U.S. PROGRAMS IN SUPPORT OF AGRICULTURAL RESEARCH IN THE DEVELOPING COUNTRIES

United States foreign assistance programs have for many years emphasized agricultural research. The importance of the subject has in fact been recognized in Federal legislation. The United States Congress directed the President, in presenting his proposals for foreign assistance in the fiscal year 1969, to "include recommendations for improving and establishing agricultural research and training facilities in tropical and sub-tropical regions of Lation America, Africa, and Asia."

The Agency for International Development, though it defines and finances the various projects undertaken in furtherance of these objectives, itself carries out only a small part of the work. The Agency normally employs the substantial resources of the Department of Agriculture, and other agencies of the Federal Government, several score universities, and institutions of the private sector to operate these programs. Where there is a lack of trained personnel or institutional competence in the United States to perform specific research of priority importance, the Agency sometimes finances a program to create this competence in an appropriate institution.

In the mid 'fifties, United States assistance to agriculture in the developing countries began to concentrate on the broad, long-range problem of strengthening the institutions which serve the agricultural sector. It became clear that little would be accomplished by strengthening agricultural research and training institutions if the resources created in these institutions were not effectively used by ministries of agriculture, and of education, and planning commissions. It also became clear that improved research and training capabilities in the developing country universities could contribute little to development unless progress was also made with such problems as credit, marketing, land tenure and pricing policies. These considerations have shaped the United States program of research in support of agriculture in the developing countries. This program is briefly summarized below.

1. The building of institutional competence in the developing countries. Two major types of assistance fall under this heading:

a) The creation of strengthening of agricultural universities in the developing countries. Programs directed toward this objective were strongly influenced by the American experience with the land-grant universities, which made an important contribution to agricultural development in the United States. A major effort, extending over more than fifteen years in some areas, has been made to help create in the developing countries similar institutions with integrated programs of training, research and extension. The United States has spent approximately $100 million supporting programs directed toward this objective. About 40 U.S. universities have been engaged to provide assistance

to some 80 major research and educational institutions in 44 developing countries. The programs have varied in scope, duration and achievement: some of the most successful have lasted over fifteen years and have assisted the indigenous institution achieve research capability of a high order. The Indian universities of Uttar Pradesh and the Punjab, which together received nearly $10 million of United States assistance over a fifteen year period, can be cited as examples of successful efforts at institution building.

b) Helping to create or reorganize research institutions. Typically, the U.S. contribution in this area is to cooperate with representatives of the developing country in making a joint survey of existing facilities, programs, personnel, etc., and to recommend measures designed to obtain maximum results from available resources. Such joint surveys have been made in India, Pakistan, Malaysia and Indonesia. The Agency recently launched its most ambitious project in this area: a grant to the National Academy of Sciences to study the research resources and requirements of Africa, with a view to recommending an integrated plan to meet the needs of the entire continent in the most efficient and economic manner.

2. Training: Over the years, training has been provided in the United States to more than 5,000 agriculturalists of the developing countries, many at the post-graduate level. The U.S. program of building agricultural Universities in the developing countries has been based in large part on the conviction that the developing countries must ultimately assume responsibility for training their own agricultural scientists but it is recognized that the developed countries will have to continue to provide post graduate training for some time. The United States policy is committed to providing this training on an expanded scale and, moreover, is attempting to make it more relevant to the needs of students from the developing countries. An effort is now under way to develop a pilot curriculum and appropriate course material to meet the needs of students from the developing countries. AID intends to provide support to institutions which develop such material and offer the revised curriculum.

3. Technical Advisors: Generally speaking, the direct involvement of the United States in the research programs of developing countries has been limited, although we have had research scientists working in and with their agricultural research institutions. However, during the massive campaigns to introduce and disseminate the high-yielding varieties of wheat and rice in 1967-68-69, AID personnel made an important contribution to the adaptive research efforts of many countries, assisting with testing programs to select the best of the imported seeds and to modify new plant types to local climates, diseases, and tastes.

The green revolution brought not only the promise of relief from hunger, but the creation of new social and economic problems. The emergence of these new problems emphasized the need for a broader range of research, and revealed the lack of adequately trained personnel in the developing countries, particularly of agricultural economists, to study socio-economic problems. In recognition of the increasing need of the developing countries for highly trained

personnel to help with such studies, AID has developed a new arrangement for "talent sharing" with four American universities distinguished in agricultural economics, under which members of their faculty will serve with AID on a rotating basis. Of the total of ten professional agricultural economists at any one time provided for under these arrangements, half are expected to serve at headquarters in Washington, and half in the field. These same arrangements also expand the pool of similar personnel on which we can draw for short-term assignments.

4. United States research on behalf of the developing countries: Individual AID country programs frequently include projects with a significant research component, as, for example, assistance provided to adapt the new cereal varieties to individual country requirements. Generally speaking, projects of this type are ad hoc responses to specific local needs.

There is also a broad program of centrally funded research which reflects the Agency's conception of priority problems of general concern to a number of developing countries. This program was initiated in 1961, and has since been pursued with a measure of consistency; it is beginning to produce some significant results. Some 27 research projects in agriculture, costing $4,637,000 are now being financed by AID and conducted by agencies of the United States Government, and American Universities. These projects range from the highly specific, such as "laboratory and field testing of a newly developed foot and mouth disease vaccine" to the broadly general, such as "the impact of new agricultural technology on rural employment and income."

To simplify presentation, this central research program is discussed under two headings: field programs, and U.S.-based programs. In reality, the division is rather arbitrary, since those projects classified as field studies are directed in some measure from headquarters in the United States institution, while those classified as U.S.-based involve some field work, or, at a minimum, the use of material gathered in the developing countries. Nevertheless, a legitimate distinction can be made between those programs which operate mainly in the developing countries, and those conducted primarily in the United States.

a) Field Programs: The United States conducts numerous projects that are exclusively research in character, or that have an important research component. A few examples will illustrate the nature and range of these projects. The Agricultural Research Service of the Department of Agriculture has administered successful programs of hybrid corn and sorghum in East and West Africa, involving plant breeding, adaptive research, and production assistance, and has done research on legumes in India and Iran. AID has financed projects as diverse as the development of simple equipment for rice production (by the International Rice Research Institute in the Philippines) and the control of vertebrate pests (by the Bureau of Sport Fisheries and Wild Life, Department of the Interior in the Philippines /rats/, Mexico /bats/ and the Sudan /birds/). American Universities, under AID contract

have done research on seed production, soils analysis, water management and weed control in a number of Latin American countries. They are also studying a range of important policy problems, such as the effect of agricultural commodity prices on economic development in India, Pakistan and Thailand.

b) U.S.-based projects and programs: Of the 27 centrally-funded agricultural research projects now in progress, only about a fourth are based in the United States. About half of these deal with broad sectoral problems, such as agricultural sector planning models (by Michigan State University), analysis of demand prospects for agricultural exports, and analysis of factors associated with differences and changes in agricultural production (both by the Economic Research Service of the Department of Agriculture.)

There are two important plant breeding programs aimed at increasing the protein quality of wheat (University of Nebraska) and sorghum (Purdue University.) Both of these universities have established cooperative arrangements with a number of experiment stations in various parts of the world, and their work has taken on some of the aspects of the international institutes.

For example, with funds provided by AID, Purdue has involved in a single project most if not all of the major sorghum breeding stations in the developing countries --15 major centers and 103 nursery centers in 53 countries. The activities are jointly planned by Purdue and developing country personnel. A complete bank of sorghum germ plasm is maintained at Purdue, as is a constantly expanding number of varieties classified for nutritional values, local adaptabilities, a yield under varying conditions, etc. New varieties are being developed to optimize all the major values significant to the developing countries. Purdue has been quite successful in improving both the yield and quality of sorghum vulgare, and its products have been distributed, tested, and adapted in many of the developing countries, where they are now in production. The success of this program suggests that the international research network might be significantly strengthened by a more deliberate effort to build on existing centers of excellence in the developed countries linking them with field stations in the same way that CIMMYT is linked with such stations in its nursery program for spring wheat.

Some of the basic research work performed by American Universities has served to undergird the production-oriented research of the international institutes. For example, the work on improving the protein quality of wheat by the University of Nebraska is contributing to CIMMYT's wheat program; and Purdue's development of Opaque 2 provided the base for the CIMMYT program on high protein corn now financed by UNDP. These important reinforcements of the international network have been largely the result of coincidence. These chance successes suggest that a planned program of cooperation between the international institutes and research institutes in the developed countries (perhaps financed by the national agency for foreign assistance) might yield even more substantial benefits.

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