

Chapter IV

GROWING NATIONS AND A WORLD WITHOUT HUNGER

International Agricultural Development Service Progress Report

International Agricultural Development Service Organizational
Chart

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UNITED STATES DEPARTMENT OF AGRICULTURE
INTERNATIONAL AGRICULTURAL DEVELOPMENT SERVICE
WASHINGTON, D.C. 20250

AUG 5 1968

MEMORANDUM

TO: The Secretary
FROM: Les Brown
SUBJECT: Progress Report

Lester R. Brown

As Lyle and I complete our first full fiscal year in IADS, we find it useful to reflect on accomplishments to date and provide a brief summary for your information. Below we discuss our objectives, the resources at our disposal and specific accomplishments and problems by area of activity.

I. Objectives

The objectives of IADS are to (1) increase the rate of growth in agricultural output in the developing countries, (2) to improve nutrition, and consequently the quality of human resources and, in so doing, to (3) accelerate the overall rate of economic progress in these countries.

II. Resources

The principal resources at our disposal to attain the above objectives are two-fold: professional competence existing within the Department and the leverage represented by \$1.5 billion worth of PL 480 commodities. Other resources we use but which are less directly at our disposal include AID loans and grants and the U. S. agribusiness community.

III. Accomplishments by Areas of Activity

A. Self-Help

The first meaningful self-help agreement was negotiated in Rome in November of 1965 between you and Minister Subramaniam. Not only was this the first agreement, it was also the most significant. We had a great deal of leverage at this time with India because the prospective quantities of grain were quite large and needs were urgent.

The idea of converting a resource, the annual outflow of U. S. commodities valued at about \$1.5 billion per year, from a possible disincentive to agricultural progress as it was in many instances, into a source of leverage for bringing about essential agricultural policy changes and shifts in resource allocation, has been an important factor contributing to the recent surge in agricultural production in the major less developed countries of Asia.

We have brought about many changes with food aid leverage; year to year increases in agricultural budgets ranging from 10 percent in some countries to as much as 50 percent in others have been obtained; minimum price levels for farm products have been established, shifting food price policy from being solely consumer oriented to being largely producer oriented; the private sector has been opened up for investment by agribusiness firms; and distribution of agricultural inputs has been shifted from government organizations to the private sector.

In terms of effective payoff, this is by far the most important activity. Sound technological advice is often ignored but when backed by the kind of leverage which PL 480 affords, it can be very effective.

One of the principal problems at the moment is that the excessive stock of commodities available for PL 480 use has caused us to lose much of our leverage, both in our initial negotiations with AID as to what self-help commitments we will seek, and then later in actual negotiations with the host country. Since we cannot always accurately balance supply and demand, given the vagaries of weather, we can only hope to solve this type of problem by reserves legislation which would permit the isolation of sizable stocks from the market. This would also eliminate the risk of excessive scarcity as was the case two or three years ago.

B. Program Review

Each year the AID Missions submit a program for the forthcoming fiscal year to Washington for review. These reviews, given considerable prominence by AID, are often chaired by Bill Gaud himself. Either Lyle or I usually participate in each of the reviews, accompanied by agency representatives as issues and space dictate.

USDA participation in these program reviews is becoming increasingly meaningful. As a result of our supplying agricultural review teams and short term technical consultants to aid-receiving countries we are rapidly accumulating a body of expertise for a large number of countries. We are developing for each of the major countries a small group of specialists similar to the informal group of India specialists we have had the past few years.

Prior to the review at AID, USDA interagency meetings are called by IADS to consider various agricultural policy and program questions including USDA inputs such as PL 480 and technical assistance. FAS, ERS and PEPS participate regularly in these discussions; other agencies participate according to their involvement and expertise in any particular country.

We do not always modify program submissions to the extent we would like, but we do influence top level AID thinking. It gives us an opportunity to press for action in areas we consider important and to acquaint senior AID officials with agricultural issues and problems, both in worldwide and country terms, which they otherwise would not be exposed to.

C. PASA's

During the 18 months in which Lyle and I have been in IADS, we have shifted the emphasis on PASA's toward policy formulation and program development. There are two ways in which we have achieved this. One is to actually develop a PASA within the AID Mission for a policy planning group. An example of this would be Ed Farstad's small but very successful group in Vietnam. It was Ed and his group who drafted the rice program for Vietnam.

We also have a senior economist at the AID Mission in India who functions in much the same fashion. Another way of achieving the same objective is to establish a USDA policy-planning group within the Ministry of Agriculture of the host country. These groups then provide leadership in formulating agricultural policy and developing agricultural plans and programs. USDA policy-planning groups within the Ministries of Agriculture in Colombia and Kenya are examples of this approach. This enables us to achieve maximum effect on policy formulation and resource allocation with a very modest input of manpower.

Another major shift which has occurred in our development of PASA programs is the trend toward concentrating on a few priority activities rather than attempting to deal with a wide range of activities, spreading our resources so thin as not to be able to measure accomplishments. A USDA PASA team to Afghanistan, which included Bill Carlson and Vern McNinny, recommended that Afghanistan concentrate its resources over a large number of crops. By concentrating on a small number of priority objectives it is possible to show substantial results often within a very short period of time. This has the advantage of being quite visible and is psychologically much more satisfying both to our people working toward the agreed upon objectives and to the host country.

The number of full time PASA personnel has increased sharply over the past two years going from a total of 161 at the end of FY 1966 to 279 at the end of FY 1968, an increase of 73 percent. Interestingly, these gains occurred in spite of the DALPA exercise, reduced overall AID budgets and recent sharp reductions in Vietnam because of the Tet offensive and in Nigeria because of the civil war. The number of short term consultants provided during FY 1968 was also up significantly from the preceding years.

Among some of the more significant accomplishments by our PASA people are the completion of a soils inventory of the interior of Brazil which will permit a much more rational development of the Brazilian interior; a functioning market news service in Brazil; a pulse research project located in both India and Iran which, though only 4 years old, has already begun to generate high yielding varieties; a corn breeding program in East Africa which produced some high yielding hybrids, enabling Kenya to become self-sufficient in corn, and a rice program in Vietnam which promises self-sufficiency within the next few years.

Some of our short term consultant work has also been strategically important to a number of countries. One of the most recent was a short term consultant to East Africa to analyze the desert locust threat and recommend action to prevent widespread damage; others include a soil and water team in Pakistan working on problems of soil erosion and silting of Pakistan's large irrigation facilities in response to President Ayub's personal request to President Johnson for assistance; and a consultant to Thailand to assist with grain marketing problems and advise on the feasibility of a proposed commodity futures market for Thailand.

We believe the PASA concept is a sound one. Where USDA is concerned it enables us to mobilize a vast variety and array of Department expertise, bringing them to bear on particular problems. Once in the field, our men receive technical backstopping from their respective agencies in Washington in the form of advice, short visits by agency specialists to deal with particular problems and published materials. We also believe that it is to everyone's advantage to integrate USDA and AID operations in the field. We are, after all, part of the same team, and if closely integrated, we can be much more effective. Our operations are now wholly integrated in two of the large countries in which we are involved, Vietnam and India, and to a lesser but increasing degree in most other countries.

D. Training

Of all our activities, the return on our training activities, in reality an investment in human capital, is the most difficult to measure. Cumulatively, the number of foreign agriculturists trained in the United States under both AID and UN funded programs is becoming quite impressive -- some 40,000 since the Foreign Training Division was organized during the early 1950's.

During the past year or two we have worked to improve the quality of our training, attempting to make the training experience here more relevant to the problems faced in the developing countries. We have made a particular effort to acquaint agriculturists here with the major issues of agricultural development and to provide some specific training in administration.

The sizable concentration of agriculturists whose training was planned by our Foreign Training Division is becoming quite evident in the upper echelons of the Ministries of Agriculture in several developing countries. Because the participants selected and sent to this country for training are usually already established in an official capacity and because their training is job-related, the percent lost to the "brain drain" is really very small, possibly the smallest of any program under which nationals of the developing countries are trained in the United States. We have a particular advantage over many other training programs, particularly those which provide only for obtaining degrees. Academic training at land grant universities continues to be the backbone of our training program but

we also rely heavily on Department agencies and private industry. We obtain an impressive amount of free training from farm organizations, trade groups, cooperatives and agribusiness corporations. This reflects both an effective public relations program on our part and a genuine desire on the part of many organizations and corporations in this country to assist developing countries.

Perhaps the adequacy of the training being provided in the agricultural area is best evidenced by the agricultural revolution in Asia today. It is quite evident that most of the major countries of Asia do have the trained leadership needed to generate an agricultural takeoff.

We are also beginning to develop some in-country training with our PASA personnel. A current example is a 90-day course in Organization and Management of Cooperatives given to some 25 co-op officers and leaders in Sao Paulo, Brazil. This is considered so successful that we plan to repeat this course this fall in one of the regions of the country, most likely the Northeast.

E. Agribusiness

The principal form of assistance which we provide to the agribusiness community interested in investing overseas is advice and information of both a technological and economic nature. We are in effect consultants to the agribusiness community on investment prospects ranging from high protein foods in El Salvador to fertilizer plants in Thailand.

We have met with representatives of at least 300 agribusiness firms during the past two years including both those firms which produce and distribute farm inputs and those which process and distribute farm products. With some of the larger, more involved firms such as Monsanto, Ralston Purina, Esso Chemical and Corn Products we maintain a continuing dialogue.

In large measure the function we undertake is an advisory and educational one. We attempt to reach decision makers in agribusiness firms through direct contact and consultation, through conferences and seminars, and through the publications media.

We have participated actively in the major agribusiness conferences held within the past two years. These include those sponsored by the Heinz group in New York, which resulted in the 50-firm Agribusiness Council now headed by George Nehren, and the Chicago Board of Trade agribusiness conference. We have organized seminars, some dealing with agribusiness investment in the developing countries on a very general basis such as the one which IADS and the Harvard Business School jointly sponsored and which was attended by the Secretary, Professors Galbraith, Mason and Goldberg, etc. Other seminars have been rather specific, such as the one organized when Bob Chandler was here in Washington, when we brought together top level representatives of 15 agribusiness firms to discuss with Chandler the implications of the new rice varieties for both agribusiness investment and marketing opportunities.

We have extensively used the publications media, relying heavily on economic and business publications for published articles ranging from protein fortification of cereals with amino acids to the agricultural revolution in Asia and its implications for agribusiness investment. Publications carrying articles include the Columbia Journal of World Business, Foreign Affairs, U. S. News and World Report and Chemical Engineering News.

Our educational efforts have not been limited to educating firms to the possibilities for overseas investment but have also included, quite importantly, educating government officials in developing countries to the need for private investment in the agribusiness area as a means for developing a healthy, progressive agriculture.

The lead time required to generate interest and educate people to the point where we can significantly influence investment decisions by agribusiness corporations is very substantial. There is little doubt but that we have greatly influenced thinking within these firms, resulting in a shift of their resources from the United States to overseas operations. A number of our larger agribusiness firms, such as Ralston Purina and Corn Products, now plan to have a major share of their operations outside the United States within the next few years.

One of the frustrations in this area is the balance of payments constraints on investments overseas. In some instances the problem now is not a lack of interest or lack of invest-

ment opportunity, but the inability to mobilize and transfer as much capital as some firms would like. This is particularly true of firms just beginning their overseas operations.

We have worked hard at expanding the investment in fertilizer plants, particularly in Asia, by working with individual firms. Some projections of fertilizer supply and demand show the less developed regions with surplus fertilizer capacity within the next few years. We do not accept this but do believe the prospects for rapidly expanding fertilizer use in the developing countries in the years ahead are much better because of the investments made within these countries within recent years.

F. Nutrition

Our endeavors in the field of nutrition are among our newer ones. The basic objective has been to develop an awareness of malnutrition and its social and economic costs. Having done this, we then attempt to educate government leaders in developing countries on new technologies and possibilities for dealing with malnutrition.

Efforts thus far would have to be judged highly successful. The two basic concepts, that of fortifying proteins with synthetic amino acids, and that of manufacturing high protein foods, frequently using protein supplies otherwise wasted or inefficiently used, are now widely accepted.

Our group, under Aaron Altschul's leadership, is a small but effective group. It illustrates the idea that you do not need a large number of people or a large budget to have widespread impact. Even though our resources are exceedingly limited, we are today providing leadership, not only in Washington but worldwide.

We are forcing country after country to rethink their strategies and priorities in the face of new food technologies now in being. One country has been selected in each of the major less developed regions -- Peru in Latin America, Tunisia in Africa and India in Asia -- to illustrate what can be done to reduce malnutrition given the technologies now available.

Our purpose is to get each country to develop a national nutrition strategy. We believe that adequate nutrition should be a national goal just like full employment. The

(B) upgrading of low quality proteins with the addition of synthetic amino acids and the manufacture and distribution of high protein foods can both be commercialized. We believe that the long term solution to the problem of malnutrition requires the commercialization of good nutrition.

IV. Areas of Emphasis

Earlier our primary emphasis in the agricultural development area was on providing incentive prices to farmers. Without this the prospects for generating an agricultural takeoff were nil. This effort focused on shifting price policy toward producers and developing effective price support programs for the major food crops, especially for major cereals.

With the dramatic advances now occurring in several countries in the production area, we have shifted our attention toward marketing. A failure to solve the marketing problems may offset many of the recent and prospective gains in production. Both our AID Missions and host country governments seem much more able to program resources to expand production than to improve marketing. It is much easier to make a large loan to finance fertilizer imports than it is to commit the same scope of resources to improvement of the marketing system which is much less tangible. We have thus launched a campaign, beginning to educate AID Administrators and Mission Directors on how to improve inefficient marketing systems.

cc: Under Secretary
Mrs. Jacobson
Robertson
Abel
Hjort
Altschul
Harvey
Kriesberg
Koenig
Regional Coordinators

U.S. DEPARTMENT OF AGRICULTURE
INTERNATIONAL AGRICULTURAL DEVELOPMENT SERVICE
JAN 23 1964

OFFICE OF THE ADMINISTRATOR AND DEPUTY ADMINISTRATOR

Program Administration: Administers the programs and policies of the U.S. Department of Agriculture relating to international agricultural development; provides leadership in the formulation of current and long-range programs, plans, and policies for carrying out foreign country and regional agricultural development programs and activities for which USDA is given responsibility, including training in the United States of foreign officials, leaders, scientists, technicians and other nationals in fields of agriculture, home economics and related subjects.

Program Coordination: Assures effective mobilization and coordination of the resources of USDA and private and governmental interests, and expedition of their application in the planning, review, evaluation and operation of international agricultural development programs and activities under responsibility of USDA; develops and assures maintenance of effective relationships with Agency for International Development; provides for coordination of the recruitment, assignment and orientation of USDA personnel for loan to Agency for International Development, the Food and Agriculture Organization of the United Nations and similar groups, including development of operating, functional and contractual agreements between USDA and such groups; and provides for coordination of implementation of Government-sponsored agricultural exchange programs.

Program Evaluation and Information: Provides for the evaluation and reporting of accomplishments and dissemination of information concerning these programs.

Liaison and Representation: Represents the Assistant Secretary for International Affairs and the USDA at conferences and meetings at which matters regarding these programs are discussed, including meetings, domestic and foreign, with representatives of Agency for International Development, public and private U.S. and international organizations, Land-Grant Colleges and other educational institutions, farm organizations, interested foundations, top officials and other representatives of foreign country governments, and others.

RECOMMENDED: Herold E. Fickner
Acting Administrator, International
Agricultural Development Service

APPROVED BY: Robert D. Brown
Assistant Secretary for International Affairs

DATE: JAN 27 1964

INTERNATIONAL AGRICULTURAL
DEVELOPMENT COMMITTEE

REGIONAL COORDINATOR

Latin America Area

REGIONAL COORDINATOR

Africa Area

REGIONAL COORDINATOR

Asia and Far East Area

Program Development, Implementation and Supervision: Develops and coordinates USDA participation in development of current and long-range agricultural technical assistance and development programs for the foreign area under jurisdiction; conducts analyses and assures recognition of the range and scope of agricultural development needs within assigned area, involving surveying of country or regional resources, the improvement of manpower skills, and the acquisition and acceptance of new ideas; conducts or coordinates conduct of analyses to discover new techniques of assistance and to make the aid efforts more effective; prepares overall integrated development plans by country and/or region for area under jurisdiction; and coordinates implementation and supervision of such programs in foreign areas.

Utilization of Resources: Arranges for and coordinates utilization of resources made available by agencies of USDA; and maintains effective working relationships with international organizations and institutions, Agency for International Development and other agencies of government, essential to meeting the objectives of these programs.

Orientation: Coordinates orientation of USDA personnel on detail or loan to Agency for International Development, the Food and Agriculture Organization of the United Nations and similar groups, and the development of operating, functional and contractual agreements between USDA and such groups for area programs.

Representation: Represents the Administrator, and USDA at national and international meetings where matters concerning area programs are discussed. Maintains continuous liaison in the planning and implementation of these programs with other USDA offices, Agency for International Development and other Governmental agencies, public and private national and international institutions, representatives of foreign embassies, professional and private educational and business entities in this country and abroad; and represents the Department in special negotiations and development of contractual agreements essential to conduct of such programs.

FOREIGN TRAINING DIVISION

Program Development, Implementation and Supervision: Coordinates and directs the development, implementation and supervision of training, study, consultation and observation programs in agriculture, home economics, and related subjects for foreign officials, leaders, scientists, technicians or other nationals sponsored by agencies of the United States Government, international organizations, other public or private groups, and foreign Governments; makes arrangements for technical leaders for groups, and provides services required for participants following the program.

Utilization of Resources: Arranges for and directs utilization of resources made available by agencies of the Department of Agriculture, Land-Grant Institutions, other Departments of Government, other public institutions or agencies, international and private institutions, for meeting the objectives of training in the United States of foreign nationals.

Orientation: Directs the orientation of foreign participants on the objectives and operation of their training program, and the agricultural customs, life and situations, agricultural institutions, agencies and organizations in the United States.

Analysis and Evaluation: Directs the analysis and evaluation of the training processes employed, of training program results, and the work of participants to assure maximum progress towards established objectives of the program.

Participant and Program Services: Directs maintenance of records and controls pertinent thereto and the development of preliminary budget requirements, estimates and additional fund needs; conduct of orientation and briefing programs for nationals with respect to travel, subsistence allowances, training aid and book allowances, benefits, financial, and other matters of personal concern to them; preparation of vouchers, letters of agreement, and other papers for fiscal action; and maintenance of records on program operations, and development of reports on overall program accomplishments.

Representation: Represents or provides for representation of the Administrator and Department of Agriculture at State and National meetings on matters pertaining to training programs for foreign nationals; maintains continuous liaison with USDA agencies, Agency for International Development and other governmental departments, Land-Grant Institutions, representatives of foreign embassies, professional and private educational and business entities and individuals on matters concerning the training of foreign nationals; and represents the Department in special negotiations and development of contractual agreements pertaining to such programs.

SPECIAL PROGRAMS BRANCH

ECONOMICS PROGRAMS BRANCH

EDUCATIONAL PROGRAMS BRANCH

PRODUCTION PROGRAMS BRANCH

GENERAL AGREEMENT BETWEEN THE
DEPARTMENT OF AGRICULTURE
AND THE
AGENCY FOR INTERNATIONAL DEVELOPMENT

I. Purpose

This Agreement establishes the framework for cooperative relationships between the Department of Agriculture (hereinafter referred to as the Department) and the Agency for International Development (hereinafter referred to as A.I.D.) in carrying out the provisions of Section 632(b) of the Foreign Assistance Act of 1961, as amended.

II. Underlying Premises

The building of the human and institutional resources essential to sustained national development of the less developed societies is a long-term, complex and exacting process. Effective U.S. assistance to this process requires a vigorous technical assistance program, demanding the use of the best professional skills and institutional resources available in the United States. The U.S. has a vital interest in the attitudes, skills, motivation and well-being of the people of the developing countries, and in the characteristics of the institutions they build, for these are the factors which ultimately determine the nature of their developing societies.

A.I.D. recognizes the unique personnel resources, capabilities and experience of the Department relevant to this task; it seeks through this agreement, therefore, to enlist as fully and effectively as possible, on a partnership basis, the pertinent resources of the Department in planning, executing and evaluating those portions of the foreign assistance program in which it has special competence.^{1/}

In furtherance of broad U.S. objectives, the Department recognizes its responsibility, within its authority, to contribute toward U.S. foreign policy by participation in foreign assistance programs.

III. Planning, Coordination and Consultation

Effective cooperation between A.I.D. and the Department requires adequate arrangements for joint planning, coordination and consultation. These arrangements may include, but are not limited to the following:

^{1/} These underlying premises, as expressed in AID Policy Directive 23, Mobilizing U.S. Government Resources in Support of Foreign Assistance, are stated in greater detail in A.I.D. Manual Order Series 240 issued August 27, 1964.

A. The Administrator of A.I.D. and the Secretary of Agriculture will each designate a senior officer to coordinate basic negotiations and matters of general policy under this Agreement. The Department and A.I.D. will similarly designate appropriate channels for contacts on operations within their subdivisions.

B. Joint arrangements may be made for: (1) examining country development plans, total U.S. country assistance programs and, as feasible, those of other U.S. government or U.S. private organizations, foreign government and other entities participating in economic assistance programs, relevant to the activities the Department might be requested by A.I.D. to undertake; (2) reviewing activities proposed by A.I.D. for the Department's consideration, including participation in field surveys and (3) evaluating the effectiveness of current and completed Departmental activities on behalf of A.I.D., including operating procedures.

C. In order to facilitate the Department's planning, A.I.D. will give the Department the maximum possible advance notice of projected A.I.D. requirements for services. The Department will advise A.I.D. as early as feasible as to its ability to provide these services.

D. In providing services under this Agreement the Department may use private sources with the concurrence of A.I.D.

IV. Participating Agency Service Agreements (PASAS)

Services which are rendered by the Department either in the U.S. or overseas will be governed by individual Service Agreements except as outlined in Section V.B. below and Appendix III. A Service Agreement will define the scope, location and duration of the service, the personnel requirements, costs, method of financing, and special implementation conditions not otherwise stipulated in this Agreement or required by A.I.D. regulations. Arrangements covering Service Agreements and personnel serving under such agreements are contained in Appendices I and II to this Agreement. PASA's may be signed by properly authorized officers of each agency.

V. Types of Assistance

The types of assistance which the Department agrees to provide A.I.D., upon its request, may involve but are not confined to the following:

A. Project Services

A project service can be specifically defined in terms of planned end result, estimated cost, location of implementation and duration.

A project may range from a short feasibility survey to the assumption of a world-wide service over a period of years subject to the availability of resources. It may involve the assignment or temporary detail of a group of technicians or in some instances of a single expert. In providing such a service either in the U.S. or overseas, the Department will assume operating responsibility for the project, which may involve staffing, supervising, budgeting, backstopping, procurement, inspecting, evaluation and reporting.

B. Technical Consultation Support Services

Technical consultation support services cover any service, in support of the foreign assistance program which cannot be characterized as a project or staff service and which is normally performed in the U.S. on a continuing basis. Such support services may include the furnishing of technical information and advice, backstopping of project services in the field, assistance in recruiting technical experts and the provision of training and procurement services, in the fields of competence of the Department, in accordance with Appendices III, IV, and V to this Agreement.

C. Staff Services

A staff service involves the detail or assignment of an individual Department employee to fill an A.I.D. staff position overseas. Persons detailed or assigned for staff duty with A.I.D. will be entirely under the supervision and direction of A.I.D. However, questions concerning an individual's status as an employee of the Department will be dealt with directly between the Department and the employee concerned.

Arrangements covering the assignment or detail of Departmental personnel to A.I.D. are outlined in Appendix II to this Agreement.

VI. Professional Development

The Department considers foreign service for its employees of such importance that it will assure that such service will be fully recognized in their career development and promotion within the Department. A.I.D. will encourage such professional development activities as attendance at appropriate professional meetings, professional publications, research appropriate to their assignments and full utilization of their professional advice and counsel in Agency program planning. To the extent appropriate and feasible, the Department will participate in orientation and other personnel development functions of A.I.D.

VII. Operating Relationships

A. In the United States

General technical and project services provided in the United

States will be carried out by the Department in accordance with its established procedures.

B. Overseas

1. Department personnel assigned overseas as members of an A.I.D. Mission under this Agreement will receive support, benefits and privileges on the same terms as they are provided to A.I.D. direct-hire personnel and as permitted under legal and A.I.D. regulatory requirements.

2. Unless mutually agreed otherwise, the Department will utilize personnel on its rolls insofar as possible in providing services under this Agreement.

3. Personnel of the Department detailed or assigned for duty overseas with A.I.D. under this Agreement will be administratively responsible to the U.S. A.I.D. Director or his designee on matters of personal conduct, public relations and general program and policy direction. Disciplinary action, if called for, must be taken by the Department. It is the responsibility of A.I.D. to notify the Department promptly of development which might require such action.

4. With respect to project services, official communications on technical, professional and personnel matters may be direct or through A.I.D. channels at the option of the Department, provided that copies of communications sent directly will be simultaneously provided to A.I.D. Mission and AID/Washington headquarters. Official communications dealing with A.I.D. program and policy matters will be transmitted through regular A.I.D. channels. With respect to staff services, all communications are through A.I.D. channels.

5. Problems that arise in the operation of service agreements will be resolved between the U.S. AID Director or his designee and the Department's senior officer at the Mission. In the absence of a mutually satisfactory solution the U.S. AID Director may, if he deems it necessary, direct that his views be followed pending decision on the matter in Washington.

VIII. Reporting and Evaluation

In order to facilitate evaluation of the foreign assistance program, the Department agrees to provide A.I.D. with project progress and administrative reports as required in A.I.D. Manual Orders on the Participating Agency Service Agreement (PASA) or as otherwise agreed and to assist A.I.D. in making periodic reviews of costs and performance.

The US AID Director has a responsibility for continuing evaluation through observation and reports of all projects and programs under his direction.

IX. Termination of Services

If A.I.D. or the Department finds it necessary to cancel in whole or in part any project or service under this Agreement, A.I.D. agrees to reimburse the Department for appropriate costs which are mutually agreed in writing.

X. Financing

A.I.D. will provide the Department with timely forecasts of general requirements in each category of service for its guidance and planning.

On the basis of such forecasts, the Department and A.I.D. will enter into an annual budget agreement to cover the Department's annual costs for domestic program support services.

A.I.D. will reimburse the Department for its project or staff services at monthly or other agreed upon intervals on the basis of bills presented on Standard Form 1080 or 1081 to the AID/Washington Controller.

A.I.D. will provide financial support to the Department for its project, staff and other services in accordance with the specific agreement set forth in the A.I.D. Controller's letter of November 4, 1965 and the U.S.D.A. Budget and Finance acceptance of November 15, 1965, or such other arrangements as may be mutually agreed in writing between the above parties.

XI. Termination or Amendment of Agreement and Appendices

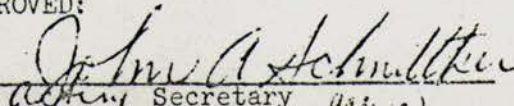
The Agreement and its Appendices will continue in force until termination by either party upon giving ninety days written notice to the other party; provided that its continuation shall be subject to Congressional action. Either party to this Agreement may propose amendments to the Agreement. Subsequent amendments to the Appendices of the Agreement based on changes in operating procedures or due to legislative requirements will be executed by the Assistant Secretary of the Department charged with the international affairs of the Department or his authorized representative and the Assistant Administrator, Office of Technical Cooperation and Research or his authorized representative.

Not more than three years after the signing of this Agreement, the Department and A.I.D. will conduct a joint review of activities under the Agreement to determine whether it will remain in force, or in what respects if any, it should be modified.

XII. Effective Date

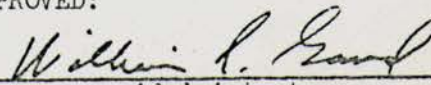
The effective date of this General Agreement and its Appendices shall be the latest date affixed below.

APPROVED:



Assistant Secretary
Department of Agriculture
FEB 15 1966
Date

APPROVED:



Administrator
Agency for International Development
19 JAN 1966
Date

SUPPLEMENTARY AGREEMENT

APPENDIX I
TO
GENERAL AGREEMENT
BETWEEN THE
AGENCY FOR INTERNATIONAL DEVELOPMENT
AND THE
DEPARTMENT OF AGRICULTURE

SUBJECT: Participating Agency Service Agreements

The participation of the Department in various aspects of the foreign assistance program, other than technical support, training and procurement services rendered in the U.S., is covered by Participating Agency Service Agreements (PASAs) entered into under the basic terms of the General Agreement between the Department and A.I.D. The following provisions apply generally to all PASAs:

I. Form and Content

A PASA will usually consist of (a) a face sheet, (b) a Budget Plan and (c) a Project Implementation Order/Technical Services (PIO/T (which includes a statement of Scope of Work which is sufficiently detailed to provide all information necessary to plan and effect the service, and which provides the basis for evaluation of performance). If the PASA covers services which are to be rendered beyond the fiscal year in which the agreement is entered into, the PIO/T includes a summary Scope of Work covering the entire service, as well as an annual Scope of Work. The initial Budget Plan also covers both the estimated total cost of the service and the first fiscal year of operations. Each fiscal year a new PIO/T will be issued to provide additional funds, and as required, a new Scope of Work and Budget Plan will be issued.

II. Duration

The PASA includes the duration of a given project or service.

A specific date for the projected termination of the service covered by a PASA is always stated. This date may be extended by amendment to the PASA.

III. Effective Date

A PASA is effective as of the date of the last A.I.D. or Department signature on the agreement, unless another date is specified.

IV. Amendment and Termination of Agreement

PASAs should be appropriately amended, by mutual agreement.

In the event that circumstances are such that A.I.D. or the Department deems it necessary or desirable to terminate a service agreement before completion of the services to be provided, A.I.D. and the Department will consult in advance on such termination and, insofar as possible, will fix a termination date sufficiently in advance so that the parties may make personnel and other adjustments in their operations in the light of such termination. The establishment of a termination date is documented in a format prescribed by A.I.D. for signature by the Department and the A.I.D. official (or their successors) who signed the original Service Agreement.

If A.I.D. or the Department finds it necessary to cancel in whole or in part any project or service, A.I.D. reimburses the Department for its liabilities relating to termination.

V. Progress Evaluation

In order to facilitate the evaluation of specific services, the Department will prepare periodic reports on implementation progress, including any problems encountered in rendering those services. Such reports will be submitted to: (a) the US AID Director or his designee, and the appropriate AID/W office--for services on behalf of a US AID, (b) the appropriate AID/W office--for services on behalf of AID/W or of a regional or interregional nature.

Unless specified otherwise in an individual PASA, either directly or by reference to an A.I.D. issuance, the frequency of such reports will be (a) upon request of A.I.D.--for services of less than one year; or (b) quarterly for services of one year or more. Where a completion of service report is required, the Department will make such a submission, where feasible, not later than 60 days after the service or project is completed.

Where the format, number of copies required, and content of progress reports for specific types of services are not stipulated in A.I.D. issuances, they will be mutually agreed upon at the time the agreement is entered into so as to meet the operating requirements of both the Department and A.I.D. The Department may, in addition to A.I.D.'s reporting requirements, establish other reporting requirements from its personnel to satisfy its own supervisory responsibility.

VI. Contracting Under a Service Agreement

When a contract with a private, international or other non-U. S. Government organization is necessary to implement a particular project, A.I.D. normally enters directly into such an arrangement. However, under the terms of a PASA, A.I.D. may authorize the Department to enter into a contract to implement a specific phase of a project. If such a contract involves the performance of services outside the U. S. by U. S. citizens, the Department will take appropriate action to assure compliance with the loyalty and security investigation requirements of Section III of the Foreign Aid and Related Agencies Appropriation Act of 1966 (Public Law 89-273) and any successor legislation, and implementing AID regulations relating thereto. The certification of security clearance will be made by the Department. A.I.D. will reimburse the Department for the cost of such investigations.

VII. Maintenance and Disposition of Records

Records and files accumulated and maintained by Department personnel in connection with overseas activities undertaken pursuant to a Service Agreement will be the property of the Department, which will be responsible for their maintenance and will determine and effect their final disposition. If requested and authorized in writing by the Department, A.I.D. personnel in the field will arrange for the destruction without screening of those records which have been determined by the Department to be eligible for destruction. However, property records required to validate the inventory paid for from A.I.D. funds will be retained and turned over to A.I.D.

VIII. Disposition of Property

All property, including vehicles, equipment, and supplies purchased by the Department relative to and financed under a PASA covering an overseas activity will be turned over to and will become the property of A.I.D. upon completion of that activity, unless the PASA specifically provides otherwise. The Department will maintain itemized property records on all non-expendable items costing more than \$50 each, showing description, date acquired and from whom, cost and location.

Appendix II

SUPPLEMENTARY AGREEMENT

APPENDIX II
TO
GENERAL AGREEMENT
'BETWEEN THE
AGENCY FOR INTERNATIONAL DEVELOPMENT
AND THE
DEPARTMENT OF AGRICULTURE

SUBJECT: Personnel Arrangements

I. General

As used in this agreement, and subsequent implementing documents and related correspondence--(a) the overseas "assignment" of Department personnel is understood to entail the establishment of an overseas position and the assignment or appointment of an employee to that position for a tour of duty, with the employee remaining on the Department's payroll, (b) the overseas "detail" of Department personnel to the A.I.D. program to provide either project or staff services is understood to entail temporary duty (reimbursable or non-reimbursable detail) with a US AID with no change in the individual's employment status with the Department.

The implementation of Participating Agency Service Agreements (PASAs) may entail the utilization of Department personnel resources in a variety of ways depending on the nature and magnitude of the services to be rendered. In providing personnel services under this agreement the Department may --

A. For Project Services:

(A given project may require any one or a combination of these staffing arrangements):

1. Assign or appoint employees to fill positions established to implement project service PASAs in the U.S.

2. Detail employees for temporary duty overseas.

3. Assign employees overseas for a tour of duty in an overseas position specifically established by the Department pursuant to a PASA.

B. For Staff Services:

Assign employees to A.I.D. staff positions overseas.

II. Arrangements Applicable to Service in the U. S.

Department personnel appointed or assigned by the Department to duties in the U. S. relating to the foreign assistance program, either for technical support services (including training and related services) under a General Agreement or project services under a PASA, are governed wholly by the Department's rules and regulations.

Under certain circumstances, A.I.D. may request and the Department may agree to provide the services of a Department employee to occupy an A.I.D. staff position in the U. S. on a detail basis. Such a detail is not considered as constituting technical services and is not covered by a PASA.

III. Arrangements Applicable to Overseas Service

The following basic arrangements are applicable, prima facie, to the overseas detail or assignment of Department personnel in the foreign assistance program. Specific guidance and requirements are provided in A.I.D. manual orders.^{1/} They apply uniformly to all Federal Government employees engaged in any phase of the foreign assistance program overseas and are designed to insure that such employees are treated equitably while on such duty, that the basic requirements for such duty are equally applicable to A.I.D. and Department personnel and that to insure effectiveness and economy of operations, the principle of coordinated programming and management is carried out in both the planning and implementation phases of the foreign assistance program.

In the event the Department is to provide services in a country where there is no US AID, AID/W will make appropriate arrangements to have the functions and responsibilities of a US AID as outlined herein, assumed by the Chief of the Diplomatic Mission, or his designee, or will make other appropriate arrangements.

A. All Overseas Service

1. Security

The Department will arrange for the necessary investigation and certify the security clearance. An employee may not depart for an overseas post until such clearance is obtained. ^{2/}

^{1/} Manual Order 416.6 - Participating Agency Appointments and Employment.

^{2/} Manual Order 244.1 as amended - Procedure for Assigning Participating Agency Personnel Overseas Under a Participating Agency Service Agreement.

2. Standards of Conduct

The conduct, both official and social, of Department personnel (and dependents) assigned to US AIDs must at all times be acceptable to A.I.D. and the cooperating country. Discipline of such personnel is a responsibility of the Department--in collaboration with A.I.D., as appropriate. However, A.I.D. may have occasion to request that an employee be relieved of his duty. In such an instance, the Department will arrange for the prompt withdrawal of the employee from the US AID. A.I.D. will provide the Department with information concerning the circumstances of the case, and such other information concerning the conduct of the employee, as may be necessary to meet the requirements of the Department. In an emergency situation, as determined by the US AID Director, the US AID may issue travel orders and arrange for travel pending administrative action by the Department.

3. Mission Clearance

Each Department employee proposed for an overseas assignment is nominated to the US AID for the purpose of obtaining US AID and cooperating country concurrence, as appropriate. This nomination is prepared by the Department and approved and transmitted by A.I.D. Such clearance must be obtained before the employee may be authorized to depart for an overseas post.

4. Administrative Support

A.I.D., through the US AID, will provide Department personnel with adequate common supporting services including ordinary supplies and equipment and administrative support comparable to services provided A.I.D. direct-hire technical assistance personnel, e.g., office supplies, official transportation, office space and equipment and administrative assistance except in cases where the PASA specifies that the Department or the cooperating country will provide any one or all of such support services.

5. Briefing and De-Briefing

A.I.D. general orientation and program briefing will be given, in addition to briefing required by the Department, unless mutually agreed otherwise in specific instances. Personnel returning from duty overseas will be available to A.I.D. for consultation and de-briefing.

B. Overseas Details

1. Departmental personnel detailed overseas for temporary duty under a PASA under authority of Section 632(b) of the Foreign Assistance Act of 1961, as amended, continue to occupy their position in the Department. Such details are normally not in excess of 6 months.

2. The Department authorizes, arranges and pays for the employee's international travel, and per diem for such travel, as prescribed in Standardized Government Travel Regulations or Joint Travel Regulations (governing the Uniformed Services), as appropriate. The Department and A.I.D. recognize that maximum use is to be made of local currencies in accordance with Bureau of the Budget Bulletin #65-5, September 15, 1964, and subsequent Department of State and A.I.D. notices. In those instances when local currencies are available in countries listed in Bureau of the Budget Bulletin #65-5 and subsequent additions the PASA will specify when U.S. dollar or local currency expenditures are to be authorized and include necessary procedural guidance.

3. All travel authorizations will remind the traveler to use designated A.I.D. or Embassy cashiers for exchanging U.S. dollar checks in accordance with the prescribed regulations of the post. This is applicable to both official and personal checks.

C. Overseas Assignments

1. Assignment Authority

The employment or assignment of Department personnel for overseas duty in the foreign assistance program may be authorized by A.I.D. pursuant to Section 625(d) (1) of the Foreign Assistance Act of 1961, as amended.

2. Tour of Duty

The normal period of service in an overseas position is a two-year tour from date of arrival in the country of assignment. This period may be more or less than two years depending on the requirements of the project. 3/

3. Establishment of Position

An assignment to a project pursuant to Section 625(d)(1) involves the establishment of an overseas position by the Department. An assignment to a staff position involves a position established or maintained by A.I.D.

Based on information concerning the job to be done, as outlined in the PASA, the Department will prepare a position description and classify it in accordance with Civil Service standards. The General Schedule classification is converted to the appropriate class in the Foreign Compensation (FC) schedule. Two copies of this position description are provided A.I.D.

3/ Exceptions to the A.I.D. criteria applicable to overseas tours of duty are to be processed under the provisions of A.I.D. Manual Order 416.6.

4. Qualifications and Suitability

The Department is responsible for determining the technical qualifications of employees it selects for assignment to overseas positions in the aid program.

Successful performance in an overseas assignment requires also special personal qualifications. Therefore, to the maximum extent possible, the Department will follow the guidelines established by A.I.D. for determining the suitability of an individual for overseas service and will also obtain necessary information from appropriate sources about those members of the candidate's family who will accompany him overseas. It will provide A.I.D. with a certification that such an investigation has been made with satisfactory results.

5. Training

If a project or service requires that the incumbent of a particular position have proficiency in the language of the country of assignment, the Department will insure that the candidate selected meets this requirement. If necessary, arrangements will be made with A.I.D. for appropriate language training prior to departure overseas. Language training provided at the overseas post is available to Department personnel on the same basis as A.I.D. personnel. Orientation training by A.I.D. in Washington, supplemented at the Mission, is normally required. Other training may be made available by A.I.D. Departmental personnel assigned to A.I.D. programs overseas may qualify for within-grade step increases, for having attained proficiency in an esoteric language if such language is the primary or primary-alternate of the post of assignment. 4/

6. Medical Clearance

Medical clearance for the employee and those of his dependents who will accompany him overseas will be obtained by the Department from the Medical Division, Department of State. Such clearance is a prerequisite for authorization of the employee's departure from the U. S.

7. Assignment Documentation

The assignment or appointment of a Department employee to a position in the foreign assistance program is documented on a Standard Form 50, or comparable official document. Two copies of such documentation will be forwarded to A.I.D. not later than 15 days after the effective date of the action.

8. Compensation and Benefits

While assigned to an overseas position established under the terms of this agreement, Department employees are entitled to compensation and benefits provided under Section 625(d)(1) P.L. 87-195, including medical benefits, allowances, differentials, and leave, on the same basis as applicable to A.I.D. foreign service personnel.

9. Leave

Before termination of an A.I.D. assignment a Department employee is entitled to take whatever annual leave has been accumulated during that assignment. However, if the employee's employment with the Department is to be terminated in conjunction with the termination of his A.I.D. assignment, he may only take that amount of annual leave which is in excess of his leave ceiling and the balance of annual leave must be paid to him in accordance with the Lump Sum Leave Act. A.I.D. will reimburse the Department for that portion of the lump sum leave payment earned during the employee's assignment to A.I.D. An employee may be granted home leave in accordance with applicable regulations if he has completed the required continuous service abroad and it is contemplated that he will return to services abroad (including service under PL 85-795) under an overseas program entitled to home leave benefits provided under the Annual and Sick Leave Act of 1951, as amended.

10. Initial Rate of Pay

Department employees are compensated in accordance with the class of the position to which they are assigned. ^{5/}

11. Payment of Salary and Differential

The Department will authorize and pay its employees basic salary and the applicable hardship differential.

12. Allowances

Allowances for post (cost of living), quarters, temporary lodging, education, local travel and transfer, as well as local travel per diem, Standardized Regulations (Government Civilians, Foreign Areas) and A.I.D. regulations and orders, will be paid directly to the employee by the US AID, unless otherwise specified in the PASA. Such allowances are normally paid in local currency, except that education and transfer allowances may in certain cases at the discretion of the US AID, be payable in dollars. Transfer allowances are authorized for payment by the Department when the

^{5/} Rates of pay in excess of norms prescribed in M.O. 416.6 - Participating Agency Employment require the written approval of an authorized official of A.I.D. and the Department.

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transfer is to another bona fide overseas program and when such transfer otherwise meets the eligibility requirements for transfer allowances as set forth in the Standardized Regulations (Government Civilian, and Foreign Areas).

The Department will certify an employee's eligibility for separation allowance in accordance with Standardized Regulations and will pay this allowance directly to the employee.

13. Promotions

The promotion by the Department of an employee assigned to the A.I.D. program is based on the reclassification of his position or his reassignment to a higher level position, provided he has served for one year in his present grade and has demonstrated ability to perform the duties of the higher level position.

14. Performance Evaluation

To assure that Department personnel receive full recognition for their contributions in the foreign assistance program, the US AID will furnish AID/W and the Department, if it so desires, with copies of performance evaluations, 6/ or any other document (e.g., letter of commendation) which in any way evaluates the accomplishments of performance of the Department's employees assigned to the US AID.

If the US AID Director determines that an employee's performance is not sufficiently effective in a given work situation, he may request the Department to terminate the employee's assignment.

15. Travel and Transportation

A.I.D. regulations and the Standardized Regulations (Government Civilians, Foreign Areas) govern the travel and transportation of all Department personnel (and dependents) assigned overseas for a tour of duty pursuant to Section 625(d)(1) of the Foreign Assistance Act of 1961, as amended.

a. The Department authorizes, arranges for, and reimburses such employees for:

(1) Travel within the U.S. and between the U.S. and the overseas post.

6/ See M. O. 416.6 - Participating Agency Appointments and Employment.

(2) Costs involved in the transportation and/or storage of household goods, personal effects and a privately owned motor vehicle on the same basis as A.I.D. employees at the same Mission.

The Department consults with A.I.D. as to the availability of local currency for such expenditures and the procedure for its utilization.

b. The US AID authorizes, arranges for, and reimburses Department personnel for:

(1) Other international travel which the Department has approved or concurred in.

(2) Local travel within the country of assignment.

(3) Travel for rest and recuperation in countries where such travel is authorized.

(4) Education travel.

16. Termination

The US AID will furnish a Completion of Assignment Report, in accordance with A.I.D. requirements, for all Department personnel, as well as A.I.D. employees.

When a Department employee is returned to the U.S. for completion of assignment and is not to be reassigned to another position in the A.I.D. program, the Department will ordinarily effect the termination action not later than the next regular pay period ending after the employee's return to the U.S., unless medical clearance requires a delay, and will provide A.I.D. with the appropriate documentation of such action.

Should final medical clearance for a Department employee, or his dependents, not be received within two weeks after return to the U. S., the termination date will be extended in consultation with A.I.D. In such cases, if the employee is on active duty with the Department after a 60-day period, A.I.D. will terminate reimbursement of the employee's salary. Medical benefits will be forfeited if arrangements for medical examinations are not made within 30 days and completed within 60 days after the employee or his dependents depart from post. 7/

17. Recruitment Status Reports

The Department will provide AID/W with a monthly report on the status of recruitment to fill positions established under PASAs.

7/ Detailed procedures governing the medical and health program are contained in M. O. 454.1.

SUPPLEMENTARY AGREEMENT

APPENDIX III
TO
GENERAL AGREEMENT
BETWEEN THE
AGENCY FOR INTERNATIONAL DEVELOPMENT
AND THE
DEPARTMENT OF AGRICULTURE

SUBJECT: Technical Consultation Support Services

I. General

This appendix outlines the types of technical services, which the Department agrees to perform upon request, on behalf of the Agency for International Development, in support of the foreign assistance program.

A.I.D. will furnish the Department with copies of reports and communications relating to programs, projects and questions on which A.I.D. may request assistance.

II. Types of Support

Services provided by the Department to A.I.D. may include but are not limited to:

A. Providing consultation and advice in connection with program planning, review and coordination.

B. Reviewing and evaluating proposed programs, activities or projects concerning which there is need for special technical advice.

C. Advising on technical resources available within the Department or other government or private agencies.

D. Discussing and advising on technical problems with AID/W personnel or individuals referred to the Department by AID/W.

E. Answering technical inquiries made by AID/W or sent in from the field and referred by AID/W in writing to the Department.

SUPPLEMENTARY AGREEMENT

APPENDIX IV
TO
GENERAL AGREEMENT
BETWEEN
AGENCY FOR INTERNATIONAL DEVELOPMENT
AND THE
DEPARTMENT OF AGRICULTURE

SUBJECT: Procurement of Commodities Incidental to the Furnishing
of Services

I. General

This appendix outlines commodity procurement services which the Department agrees to provide A.I.D. -- in cases mutually agreed to by the Department.

II. Procurement Services

Upon receipt of an acceptable authorizing document from A.I.D. the participating agency performs the following services in behalf of A.I.D. or for a borrower/grantee on behalf of A.I.D. 1/

A. Procures commodities or services specified in the authorizing documents.

B. Renders advice and assistance in selecting commodities or service organizations best suited to accomplish a particular purpose.

C. Prepares requisitions or other listings for the approval of A.I.D. or for a borrower/grantee on behalf of A.I.D.

D. Prepares commodity specifications and arranges necessary inspections.

E. Arranges transportation, including packing, inland and ocean transportation, licensing and, where appropriate, marine insurance.

F. Maintain records and prepares reports required by A.I.D.

1/ Detailed requirements and procedures governing procurement in A.I.D. programs are contained Manual Order 1430, "U.S. Government Agency Procurement, Commodities."

III. Financial Arrangements

Funds from which A.I.D. will pay for procurement costs are provided in Project Implementation Orders/Commodities (PIO/Cs) or Procurement Authorization/Purchase Requisitions (PA/PRs).

SUPPLEMENTARY AGREEMENT - TYPE ONE

APPENDIX V

TO THE GENERAL AGREEMENT BETWEEN THE AGENCY FOR INTERNATIONAL DEVELOPMENT
AND THE DEPARTMENT OF AGRICULTURE

SUBJECT: Training of Foreign Nationals

1. General

This appendix outlines the responsibilities of the Department and A.I.D. in the planning and execution of technical cooperation training projects referred to the Department by A.I.D. The carrying out of these responsibilities constitutes an effective contribution to the execution of the program of A.I.D. in and for the cooperating country involved.

II. Responsibilities of the Department

At the request of and in consultation with A.I.D., the Department
will

A. Develop and administer training programs for foreign nationals who are brought to the United States by A.I.D. for training in the field of agriculture and related subjects, and provide the technical competency needed in carrying out these programs.

B. In the development of training programs

1. Determine which services of the Department, private business, academic or other groups can best assist in the development and implementation of desirable training programs.

2. Prepare and submit to A.I.D. for review and concurrence a proposed training program, and such revisions as may be required, including essential cost elements needed to fund approved programs.

3. Provide A.I.D. with copies of all reports prepared by or about participants which discuss the participants' programs, progress, or problems.

4. Provide news releases about participants indicating A.I.D. sponsorship and the objectives of the study program(s).

5. In consultation with A.I.D., develop alternative procedures when extraordinary circumstances render the above procedures infeasible.

C. In the implementation of the training program,

1. Orient the participants regarding their programs.
2. Arrange with organizations, industries, educational institutions, or other groups for assistance in implementing the training program.
3. Evaluate the program effectiveness by appropriate methods as mutually agreed upon by the Department and A.I.D.
4. Inform A.I.D. of illnesses, conduct prejudicial to the program, or other emergencies arising during the period of the participant's visit. Assist in making the necessary arrangements for medical care or treatment pursuant to the provisions of the insurance; provided, however, that the Department shall not be responsible for the performance of any medical, legal, professional, or other services of a private nature.
5. Prepare quarterly reports on the numbers of participants trained during the quarter and submit these on the standardized A.I.D. report form not later than the 10th day of the month following the quarterly reporting period.
6. Provide in accordance with A.I.D. Manual Orders, the necessary implementation of the training programs by:
 - a. Obtaining as authorized by A.I.D., the services of technical leaders and processing documents for payment of salaries and other expenses for the same.
 - b. Paying in advance, participants' maintenance allowances at the A.I.D. approved rates.
 - c. Providing assistance and funds to participants for purchase of books, training aids, and equipment.
 - d. Providing the necessary program travel for the participants.
 - e. Processing documents for A.I.D. use in payments of tuition and training fees in connection with programs in institutions or firms, or paying tuition and training fees as agreed upon by the Department and A.I.D.
 - f. Paying travel expenses for interpreters as authorized.
 - g. Assisting as required in the shipment of the participant's books, and printed program related training materials to the Mission.

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- h. Mutual consultation regarding the participant(s) scheduled departure date at least 30 days in advance.
- i. Whenever possible, collecting all overpayments to the participants prior to departure.
- j. Distributing and forwarding mail to participants.
- k. Arranging, when appropriate, for the participant's membership in an A.I.D. approved American Professional society.

III. Responsibilities of A.I.D.

- A. In the development of training programs, A.I.D. will
 - 1. In consultation with the Department assist in the development of all programs, reviewing and approving them prior to implementation.
 - 2. Furnish the Department appropriate information relating to requested training for each foreign national for whom training has been approved, such as;
 - a. Major problems and needs in the cooperating country toward which training should be directed.
 - b. Type of training desired by the Mission and the cooperating country.
 - c. An evaluation of training, education, experience, and ability of the participant.
 - d. Particulars as to the present position of the participant and the position that he is expected to occupy upon his return to the cooperating country after training.
 - e. Official transcripts of scholastic records, if available, when academic training is indicated.
 - f. General proficiency of each participant in the English language.
 - 3. Communicate with Mission to obtain information on program changes, extensions, funding, etc.
 - 4. Transmit the programs to the Mission.
 - 5. Arrange arrival dates in line with the dates shown in the proposed program and inform the Department of those dates.

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6. Make appropriate public announcements regarding the training program giving credit therein to the participation of the Department.

7. Obtain systematic information from the Missions on the extent to which the participants' training in the United States is being utilized and furnish information of a significant nature to the Department. Information of this type received by the Department directly is furnished to A.I.D.

B. In the implementation of the training program

1. Arrange for reception services at Ports of Entry and in Washington except as mutually arranged otherwise.

2. Provide initial administrative orientation to participants.

3. Collect insurance premium payments from independently financed participants.

4. Arrange for contractual services to cover medical insurance for participants; and forwarding services for shipment of participants' publications and printed training aids.

5. Arrange for renewal of participants' visas as required.

6. Conduct a final conference, where possible, with the participant(s) for the purpose of evaluating the program and its effectiveness.

7. As agreed upon, arrange international return travel for participants upon receipt of scheduled departure dates from the Department, informing the Department of these arrangements in order that the Department can complete all fiscal transactions prior to departure.

8. Arrange for interpreters when needed.

9. Obtain the security clearance for Technical Leaders as required.

MEMORANDUM OF UNDERSTANDING
between
UNITED STATES DEPARTMENT OF AGRICULTURE
and
FARM CREDIT ADMINISTRATION

The United States Department of Agriculture (USDA) under Participating Agency Service Agreements (PASA) with the Agency for International Development (AID) is committed to furnish technical assistance in several countries of the world, and under AID policy will be requested to furnish technical assistance to more countries. A substantial segment of this technical assistance is in the field of agricultural credit, both supervised agricultural credit and cooperative agricultural credit.

Competence in the field of cooperative agricultural credit exists for the most part, in the Cooperative Farm Credit System, which is under the supervision of the Farm Credit Administration (FCA), an independent agency.

In order that the FCA can make available the services of its competent technicians to the USDA for foreign technical assistance in countries where USDA may have a resident team in the field under a PASA, and in order that the USDA may have access to the services of such technicians for an appropriate part of the PASA team effort, it is hereby agreed as follows:

1. Upon request by USDA, through International Agricultural Development Service (IADS) to FCA for a resident technician, FCA will consider the request and, if in agreement that the position falls within their field of competence, will attempt to assign one of their employees, or will make an effort to recruit an employee from one of the Farm Credit Banks, Production Credit Associations, Federal Land Bank Associations, or other appropriate source, to fill the requested position.
2. FCA will prepare and submit to IADS/USDA the necessary budget for costs of FCA technicians on their staff who will serve abroad including salaries, post differentials (if any), training, security clearances, medical clearances and care, travel from employee's home to Washington and per diem while in training, international travel of employee and family, and shipment of required household effects, and any other related costs.
3. Upon agreement as to the required budget IADS/USDA will advise FCA, in writing, as to the amount of funds under the PASA that will be available to FCA and which will be the basis for FCA to submit periodic billings. Under the present arrangement between USDA and

AID, whereby AID advances funds to USDA for PASA expenditures, FCA will bill IADS/USDA for reimbursement for the amount of necessary expenditures under approved budgets.

When, as, and if the USDA-AID arrangements are changed, whereby AID reimburses USDA for PASA expenditures, FCA will be notified of such change and will thereafter bill AID directly for such expenditures.

4. FCA will prepare biographic data for the employee and submit it to IADS/USDA for transmittal through AID channels to the appropriate USAID Mission for the purpose of obtaining Mission and host Government concurrence.
5. FCA shall prepare position description on PASA personnel, three copies of which shall be provided to IADS/USDA for forwarding to AID.
6. Grades (FC) and salaries generally shall be established in accordance with AID regulations applicable to participating agencies. FCA documented requests for exceptions shall be submitted to IADS/USDA.
7. FCA will submit to the USDA Security Officer requests for security clearance together with appropriate forms completed by the employee. FCA will be billed for the cost of these clearances. When clearance is granted, the USDA Security Officer will notify FCA.

When an FCA employee is to be assigned to an overseas post of duty, the USDA Security Officer will certify to AID that the employee has been the subject of a full field investigation and that TOP SECRET clearance has been issued.

8. FCA will follow the IADS Handbook instructions to obtain medical clearances through Department of State medical facilities on employees and accompanying dependents prior to initial and each subsequent tour of overseas duty and upon termination of overseas duty. Waivers of medical clearance for an employee or a dependent shall be kept to a minimum and granted only with the concurrence of the IADS/USDA Administrator, or his designated representative.

The FAS Personnel Division will maintain contacts with the Department of State Medical Division on all matters concerning medical clearance and health care.

9. IADS/USDA and FCA will jointly prepare and carry out an appropriate training program for FCA employees mutually agreeable to both agencies.
10. When all clearances have been received, FCA will issue personnel actions and travel orders for the employee and dependents. Three

copies of each official personnel action processed shall be provided to IADS/USDA for forwarding to AID. FCA will then submit to FAS travel section (a) Form AD-121 Passport Request (initialed on first carbon by appropriate FCA official), which will request State Department to release the passport to FAS travel for obtaining the necessary visas; (b) and a signed Transportation Request, which will authorize FAS travel office to make plane reservations and buy the tickets. IADS will notify through AID channels the appropriate USAID Mission the date and flight number employee and dependents will arrive at post.

11. FCA as employer will generally supervise and backstop the employee both technically and administratively, except that employee will depend upon the Chief of USDA Party, or his designee, for coordination of his work with the overall USDA PASA program.
12. In its capacity of technical supervision and backstopping, FCA will furnish upon joint requests from USDA Chief of Party and USAID Mission short-term consultant services. Such consultants, if FCA employees, will be detailed to IADS/USDA. Their salaries and personnel benefits will be reimbursed to FCA from IADS. In these cases, IADS will obtain all clearances, cut travel orders, furnish advance of funds for travel, obtain passports and visas, obtain travel reservations and tickets, and process travel vouchers.

In cases where such consultants are employees of the Farm Credit Banks, Production Credit Associations, Federal Land Bank Associations, or in any other non-Federal Government position, the consultant will be appointed on IADS rolls for the duration of the assignment. IADS will obtain all necessary clearances, cut travel orders, furnish advance of funds for travel, obtain passports and visas, obtain travel reservations and tickets, and process travel vouchers.

13. This Memorandum of Understanding shall become effective upon the date of execution and shall continue indefinitely but may be terminated by either party upon 90 days notice in writing.

APPROVED:

Matthew Drosdoff

Matthew Drosdoff, Administrator
International Agricultural
Development Service, USDA

Glenn E. Heitz

Glenn E. Heitz, Acting Governor
Farm Credit Administration

9/9/65
Date

9/9/65
Date

AGRICULTURE/2000 -- GROWING NATIONS, NEW MARKETS

This is the fourth in a series of six messages I will deliver this year on agriculture's role in helping to prepare this nation -- and the world -- for the Year 2000.

Earlier in the series, I talked about Agriculture/2000 -- Income and Abundance, Agriculture/2000 -- Communities of Tomorrow, and Agriculture/2000 -- Resources in Action. Today I intend to explore with you an even broader and deeper subject -- the role of agriculture in developing -- by the Year 2000 -- a world free from hunger ... a world largely insulated, thereby, from the tinder of international tension.

Admittedly, hazarding predictions about the future implies some arrogance of omniscience. But no man, of course, is omniscient -- and least of all the Secretary of Agriculture. The rapidity of change in our own lifetime staggers the imagination and deters even the brave from anticipating what the world will be like 33 years from today.

The changes, the progress, and the disappointments which will occur **between** now and then will, I'm sure, far exceed those that have taken place since 1934, the second year of the New Deal.

Consider the world of 33 years past. How many then -- peering into the future in 1934 -- foresaw today's wonder drugs ... the victory

Address by Secretary of Agriculture Orville L. Freeman at the Overseas Press Club, New York City, February 15, 1967, at 1:15 p.m. EST.

over dread poliomyelitis ... the popular universality of television ... the phenomenon of 6 percent of the population supplying the food needs of 197 million fellow Americans and millions overseas ... the jet airplane ... walks in space ... and the imminence of man's first visit to the moon?

And, on the darker side, how many foresaw the impending holocaust of World War II ... the bloody frustrations of Korea ... the awesome tapping of nuclear energy ... slums, squalor, and strife in the streets in the midst of unprecedented social advance and economic prosperity ... or the hovering spectre of world-wide hunger?

Of only one thing can we be certain. Changes will occur far more rapidly in the 33 years ahead, than they did in the 33 years before.

This fact alone compels us to think about the future ... to postulate alternatives ... to look to the experts for every glimmering of knowledge, for every bit of information we can marshal in an all-out effort to chart the course to a better world ... a better life. We can't afford to do less. The luxury of lead time to correct mistakes is a luxury of the past.

With this in mind, it behooves us to establish a priority of effort ... a determining of what first must be done.

Circumstances already have determined that priority. In his State of the Union message, on January 10, 1967, the President described it in these words:

"Next to the pursuit of peace, the really great challenge to the human family is the race between food supply and population increase. That race tonight is being lost."

The President did not set this priority casually. His words were emphatic. In this winter of 1967, the War on Hunger is being lost.

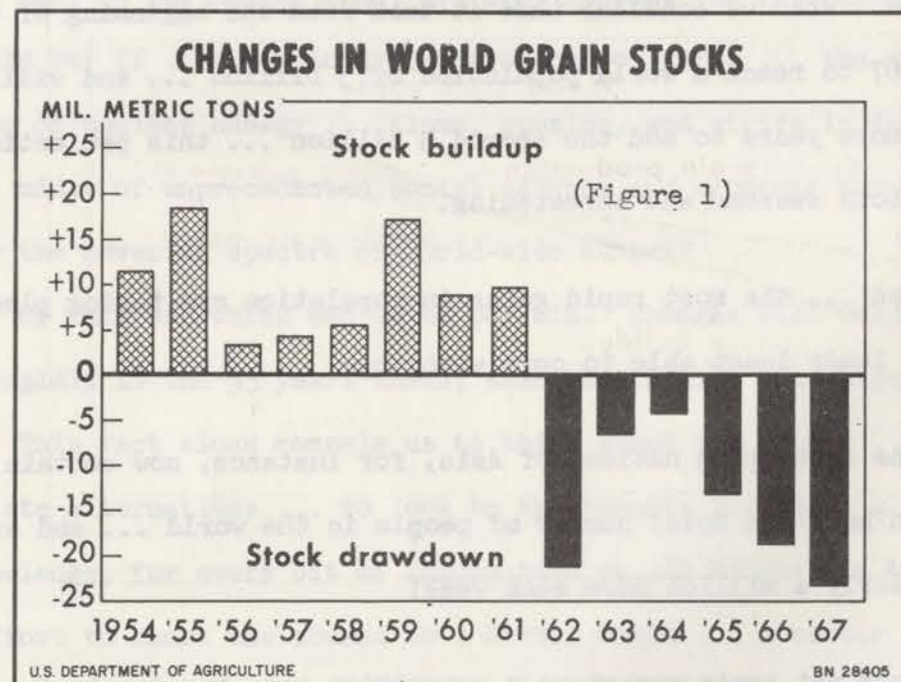
Unless something is done now, the world's population will double by the Year 2000 -- rising from 3 billion people to more than 6 billion. When we consider that it took from the beginning of time until 1967 to reach a world population of 3 billion ... and will take only 33 more years to add the second 3 billion ... this projection becomes both awesome and threatening.

And ... the most rapid gains in population are taking place in those lands least able to cope with them.

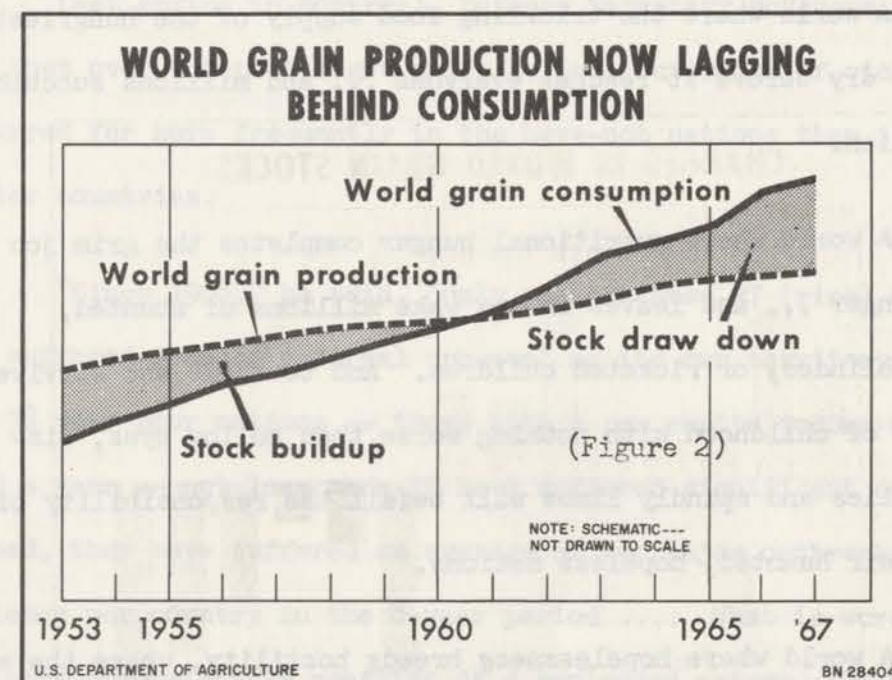
The developing nations of Asia, for instance, now contain more than half the total number of people in the world ... and are adding nearly a million more each week!

From net grain exporters a generation ago, the developing nations have now become importers of more than 30 million tons of grain a year in their desperate efforts to feed a populace that can no longer be sustained by the primitive tillage of their own soils. Nearly one-fifth of the United States' wheat crop was shipped to India to stave off famine in 1966. Similar needs are developing again this year. Yet the quantity of grain shipped in 1966 -- so huge it was shipped in the largest flotilla assembled since D-Day -- was still not enough to maintain India's food consumption levels of the early 1960's.

Recent world food trends are alarming. For six years now world grain stocks have been declining. Each year since 1961 world food consumption has exceeded production. This excess of consumption over production was made possible by drawing down stocks.



Now that grain stocks are reduced to near-minimal levels they cannot be reduced much further. This means that the lines in figure 2 must come together again. The production line must go up, or the consumption line will come down.



THE ALTERNATIVES

If nothing is done to alter present trends ... if nothing is done to slow population growth and accelerate food production ... the outlook for the Year 2000 is a grim outlook, indeed.

With fully four-fifths of the 3 billion people-increase projected by the turn of the century added to the developing countries, where food already is in short supply, we can then expect to find by the Year 2000:

A world where the developed nations sacrifice compassion on the altar of survival -- feeding only themselves as they huddle behind arms-and-tariff-protected borders.

A world where the trickling food supply of the hungriest lands runs dry before it reaches everyone ... and millions succumb to starvation.

A world where nutritional hunger completes the grim job of caloric hunger ... and leaves in its wake millions of stunted, retarded, blinded, or ricketed children. And to those who survive the perils of childhood with nothing worse than hollow eyes, distended bellies and spindly limbs will befall the responsibility of leading their haunted, hopeless nations.

A world where hopelessness breeds hostility, where the ever-growing gap between the haves and the have-nots first provokes riots in the streets ... then insurrection and the toppling of governments ... then final, desperate international aggression.

When this occurs, the developed nations that did not act when there was still time to act will learn the harshest lesson of all -- that there is no peace, there can be no security in a world where population smothers the land and hunger takes to the streets.

Centuries ago, the Roman philosopher Seneca observed that "a hungry people listens not to reason, nor cares for justice, nor is bent by prayer."

Last spring in Montreal, Defense Secretary McNamara pointed out that over the past eight years serious outbreaks of violence occurred far more frequently in the have-not nations than in the richer countries.

"Since 1958," he said, "only one of these 27 (rich) nations has suffered a major internal upheaval on its own territory. Among the 38 very poor nations -- those with a per capita income of under \$100 a year -- not less than 32 have suffered significant conflicts. Indeed, they have suffered an average of two major outbreaks of violence per country in the 8-year period What is worse, it has been predominantly conflict of a prolonged nature. There is an irrefutable relationship between violence and economic backwardness. And the trend of such violence is up, not down. When people are hungry and poor, they look toward any promise of a better life."

It should be apparent, then, that if the world pursues its present course ... if the gap between the haves and the **have-nots** continues to widen ... if population expansion is not controlled and food production greatly increased ... the world of the Year 2000 will be a grim, sullen, hate-filled planet tottering on the brink of self-destruction -- if indeed it hasn't blown **itself** up long before it reaches the turn of the century.

A BETTER WORLD

But need it be? Not if the primary problem of people-and-food imbalance is solved in the next 33 years.

Suppose, for instance, that the hoped-for advances in family planning -- particularly in the developing countries -- do, indeed, occur.

Suppose that by the turn of the century the world has -- not 6 billion people -- but only $4\frac{1}{2}$ or 5 billion.

Suppose effective means are found to increase substantially the world's total food production ... that the developed world's knowledge, technical skills, and investment capital are transplanted to the hungry nations to energize their transition to modern agriculture ... that these emerging nations are transformed from concessional to commercial markets.

And supposing all nations finally do perceive the folly of insulating themselves from truly international dialogue ... and truly international commerce.

What then?

A better world --

-- A world where hunger and hostility are fast vanishing from the earth ...

-- A world where young nations are as healthy as the old ... all but freed from the need of outside assistance ... their economies soundly based on productive agricultures ... able to grow much of what they need ... and able to buy much of what they cannot grow.

-- A world where the children of young nations are not gaunt, dull-eyed, malnourished and illiterate ... but tall, strong, clear-eyed and educated ... physically and mentally ready to assume, in time, the yoke of leadership of nations that have found their places in the sun -- and no longer need covet their neighbor's bounty.

Under such conditions, the resulting serenity and security may well melt away the final walls between nations. With tariffs abolished the free flow of goods, of people, of ideas, and of the fruits of science, research and culture can stimulate global prosperity and insure a lasting peace.

Barring natural calamity -- or the unthinkable war -- perhaps this can all be ours by the Year 2000 -- if we win the War on Hunger.

WEAPONS AND TOOLS

We've seen the alternatives. Now we can properly ask:

What will it take to reach that better world by the Year 2000?

What will it take to solve both sides of the food and people equation?

What will it take to win the War on Hunger?

It will take knowledge. It will take resources. It will take the means to organize resources and apply knowledge. It will take widespread awareness of the urgency of the problem. And it will take skill and determination.

I'm confident we already have the knowledge, the resources, and the means. I'm also certain the world is aware of the problem and is rapidly coming to realize what must be done to slow population growth and spur food production.

The War on Hunger can be won. We can have that better world I've pictured for the Year 2000 ... if we have the determination, the persistence, and the skill to mobilize and use the technical skills already available to the developed world.

KNOWLEDGE

We know that the only acceptable method of controlling population growth is reducing birth rates. We also know this will take time, and education, and money ... and that the effects will not be immediately noticeable because many of those who will be consuming food in the 1980's are already born.

But we also know that science has provided the means to reduce birth rates. The challenge now is to clear the cultural, ethnic, religious and educational hurdles.

A strong beginning has been made. Family planning efforts are being organized in a number of crowded, hungry nations. Some, Taiwan and South Korea, for example, have achieved a perceptible reduction in birth rates since inaugurating nationwide family planning programs only a few years ago.

But time is running out. Surveys and rhetoric must give way to crash programs which can spread family planning as rapidly as possible in every country where the fertility of people is outstripping fertility of the soil.

The awareness of the urgent need for family planning -- and the demonstrated determination to carry out such programs -- offer encouragement that the right approach and the right measures can improve significantly this side of the threatening equation before disaster engulfs us.

We also have the technical skills to solve the other side of the equation. Our own agricultural history, a record of miraculous production gains, shows what can be done. A century ago, one American farm worker met the food and fiber needs of himself and five others. Today he provides for 37. In 20 years, crop production per acre and livestock output per breeding unit have increased 40 percent. And one hour's farm labor today produces five times more than it did in 1921.

What has been done in the United States, can be done in the developing countries. But it must be done much more quickly.

Science and research will spur this accelerated effort. The scope of agricultural research underway in our country today -- research costing nearly \$900 million last year and embracing nearly 50,000 projects -- assures us continuing advances in yield takeoffs, new foods, nutrition, pest control, and conservation. On the strength of achievements to date, and research underway, corn yields of 200 to 400 bushels an acre are predicted by some for turn of the century agriculture.

An entire speech could be devoted to the breakthroughs in creating new sources of high protein -- extremely low-cost -- food for the world's malnourished ... food made from rough fish and from soy, cottonseed and peanut products that are now largely wasted ... food that can be made into new or familiar dishes.

Then, too, there is an exciting development in high protein, high vitamin food stock extracted from a combination of crude oil, bacteria, yeasts, nitrogen, phosphate, and water. Though this is still in the test tube stage, there are high hopes that in the years ahead this product can be made into low cost food which tastes like fish or meat.

The new high lysine corn is not only an important source of protein in itself, but also promises a sharp reduction in the cost of producing animal products. Pigs gain weight 50 percent faster on high lysine corn. This, in turn, promises increased pork products for the protein-starved diets of the hungry nations.

The sea holds out still another food resource that science is tapping -- the calculated cultivation and planned harvesting of fin and shellfish ... and the conversion of seaweed and algae into nutritious food substances.

RESOURCES

What other resources can we muster in the War on Hunger? The "conventional" weapons, of course ... the food products of our own and other advanced agricultural nations -- those nations still capable of producing beyond their own domestic and commercial export requirements. With these food products we can buy time and prevent the threat of famine while modern agricultural techniques are being exported to -- and adapted by -- the developing countries.

Our own agriculture, healthier than it has been in decades, has reached near supply-demand balance -- to the benefit of farmer and taxpayer alike. The Food and Agriculture Act of 1965 and the Food for Freedom program have given our agriculture the flexibility it needed to achieve stabilization and to respond quickly to the rise and fall of demand. Now, for the first time, we are able to establish an authentic food budget. We can determine what domestic demand, commercial export requirements, and food aid needs will be ... and gear our production accordingly.

Though our surpluses are gone, we still have **some remaining reserve acreage to call upon as needed.**

But these great conventional resources of the developed nations -- invaluable as they are as a stop-gap averter of famine and malnutrition in the developing countries -- will not be enough to win the War on Hunger.

Our studies show that in the not too distant future all of the productive acreage of all of the advanced agriculture nations will not be enough to meet the food needs of the hungry nations ... if the population juggernaut is not slowed.

If my analysis is correct -- and the world does have the knowledge and the technical skills to balance the equation and feed itself while modern agricultural methods are being adopted by the developing countries -- then the question becomes: do we have the determination and the will to do what can be done to win the War on Hunger?

Only time will tell. But I think we do.

GUIDELINES AND POLICY

The United States has declared all-out War on Hunger. Three times in less than a year, President Johnson has spelled out the dimensions of the world food problem and explained what must be done by the underdeveloped and the developed nations to win that war.

These three powerful messages have set the guidelines to victory as they summoned the entire world into action.

The sign posts marking the guidelines are clearly defined. They are: self-help by the developing nations, multilateral assistance by

the developed countries, greater efforts by international organizations and the gearing of individual governments to apply assistance more effectively, and greater contributions by the private sector of the developed world's economy.

SELF-HELP

Recognizing the foreseeable limit to the developed world's ability to provide enough food aid for the hungry nations to survive, the President's messages call for the developing nations to recognize that, in the long run, they must become able to feed themselves ... that vigorous self-help efforts to boost their own food production to self-sustaining levels must be launched if they are to expect more than emergency aid from this country.

Self-help, the President said, is the "lifeblood of economic development." Without it, no sustained progress is possible. The recipient nations must demonstrate a national determination to improve their own economies by first improving their own agricultures.

It will not be easy. They must compress into years what we took a century to accomplish ... into months what we took years to do. Yet it must be done. And it can be done. Some of the more successful developing nations already are increasing their food production at a greater rate than was ever achieved by us, or any other advanced nation.

All developing nations are now being challenged to emulate and surpass that feat.

MULTILATERAL ASSISTANCE

But while they are trying, they must receive accelerated, multilateral assistance. We are encouraging other developed nations to join with us -- on a proportionate basis -- to contribute their products, finances, services, and talents. Already we are seeing this concept take shape in the consortium approach to food aid for India.

If we are to win the War on Hunger, the President said, all nations -- rich and poor alike -- must join together and press the agricultural revolution with the same spirit, the same energy, and the same sense of urgency that they apply to their own national defense. Nothing less, he said, is consistent with the human values at stake.

ORGANIZATIONAL AND GOVERNMENTAL GEARING

Realization of the gravity of the situation is eliciting a substantial response from many quarters. Our own goal in the Department is to mobilize all the resources of the U. S. agricultural community in an effort to provide enough food for that two-thirds of the world still hungry. The USDA's International Agricultural Development Service was established for the specific purpose of mobilizing these resources and coordinating our response to requests from the Agency for International Development.

Increasingly, AID is asking the Department to assume more responsibility in the agricultural development effort abroad. In some countries AID has asked us to assume responsibility for the entire agricultural development effort; in others we undertake particular areas of activity within the overall effort.

We have in the Department a surprisingly large share of the world supply of agricultural brain power -- some 45,000 skilled professionals -- agronomists, entomologists, agricultural economists, and geneticists. In addition, we work in concert with the land grant institutions when mobilizing the complement of skills needed for a particular job. More and more, the agricultural competence of the United States is being utilized in formulating agricultural policies and developing agricultural programs in the developing countries.

The World Bank is shifting more and more of its loans toward the agricultural sector of recipient countries. The Agency for International Development is sharply increasing its investment in agricultural development projects. The Food and Agricultural Organization of the United Nations is preparing an Indicative World Plan which will outline food needs over the next 15 years and describe what will be required to meet those needs.

But the efforts to win the War on Hunger cannot be limited to governments alone. "The War on Hunger," the President said, "is too big for governments alone. Victory cannot come unless businessmen, universities, foundations, voluntary agencies, and cooperatives join the battle."

This is true because there is, after all, the practical matter of money.

THE PRIVATE SECTOR'S ROLE

Investment capital, for the most part, comes not from government but from private business. So, too, is private business the most efficient and effective mobilizer and manager of technology and resources.

Confronted by the dilemma of relatively little remaining new land to till and a shortage of the inputs necessary to achieve significant yield take-offs in land already under cultivation, the developing nations must seek: 1. enlightened price policies to encourage their farmers to use the necessary inputs; 2. measures to encourage profitable investment by private business to develop resources and supply those agricultural inputs.

Recognizing the importance of enlisting private investment in the War on Hunger, the President has proposed the establishment

of an Office of Private Resources in the Agency for International Development which would concentrate on marshalling private investment and the expansion of private sectors in the developing world. The President has called this "the best long-term route to rapid growth."

Rapid economic growth by the developing countries promises the developed world a reciprocal benefit the dimensions of which have been largely overlooked. Our studies indicate that as incomes increase in these lands, their imports from us, including farm products, increase steadily. This is why I have frequently referred to the developing world as a "sleeping giant" of trade potential.

CONCLUSION

These, then, are the major weapons in the War on Hunger: self-help by the hungry nations, accelerated assistance by the entire community of developed nations, the gearing of individual governments and international organizations to facilitate assistance, and the encouragement of private investment in the developing lands.

Victory in this war promises us:

- * The satisfying discharge of our responsibility to the less-fortunate of the world.
- * The emancipation of mankind from the bonds of chronic hunger ... and the freeing of all men for the pursuit of self-identification and self-fulfillment.

* A nearing of that global security and serenity which can melt the final barriers between all nations and ensure a lasting peace.

I believe we can win the War on Hunger and build a better world by the Year 2000. I believe this because free men, historically, have had the will to make a better world. All they needed were the means.

And now they have them.

Winston Churchill once said: "In the past we have had a light which flickered, in the present we have a light which flames, and in the future there will be a light which shines over all the land and sea."

That light will shine over a better world than you and I have ever known.

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THE AGRICULTURAL REVOLUTION IN ASIA

BY LESTER R. BROWN

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THE AGRICULTURAL REVOLUTION IN ASIA

By *Lester R. Brown*

FOR those whose thinking of Asia is conditioned by the food crises of 1965 and 1966, the news of an agricultural revolution may come as a surprise. But the change and ferment now evident in the Asian countryside stretching from Turkey to the Philippines, and including the pivotal countries of India and Pakistan, cannot be described as anything less. This rural revolution, largely obscured in its early years by the two consecutive failures of the monsoon, is further advanced in some countries—Pakistan, the Philippines and India—than in others, but there is little prospect that it will abort, so powerful and pervasive are the forces behind it.

That the agricultural revolution of the less developed world began in Asia is fortunate, since it is both densely populated and has a rapid rate of population growth. In this respect, Asia is unique among the world's major geographic regions. Western Europe is heavily populated but its population grows slowly; Latin America's population is expanding rapidly but as yet most of the region is sparsely populated. Fifty-six percent of the world's 3.3 billion people live in Asia; one-third of the world's population, an estimated 1.1 billion, live in Asia outside China. It is this part of the world and this third of mankind that this article deals with.

Historically, as Asia's population increased, it was supported by traditional agriculture on an ever-expanding area of cropland. As the postwar population explosion gained momentum in the late 1950s and early 1960s, the supply of new land was used up, but the productivity of land under cultivation increased little. The result was a slowdown in the rate of gain in food production and a growing concern that population growth and food production were on a collision course.

The gravity of the situation came into focus as the monsoon on the Indian subcontinent failed two years running, in 1965 and 1966. The United States responded by shipping the equivalent of nearly one-fifth of its wheat harvest, feeding sixty million Indians for nearly two years. This record shipment, the largest ever between two countries, was sufficient to stave off famine.

As of mid-1968, both the food situation and food production prospects in Asia have changed almost beyond belief. The Philippines is self-sufficient in its staple food, rice, for the first time since 1903. Iran, with a substantial expansion in wheat acreage, is actually a net exporter of wheat this year. Ceylon's rice harvest climbed 13 percent above the previous record, as it both expanded the area under cultivation and raised yields.

Pakistan's wheat crop, harvested in April and May, is estimated to be 30 percent above the previous record. So is India's. The total Indian foodgrain crop, officially estimated at 100 million tons, is up 32 percent from last year's drought-depressed levels and, more importantly, up 12 percent from the previous record. Good weather has helped boost the harvest on the Indian subcontinent this year, but increases above the previous record are largely the results of solid technological progress—more efficient varieties, more fertilizer and better farm practices.

What has caused this remarkable turnabout? One factor is new political commitments at the top in several countries. Short-changing agriculture is no longer either feasible or fashionable. This new political climate has led to firm allocations of budgetary and foreign-exchange resources. India, for example, increased its budget for agricultural development by one-third in 1966-67; it is now using the equivalent of nearly one-fifth of its foreign-exchange earnings to import fertilizer and raw materials for manufacturing fertilizer. Turkey's imports of fertilizer may make up the largest single item in overall imports this year, exceeding for the first time petroleum and petroleum products. The availability of fertilizer in Pakistan is twice that of two years ago and several times that of 1960; it is expected at least to double again by 1970.

Many governments which heretofore neglected agriculture have been encouraged to give agriculture a higher priority by the "short-tether" policy of the United States, whereby food-aid agreements are of short duration and renewal depends on local effort and performance. The overall scarcity of foodgrains, particularly rice, in many Asian countries increased prices to the point where it suddenly became very profitable for large numbers of farmers to use fertilizer and other modern inputs.

While some factors contributing to the takeoff in agriculture are of recent origin, others have been long in the making. The agricultural infrastructure is capable of supporting current ad-

vances because of several years of AID investment in farm-to-market roads, in irrigation projects and in agricultural research and training. Investment in irrigation systems over the years provides a vast acreage of well-watered land, much of it well suited to the intensive use of modern farm technology. Adequate supplies of water and fertilizer are needed to attain high yields. The training of some 4,000 Asian agriculturists over the past decade, sponsored jointly by AID, the U. S. Department of Agriculture and the Land Grant Universities, contributes to a corps of trained professionals capable of adapting and disseminating new technology.

The availability of fertilizer has increased severalfold over the past decade, partly as a result of expanding indigenous production and partly because of steadily rising imports. The financing of fertilizer imports is now a major AID activity, requiring a sizable portion of the agency's budget. Investment by fertilizer manufacturers and other supporting industries has helped to fuel the takeoff in agricultural production. Countries in which U.S. firms have built or are building fertilizer plants include South Korea, the Philippines, Taiwan, India, Iran and Malaysia. Fertilizer produced in these plants could increase the region's annual food-producing capability by an estimated 25 million tons of grain. Other agrobusiness activities such as the manufacture of pesticides and farm equipment are also contributing to the rapid growth in food production.

Perhaps the most exciting development is the rapid spread of new, high-yielding varieties of cereals. The Mexican wheats now proving so adaptable throughout Asia are the product of more than twenty years of work by the Rockefeller Foundation. Efficient new rice varieties are coming principally from the International Rice Research Institute in the Philippines, an institution founded jointly by the Rockefeller and Ford Foundations in 1962 and devoted solely to the improvement of rice production in the tropics and subtropics. Work on high-yielding varieties of corn, sorghum and millet is concentrated in India, where the Rockefeller Foundation is providing leadership for the program. Areas planted to the new varieties went from a few hundred acres in 1964-65 to about 23,000 acres in 1965-66, nearly four million acres in 1966-67 and over twenty million acres during 1967-68, the crop year just ended. Plans and expectations indicate a further expansion of up to forty million acres in the coming year.

Several factors are responsible for this rapid gain in acreage. The new varieties often double yields of traditional varieties; their superiority is so obvious that farmers are quickly persuaded of their merits. This contrasts sharply with improved varieties made available in the past, which were only marginally superior to varieties being used. Another reason is the degree to which the high yields attained on the experimental plots are transferable to field conditions. There are reports of instances in which farmers actually attained higher yields under field conditions with large acreages than researchers did on experimental plots.

The availability of these new seeds has enabled many Asian countries to shorten materially the agricultural development process. The importing of numerous varieties in small quantities for testing purposes was in itself an effort to achieve a shortcut; food-deficit countries availed themselves of the results of plant-breeding work undertaken elsewhere. But they did not stop there. Once it was demonstrated that a given high-yielding variety was adapted to local growing conditions, large tonnages of seed were imported, thus eliminating the several years required to multiply and accumulate sufficient supplies of seed locally.

Pakistan imported 42,000 tons of seed wheat from Mexico during 1967, enough to plant 1.5 million acres. As a result, Pakistan now has enough seed to plant its entire wheat acreage to Mexican wheats. India imported 18,000 tons of Mexican wheats in 1966. This, coupled with indigenous multiplication of seed from the initial introduction of the same varieties, enabled Indian farmers to plant 8 million acres this year—the target acreage for 1970–71, and more than double the target of 3.5 million acres for the current year. Turkey, starting later than India or Pakistan but determined to catch up, imported 21,000 tons of high-yielding wheat, including some U.S. varieties, for use on a much smaller acreage. Both the import of samples of the new varieties initially, and the larger shipments later, represent a massive infusion of a new technology at a nominal cost, with potentially widespread application. They constitute a windfall gain in food production for many of the less developed countries.

The new varieties possess several distinctive characteristics. They are almost all short-stemmed, so they can absorb large quantities of fertilizer without lodging (becoming top-heavy and falling down); they are much more responsive to fertilizer at all levels of application. A given amount of fertilizer produces a much

greater increase in yield than with the older varieties of grain. And unlike high-yielding varieties of cereals developed in the United States or Japan for rather specific growing conditions, these varieties are adapted to a much broader range of latitudes.

The new varieties of rice are early maturing, ripening in 120 to 125 days compared with 150 to 180 days for the older varieties. They are also rather insensitive to the length of daylight and thus can be planted at any time of the year if the prevailing temperature and water supply permit. With adequate water, some farmers in the Philippines and India are harvesting two or even three crops each year. Where water supplies are not sufficient to grow rice during the dry season, farmers grow high-yielding hybrid grain sorghums or hybrid corn. Triple-cropping of rice, or rice in combination with sorghum or corn, is resulting in yields under field conditions as high as 8 tons of grain per acre per calendar year. This contrasts with average yearly rice yields in Japan of just over 2 tons per acre and wheat yields in Europe of less than 2 tons per acre. The introduction of the early-maturing Mexican wheats in northern India and Pakistan is permitting the double-cropping of wheat and corn, with wheat grown during the *rabi* (winter) season and corn during the *kharif* (summer) season.

II

Introduction of the new varieties is changing not only the technology of production but also the economics. The potentially far-reaching economic implications of the agricultural revolution are only now becoming clear. Projected demand for agricultural inputs such as fertilizer, pesticides, water and irrigation equipment must be recalculated. Many of the assumptions underlying current strategies of agricultural development must also be reexamined. For example, in the short run, the profitability of using fertilizer will increase demand above what it would otherwise have been. Over the longer run, however, the demand for fertilizer may be lower than would otherwise be the case since a smaller amount of fertilizer will be required on the more responsive varieties to reach a given level of production.

High rates of return on investments in production inputs, reflecting a more favorable economic climate due to better prices for farm products and more efficient new technologies, are mobilizing rural savings not previously available for production

purposes. Investment is on the rise not only in those things which increase output in the short run, such as fertilizer, but also in those which boost food-producing capability over the long run, such as tubewells and irrigation pumps. Over the course of five years, Pakistani farmers in the cotton and rice-growing areas of the former Punjab, where the water table is quite near the surface, have installed some 32,000 private tubewells, costing from \$1,000 to \$2,500 each. The value of the supplementary irrigation made possible by these wells is such that farmers characteristically have paid for them in two years. A large proportion were installed without government assistance or subsidy of any kind. The number of low-lift pumps installed in East Pakistan, totaling 2,200 in 1965, is expected to increase to 14,000 by 1969, greatly increasing the potential for double-cropping rice during the dry season. Similar high rates of return on small-scale irrigation investments are reported in India, where the number of wells is also climbing at an astronomical rate.

Early-maturing varieties of rice which ripen during the monsoon require mechanical drying before storage, since the time-honored method of spreading rice in the roadside to dry is not feasible. The demand for grain-drying equipment, now climbing rapidly, was not anticipated. Similarly, the use of pesticides, often uneconomic when average rice yields were 1,000 to 1,500 pounds of milled rice per acre, is suddenly very profitable on the new varieties, averaging 3,000 to 4,000 pounds. Growth in demand for both pesticides and application equipment such as knapsack sprayers and dusters will be closely associated with the spread of the improved seed.

The new varieties, with their potential for multiple-cropping, place a premium on fast preparation of the seedbed. Farmers planning to double-crop or triple-crop their land may no longer have several weeks to prepare the ground with bullocks or water buffalo; they may have to use power-driven farm equipment to prepare the seedbed quickly and plant the next crop. Even in some countries where new varieties are not yet widely spread, the profitability and feasibility of farm mechanization are being increasingly recognized. In Thailand, where the movement of goods from farm to market is largely by canal or river, rice fields are prepared principally by water buffalo. Under these circumstances, farmers are discovering it is more economical to hire someone with a tractor to plow the rice fields for a few dollars

per acre than to feed and care for a team of water buffalo all year just to use them during a few weeks at plowing time. Some 20,000 to 25,000 imported tractors plowed an estimated one-fourth of the rice acreage this past year, mostly on a custom-hire basis—not unlike the way in which wheat is harvested in the Great Plains of the United States.

The more intensive farming methods associated with the new technology require more farm labor. The new varieties will not respond to the traditional practice of planting the crop and then virtually forgetting it until harvest time. Substantial amounts of additional labor must be invested in applying fertilizer, weeding and the like. Expansion of the area that can be multiple-cropped is also resulting in a more effective use of the rural labor supply, particularly during the dry season. In Asia, where underemployed labor constitutes one of the world's largest underutilized resources, this promises a major economic gain. For the first time, there is the possibility of significant labor scarcities in localized rural areas.

III

Changes associated with the new farm technology have a social as well as an economic impact. The exciting new cereal varieties are so superior to the traditional varieties and so dramatic in their impact that they are becoming "engines of change" wherever used. They may be to the agricultural revolution in Asia what the steam engine was to the industrial revolution in Europe.

Successful adoption of the new seed requires the simultaneous adoption of new cultural practices and the use of modern inputs. The seasonal rhythm of rural activity, once determined largely by the monsoon, is changing as farmers begin to double-crop and to introduce new combinations of crops. Farmers taking advantage of the new technology must enter the market; they cannot remain subsistence farmers. Rural Asians will change and innovate—when it is to their advantage to do so. Significantly, there may be some spin-off from this breakthrough in agriculture, this initial break with tradition. Family planners should take heart. As farmers learn that they can indeed influence their destiny, they may become much more susceptible to family planning and other equally "radical" departures.

Not all changes wrought by the new technology are desirable. In some areas, tenants are being reduced to farm laborers as

landowners discover the profitability of the new technology in the current economic setting. Even though income to the landless may rise, the socioeconomic gap between the landowners and the landless may widen. Dissidents among the landless group in some states in India now form the nucleus of the opposition parties. Among those who own land, the income gap between those owning fertile, well-watered land and those with marginal land is also likely to widen. While many of the former may easily triple or quadruple output, the latter may not be able to employ the new technology at all. Those who can, and are thus permitted to enter the market, are likely to become more vocal and more interested in influencing the economic policies affecting their fortunes in the marketplace. Political activization of rural populations is an expected concomitant of the agricultural revolution now under way.

The leadership in most Asian countries is not unaware of the political implications of recent changes in rural areas. Prime Minister Demirel of Turkey feels strongly enough about the crash program in wheat production, initiated at his behest less than two years ago, to have it directed and monitored from his office. Some observers think President Marcos of the Philippines, who has brought his country to self-sufficiency in rice by emphasizing rural development, may be the first President of the Philippines ever to be reelected to office. Former Prime Minister Maiwandwal of Afghanistan was so impressed with the production potential of the Mexican wheats and with the urgent need to arrest Afghanistan's growing dependence on imported wheat that he assessed each of the Ministries 2.5 percent of its current year's development budget to create a fund to launch an accelerated wheat-production program. Two years later, the Afghans appear to be progressing toward their goal of self-sufficiency in wheat. President Ayub of Pakistan shows a deep personal interest in the agricultural programs under way in his country and follows their progress on an almost daily basis. India's progressive C. Subramaniam, former Food and Agriculture Minister, took advantage of the food crisis to mobilize support for and launch the accelerated food-production effort responsible for much of India's gains.

Recent agricultural progress should not give cause for complacency. Many difficult problems lie ahead, especially in the fields of farm credit, water development, plant disease, foreign-exchange availability, marketing and price incentives.

Purchases of farm inputs are often concentrated initially among the larger farmers who are able to finance their own purchases. The rate at which small farmers adopt new technologies is frequently determined by the availability of farm credit on reasonable terms. If, like the great majority of Asian farmers, they are dependent on the local moneylender for credit, often at interest rates ranging from 20 to 100 percent per year, they may not find it profitable to use modern inputs such as fertilizer. Available evidence indicates that fertilizer distribution in some parts of India and West Pakistan is beginning to slow because of a lack of credit.

Intensive cultivation of the new high-yielding varieties requires, in addition to an adequate supply of water, a far more sophisticated system of water control and management. At present not more than one-third of Asia's rice land is considered suitable for the new, short-stemmed rice varieties. Excessive and erratic flooding during the monsoon or rainy season is not conducive to the intensive cultivation of rice, which requires hand-weeding and the use of fertilizer and pesticides. Either too little or too much water can be damaging.

Associated with the massive introduction of exogenous varieties is the risk that some local insect or disease could suddenly wipe out the entire acreage, thus creating possible famine not unlike that occurring in Ireland more than a century ago. The worst of this threat may have passed, however, for the number of new varieties has already reduced dependence on any single one. Each year that passes should make the threat less dangerous.

Rice production during the dry season, once limited by the lack of varieties adapted to the off season, is now limited by a lack of water. This can be remedied either by developing underground water resources, which are quite abundant in some areas, or by using pumps to lift water from the numerous rivers and canals that flow through many of the rice-growing areas during the dry season. The exploitation of unused water resources will expand the acreage suitable for planting the high-yielding rices. Few, if any, developing countries are endowed with all the raw materials needed for manufacture of chemical fertilizers—phosphate rock, potash, sulfur and natural gas or naphtha. As the use of fertilizer expands, many countries, chronically faced with a scarcity of foreign exchange, are hard pressed to find enough hard currency for the required imports. For some individual countries, such as

India, this scarcity of foreign exchange could effectively reduce the rate of agricultural progress.

Frustrating though these problems may be, the dominant constraint on agricultural growth is likely to be inadequate marketing systems and an overall lack of markets. The recent emphasis on agricultural development has been concentrated on the expansion of production; marketing has been largely neglected, with the result that some of the promising gains made in production may be negated. Over the past decade many of Asia's large coastal cities—Karachi, Bombay, Madras, Calcutta, Colombo and Djakarta—have become increasingly dependent on imported foodgrains. To become self-sufficient requires not only producing a surplus in the countryside sufficient to feed these cities, but also having a marketing system capable of moving rural surpluses to the cities when needed. This means farm-to-market roads, storage facilities and a market-intelligence system to rationalize the movement of commodities.

Several Asian countries, such as Pakistan, the Philippines and Turkey, could produce exportable surpluses of grain within the next few years, joining Thailand and Burma. If they do, they must develop the transport and storage facilities needed to move potentially large surpluses of grain from often remote rural areas into world markets. If exportable surpluses develop, there will be mounting pressure on Japan and the EEC countries—where cereal production is often subsidized at prices double the world market price—to reduce subsidies and permit imports.

IV

Problem areas notwithstanding, an agricultural revolution is under way in Asia. The new cereal varieties provide a means for tapping some of the vast, but as yet largely unrealized, food-producing potential of the tropics and subtropics, putting them on a more competitive footing with the temperate-zone cereal producers. The agricultural breakthrough occurring in several major Asian countries can be repeated in Latin America and Africa. Mexico, which once depended on imports for nearly half its wheat needs, is now exporting small quantities of both wheat and corn. Kenya, until recently a food-aid recipient, has produced an exportable surplus of corn, its food staple. Tunisia and Morocco are introducing the Mexican wheats. Much of the technology now being applied in Asia will also be applied in both

Latin America and Africa, if the necessary top-level political support and proper combination of economic policies are forthcoming.

The farm sector now constitutes from one-third to one-half of most Asian economies. It is conceivable that the 2 percent rate of increase in food production prevailing during the early and mid-1960s could accelerate to 4 or 5 percent yearly over the next few years, provided markets can absorb the additional output. The additional purchasing power thus generated for both production and consumer goods will stimulate a more rapid rate of growth in the non-farm sector. The net effect should be a much more rapid rate of overall economic growth than would otherwise have prevailed. If the Asian agricultural revolution continues, it could well become the most significant world economic development since the economic rebirth of Europe following World War II.

This agricultural revolution is not the ultimate solution to the food-population problem, but it does buy some much needed additional time in which to mount effective family-planning programs. If food scarcity lessens as anticipated in some of the major food-deficit countries, governments recently preoccupied with real or impending food crises can again turn their attention to the business of development. Although the need for food aid is likely to lessen sharply within the next few years, capital needed for investment in the agricultural infrastructure is certain to increase. The need for technical assistance seems likely to rise as the problems generated by dynamic movement in agriculture increase. The need for foreign private investment in agrobusiness will also rise sharply as farmers clamor for the inputs they need to take full advantage of the new genetic potentials available to them.

The positive economic effects of an agricultural takeoff in Asian countries are quite evident. What is not so readily realized is that it will bolster the confidence of national leaders in their ability to handle other seemingly insoluble problems. It may also strengthen their faith in modern technology and its potential for improving the well-being of their people.

MALTHUS, MARX AND THE NORTH AMERICAN BREADBASKET

By Orville L. Freeman

NORTH America's dramatic emergence over the past generation as the world's principal supplier of food can be illustrated with a half dozen numbers. During the late 1930s, three of the world's seven major geographic regions supplied virtually all of the grain moving into the world market. Latin America, with exports of nine million metric tons yearly, was the leading food exporter, and grain exports were an important source of foreign exchange earnings. North America and Eastern Europe (including the Soviet Union) were each exporting five million tons yearly. Most of the grain exported from these three regions, principally wheat and corn, went to Western Europe.

Thirty years later, the pattern of world grain trade has been altered beyond recognition. As of 1966, Latin America, with net grain exports of two million tons, was scarcely self-sufficient. Exports from Argentina were largely offset by imports into Brazil and other smaller importing countries. Eastern Europe, including the Soviet Union, no longer exported grain but on the contrary was an importer; in 1966 the area imported some fourteen million tons, largely from Canada.

Of all the changes in the pattern of world grain trade between the late 1930s and 1966, the change in the position of North America was most pronounced. As shown by the table on the next page, net grain exports increased from five million tons to sixty million tons, providing in 1966 some 85 percent of the combined grain exports of the net exporting regions. Australia has substantially increased its exports, but its share of the total has remained at about 12 percent. North America has clearly emerged as the breadbasket of the world.

About three-fourths of North America's grain exports originate

in the United States; the remaining one-fourth, coming from Canada, consists largely of wheat. U.S. grain exports are presently rather evenly divided between wheat and feedgrains. Significantly, the United States alone could export easily the entire sixty million tons yearly if it were to remove all remaining production constraints.

Several factors have contributed to North America's growing importance as a source of food for the rest of the world. Three of these stand out. On the demand side, both the forces identified by Malthus and the adverse influence of Marxian thought on agri-

WORLD GRAIN TRADE BY MAJOR GEOGRAPHIC REGIONS

Region	1934-38	1960	Estimated 1966
	(in million metric tons)		
North America	+ 5	+ 39	+ 60
Latin America	+ 9	0	+ 2
Western Europe	- 24	- 25	- 23
Eastern Europe (incl. U.S.S.R.)	+ 5	0	- 14
Africa	+ 1	- 2	- 3
Asia	+ 2	- 16	- 30
Oceania (Australia & N.Z.)	+ 3	+ 6	+ 8

Note: plus = net exports; minus = net imports. Minor imbalances between world imports and exports in a given year may be due to rounding or variations in reporting methods used by various countries.

culture in the communist countries have contributed to the steadily growing excess of food consumption over production outside North America. On the supply side, the massive application of science to agriculture in the United States has resulted in an impressive increase in its capacity for producing food, making it possible to respond to growing needs abroad.

II

Malthus first described the threat of uncontrolled population growth in 1797, nearly 170 years ago. His theory that population would tend to grow geometrically while food production would increase arithmetically has proved valid throughout much of the world. Half a century after his gloomy prognosis Ireland's population was sharply reduced by a famine.

It is commonly supposed that food shortages exist in the less developed countries because agriculture is performing poorly there. This is not exactly the case. Food production is increasing almost as rapidly in the less developed countries as in the developed ones. Between 1957-59 and 1966, total food production in the less developed countries increased 19 percent as compared to

22 percent in the developed countries. But population growth rates in less developed countries were double those in the more advanced countries, largely offsetting the overall gains in food production. Latin America and Western Europe illustrate this. Both have expanded food production at about 2.5 to 3.0 percent annually over the past decade. In Europe, where population is increasing at about 1 percent per year, this has meant progress and a steady upgrading of diets. But in Latin America, where population has been multiplying at nearly 3 percent per year, food output per person has not been gaining.

Rates of population increase in the less developed countries today are without precedent. In several they are well above 3 percent yearly, in some instances approaching the biological maximum. Populations growing at 3 percent yearly double within a generation and multiply eighteenfold within a century. To the agriculturalist, this Malthusian arithmetic is frightening. A less developed country today is, almost by definition, one with a rapid rate of population growth. There are not many exceptions. The impact of modern health measures has reduced death rates, but comparable reductions in birth rates have not been achieved. Even a population growth rate of 3 percent could be tolerable if there were vast areas of fertile, well-watered land to be brought under the plow. But unfortunately, most of the frontiers have long since disappeared and the supply of new land which can be brought into production quickly and cheaply is fast diminishing.

The world food problem is, however, more than a race between food and people. In reality it is a race between the production of food and the demand for food. There are two reasons for the sharp increase in the world demand for food: population growth is one; the other is rising per capita incomes.

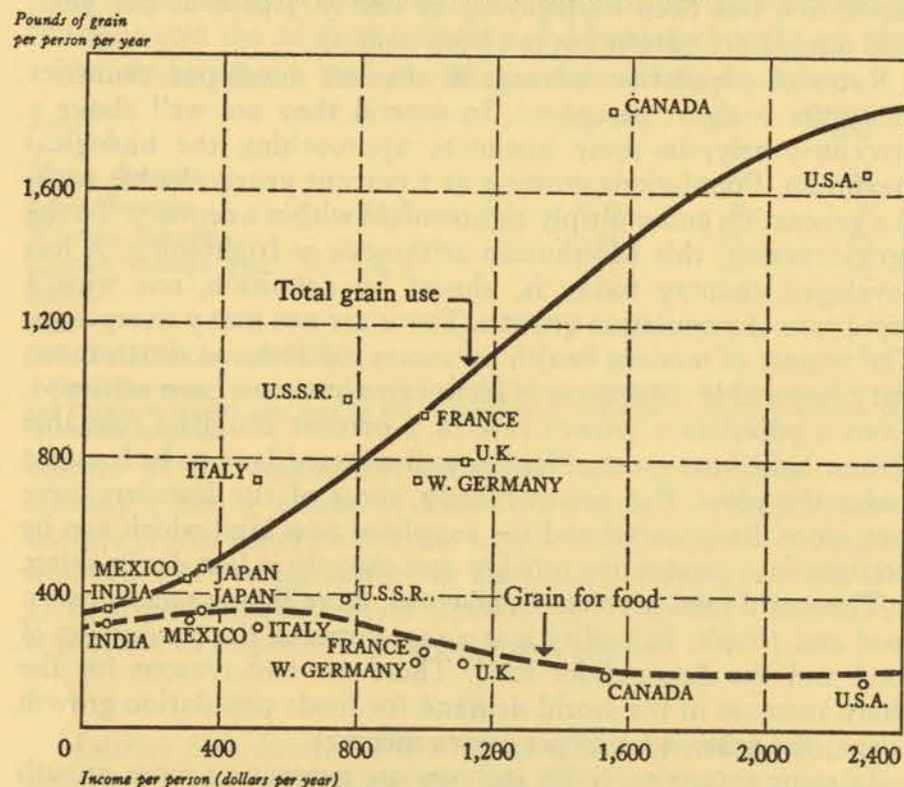
In some countries, rising incomes are generating more growth in the demand for food than is population increase. This is certainly the case in Japan, where incomes have risen 7 percent annually over the past decade, but where population has grown less than 1 percent annually. The same is also true for many countries in Europe, particularly West Germany, France, Sweden and Italy. To construe the problem merely as a race between food and people fails to grasp the whole issue.

In no country prior to World War II had population growth rates or per capita incomes risen rapidly over an extended period. High, sustained rates of growth in both population and income per

person are largely postwar phenomena, and to make things more difficult, they have occurred simultaneously. The result, in recent years, has been a rate of increase in demand which the world's farmers have not matched.

The difference in diets between a low-income, less developed country and a more advanced country such as the United States

INCOME AND PER CAPITA GRAIN CONSUMPTION, TOTAL AND FOR FOOD



or Canada is much more than merely the difference between 2,000 calories per person per day and 3,000 calories. Caloric intake measures only the quantitative aspects of diet. It gives no indication of quality; it does not show whether malnutrition exists—from, say, the lack of protein.

To provide the high-protein diet enjoyed by North Americans requires close to one ton of grain per person per year. Of this total only about 150 pounds are consumed directly as grain. Most of the remainder is consumed indirectly in the form of meat, milk and eggs. The amount of grain available per capita in the less

developed nations averages about 400 pounds per year. Deducting some 10 percent of this for seed leaves 360 pounds for consumption, or less than one pound per person per day. Nearly all of this must be consumed directly to meet minimum energy requirements. Little is left for conversion into meat, milk and eggs—the traditional sources of protein in the more developed nations.

For every \$2 rise in annual per capita income there is a corresponding rise in grain requirements of at least one pound. (See chart.) The significant point is that virtually every country, regardless of its level of development, is striving to improve per capita income over the next few years. If these plans succeed, much more food must be obtained somewhere.

III

Just as the developing countries are, almost by definition, countries with rapid rates of population growth, so communist countries are countries with a poorly performing farm sector. There are few, if any, significant exceptions. To name a communist country—Poland, Czechoslovakia, East Germany, the Soviet Union, Albania, Mainland China, Cuba—is to name a country having problems with agriculture.

All of these nations have claimed allegiance to Marxian thought—in agriculture as well as in the rest of the economy. Actually, Marx himself had little to say about agriculture. He was a city boy, primarily interested in diagnosing the social ills of early industrial societies. It was largely his followers who assumed that agriculture, like industry, could be readily organized on a large scale under state control. And it was they who went on to exploit agriculture in order to provide the basis for industrialization. Agriculture was given neither sufficient inputs nor incentives.

The communist countries are beginning to pay dearly for this policy. Food shortages have become a drain on their foreign exchange and a drag on their economic growth. The decision to organize agriculture on a large-scale, authoritarian basis has cost the communist countries literally billions of dollars in inefficiently used resources and lost economic growth.

Khrushchev's rise to power was closely followed by several efforts to cure Russia's farm ills. The Machine Tractor Stations were abolished; large areas were planted to corn in an effort to emulate successes in the American Midwest; and vast areas of virgin land were plowed and planted to wheat in areas of marginal

rainfall. Output did increase from 1954 to 1957, and in 1958 Khrushchev promised the Soviet people that they would soon surpass the Americans in per capita production of meat, milk and eggs. At the same time, however, investment in agriculture was reduced. In the following years, output stagnated at 1958 levels. Yet in 1963 when I visited the Kremlin, Khrushchev was still bragging loudly. That year drought struck, accentuating an already weak position, and in 1964 the Soviet Union imported more wheat than any country in history. Khrushchev was out of office before drought occurred again in 1965.

The dramatic reversals in Chinese agriculture, following the Great Leap of 1958 and during the early 1960s, were equally abrupt. Many, principally those who had failed to gauge the weaknesses of the Great Leap, particularly in agriculture, were much surprised in 1961 when China turned to Western countries for several million tons of imported grain. This continuing dependence on food from abroad probably reveals more accurately than any other available information the true state of affairs in Chinese agriculture. Another indicator is the reported effort to move twenty million urban immigrants back to the rural areas from whence they came "to provide more labor to produce food." What it may disclose is not so much a shortage of labor in the countryside as the inability of the Peking régime to procure food in the countryside for movement to the cities. To avoid hunger and possibly famine in the cities, Peking has imported food from abroad and exported people back to the countryside where their village kin are more willing to share their food with them.

A generation ago Mainland China was the leading producer of soybeans, supplying some 90 percent of all the soybeans entering the world market. In recent years, however, a steadily expanding population has reduced the outflow of soybeans to a trickle. Today, the United States produces three-fourths of the world soybean crop, enabling it to provide some 90 percent of the soybeans entering a vastly enlarged international market.

Mainland China is, perhaps ominously, suffering from both the influence of Marx and the forces identified by Malthus.

IV

Offsetting the effects of the forces described by Malthus and the adverse influence of Marxian thought on food production has been the impressive development of North America's capacity for

producing food. Several factors have contributed to this. To begin with, the United States has an excellent piece of agricultural real estate. Its Midwest, or Corn Belt, is one of the largest areas of fertile, well-watered farmland in the world. The only other areas even remotely approaching it in both size and inherent fertility are Northwestern Europe, the pampas of Argentina and the Gangetic plain of India.

Not only did we start with good farmland but we have done an excellent job of developing it. Through scientific soil and water management we have made inherently fertile soils even more fertile. Perhaps the most important single factor contributing to our unparalleled productivity has been the family farm. As a production unit it is the most efficient yet devised. Other forms of production organization are in use or have been experimented with, but most have not worked well. This is particularly true for most of the systems embodying very large production units such as collectives, communes or haciendas. The family farm, where the social unit and the production unit are identical, provides a stronger link between effort and reward than any other system. As a result, they are continuing to grow in both size and efficiency. Although many of these production units run up to several hundred acres in size and have assets frequently exceeding \$100,000, they are not corporate farms. They are still family units, owned and operated by the family, using mostly family labor. The number of large corporate farms is exceedingly small, and actually declining.

Another factor contributing to the success of American agriculture has been the careful delineation of the government's role. There seems to be a great deal of confusion as to the proper role for the public and private sectors in many of the hungry countries today. The record of U.S. agriculture provides some clues. The government has never been directly engaged in agricultural production. Actions such as the Homestead Act of 1862 were specifically designed to encourage private settlement and production. Neither has the government engaged in producing and distributing any of the multitude of inputs that modern agriculture requires. This has been left entirely to private industry.

Conversely, we did decide that government should conduct agricultural research and education. The idea that problems in agriculture should be subject to systematic research took root over a century ago. The first publicly supported agricultural

research in the United States took place before the Civil War in the Patent Office, the predecessor of the Department of Agriculture. Since the passage of the Hatch Act in 1887, the Land Grant Colleges have been an important partner in agricultural research. This government-sponsored work was the precursor of the concept of research and development in modern industry. We also decided at an early date that the government should be involved in extending new ideas and techniques from the laboratory and experimental plot to the farm. The result has been our widely respected Extension Service. The discoveries made through research sponsored by the Department of Agriculture are public property. As soon as new varieties are developed they are released, to be multiplied and distributed by private industry, hopefully at a profit. Similarly, when the process for developing frozen citrus concentrates had been perfected in Department laboratories, it was turned over to private industry.

Public policy recognized, after much struggle, that three million production units—producing literally dozens of different commodities and scattered throughout the United States—are not likely to be able to bargain effectively with the non-farm economy. As a result, government has influenced the terms of trade between farmers and the rest of the economy, generally by means of price supports. This policy, dating from the late 1930s, was instrumental in triggering what we now term the modern agricultural revolution. The effect of an assured price level backed by government is to encourage farmers to invest both short-term production capital in fertilizer and in superior but expensive seed of new and improved varieties; and longer term capital in productive capacity—in irrigation, drainage and other improvements in land and other capital assets.

Governments in nearly all of the countries with modern, productive agriculture now operate price-support programs for principal crops. Thus we see government serving as a guarantor of minimum price, a referee in the marketplace and a catalyst to technological progress. This is not to say that the pattern we have chosen to follow in the United States is the precise policy that should be adopted by the developing countries, but it may be a useful guide. Involving government too directly in agriculture—often for political reasons—has resulted in a great waste of resources in developing countries.

v

Inevitably, the agricultural successes of the North American breadbasket and stagnation in communist agriculture have affected the balance of power between East and West. Indeed, North American food and our capacity for producing it have been instrumental in tilting the scales in favor of the West.

About the same time as Khrushchev's 1958 promise of a better diet and, implicitly, a better performance in agriculture, the Soviet leaders were also challenging the United States to a general economic competition. This was to replace the more overt military and political competition characterizing the earlier stages of the cold war. In some areas of economic competition the Soviets are performing exceedingly well. The overwhelming advantage we once enjoyed in the production of steel has been narrowed; the generation of hydroelectric power has increased rapidly in the Soviet Union, narrowing the gap between the two economies; in the space race we do not know whether the language first spoken on the moon will be English or Russian.

But in agriculture there is no contest. The United States, with scarcely 6 percent of its people still on the farm, is feeding 200 million Americans, 60 million Indians and the equivalent of at least another 100 million people in other parts of the world. The Soviets, by contrast, with close to half of their labor force still tied to agriculture, are importing grain to provide bread for their people. If we were as far ahead of the Russians in the space race as we are in agriculture, we would by now be running a shuttle service to the moon.

The impressive food-producing capability of North America and our growing lead over the countries of the East are beginning to have an impact on the countries of the Third World. During the early post-colonial years, many of the newly independent peoples could be satisfied with slogans and flag waving. Now they are hungry; they want food, not slogans. Rising rice prices in Djakarta helped to undermine Sukarno. Empty shelves in the food shops of Accra contributed to the overthrow of Nkrumah. More and more, the less developed countries are turning for assistance to those with food and food-producing know-how.

Our unmatched food-producing capability has strengthened our foreign policy immeasurably. For instance, during the period since World War II, and particularly since the communist takeover of the Chinese Mainland in 1949, the Japanese and U.S.

economies have become increasingly integrated. Traditionally, China and Japan were natural trading partners, with China supplying basic raw materials and foodstuffs in exchange for Japanese manufactures; Japan looked to China for much of its imports of soybeans, rice and other farm products. But China can no longer supply Japan's needs. Today, Japan looks to the United States for the bulk of its imports of farm products—wheat, rice, feedgrains, soybeans and cotton. The flow of farm commodities crossing the Pacific from the United States to Japan may exceed \$1 billion in 1967. Without our ability to generate huge farm exports, these strong economic ties could not have developed. In geographic terms Japan is off the coast of China, but in economic terms it is just off the coast of California. This is but one of the more dramatic illustrations of the value of a productive farm sector in supporting our foreign policy.

The growing food deficits common to nearly all the communist economies are causing them to become politically and militarily vulnerable. During the early 1950s the Communist Chinese did not hesitate to intervene massively in the Korean conflict, but today, though they have threatened to intervene in Viet Nam, in fact they have not done so. Nor do I think they will. During the early 1950s China was self-sufficient in food production. During the 1960s, however, it has imported five to six million tons of grain annually. In addition, its dependence on imported fertilizer has increased to the point where it is now the world's leading importer. Significantly, nearly all the imports of both food and fertilizer come from the West—Australia and Canada in the case of grain, Western Europe and Japan in the case of fertilizer.

Combined imports of food grains and fertilizer into China now require nearly 40 percent of her total export earnings. Data on food production trends within China are unreliable but the fact that the Chinese leadership, intent on industrializing, is willing to use such a large share of available foreign exchange for food and fertilizer—essentially consumer goods—indicates just how hard pressed the Chinese are on the food front. In the event of a showdown with the Chinese in Viet Nam, or anywhere else in Asia, it is quite likely that exports of food from Australia and Canada would cease. Imports of fertilizer might also be halted, and China would then face a near famine or possibly worse.

Food deficits in Eastern Europe are also affecting the relationships between countries. The fact that nearly all the COMECON

countries have grain deficits has loosened the economic and, therefore, the political ties binding them together. As recently as the early 1960s, the Soviet Union was supplying large quantities of grain to the East European countries in exchange for industrial products, such as chemicals from East Germany and machine tools from Czechoslovakia. As of the mid-1960s, however, the East European countries are turning increasingly to Canada for wheat and to the United States for feedgrains. East Germany, once the breadbasket of all Germany, must today import large and growing quantities of food and feed. The East European countries are finding that their natural trading partners lie to the West as well as to the East.

The embarrassing food shortages plaguing almost every communist economy are causing governments to invest more resources in agriculture, with the result that production is likely to increase. The Soviet Union enjoyed a bumper crop in 1966. This is not to say, however, that it, or any of the other communist countries, will become a leading grain exporter. The pressure for internal improvement in diets, as the standard of living improves, is too great. Some very substantial gains in grain production will be required before the Soviet Union can satisfy the growing desire of its people for more meat, milk and eggs.

As agriculture failed in one communist country after another, and they turned to the West for food imports, the communist strategists in Moscow must have faced a dilemma as they plotted their takeover of the world. What if they were successful? Who would be left to feed them?

VI

As the East-West ideological conflict begins to fade, it is clear that a new North-South polarization is beginning to take shape between the have and have-not countries. This new polarization—which is essentially economic rather than political—threatens to be a pervasive and divisive force. In spite of all the rhetoric describing the need to narrow the gap, the gulf is widening, both absolutely and relatively. Nowhere is this growing gap so painfully evident as in the case of food.

For the past seven years, increases in world food production have almost exactly equalled those in population growth. But the expansion in production plus the continuing reduction in stocks in recent years have not been sufficient to cover the additional

demand created by rising incomes. The result has been rising prices for basic food commodities such as wheat and rice, both within individual countries and in world markets.

Those countries which are more advanced and which have stronger purchasing power have been increasing their per capita consumption. In several countries where purchasing power is weak, either because of a lack of income or lack of foreign exchange, per capita consumption has declined. Two drought years are only a partial explanation of why per capita food supplies in India in 1966-67 were 5 percent below those of the early 1960s.

This decline, of course, has been concentrated in the low-income groups. Those of middle and upper income have increased their expenditures for food to offset at least partially the rise in prices. Those at the bottom of the economic scale, already using most of their income to buy their meager daily rations of food, have not been able to do so. When they have tightened their belts to the last notch, they take to the streets. Food demonstrations or riots erupt periodically, and with increasing frequency, in the major cities of Asia, North Africa and Latin America.

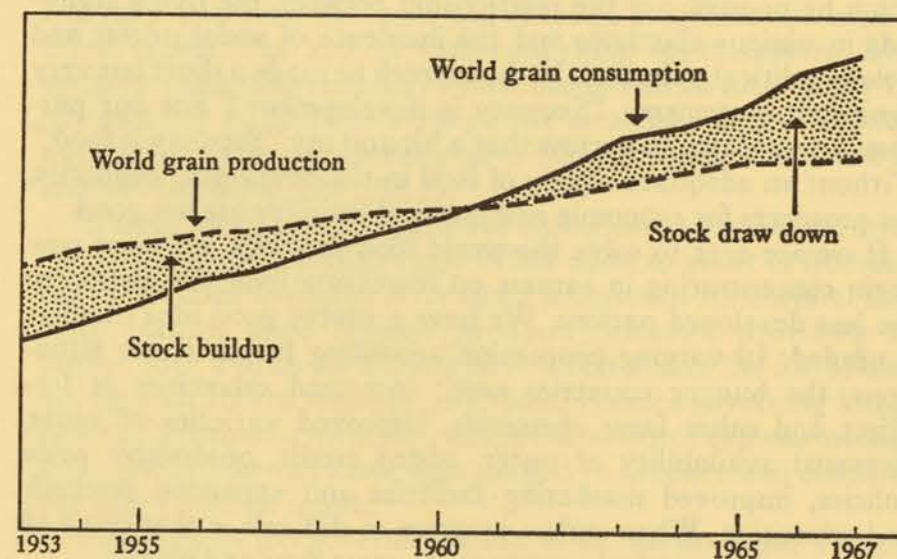
Perhaps the best illustration of just how acute this problem is becoming is the trend in rice prices in recent years. Nearly all of the world's rice-consuming peoples, except the Japanese, are continuing to multiply at an unabated rate. The area of land which can be used to produce rice, however, is rather rigidly defined by temperature, the availability of water and type of soil. The result has been a growing worldwide shortage of rice and rising prices over the past few years, and particularly the last several months. The price of rice, traditionally somewhat higher than wheat, has now climbed to the point where a ton of rice can be exchanged for two tons of wheat in the world grain market. Although this has not seriously affected the more advanced countries such as Japan or the smaller rice-importing countries of Europe, it has sharply reduced the ability of low-income, rice-consuming countries to import the rice they need.

An analysis of the trends in world stocks of grain—held almost entirely by the major exporters of wheat, feedgrains and rice—shows the emergence of some new and disturbing trends. During the eight years from 1953 to 1961, world grain stocks increased by an average margin of nine million tons each year. During this period world production was running ahead of consumption. During the six years from 1961 until 1967, world stocks of grain

declined each year. Most of this decline, averaging fourteen million tons per year, took place in the United States. This means that since 1961 grain consumption has been exceeding production by 1.4 percent a year. Stated otherwise, production is going up only 2 percent a year, while consumption has been increasing at about 3.4 percent annually.

This excess of consumption over production has been met by using the surplus stocks held by the major exporting countries, particularly the United States. But if food deficits continue to

WORLD GRAIN PRODUCTION NOW LAGGING
BEHIND CONSUMPTION



grow in the less developed countries, the exporting nations will not be able to fill the growing food gap. Five years ago, we in the United States had the world's two major reserves in the race between food needs and food production: some fifty million tons of excess grain in storage, and a large area of fertile cropland made idle under our farm programs. During the early 1960s, idle cropland increased and in 1966 exceeded fifty million acres. Decisions within the past year to increase acreages of wheat, feedgrains, rice and soybeans will bring nearly one-half of this cropland back into production. Once this ready reserve is exhausted, it will become much more difficult for the world to achieve any abrupt increases in production to meet additional demand.

Since World War II, and more particularly since passage of

Public Law 480, the 1954 enabling legislation for our food aid program, the United States has been attempting to alleviate world hunger by shipping food abroad. By the end of 1966, about 176 million metric tons of food worth \$15.7 billion had been shipped abroad under concessional terms. Despite this massive program we are still as far from solving the problem as when we began—perhaps further than ever.

The growing economic distance between the have countries of the North and the have-not countries of the South is, moreover, now a source of social unrest and political instability. Secretary Robert McNamara gave a speech in Montreal last May in which he pointed out the relationship between the living standards in various countries and the incidence of social unrest and violent political upheaval. In that speech he made a short but very significant statement: "Security is development." For our purposes I would like to narrow that a bit and say "Security is food." Without an adequate supply of food in the developing countries, the prospects for economic and political stability are not good.

If we are ever to solve the world food problem, we must now begin concentrating in earnest on increasing food production in the less developed nations. We have a pretty good idea of what is needed. In varying proportion according to particular situations, the hungry countries need: increased quantities of fertilizer and other farm chemicals, improved varieties of seeds, increased availability of water, added credit, productive price policies, improved marketing facilities and expanded research and education. What makes progress so difficult is that most of these must be brought together at the same time and place.

It is well recognized that these inputs are in short supply in most of the less developed nations. But one key item that is perhaps less well recognized is the lack of trained agriculturalists. Skilled and educated manpower is essential in every phase of a program designed to improve the production and marketing of agricultural products. Yet in virtually none of the less developed nations is the supply of trained manpower in agriculture anywhere near adequate. In many cases, there is only a handful of educated researchers, planners and extension workers. Colleges of agriculture are few and their output small.

By comparison, in the United States we have land-grant institutions in every state, plus many privately supported institutions, which have been graduating trained agriculturalists for many

decades. We have a relatively vast reservoir of highly skilled professional manpower (although still more is needed). In the Department of Agriculture alone we have 40,000 professional agriculturalists, only a few of whom are in Washington; most are working in the field throughout the 3,100 counties in the United States. These professionals include agronomists, entomologists, plant geneticists, agricultural economists and a host of others needed to develop and maintain high levels of productivity.

Until the less developed nations can build up cadres of trained personnel of their own, the logical approach is to make use of agriculturalists from the advanced nations. The United States has, for many years, been loaning know-how through A.I.D. and its predecessor agencies, and through programs operated by State universities and private consulting organizations. More recently these programs have been broadened to include the Department of Agriculture through the establishment of an International Agricultural Development Service which is financed by, and works closely with, A.I.D.

In addition to providing trained biological and social scientists, the Department is increasingly called upon to assist in formulating the policies so essential for rapid progress in agriculture. Food price policies must become producer oriented, providing the farmer with a price for his products which makes the use of modern agricultural technology profitable. Policies governing foreign private investment must encourage the influx of capital, management and marketing know-how needed to produce and distribute the sorely needed inputs.

This is not a job government can or should do alone. The participation and coöperation of industry—with its special skills and resources—is also urgently needed. As a nation we must cease asking how much it will cost to solve the food/population problem and begin asking how much it will cost if we fail to solve the problem in the allotted time. Time is the critical dimension. Today's hungry countries must compress the progress of centuries into decades and decades into years if they are to feed their rapidly multiplying peoples. Our aid is essential. As a nation we must now exercise the same imagination and resourcefulness which brought us to our current position of world agricultural leadership. We must devise more effective ways of linking our skills in producing food with the needs of the less fortunate multitudes abroad. The challenge has never been greater, or the stakes higher.

THE STORK OUTRUNS THE PLOW

Lester R. Brown

*If this race is to end differently, the food-scarce
nations must employ foreign know-how and
domestic price policy to spur efficient production
and distribution of yield-raising inputs*

The Stork Outruns the Plow

LESTER R. BROWN

ONE OF THE MOST disturbing problems facing man today is his apparent inability to balance his numbers and his food supply. Populations growing by 3% a year double within a generation and multiply eighteenfold in a century. To an agriculturist the demographic arithmetic is frightening. Man-land ratios are rising sharply throughout the less-developed world as the stork outruns the plow.

Thirty years ago the less-developed regions of Asia, Africa and Latin America were all grain exporters. Collectively, they sent some 11 million tons of grain yearly to the developed regions, principally Western Europe. During the war decade of the 1940's, this flow was reversed and the less-developed world became a net importer of grain, losing a valuable source of foreign exchange earnings. Net imports of grain

reached four million tons in 1950 and 13 million tons in 1959. As population growth rates in the less-developed countries accelerated further during the 1960's, the net inflow increased sharply, reaching an estimated 31 million tons in 1966. This rapidly growing food deficit is causing a sharp diminution in the world's food reserves.

Five years ago the United States had the world's two major reserves in the race between food and people. It had in its grain elevators 50 million tons of excess grain; i.e., above and beyond normal reserve requirements. In addition, a sizable fraction of its cropland was idled under farm programs. As of 1966 the surpluses of grain are gone. There are no excess stocks of wheat, rice or feedgrains. As recently as 1965 we had 56 million acres of idled cropland. Actions

taken during 1966 to expand acreage of wheat and feedgrains will bring back into production at least half of this one remaining reserve. With the U.S. reserves fast disappearing, the less-developed countries must now provide for increased food needs from their own resources.

Frontiers Fade

Why is the less-developed world losing the capacity to feed itself? Throughout most of recorded history man was able to increase his food supply by expanding the area of land under cultivation. He matched his increase in numbers with increases in the area under the plow. This was a moving force in the colonization of new lands. As long as he had this option, maintaining an adequate food supply was relatively simple. But on a finite earth this period of land expansion had to come to an end.

The area of land under cultivation in North America and Western Europe, ceasing to expand several decades ago, has actually declined over the past 30 years. This has not caused serious problems. Both of these regions developed an impressive production capability on the existing land area, doubling production within the past generation. The large-scale investment of capital and widespread application of technology enabled these regions to compensate for the lack of new land.

Until quite recently, most of the less-developed world was still expanding the area under cultivation to feed its rapidly growing population. In recent years, however, country after country has furrowed the last of the "new" land readily cultivatable.

During the Fourth Plan Period ending in 1971, India plans to expand the net area sown by less than 1%, though the nation's population is expected to increase by 14%. Clearly, most of its additional food

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needs must be met by raising productivity per acre.

Nearly all of Asia, the Middle East and North Africa share this land hunger. Only Subsaharan Africa and parts of Latin America [Editor's Note: See the article by Felipe Herrera on page 33.] can expect to significantly expand the area under cultivation. Most of the increases in world food needs over the remaining one-third of this century must be met by increasing the productivity of land already cultivated.

But many of the less-developed countries are faced with a dilemma. Although they have run out of new land to bring under cultivation, they have not yet achieved a takeoff in food output per acre. The result is growing food deficits. In order to keep food production increasing in line with demand, these countries must now begin using massive capital inputs and advanced technology.

As long as there is an abundance of new land to cultivate, continuing population growth does not pose any serious problems for traditional agriculture. The frontier is simply pushed back a bit further. Land and labor, the key inputs, are readily available. Seed and draft animals, the principal capital inputs, are self-generated on the farm. Next year's seed is saved from this year's crop. Technology does not change. Inputs are not needed from the rest of the economy.

## That Second Blade of Grass

An economy running out of new land to plow, however, must begin using large amounts of purchased inputs to raise the productivity of land. Under these circumstances, agricultural growth is entirely dependent on the rest of the economy for the goods and services needed to generate and sustain a takeoff in yield per acre. Fertilizer, pesticides, implements, improved plant varieties and a wide array of other inputs are needed. All must come from the nonfarm sector. Required services are as essential as the physical inputs themselves. These include research, credit, transportation and marketing facilities. Gains in food production in a "fixed-land" economy depend directly on the ability of the nonfarm sector to supply the necessary goods and services.

The extent of capital investment and technological change required to "make two blades of grass grow where one once grew" is not generally appreciated. Consider the variety and scale of purchased inputs in the United States. The farm inputs purchased by U.S. farmers totaled \$21.5 billion in 1965. Approximately \$9 billion of this represented feed and livestock purchases, many of them from other farmers. The remaining \$12.5 billion of purchased inputs came from outside the farm sector. The wide variety of inputs used included such things as fertilizer and lime (\$1.7 billion), petroleum products (\$1.5 billion) and equipment parts and repairs (\$525 million).<sup>1</sup> A sampling of other items includes electricity, containers of all kinds, binding twine for hay bales, veterinary services and animal antibiotics. The complete list of purchased inputs is pages long. For each of the 300 million acres they cultivate, American farmers spend \$42 annually on production requisites supplied by the nonfarm sector.

### **Japan: "Horticulture Not Agriculture"**

The average size of the U.S. farm is quite large, but it must not be thought that a system of small holdings is a deterrent to either the sharply expanded use of inputs or to greater agricultural output. Japan and Taiwan, with farms averaging only 2.5 and 3.1 acres respectively, have two of the world's most technologically advanced farm sectors. Consider Japan. [Editor's Note: For a brief analysis of Taiwan's success story, see the article on page 23.] Her farmers, with a high-rainfall rice culture and a more intensive mode of cultivation, spend even more per acre than do their American counterparts. Their per-acre expenditures for agricultural chemicals alone—fertilizer, insecticides, fungicides and herbicides—now exceed per-acre expenditures for all production requisites in the United States. In addition, though Japanese farmers typically operate on a small scale, they spend each year more than five dollars an acre for farm implements and power equipment. This is almost exactly the same expenditure per acre as in the United States. Whereas U.S. farmers buy one large tractor for, say,

150 acres, Japanese farmers buy a number of small garden-type tillers for the same area.<sup>2</sup>

U.S. farmers last year spent \$599 million for improved seed. India, with a slightly larger area under crops, represents a potential market of comparable size. The entire less-developed world, with a cultivated area roughly five times that of the United States, represents a fantastically large market for seed alone. By 1980 most of this vast area of cropland must be planted to improved varieties if the projected population is to be adequately fed. Few traditional varieties of foodgrains are genetically capable of the rise in yields required over the next 15 years. [Editor's Note: The possibility of genetic improvement of varieties is discussed by Wm. B. Murphy on page 94.]

### **Needed: 900 Million Tons of Food**

The demand for food in the LDC's, reflecting both population growth and modestly growing incomes, is rising 4% a year. Compounded over the next 15 years, this rate of growth will increase the demand for food by 80% between now and 1980. Grain consumption, now totaling just over 500 million tons, must climb to 900 million tons. Assuming this target, and using the rule of thumb of one pound of plant nutrients for each 10 pounds of grain, the current yearly fertilizer consumption of 7 million tons in the less-developed world must climb to 47 million tons in 1980. At \$150 per ton of fertilizer, this prospective market could well expand from the present one billion dollars a year to at least \$7 billion 15 years hence. This volume of fertilizer, averaging about one-fourth the Japanese rate of usage, would still be far from optimal.

The ability to supply this and other essential inputs rests in large part on two developments: the adoption by the developing nations of (1) enlightened price policies and (2) measures to encourage private foreign investment. In an area-expanding agriculture, food prices received by farmers have relatively little bearing on production levels. Once a country turns to raising output per acre, however, its farmers must be assured of a price for their products which makes the use of modern technology profitable. A farmer cannot

be expected to use fertilizer if its cost exceeds the value of the additional grain it helps produce. Yet, governments in most LDC's, with political bases in the urban areas, traditionally have a consumer-oriented food price policy. Their aim is to hold retail prices down. This generally involves keeping farm prices down, aggravating food supply problems. [Editor's Note: For an emphatic amen, see page 27.]

### **Supports and Subsidies**

The rash of takeoffs in yield per acre occurring in the late Thirties and early Forties in the advanced industrial countries was closely associated with the adoption of farm price support policies during the depression years. Some countries have chosen to achieve the same end by subsidizing farm inputs. The Government of Pakistan, for example, has been making fertilizer available at half the cost, stimulating demand to the point where it now exceeds the available supply. Farm price supports or input subsidies, or some combination of the two, can be effectively used to speed the adoption of modern technology, telescoping into years developments normally taking decades.

Once it becomes profitable to use modern technology, farmers catch on quickly, even though they may be largely illiterate. The problem then becomes supplying the inputs rather than overcoming the farmer's reluctance to use them. In India, where a price support system is now operating, the effective demand for nitrogenous fertilizer is estimated at 1.5 million tons this year. Since India produces only 400,000 tons, some \$120 million of scarce foreign exchange is being used to import 600,000 tons from abroad. Even so, a serious shortage, reportedly resulting in fertilizer riots in some localities, remains. [Editor's Note: For a further statement on India's fertilizer bottleneck, see page 26.] Fertilizer riots are admittedly preferable to food riots, but nonetheless it is unfortunate that farmers are deprived of the inputs they want and the country deprived of the food it so desperately needs.

The clamor for inputs is not limited to India or

to fertilizer. It exists in nearly all those developing countries where the use of modern agricultural technology is now profitable. Unfortunately, the industrial sectors of these countries lack the resources and technology to provide the necessary yield-raising inputs on the scale needed. Nor can the gap be filled with government-to-government assistance.

We have heard many times from many sources that the world now has the know-how to banish hunger. Unfortunately, however, the know-how is concentrated in one part of the world and the hunger in another. The resources—capital and managerial, technological and distributive—to meet this need are largely not in the hands of government. These resources have been developed by those large industrial firms producing and distributing agricultural inputs in North America, Western Europe and Japan. The problem is how to transfer these existing resources across national boundaries to the areas where they are needed. If the developing countries had unlimited time, they could eventually develop with their own resources an industrial sector capable of supporting a modern agriculture. But populations that double within a generation leave little time. Feeding populations that are 3% larger each year, on a fixed cropland base, requires a lot of progress in a short period of time. The transition from expanding area to raising yields must be quick. The progress of centuries must be compressed into decades; that of decades into years. Time is the new and single most critical dimension of the food-population problem. This is why the developing countries must seek a massive injection of private resources from abroad.

### **Flag Waving's on the Wane**

In the past, internal policies affecting foreign private investment in the land-scarce, food-hungry countries have been heavily weighted with ideological considerations. Fortunately, this is on the wane. People in the developing countries seem less and less willing to accept slogans and flag waving as a substitute for progress and better living conditions. An enlightened political leadership is beginning to heed the words

of Berthold Brecht in his celebrated *Three Penny Opera*:

*Now all you gentlemen who wish to lead us,  
To teach us to resist from mortal sin,  
Your prior obligation is to feed us:  
When we've had our lunch, your preaching can begin.*

The technology, capital and management and marketing know-how to overcome the energy-sapping food shortages in the developing countries exist. The problem these countries face is how to obtain them. Some countries, particularly Mexico, Taiwan and Israel—all three of them agricultural success stories—have successfully tapped this international resource. [Editor's Note: Further material on the Mexican experience appears on page 59.]

### Get Gov't. Out of Distribution!

Production of the needed farm inputs solves only part of the problem. They must also be distributed in an efficient, timely manner.

Too many leaders in the developing countries feel that government agencies can distribute farm inputs more efficiently than can private industry. Although governmental bureaucracies are not very adept at producing farm inputs, the record indicates they are even less adept at distributing them. Horror stories about seed arriving months after planting time and fertilizer not arriving at all are commonplace throughout the less-developed world. Private distribution systems reward the distributor for a successful distribution and sales effort and penalize him for failing to deliver the product in time for use. Government distribution agencies seem not to notice.

The distribution of agricultural inputs is incredibly complex compared with that of most industrial raw materials. The small-scale distribution systems with high markups characterizing most developing countries will not serve the needs of a modern agriculture. Modern mass-distribution methods of the kind used in the advanced countries must be introduced.

The concept of servicing customers seems not yet to have caught on in most developing countries. Firms distributing inputs in the more advanced countries

use customer servicing as a competitive tool. In the fertilizer business, for example, the quality of soil-testing services and advice on fertilizer usage provided to farmers is often a more important competitive tool than pricing. Advice meted out must be reliable. Next year's sales depend on it.

The lack of customer servicing in the LDC's is perhaps most obvious in the case of farm equipment. Governments in many developing countries import farm tractors and equipment directly, but fail to assume the responsibility for providing the spare parts and skilled maintenance men needed to keep equipment operational. The weaknesses of such an approach are evident in the abandoned farm equipment, particularly tractors, dotting the countryside.

The extraordinarily farsighted research and extension concept developed in U.S. agriculture during the latter part of the last century is the counterpart, and perhaps forerunner, of modern industry's research and development effort. During the earlier part of this century nearly all of the agricultural research in the United States was government research, conducted by the Department of Agriculture and the State Experiment Stations. The Federal-State Cooperative Service was the institution responsible for getting the results of this research to farmers.

This picture has altered dramatically since World War II. As of 1966 private industry is doing the major share of the agricultural research. Industry, through its highly trained sales and service force, is also now doing much of the extension of technology from the research plot to the farm, a job once belonging almost exclusively to the Extension Service. The innovative character of U.S. agriculture in the postwar period is due in good measure to the large-scale entry of industry into agricultural research and extension. At no time has the U.S. Government burdened itself with the production and distribution of inputs.

Today government and industry are effectively teamed, producing one of the most progressive and efficient farm sectors in the world. Government contributes importantly with its price support programs where they are needed, ensuring a minimum price to the farmer for his product. On the basis of this, the farmer and the lending institutions are willing

to invest in both short-term production capital and long-term improvements. Government supports basic research and industry translates this into a bewildering array of new and advanced inputs, many of which did not exist 10 years ago.

To the extent that developing countries can tap this research and extension capability through investment from abroad in their farm supply industries, they can move much faster.

In recent years, at a time when the need for additional resources in the have-not countries is growing, the actual flow of government-sponsored assistance from the advanced industrial countries has leveled off. Government aid as a share of gross national product of the donor countries has, in several important instances, declined sharply. Legislators, reflecting the mood of taxpayers, are reluctant to approve the expansion of funds for aid. These taxpayers, most of whom are stockholders either directly in the market or indirectly in the form of insurance or pension funds, seem not at all hesitant about having the firms in which they share ownership to some degree invest in the LDC's. Stockholders apparently feel that their capital will be used more effectively if subjected to the discipline of a profit-and-loss statement. The transfer of resources through private investment may over the longer run result in a much healthier relationship between the haves and have-nots. It is no longer a donor-receiver relationship. Investment agreements are entered into by both parties with the expectation of eventual benefit.

### No Strain on External Payments

Given the present tenor of things, this may be the only way to get the much-needed expansion in the flow of resources from the haves to the have-nots. This expanded flow need not aggravate balance-of-payments problems in the advanced countries. Large industrial firms in all of the more advanced countries are currently investing heavily abroad, but largely in other industrialized countries that are supplying most of the payments pressure. The times call for the redirection of at least a small share of this capital to

the developing countries, particularly in the industries supporting agriculture.<sup>3</sup> Such a redirection could effectively supplement the meager and decidedly inadequate resources of the developing countries.

The world must prepare to feed, by 1980, an additional one billion people. Fully four-fifths of this one billion will be added in the food-short developing countries. Expanding the food supply sufficiently may seem an awesome, almost impossible task, considering that the current 3 billion are so poorly fed. It is. But we have no alternative but to seek a solution. If the developing countries fail to generate an agricultural yield takeoff, the future will not be worth contemplating.

The know-how and the wherewithal to make the takeoff in land productivity possible resides within the advanced economies of Western Europe, Japan and North America—most of it in those firms which today provide the billions of dollars in purchased inputs used each year by the farmers in these regions.

A new approach to the problem of hunger is clearly required. This is reflected in the food aid legislation just signed by the President. The key word in this legislation, designed to replace the Food for Peace Program, is "self-help." On July 21, Secretary of Agriculture Orville Freeman enunciated one aspect of the new U.S. world food policy before a meeting of the 20-nation Organization for Economic Cooperation and Development:<sup>4</sup>

"In response to the growing need for agricultural inputs, we are making available sharply increased quantities of these items under our aid program . . . . Over the longer term the aid-recipient countries must develop their own agricultural supplier industries. To fail to do so will simply result in a shifting of dependence on aid in the form of food to aid in the form of agricultural inputs, creating an impossible burden for the advanced countries. We must assist the developing countries in creating the investment climate needed to attract capital and the accompanying managerial, technical and marketing know-how."

The Secretary's comments reflect a growing consensus among those working closely with development problems in general and agriculture in particu-

lar. As a nation we must now exercise the same imagination and resourcefulness which brought us to our current position of world economic and technological leadership. We must devise more effective ways

of linking food producing know-how and resources at home with the needs of the less-fortunate multitudes abroad. The challenge has never been greater. Or the stakes higher.

# NOTES

- 1 *Farm Income Situation*, Economic Research Service, U.S. Dept. of Agriculture, July 1966.
- 2 Lester R. Brown, *The Japanese Agricultural Economy*, U.S. Dept. of Agriculture, June 1961.
- 3 *Foreign Aid Through Private Initiative*, report of the Advisory Committee on Private Enterprise in Foreign Aid, Arthur K. Watson, Chairman, Agency for International Development, Washington, D. C., July 30, 1965.
- 4 Orville L. Freeman, Secretary of Agriculture, "The Unfolding World Food Crisis," statement at the Fifth Annual High-Level Meeting of the OECD (Organization for Economic Cooperation and Development) Development Assistance Committee, Washington, D. C., July 21, 1966.