Peace Corps volunteer he was a technical advisor to credit unions in the Cameroon. **Travis R. Everett** joined the project as entomologist. He is a plant protection specialist with experience in the Philippines and India. The position of water management specialist was assumed by **Rogelio Lazaro**. He was formerly with the National Irrigation Administration, Philippines.

In the national agriculture research project in Indonesia, **C.P.A. Bennett** was appointed coconut pathologist. He had previously worked in coffee pathology in Honduras for the U.K. Overseas Development Administration. **Kee-Chai Chong** became the specialist in aquaculture economics. He had been a senior research fellow at the International Center for Living Aquatic Resources Management in the Philippines. The post of cotton entomologist was filled by **Clive Topper**. He has worked on cotton in Egypt and Sudan for the U.K. Overseas Development Administration.

(facing) Cacao pods.





In the Sumatra project, **Pierre Antoine** took the position of project advisor. He had been a program officer in the IADS headquarters.

Inocencio Bolo was appointed farming systems specialist in the Philippines' Bicol farming systems project. He had held the position of IADS production agronomist in the Integrated Cereals Project in Nepal.

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.

In any project that may be undertaken, 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 will be fully self-supporting but with no excess charges.

Funding

During 1984, the major sources of IADS funds were the following:

Contracts and service arrangements

Bangladesh Agricultural Research Council	\$5,366,000
Agency for Agricultural Research and Development (Indonesia)	2,887,000
Department of Agriculture (Nepal)	645,000
World Bank/UNDP	624,000
Central Research Institute for Food Crops (Indonesia)	574,000
Agricultural Inputs Corporation (Nepal)	443,000
Government of Egypt	106,000
National Agricultural Research Center (Pakistan)	105,000
U.S. Agency for International Development	87,000
<i>Other</i>	
Interest income	170,000

Financial Statements

ARTHUR YOUNG

1025 Connecticut Avenue, N.W.
Washington, D.C. 20036

The Board of Trustees
International Agricultural Development Service, Inc.

We have examined the accompanying consolidated balance sheet of International Agricultural Development Service, Inc. at December 31, 1984 and 1983 and the related consolidated 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 5, International Agricultural Development Service, Inc. has material transactions with the Rockefeller Foundation.

In our opinion, the statements mentioned above present fairly the consolidated financial position of International Agricultural Development Service, Inc. at December 31, 1984 and 1983 and the consolidated 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.

Our examination was made for the purpose of forming an opinion on the consolidated financial statements taken as a whole. The consolidating information is presented for purposes of additional analysis of the consolidated financial statements rather than to present the financial position, results of operations, and changes in financial position of the individual companies. The consolidating information has been subjected to the auditing procedures applied in the examination of the consolidated financial statements and, in our opinion, is fairly stated in all material respects in relation to the consolidated financial statements taken as a whole.

Arthur Young & Company

March 28, 1985

CONSOLIDATED BALANCE SHEET

December 31, 1984 and 1983

ASSETS	1984	1983
Current assets:		
Cash and short-term investments (Note 3)	\$ 1,823,925	\$ 1,789,449
Accounts receivable including unbilled of \$1,430,000 in 1984 and \$949,000 in 1983	1,754,241	1,341,473
Advances	397,773	350,811
Other	<u>512</u>	<u>—</u>
Total current assets	3,976,451	3,481,733
Office furniture and equipment less accumulated depreciation of \$70,767 in 1984 and \$42,504 in 1983	<u>171,741</u>	<u>154,478</u>
	<u>\$ 4,148,192</u>	<u>\$ 3,636,211</u>
LIABILITIES AND FUND BALANCE		
Current liabilities:		
Accounts payable	\$ 455,927	\$ 337,845
Contract advances	1,541,971	1,322,929
Deferred grant support (Note 5)	<u>1,132,602</u>	<u>1,160,141</u>
Total current liabilities	<u>3,130,500</u>	<u>2,820,915</u>
Commitment and contingency (Note 7)		
Fund balance:		
Designated (Note 2)	845,951	660,818
Undesignated	<u>171,741</u>	<u>154,478</u>
Total fund balance	<u>1,017,692</u>	<u>815,296</u>
	<u>\$ 4,148,192</u>	<u>\$ 3,636,211</u>

See accompanying notes.

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

Years ended December 31, 1984 and 1983

	1984	1983
Support and revenue:		
Contracts and service arrangements	\$ 10,936,436	\$ 9,158,896
Grants (Note 5)	27,539	15,382
Investment income	170,167	105,484
Other	723	927
Total support and revenue	11,134,865	9,280,689
Expenses:		
Contracts and service arrangements	9,325,590	7,667,386
Non-contract programs and projects:		
Service to individual countries	26,319	25,679
Development-oriented literature	39,806	10,703
	66,125	36,382
Program support:		
Leadership development	22,096	55,448
Liaison and interchange	27,318	56,656
Country programs	495,689	512,323
Communication	89,303	136,978
	634,406	761,405
General administration	906,348	707,910
Total expenses	10,932,469	9,173,083
Excess of support and revenue over expenses	202,396	107,606
Fund balance at beginning of year	815,296	707,690
Fund balance at end of year	\$ 1,017,692	\$ 815,296

See accompanying notes.

CONSOLIDATED STATEMENT OF CHANGES IN FINANCIAL POSITION

Years ended December 31, 1984 and 1983

	1984	1983
Source:		
Operations:		
Excess of support and revenue over expenses	\$ 202,396	\$ 107,606
Charge not involving the use of cash during the period:		
Depreciation	<u>28,263</u>	<u>19,462</u>
Cash provided by operations	230,659	127,068
Decrease in accounts receivable	—	17,682
Increase in accounts payable	118,082	4,150
Increase in deferred grant support	—	643,471
Increase in contract advances	<u>219,042</u>	<u>—</u>
	<u>567,783</u>	<u>792,371</u>
Application:		
Increase in accounts receivable	412,768	—
Increase in advances	46,962	91,839
Decrease in contract advances	—	37,018
Purchase of office furniture and equipment	45,526	108,551
Increase in other current assets	512	—
Decrease in deferred grant support	<u>27,539</u>	<u>—</u>
	<u>533,307</u>	<u>237,408</u>
Increase in cash and short-term investments	34,476	554,963
Cash and short-term investments, beginning of year	<u>1,789,449</u>	<u>1,234,486</u>
Cash and short-term investments, end of year	<u>\$ 1,823,925</u>	<u>\$ 1,789,449</u>

See accompanying notes.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

December 31, 1984 and 1983

1. Organization

International Agricultural Development Service, Inc. (IADS) was incorporated as a not-for-profit organization in 1975. In 1982 IADS Operations, Inc. (IOI), a wholly-owned, for-profit corporation, was established. Both organizations provide services, primarily in the form of technical assistance, in agriculture. Services are provided on a contractual basis and generally involve locations outside of the United States.

2. Summary of accounting policies

Consolidation—The consolidated financial statements include the accounts of IADS and IOI. All significant inter-company accounts and transactions have been eliminated.

Contract revenue and advances—All contracts provide for reimbursement of costs incurred up to specific limits and include provision for overhead expenses or management fees. Revenue is recognized as related expenses are incurred. 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. Certain contracts require the maintenance of separate bank accounts for advance funds not immediately required for operations. Funds on deposit in these interest-bearing accounts totaled \$34,995 at December 31, 1984 and \$215,000 at December 31, 1983.

Recognition of grant support—Grant awards to IADS 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.

Designated fund balance—The Board of Trustees of IADS has designated a portion of fund balance to meet temporary cash flow needs and possible future obligations.

Office equipment and furniture—Office equipment and furniture are depreciated on the straight-line basis over an estimated useful life ranging from 5 to 10 years.

3. Cash and short-term investments

The balance of cash and short-term investments at December 31, 1984 includes \$900,000 of monies invested in certificates of deposit with maturities of up to 1 month (\$1,200,000 at December 31, 1983). Such investments are recorded at cost, which approximates market.

During 1984 an agreement was entered into with a bank whereby all funds in excess of a base amount are invested on an overnight basis in a money market fund.

4. Tax status

IADS is exempt from U.S. federal income tax under Section 501(c)(3) of the Internal Revenue Code.

IOI uses the cash basis of accounting for tax reporting purposes and on that basis has a \$9000 operating loss carryforward through 1984. For financial reporting purposes on the accrual basis, IOI has a \$227,000 operating loss carryforward through 1984.

5. Grant support

During 1983, IADS was awarded grants amounting to \$678,000 (none in 1984) by the Rockefeller Foundation for program and administrative expenses. Cumulative deferred support of \$1,160,141 from 1983 was available for use in 1984. Of these grant funds, \$27,539 was spent in 1984 leaving a balance of \$1,132,602 unexpended at December 31, 1984. The Rockefeller Foundation has authorized the use of this amount in 1985 and, accordingly, it is recorded as deferred support in the balance sheet.

The Rockefeller Foundation provides certain services, primarily personnel, and makes disbursements on behalf of IADS. The Foundation charged IADS \$201,811 in 1984 and \$307,432 in 1983 for these services and expenses. The amount payable to the Rockefeller Foundation at December 31, 1983 was \$11,317 (none in 1984).

6. Pension

IADS contributes from 6 to 20% of all full-time permanent employees' base salaries to a defined contribution pension plan. Upon termination, death or retirement, employees are entitled to the current value of the contributions in their account. Pension expense was \$369,556 in 1984 and \$317,398 in 1983.

7. Commitment and contingency

IADS leases office space under an operating lease. Rent expense for 1984 was \$170,557 (\$124,000 in 1983). Minimum rental payments under the lease are as follows: \$196,000 from 1985 through 1988 and \$65,000 in 1989 (\$849,000 in the aggregate).

Costs under U.S. government contracts and grants are subject to audit by the appropriate U.S. government agency. Management believes that cost disallowances, if any, arising from audits of costs charged to government contracts and grants through December 31, 1984 would not have a material effect on the financial position of IADS.

8. Subsequent events

Effective July 1, 1985 IADS intends to merge with Winrock International Livestock Research and Training Center, an Arkansas based not-for-profit organization and the Agricultural Development Council, a New York Based not-for-profit organization. The surviving corporation shall be Winrock International Institute for Agricultural Development.

CONSOLIDATING INFORMATION

CONSOLIDATING BALANCE SHEET

December 31, 1984

ASSETS	Consolidated	Consolidation Adjustments	IADS	IADS Operations Inc.
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Current assets:				
Cash and short-term investments	\$ 1,823,925	\$ —	\$ 1,822,670	\$ 1,255
Accounts receivable	1,754,241	(213,434) ^(A)	1,967,619	56
Advances	397,773	—	397,773	—
Other	512	—	—	512
Total current assets	<u>3,976,451</u>	<u>(213,434)</u>	<u>4,188,062</u>	<u>1,823</u>
Office equipment and furniture				
less accumulated depreciation	171,741	—	171,741	—
Investment in subsidiary	—	216,830 ^(A)	(216,830)	—
	<u>\$ 4,148,192</u>	<u>\$ 3,396</u>	<u>\$ 4,142,973</u>	<u>\$ 1,823</u>
LIABILITIES AND EQUITY				
Current liabilities:				
Accounts payable	\$ 455,927	\$ (213,434) ^(A)	\$ 451,549	\$ 217,812
Contract advances	1,541,971	—	1,541,130	841
Deferred grant support	1,132,602	—	1,132,602	—
Total current liabilities	<u>3,130,500</u>	<u>(213,434)</u>	<u>3,125,281</u>	<u>218,653</u>
Equity:				
Fund balance:				
Designated	845,951	—	845,951	—
Undesignated	171,741	—	171,741	—
Capital stock \$1 par value, 1,000 shares authorized, 100 issued and outstanding	—	(100) ^(A)	—	100
Capital in excess of par value	—	(9,900) ^(A)	—	9,900
Deficit	—	226,830 ^(A)	—	(226,830)
Total equity	<u>1,017,692</u>	<u>216,830</u>	<u>1,017,692</u>	<u>(216,830)</u>
	<u>\$ 4,148,192</u>	<u>\$ 3,396</u>	<u>\$ 4,142,973</u>	<u>\$ 1,823</u>

^(A) Elimination of intercompany investment, receivables and payables.

CONSOLIDATING INFORMATION

CONSOLIDATING STATEMENT OF SUPPORT AND REVENUE EXPENSES, AND CHANGES IN FUND BALANCE (DEFICIT)

December 31, 1984

	Consolidated	Consolidation Adjustments	IADS	IADS Operations Inc.
Support and revenue:				
Contracts and service arrangements	\$10,936,436	\$ (50,354) ^Y	\$10,964,599	\$ 22,191
Grants	27,539		27,539	—
Investment income	170,167		170,167	—
Other	723	—	723	—
Total support and revenue	<u>11,134,865</u>	<u>(50,354)</u>	<u>11,163,028</u>	<u>22,191</u>
Expenses:				
Contracts and service arrangements	9,325,590	(8,435) ^Y	9,308,027	25,998
Non-contract programs and projects:				
Service to individual countries	26,319	—	26,319	—
Development-oriented literature	39,806	—	39,806	—
	<u>66,125</u>	<u>—</u>	<u>66,125</u>	<u>—</u>
Program support:				
Leadership development	22,096	—	22,096	—
Liaison and interchange	27,318	—	27,318	—
Country programs	495,689	(40,001) ^Y	494,650	41,040
Communication	89,303	—	89,303	—
	<u>634,406</u>	<u>(40,001)</u>	<u>633,367</u>	<u>41,040</u>
General administration	906,348	(1,918) ^Y	906,434	1,832
Total expenses	<u>10,932,469</u>	<u>(50,354)</u>	<u>10,913,953</u>	<u>68,870</u>
Excess of support and revenue over expenses (expenses over support and revenue) before equity in net loss of consolidated subsidiary	202,396	—	249,075	(46,679)
Equity in net loss of consolidated subsidiary	<u>—</u>	<u>46,679^{Yb}</u>	<u>(46,679)</u>	<u>—</u>
Excess of support and revenue over expenses (expenses over support and revenue)	202,396	46,679	202,396	(46,679)
Fund balance (deficit) at beginning of year	815,296	180,151 ^{Yb}	815,296	(180,151)
Fund balance (deficit) at end of year	<u>\$ 1,017,692</u>	<u>\$ 226,830</u>	<u>\$ 1,017,692</u>	<u>\$ (226,830)</u>

^YElimination of intercompany revenue and expense.

^{Yb}Elimination of equity in net loss of consolidated subsidiary.

Rice harvesters in Indonesia.



