

FINAL VERSION

THE WAR ON HUNGER

GUIDELINES FOR PLANNING AND PROGRAMMING A.I.D. ASSISTANCE  
IN AGRICULTURAL AND RELATED SECTORS

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## THE WAR ON HUNGER

### GUIDELINES FOR PLANNING AND PROGRAMMING A.I.D. ASSISTANCE IN AGRICULTURAL AND RELATED SECTORS

These guidelines are comprehensive. They describe the major elements that comprise agricultural sector development. The unique economic, physical, social and political characteristics of individual cooperating countries ultimately will determine the manner and degree in which these guidelines are meaningful in program and project design.

Any guidelines intended for promulgation on a worldwide basis must be interpreted selectively and wisely if they are to be effectively applied to the country assistance planning-programming process.

These guidelines contain much that is old and well known. They codify Agency experience and knowledge and are intended to bring about orderly program planning.

In addition to these guidelines, the formulation of assistance programs will be governed by the constraints imposed by the Foreign Assistance Act of 1966 which limits the number of countries that may receive assistance under each Chapter of the Act.

I. The Urgency and Nature of the Problem

Recent worldwide population studies, and the clear revelation of statistical analysis showing that within a few years the demand for food will out-race the production of food unless there is a great increase in production, have brought into focus the urgency with which the food supply problem must be attacked. The basic U. S. objective is to help each developing country, as soon as possible, to gain enough economic strength either to produce the food it needs or to purchase it commercially.

President Johnson, in his message to Congress on the foreign aid program on February 1, 1966, stated: "The problem of hunger is a continuing crisis. In many parts of the world we witness both the ravages of famine borne of natural disaster and the failure of food production to keep pace with rising needs.

"This is a catastrophe for all of us. It must be dealt with by all who can help. In many other countries food output is also falling behind population growth. We cannot meet the world food needs of the future, however willing we are to share our abundance. Nor would it serve the common interest if we could.

"The solution is clear: an all-out effort to enable the developing countries to supply their own food needs, through their own production or through improved capacity to buy in the world market."

It is estimated that in 1966 the food grain deficit in the developing countries totaled about 16 million metric tons. This will increase to 42 million metric tons in 1975 and 68 million metric tons in 1985, assuming that present food production trends continue, that population growth will be at the

median level of the U. N. projections, and that there will be only a modest increase in per capita food consumption. The estimated 42 million metric ton gap ten years hence exceeds the total of one annual U. S. wheat crop, and the 88 million ton shortfall in 1985 will be beyond the U. S. cropping capacity, even if we were to put back into production the 55 to 60 million acres now in reserve. It is abundantly clear that the U. S. cannot feed the world.

While an immediate increase in world food production is of vital concern and demands an intensive effort by Agency staff, it is not A.I.D.'s ultimate objective in agriculture. Rather it is A.I.D.'s basic concern that the agricultural sector in each cooperating country attain its full potential as an integral and productive part of total national economic and social development. This will require maximum participation in the task of economic development on the part of the people through the encouragement of democratic private and local governmental institutions.

Intensification of development efforts in the agricultural sector is imperative. Continuing and close attention must be given to the strategies and policies which guide food production and agricultural growth as well as to the magnitude of resources invested in agriculture. Of major influence are: (a) the qualitative adequacy of institutional and structural systems such as import-export policies, agricultural education, land tenure, taxes and agricultural credit; (b) the efficiency and level of physical inputs -- water, seed, fertilizer, pesticides, machinery; (c) the knowledge framework of applied science, research, (d) the motivation and incentives that have meaningful impact in the local social, economic and political setting.

To underscore the dimensions of importance and urgency which the U. S. assigns to the War On Hunger, Policy Determination Number        dated        has been issued. This Policy Determination should guide USAID policy, programming and implementation at all levels.

## II. The Basic Components of a Comprehensive Strategy of Agricultural Development

A comprehensive strategy for national agricultural development that accelerates growth rates and increases production beyond national subsistence levels generally will comprise the following basic components. The listing that follows will serve as a table of contents. The elements it contains are elaborated in Section V to provide guidance for planning and programming. The use of sector analysis to assess the interrelationships among these basic components is briefly addressed in Section IV.

### A. General Government Policies and Services

1. National allocative and budgetary decisions, involving both foreign exchange and local currencies for investment in agriculture.
2. General economic policies such as import, investment, exchange, etc., as they may affect agricultural investment and growth.
3. Price policies that will ensure a viable and productive relationship between the prices farmers receive for their produce and those they pay for needed production inputs.
4. Policies for equitable and adequate credit and land tenure arrangements.
5. A capacity for analysis, for strategy and policy planning, and for Program Management and Administration.

B. Technology, Including Research, Extension and Education

1. Adaptive research to ensure the compatibility of new varieties and production practices to the variable soil and climatic conditions with special attention to the hazards of destructive diseases.
2. The effective development and introduction of improved breeds and strains of livestock; plant seeds and materials; and production practices.
3. Effective systems of research, education, and extension to ensure the constant production of innovations necessary for continuous growth in agricultural production.

C. Physical Inputs for Production

1. Importation or manufacture of fertilizers, pesticides and improved equipment, tools and machinery.
2. Marketing and distribution of production inputs with attention to price as well as to availability.

D. Markets and Related Services

1. Determination of existing and potential market demands including domestic and foreign outlets.
2. The adequacy and efficiency of marketing systems, transportation, storage, and processing organizations and facilities.

E. Institutions

1. The institutional base for national programs of research, education and extension of knowledge.
2. Self-help mechanisms and incentive systems for rural people, such as local self-government, cooperatives, rural credit, farmer associations and tenure arrangements.
3. Improved systems of farm organization, operation and management

including the comparison of costs, benefits and profitability of (a) production alternatives and (b) changes in farm organization, production systems and selection of crop and livestock enterprises.

F. General Infrastructure

1. Transport, power, communications and related services and structures supporting agricultural operations.

2. Health levels and services necessary for individual productivity in agriculture.

3. Industrial investment and services directly linked to food production and distribution.

4. General education which undergirds specific education and training in agriculture and which makes possible economic, political and social advance in the rural society.

5. The characteristics of each of these six basic components and its role in agricultural development are elaborated in Section V.

III. Instruments of U. S. Assistance

The ways and means by which A.I.D. contributes to foreign agricultural development programs and intervenes in the process of development are briefly noted here. The choice of assistance instruments is varied according to the particular country situation. Assistance can be provided under individual bilateral agreements, associated with consortium agreements, and under certain conditions through multilateral organizations. These brief descriptions are referred to in the guidelines discussion in Section V. For statutory, policy and procedural guidance on these assistance instruments refer to the appropriate M. O.

The role of A.I.D. in giving assistance must not be limited merely to responding to specific IDC requests. Nor must our principal concern lie in the day to day operational task of fulfilling these requests. Systematic joint planning and analysis in the production sectors and subsectors is a prerequisite to the effective use of U. S. assistance and will require aggressive and skillful U. S. leadership. (See III-A; III-C; III-D, 3; IV and V-A).

A. Program Assistance and Negotiating Leverage

The commodity elements (e.g., fertilizer and equipment) of program activities described in Section V below would generally be financed by development loan funds and supporting assistance under the operative A.I.D. criteria (See M.O. Chapter 1100), agricultural commodities are provided under Title I and Title IV, P.L. 480 Sales Agreements. Since the urgency of the War On Hunger may require considerable realignment of host country attitudes and program policies, the leverage aspects of program, project and local currency activities are of major import.

Of particular importance in this regard is program assistance, the most direct and efficient method of transferring resources. It causes an immediate increase in the GNP; instantly improves the balance of payments position of the borrower; can quickly increase production; reduce unemployment; increase consumption, etc. Because these features are attractive to the host country, are simple to comprehend, relatively easy to administer, and require few skills to arrange, program assistance, whether loan or grant financed, is the most popular form of aid among less developed country governments. This

attractiveness puts the U. S. in an excellent position to require any self-help measures (e.g., financial stabilization, land reform, taxation measures, etc.) which it believes are necessary to accelerate economic growth and social progress, specifically those self-help measures essential to agricultural development.

B. Capital Assistance and Private Enterprise

Although much of the capital project activity is in the public sector, A.I.D. assistance to privately owned production and processing facilities is increasing. Most Capital Assistance is on a loan basis. Capital Assistance projects in the War On Hunger might include production facilities for fertilizer, agricultural chemicals, farm tools and equipment as well as food processing and storage plants. (See M.O. Chapter 1200).

A range of services in the Development Finance and Private Enterprise area, many long in use, can be utilized to stimulate investment in productive enterprise relevant to the War On Hunger (See A.I.D. brochure: "Aids to Business"):

1. The Catalog of Investment Information and Opportunities can facilitate the inflow of U. S. capital and technology into food production, processing and marketing activities in the host country.
2. Investment Surveys assess potential development prospects and reduce the uncertainty of investment decisions in the LDCs.
3. Investment Guaranties
  - a. Specific political risk guaranties against (i) inconvertibility of foreign currency, (ii) loss by expropriation or confiscation, and (iii) loss due to war, revolution or insurrection;

b. Extended risk guaranties which protect the guaranteed investor from loss from any cause, including business risks, up to 75% of his investment. Guaranties on institutional loans are particularly useful in capital intensive projects, e.g., fertilizer plants. To encourage investment in agro-industry AID/W has adopted a policy which offers extended risk guaranties covering 50% of equity investments in projects contributing to improved food supply in the LDCs.

4. Local Currency Loans and Grants In addition to the local currency loans and grants provided for capital assistance activities in the public and private sectors, Cooley loans make local currencies available to private American firms for financing such local costs as expansion of plant and equipment, land acquisition, training and operating costs, etc. (See M.O. 1510 and M.O. 1526.1)

Over and above these A.I.D. administered services, the private sector of U. S. agro-industry is a major -- and largely untapped -- source of competent technical assistance. Technical services, advisory or survey activities or research conducted by private firms, whether under USAID, host country or other auspices, have the added advantage of increasing the possibilities for subsequent investment.

C. Technical Assistance This term describes the full range of planning, analytical, educational, advisory and other activities traditionally devoted to the enhancement of human resources and institutional development. Technical

Assistance is financed from either loan or grant funds, depending upon the nature of the activity and the host country's capability to assume and service the loan. It also utilizes local currencies made available under the A.I.D. program to help meet local costs. (See H.O. Chapter 1300)

There exists at present in A.I.D. a certain disenchantment with the performance of technical assistance in the past. This disenchantment reflects a widely accepted misrepresentation or caricature of technical assistance: the agricultural technician pattering about in a small, narrowly conceived project, earnestly training one or two counterparts, wholly unaware or unconcerned with national agricultural policy, investment and resource requirement planning, price and marketing policy, etc. This caricature was widely manifest in people's minds and unfortunately still is retained.

While agricultural technical assistance over the years has often dealt with specific technical questions on a project basis, almost invariably this has been necessary to build the infrastructure, human resources, operating systems and methods essential to the launching of more comprehensive or sophisticated national programs.

Caricatures of past and current inadequacies, real or fancied, of TA practitioners should not distract USAIDs from the serious need for technical assistance as it should and must be practiced. Technical assistance must be conceived of and practiced by A.I.D. as a creative process of research, analysis, adaptation and influence. Its greater goal is to enhance productive capacity and self-sustaining growth. Its method is to be an agent of influence and guidance. Technical assistance fulfills its goal not by implementing narrow

projects and training counterparts but by strengthening national and sector planning, by designing policies and by creating productive institutions.

To this end, technical assistance must be made an integral part of national, regional and sectoral policy and program planning. This requires that technical assistance must fulfill advisory and research functions.

In pursuit of human resource development, technical assistance planners in the USAIDs and cooperating countries should relate their advisory and participant training operations as closely as possible to the recommendations of -- and derive their priorities from -- reliable national or sectoral manpower requirements surveys. Salary and other incentives to retain scarce manpower should receive careful consideration.

Currently much participant training in agriculture is accomplished in American institutions which have limited familiarity with the participant's country origin. To achieve the most effective possible exploitation of their land grant college contractors' skills in research, education and extension as well as their knowledge of specific host country physical, economic and cultural conditions, USAIDs should, within the scope of such contracts, use to the fullest the participant training facilities available. USAIDs should assure the full participation, by both contract and non-contract participants, in AID/W's non-technical training program, i.e., pre-university workshop, orientation, communications seminar and other planned activities.

D. Central, Regional or USAID Funded Research

1. Under Section 241, of the Foreign Assistance Act, the Office of Technical Cooperation and Research (TCR) conducts a research program 40% of which is devoted to agriculture.

This research, carried out by contract and Participating Agency Service Agreement is generally aimed at developing new approaches, solutions and methods for problems of Agency-wide or worldwide scope, and at adapting U. S. technology for use in different physical, economic and cultural environments.

2. AID/W Regional Bureaus also support research on problems limited to their respective regions.

3. Research accomplished by or supported by USAIDs by contract, PASA, consultants, etc., at the country level generally falls into four categories;

a. Research required for strategic planning and programming, either at the national or sectoral levels.

b. Research, including adaptive research, to solve a physical, behavioral or other problem-specific to the host country.

c. Research or feasibility analyses for planning and investment decision-making on large or complex projects.

d. USAID support of indigenous research institutions as a part of a USAID policy for strengthening the host country scientific, technological and educational base. A new and effective instrument for achieving this aim is the incorporation of a specific research component in university technical assistance contracts in support of these local institutions.

#### E. Food For Peace

A separate guidance message on the role of Food For Peace in the War On Hunger is available to USAIDs (See AIDTO CIRC XA-441, dated 8/25/66).

#### IV. The Translation Of Strategy Into Action

To chart a comprehensive strategy for agricultural development the basic components described in Section II above must be examined in a sector analysis to establish their interaction with each other and with other forces external to the agricultural sector.

Such a sector analysis, required by the Planning, Programming and Budgeting system (PPBS) as the requisite for program formulation, should permit the USAID and the host country objectively to formulate a strategy and program assistance on the basis of analytically determined priorities for each objective. Priorities which designate significance and urgency will make possible more meaningful judgements on levels of aid and on critical time relations (duration, sequence, timing) of inputs as well.

On the basis of its knowledge of the host country social and cultural situation the USAID can then make intelligent decisions on the instruments and forms of aid and on the method and style to be followed in implementation. Since the development needs of the LDCs far exceed the limited resources of AID, coordination of our assistance with that of other donors is necessary. The host country should play a major role in such coordination. The capacity of the host country effectively to coordinate the assistance activities of a variety of donors is integral with its capacity to plan and administer a program of economic and social development. This is discussed in Section V-A, 1 and 2 below.

#### V. Guidelines for Planning and Programming

This section elaborates and discusses the six basic components listed in Section II. It suggests guidance on the selection and application of appropriate AID assistance instruments.

A. General Government Policies

1. The host country must possess or be given the will and motivation to make and implement the decisions necessary for agricultural development both at the national and sectoral levels. These are decisions on allocation of resources, policies, stimulus to the private sector, structural reforms, taxation, etc. Where this will or motivation is lacking it is essential that the U. S. exert its full powers to transform the lack into a positive force for development. The entire panoply of assistance activities offers opportunity for USAID persuasion and pressure. Self-help is fundamental to development and should be placed at the head of the USAID agenda during the process of planning and negotiating both loan and grant assistance. The important leverage aspects of program loans are discussed in Section III-A above.

2. While loan and grant assistance negotiations can influence and augment the will of a host country government to adopt difficult self-help measures, neither the negotiations nor the assistance itself can create the essential capacity to plan, to manage and to produce. To make a policy improvement requires more than the mere identification of shortcomings in existing policies, it requires the ability to develop and implement a new policy which will prove better in performance than that which was abandoned. This is almost never simple nor self-assured. Human resource and institutional skills and capabilities are necessary to transform plan into action; raw materials into finished product; capital into production and subsequently into consumption.

In short, the host country must have the competence, not merely the will to make and implement sound development decisions.

The lack of such human resources and institutional competence for agricultural development is very serious in most of the LDCs. Careful study of FY 1968 PFB submissions revealed the very few examples of systematic agricultural sector analysis or planning or of planning/programming alternatives. The problem may reflect a shortage of adequately trained personnel. It may result from an inadequate organizational setting within which qualified staff can work effectively. It may reflect lack of perspective on their country problems and opportunities. High priority should be assigned to off-setting these shortcomings by strengthening the host country's analytic and planning capacity as the basis for sound policy formulation. Such increased competence enhances the possible accomplishments of U. S. negotiating leverage and makes the application of self-help criteria operationally meaningful (V-A, 1 above).

Competence to make sound planning decisions requires more than technical economic and analytic skills. Often a key deficiency is the absence of reliable, valid input-output data on technical production relationships. Sophisticated agricultural plans, even when based on elegant analysis, are at best meaningless and at worst wasteful of scarce investment resources if built on unreliable production coefficients and other critical technical data. Technical and production data on the output and capacity potential within each of the basic components is a prime requisite of planning.

Data on the interrelation among the several variables, i.e., response of output of one component to increased activity in another, is also essential to strategy and investment decisions.

Even more difficult, and much more significant, is the need for reliable indicators of the possibilities of changing these input-output relationships through investment in research, education, and institution building.

While analytic-planning competence can be purchased or borrowed on an interim basis from advanced countries, ultimately an indigenous host country competence is necessary. Except for the possible use of program or project loan dollars for interim advisory or teaching services or for training in advanced countries, the appropriate aid instrument is technical assistance.

3. Deriving directly from lack of analytic and planning competence are host country agricultural development plans (and consequently USAID assistance programs) that do not comprehend and integrate the full range of basic components described in Section II above. Neglect of one or more of the basic components will retard progress and create a skewed and wasteful investment pattern. USAIDs and host country governments should strive for an integrated plan of action for agriculture based on full understanding of the relationships between the major components.

4. In agricultural development, production incentives act upon the development process to cause farmers to: a) modify the rates and kinds or production processes and enterprise selection, and b) use better management, utilize available technical inputs, adapt innovations, and develop more efficient production units. Incentives can help change attitudes and motivate

farmers, cause changes in cropping patterns, farming systems, and farm organization, and bring about accelerated production and increases in returns and benefits. Incentives can take many different forms, and include a wide range of possibilities, such as dependable prices, acceptable cost/price ratios, roads and markets, credit, adequate share of returns to capital and labor, availability of both producer and consumer goods and services, desire for higher standards of living relative to education, social and cultural development, and recognition of and involvement in agricultural development.

5. Most government policy should be designed to stimulate real demand for food (the exchange of productive endeavor for consumption) as well as increased food production. Government policies which affect food production through allocation of public investment, subsidies, encouragement and discouragement of private investment, price and wage structures, etc., can however result also in artificially increasing the ability of the individual to consume food, i.e., increasing the purchasing power for food without a corresponding increase in ability to produce goods and services in the non-food sector.

The entire economy must grow to permit increased industrial inputs to agriculture and increased capacity in the non-food sector to consume agricultural products. Policy formulation must therefore be sensitive to the food consumers' contribution to general economic development.

6. Experience in Taiwan, East Pakistan, etc., has shown the great value of farmer participation in development planning and decision-making. This participation requires the development of local producer organizations such as farmer associations, cooperatives and community councils.. (See section V-E below)

7. In a free society it is ultimately the decisions of individual farmers, entrepreneurs and private organizations that bring about agricultural sector development. Government policy should provide the framework for actions which will be taken in the main by non-government persons and groups. To enhance the knowledge and broaden the competence of these individuals and groups, emphasis should be given to developing working relationships with equivalent groups in the United States, e.g., with American cooperative organizations, farm groups, etc., as well as with American agro-industry units and potential investors.

B. Technology, including Research, Extension and Education

The sustained development and application of new knowledge through science and technology can be the major determinant in the growth and productivity of host country agriculture as it was in the U. S.

This aspect of agricultural development has been most seriously neglected by the less developed countries themselves. AID and its predecessors also have failed in the past to emphasize adequately the need to build indigenous bases of science and technology from which the economic growth process in agriculture could receive continuing stimulus.

In the drive to move beyond an inadequate and stagnant subsistence agriculture the food-deficit countries must consider three distinct but inter-related and necessarily concurrent activities: (a) The short-term period of perhaps the next decade with necessarily heavy reliance on food supplies from food-surplus nations; (b) increasing emphasis on adaptive research to develop, test and apply new materials and production practices to upgrade inefficient traditional agriculture; and (c) the building on an indigenous base of science

and technology that is essential to furnish a sustained flow of innovations for continued growth of production.

Ten years is not an excessive lead time for creating a host country competence for the adaptive testing and research necessary to install dependable innovations -- if action is initiated promptly. Twenty years is a short period in which to build a coordinated national research and education base with trained personnel and organizational and budgetary stability. The Mondale Amendment to the Foreign Assistance Act of 1966 provides that "In developing countries where food production is not meeting the demands of population, or diets are seriously deficient, high priority shall be given to increasing agricultural production, particularly through adaptive agricultural research programs based on cooperative undertakings between universities and research institutions in the United States and in the developing countries."

Past efforts by the U.S. in agriculture, designed primarily to transfer U.S. know-how, have stressed the importance of the extension mechanism without sufficient consideration of the fact that most plant varieties from the temperate zone of the western hemisphere are not readily transferable to the tropical or sub-tropical environments of Latin America or Africa, the Near or Far East. Similarly, U.S. production practices and equipment are not necessarily well suited to the physical and economic conditions of small-farm agriculture. While some striking progress has been made through the energies of outstanding extension or rural development specialists, it is now generally recognized that substantial agricultural progress can come only from new technology, inputs and practices, not from a mere better employment of knowledge and materials already at hand.

Much of the past cooperation in agricultural development has been scattered and fragmented, with individual specialists assigned in soil science, poultry production, dairy manufacturing and similar narrowly defined fields. Such cooperation is of limited value in most countries because of the lack of a technological matrix or of a science and technology infrastructure in which to embed innovations. A deficiency of university contracts for educational institution building is that, historically, they did not contain research and extension components. Consequently, U.S. university institutional building contracts have not fully utilized the competence of these universities to do the very things needed in the less developed countries. They also have not been sufficiently well related to country and mission programs to provide guidance for development planning and policy. A continuing reliance on outside resources for the basic scientific and technological underpinning of the agricultural sector of a nation's economy can only retard the drive for self sufficiency in food production.

Generally throughout the less developed world primary emphasis must be given to plant production because plant foods are less expensive, and have higher caloric conversion efficiency than other foods. However, the host country and USAID should recognize and seriously consider the full range of opportunities for production of non-plant foods. In some countries there may exist as yet unexploited opportunities for livestock, poultry and fish production. Physical and other conditions may determine that animal production is relatively more efficient and practicable, e.g., animals can convert plants which are not

directly usable for human consumption and can therefore be raised on land (and under ecological circumstances) which cannot otherwise efficiently produce plant food and tree crops. (see section VII)

As income rises in the host country the demand for meat will increase; planning for animal production should anticipate this trend. Another major factor to be weighed is the availability of new animal production technology such as breeding and selection; feeding and management practices; disease prevention and control; and meat processing and distribution. Introduction of these technical innovations might bring about significant changes in the calculus of host agricultural planning.

The most relevant assistance instrument in this area is technical assistance with a strong research component and emphasis on full use of the participant training component of land-grant college contracts. These USAID funded activities can be effectively supported by centrally funded research on specific problems.

### C. Physical Inputs for Production

Increased agricultural productivity will not be achieved on a sustained basis unless farmers have access to water, improved crop varieties, fertilizers, pesticides and improved tools and machines. These inputs must be not only readily available but also priced low enough for farmers to make the investment necessary to achieve increased production and a properly structured and diversified agriculture.

1. In the short range, inadequate availability and utilization of chemical fertilizers may be at once the largest and most readily solvable

problem. A recent study of private industry plans indicates the current planned level of investment may be capable of meeting projected LDC fertilizer needs by 1970. In view of these study findings, it would seem clear that AID's task is to encourage and assist wherever possible in bringing these plans to fruition. The negotiations for project loans, local currency loans, investment surveys, specific and extended risk guaranties, and other aid undertakings may provide opportunities to accomplish this. Where foreign exchange problems are severe the analysis of the host country servicing load, prepared for the FY 1968 CAP I submission, should prove useful in determining the economic advantages and disadvantages of specific alternative possibilities.

Another factor to be considered is the possibility of raising the present level of utilization of existing fertilizer plant capacity which averages 50-55% in the LDCs as opposed to the U.S. operating level of approximately 85%.

A major influence in the application of chemical fertilizer in the LDC is the market price to the farmer. This price in turn will be affected by the full and efficient utilization of plant capacity, by the volume of sales and by the efficiency of the marketing system. Each of these three factors normally can be dealt with more efficiently by the private sector. Where feasible, USAID should encourage and assist the host country to turn over these functions to private enterprise.

2. Improved plant and seed varieties are of fundamental importance, particularly as fertilizer application rates increase. Three aspects of this question are of practical concern to the host country and the USAID: (a) establishing basic genetic characteristics; (b) adapting this pattern of

characteristics to fit the thousands of local conditions required; (c) developing an effective system of production and distribution for the seeds.

For maize, wheat, rice, and to some degree sorghums, the basic genetic germ plasm has been developed, largely in the United States, for producing yields four and more times the averages prevailing in the LDCs. A step toward adaptation of these strains to LDC conditions has been taken by various breeding programs at tropical stations, such as the wheat and corn projects in Mexico and India and with rice at the International Rice Research Institute in the Philippines. However, the final step must be taken at a large number of stations throughout the LDCs, to adapt to particular conditions at their locale. As noted in Section V-B above, this can be done only if a solidly organized, scientifically competent research process on not only genetic but all aspects of crop production is built within the LDCs.

The seed industry in the LDCs often suffers from inadequate reliance on private sector enterprise. As with fertilizers, the interest and capacity of U.S. seed firms to invest and produce is equal, at least in the short term, to the needs of the LDCs. There is consequently a clear opportunity for USAIDs to fulfill a constructive brokerage role in stimulating U.S. private investment in seed production and distribution abroad. In addition U.S. cooperatives are uniquely qualified to provide technical assistance in establishing local cooperative owned and operated seed services in the host countries.

3. Expanded use of pesticides and herbicides, consistent with health safeguards, warrants consideration along with the inputs discussed above, to combat loss and wastage from rodents, insects, weeds and diseases. As in the

case of seed varieties, selectivity and local field testing of chemical pesticides and other substances originally developed and used in the U.S. and Europe are necessary in view of differences in climatic and physical environments.

4. More widespread use of farm tools and machinery would help increase both labor and land productivity. It does not follow, however, that either the import of U.S. machinery or the manufacture within the host country of machinery designed for U.S. uses will produce such productivity gains. Differences in ecology, cropping and production practices, and the physical size of farm holdings demand tools and machinery designed for the locale. The role of the U.S. private sector is one of research and development to create usable products for local manufacture and marketing. Collaborative arrangements between U.S. and host country firms in this area can stimulate the growth of an agro-industry. Development of machinery cooperatives, to enable small producers to share costs and have access to equipment beyond the reach of any single individual, would encourage equipment sales and contribute to agro-industry activity.

Decisions on farm mechanization in general must take into consideration the social, political and economic implications of changing manpower utilization patterns. In many areas rural unemployment, non-mobility of labor and the absence of industrial enterprises would argue for labor intensive rather than capital intensive techniques.

5. The contribution of developed water resources extends beyond the controlled irrigation of crops. The significance of mitigation of floods, safe potable water supplies, hydroelectric power, salinity control, sediment control, etc., warrants careful attention in War on Hunger programming.

The import of these physical inputs of fertilizer, pesticides, tools and equipment and possibly seeds is accomplished under Program or Capital Assistance. The studies, services, testing and other technical and adaptive actions are best conducted by resort to the Technical Assistance and Research instruments.

D. Markets and Related Services

Greatly increased attention must be given to assured markets, both domestic and export, as well as to transportation, storage, processing facilities and organizations. PPB submissions from the nine major country missions, analyzed during the spring AID/W review reflected a lack of awareness of the critical role of food marketing systems in (a) increasing the quality, variety and quantity of food and (b) generally stimulating the economic growth process by reducing economic dualism, i.e., the disparity between subsistence rural areas and commercial/industrial urban areas.

1. The interaction of rural food production potential and urban consumption requirements has not been systematically observed in most underdeveloped countries. Generally USAIDs have not participated in or do not have access to a comprehensive analysis of the qualitative or quantitative relations between food production potential and consumption requirements. Until such information is available there is a possibility of real losses of foreign exchange from unnecessary imports of foodstuffs or potential losses of unearned foreign currencies from lost export opportunities. There also may be less discernable but more serious results of local undernutrition and malnutrition.

2. An effective food marketing system can help to enlarge the capacity of the low income rural areas to consume urban manufactures as the result of increased output while simultaneously increasing the ability

of the urban areas to consume more and better agricultural products. The result of expanding the consumptive capacity of each will be to increase the earnings of the other, resulting in turn in further increased consumption capacity. The role of marketing systems in raising rural incomes and rural consumption capacity for urban manufactures deserves serious USAID and host country attention as does the possible stimulating effect of marketing facilities on rural-based food and fiber processing industries. Cooperatives have a significant role to play in marketing, first because they directly engage the producer in the sale of his produce and secondly because the earnings from handling and distribution and from post-harvest seasonal gains in price accrue to the producer.

3. A further factor requiring cooperative study by USAID and host country analysts is the relevance of existing food market margins to (a) investment, (b) production, and (c) consumption.

4. Finally, the attention of the USAID is drawn to the important question of the effects of food marketing, handling, storage, processing, packaging, transport and distribution practices on the nutritive quality of the foods.

Generally the relevant assistance instruments in this area are Technical Assistance and central or USAID funded Research. Additional guidance material on marketing systems will be prepared by AID/W and distributed to the field at a later date.

E. Institutions

The upgrading of agriculture requires the restructuring and strengthening of existing institutions and the creation of new ones. These include the development of national programs for research; institutions for agricultural education and extension; for economic analysis and national development planning; for price, market, investment, trade and other national policies. At local levels, self-help, cooperative and other mechanisms are needed to achieve maximum involvement and enlightenment of the masses of rural people who must be motivated for greater productivity. Strengthening the capacity for local self-government and local participation in development activities will require not only competent local institutions but a viable linkage between these local groups and the decision-making Ministries and agencies at the provincial and national level. Additional guidance on the role of local organizations in planning and decision-making in economic, political and social development will be prepared by AID/W for later distribution.

Institutional development is not an objective in itself, nor do institutions necessarily have inherent substantive economic value. The reason for, and the stimulus to, institutional change should come from the promises of economic gain. The essence of our task is to increase production and productivity of man, land and investment.

Production and productivity increases are not incompatible with institution building; they are inseparable. One does not change institutions

in the abstract; such changes are wrought as a concomitant to the pursuit of functional problems. Conversely, economic advance in traditional societies almost invariably requires both new institutions and the redirection of old ones.

It follows therefore, that we must cast our programs in terms of production and productivity goals with full awareness and sensitivity for the long-term social and political implications of the institutional forms that will ultimately emerge.

Many hold the belief that the traditional, subsistence farmer is not influenced by price and other incentives. This belief is unfounded. The vast majority of the world's farmers will respond to incentives, prices probably being the most important. This means prices for the farmer's produce which are reasonably predictable and high enough to motivate him to produce for the commercial market. It means also prices for production inputs, supplies and services, low enough that the farmer can afford them. Of parallel importance is the motivation of a reliable -- if possible, guaranteed -- market for his produce.

Moreover, no farmer will attempt to produce more than his family needs if the fruit of his effort must go to the landlord or the money lender. Therefore land tenure arrangements are important incentives as is equitable credit plus guidance in its use.

The agriculture of many IDCs is predominately small scale. Programs that point only toward a small number of large, commercialized farms are not relevant. Often these larger farms produce primarily for export.

While earning foreign exchange is important, the main thrust of AID assistance must be to help the LDCs increase the production of food needed by their people.

The farmer is a cultivator, manager, bookkeeper and also a buyer and seller. Farming provides the farm family with food and a way of life, but farming is also a business. Therefore, the farmer, the non-farm consumer, and the government are interested in greater yields, higher quality and lower cost, all of which require more efficient farms.

The farmer is concerned with the quality and costs of production inputs; seeds, fertilizers, water, pesticides, machinery, equipment, power and labor. He is also concerned with output: the kinds and amounts of products the inputs produce; costs of production; and the economic returns and benefits of food and income.

One or more enterprises (crops and livestock) may be selected, depending upon physical and economic conditions, markets, technical skill and management requirements, and relative prices. In comparing and choosing among alternative inputs and enterprises, a production and farm organizational system is established. A production system is the end result of comparisons among input-output relations, and among enterprises, considering land, labor, capital, and management requirements and demand and price relationships.

Farm size is only one of the factors related to the amount of farm production and value of output. Farm organization, the nature of the cropping and/or livestock production system, intensity of cropping pattern,

rates and levels (intensities) of inputs, management, technical skills, and physical and climatic factors determine enterprise selection and input intensities. Other factors, such as capital and financing, markets, roads and transportation, taxation and tenure policies, also act to limit or expand the size of the farm business.

The number of farmers in the LDCs is not expected to decrease significantly in the near future. Therefore development efforts should be directed at those factors noted above which will increase the production efficiency of small farms.

The primary instruments of U. S. assistance are Technical Assistance and Research. Loans and grants of AID controlled local currency can be very helpful in getting the necessary financial institutions established.

#### F. General Infrastructure

The dimensions of the world food supply problem require careful study of those activities in other sectors that impinge upon or indirectly support the host country's drive for increased food production. These sectors are briefly described to illustrate the opportunities to direct USAID and host country programs in those sectors toward greater favorable impact on the agriculture sector.

##### 1. Transport, Power, Communications and Related Services.

Transport of fertilizer; farm produce, both perishable and non-perishable; machinery and equipment; storage of seasonal farm produce; etc. Power for irrigation; non-daylight farm operations; drainage and other pumping

requirements; etc. Communications for agricultural market, price and weather forecasting and reporting; technical and vocational training in agricultural specialities.

2. Health. Health programs to develop and maintain the physical capacity of the farm population for efficient work. Nutrition programs to widen and diversify range of available food products; to promote production of higher quality food (higher and better quality protein content in the food grains); to influence agricultural policies and incentives on such questions as allocation of best land for food as opposed to fiber, for domestic food as opposed to food for export, etc.; to stimulate the production of enrichment and fortifying elements to be added to indigenous cereal grains, etc.

3. Industrial Investment and Services. Industrial facilities for the production of fertilizer, agricultural equipment and supplies. Processing, preservation and packaging procedures to enrich and preserve food and to attenuate and compensate wasteful seasonal fluctuations in food supply and demand.

4. General Education. The contribution of general education to better public understanding of the importance of agriculture in the economy, of the need for certain national agricultural policies, etc. The role of general education in bringing the rural populace into full democratic participation in the nation's political and cultural life. The contribution of general education to specialized vocational and advanced technical education in agriculture.

The full range of assistance instruments may be used to address programs described in this section.

VI. The Role of Agriculture in the Economy of a Developing Country

A. Structural Considerations in the Agricultural Sector

The underdeveloped world is largely agricultural. Improvements in agriculture therefore have the potential of directly affecting the lives of 80% to 90% of the people in most underdeveloped countries. In these countries, without a rapid and steady increase in the productivity of agriculture, economic development of even the most modest sort cannot succeed. Even though the process of economic development consists largely of increasing the relative importance of non-agricultural industries, and of increasing the relative importance of people working outside agriculture, a radical increase in the efficiency and productivity of agriculture is an absolute essential to such development.

Increased productivity of both land and agricultural worker is indispensable to general and sustained economic development for three major reasons:

a. Increased productivity in agriculture is necessary to provide food and fibre for an ever-increasing proportion of the population working outside agriculture.

b. Increased productivity in agriculture and the consequent increase in rural consumption capacity is necessary in order to provide ready markets for the growing production of non-farm goods and services.

c. Increased productivity in agriculture is necessary as the most important potential source of capital for necessary investment in non-agricultural as well as agricultural industries.

If a country's food production is not adequate, the principal mechanism by which agricultural sector performance and food demands are brought into equilibrium is through reduction in the rate of general economic development. This adjustment may be artificially postponed, and even disguised through a variety of policy and administrative devices. The adjustment, when it comes, may be quite abrupt, highly sensitive to subtle social, political, and psychological factors. Agricultural exports may be reduced in favor of production for domestic consumption; imports of food may be increased at the cost of imports of investment capital; inflation may disrupt investment plans; in more dramatic instances food riots may impede orderly development processes. But most important, the formation in the agriculture sector of physical and human resource capital for eventual transfer into the non-agricultural sector will be severely curtailed.

The formation of capital within the agricultural sector and its transformation into forms suitable for transference into non-farm investment takes place primarily through the classical channels of reduced food cost which increases the potential for savings. It may also take the form of actual transfer of wealth from farm to non-farm investments. An overlooked but extremely important channel is the transference and consequent loss to non-farm uses of investments in human resources made by farm families and communities.

In the LDCs, however, the problem is greatly complicated by the fact that non-farm investment as currently made has a large foreign exchange component. The consequent lack of foreign exchange for investment in agriculture creates many difficulties for these countries, its principal disadvantage being the serious limitation of the potential contribution of agricultural capital to national development.

The foreign exchange problem forces many countries to skew their agriculture toward the export market. Price elasticity data for these commodities are highly inadequate. But it is clear that this practice, when followed by large numbers of the LDCs, aggregates into a situation in which large increases in production result in little if any increase in total foreign exchange revenue for LDCs as a whole. Production for domestic consumption, on the other hand, caters to a much more elastic demand. Given the narrow margins between food production and population growth, income growth creates onerous and disorganizing pressures on food supplies. Unless this problem is carefully addressed on a worldwide basis, gains in efficiency in the agriculture sector of the LDCs will accrue largely, if not entirely, to the benefit of the developed countries through worsening terms of trade for the LDCs. Much more attention needs to be given to the possibilities of agricultural production for domestic use, as against export, to save foreign exchange which would otherwise be used for food imports and to provide from the agricultural sector a source of capital supply for non-farm investment.

Although the agriculture sector of most developing countries must be greatly strengthened, this process of development must be achieved through devices which do not detract unduly from priority investment elsewhere in the economy. Stated simply, a crude assault on lagging agricultural development by massive reallocation of investment, particularly of foreign exchange, from non-farm to the farm sector would be self-defeating. It would be essentially a forced draft of the very kind of equilibration process we should be seeking to avoid -- namely, bringing agricultural performance into line with food demands by reducing total economic development rates.

Increases in agricultural production in the LDCs can be achieved from internal changes requiring relatively little external or even internal capital. For many countries the most rapid future increases in agricultural production, as in the recent past, will come from broadening the crop and pasture land base. Properly pursued, the opening of new lands to settlement should be a derivative of the general infrastructure investment of the country. Capital invested in colonization projects of high per unit cost usually earn very small or no returns. Conversely, investments in resource inventories, undergirding research, national and local planning and institutional development to guide voluntary settlement, may yield extraordinarily high returns. In some instances, large additions to the land may result simply from modifications of governmental policy or procedure -- with respect to prices, water assessments, taxes, etc. In addition to the expansion of land where feasible, reclamation and double or triple cropping practices may warrant consideration.

The marginal productivity of variable capital in agriculture in typical less developed countries is extremely low, even though interest rates may be very high. Unless credit programs introduce capital in such fashion as to make agriculture more efficient by causing significant changes in methods of farming, they also are a poor use of resources. Like expensive colonization schemes, the mere injection of capital through credit programs is likely to earn only small returns. Conversely, credit institutions carefully developed specifically to channel capital into production increasing changes can yield very high returns.

Technological and institutional changes must be implemented simultaneously in the LDCs in order for them to reach their optimum potential in the production and marketing of foods. Basic institutions necessary to meet the needs of the agriculture sector and of overall economic progress in the LDCs are generally either non-existent, inadequate, or improperly oriented. The allocation of sufficient resources to assure adequate educational progress among rural people and to establish a framework of institutions dedicated to adapting technological developments to the advancing of family farms is perhaps the most important single key to economic development of most less developed, primarily agrarian countries.

The entire institutional structure of a typical underdeveloped agrarian society evolved through centuries with primary emphasis on social objectives other than progress. Of paramount concern was survival -- survival of the group rather than of the individual. The social organization,

centering around the greater family or tribe, placed emphasis upon the individual's having carefully assigned responsibilities to the larger group, discouraged any imaginative individual initiative which might risk survival of the group, discouraged change which might threaten established order, and limited decision making to the few conservative ruling elders rather than spreading it broadly or entrusting it to those young enough to be apt to try out new and dangerous ideas. Progress has thus been specifically forfeited in the interest of survival. As a result the individual in the typical underdeveloped agrarian society of today lacks the individual incentives essential for institutional transformation and economic development -- incentives to work hard, to save, to invest, to innovate, to take risks, to acquire new skills.

B. Obstacles to be Overcome in Agricultural Development

Typical of the types of institutional impediments to rural development are land tenure institutions whereby absentee landlords have almost complete control over the landless tenant farmers, credit systems which often hold farmers in total bondage to money lenders, and rudimentary or non-existent pricing and marketing systems in which prices for identical farm products often vary widely from village to nearby village.

Technological improvements, including the expansion and more intensive use of the land are, improving the technological basis of agricultural production, improving sources of supply of major production requisites, improving the infrastructure of roads and other transportation facilities, are essential but not enough. Emphasis must also be placed on

the changes in the social structure which will permit development of human resources and capabilities required in a modern agrarian society. Research and education must be carried out in the public sector. Public officials must not only have technical and administrative competence but must assume a servant rather than a master relationship to the farm people with whom they work, requiring a basic and difficult change in the deepest cultural values. A democratically oriented progressive agriculture requires a complex system of government services to farmers including a research service, extension service, credit service, price-supporting service, and marketing service.

The principal tool of AID assistance to the agricultural sector in the LDCs must be broadly based, institutional-and-human resources building Technical Assistance, with such Capital and Program Assistance attached as is necessary to make the technical assistance productive. The rural people must, for political and social, as well as economic, reasons participate more fully in total national development. However, unless the increase in productivity of the agricultural sector contributes to or is at least associated with an even more dynamic non-farm sector, it will result in a worsening position of the farmer due to adverse shifts in terms of trade. It is therefore essential that the agricultural sector be thoroughly integrated with the industrial sector, rather than simply made more productive.

VII. The Relation of Inadequate Food Supplies to Social and Economic Development

A. The Qualitative Food Problem

The world food shortage is composed of two components: under-nutrition (insufficiency of calories) and protein malnutrition (insufficiency of protein concentrate). The under-nutrition component is often described in terms of a deficit of cereal grains which is expected to be of the order of magnitude of 57 million tons in 1970, and the malnutrition component is estimated at about 10 million tons of protein in 1970, of which 5 million tons are animal protein.

Under-nutrition and malnutrition are attributable in the first instance to inadequate total intake of food. Since all amino acids, the building blocks of protein, originate from plant life, increasing the per capita intake of food grains will decrease both caloric and protein deficiencies.

However, all of the essential amino acids are not present in the food grains which constitute the major source of nutrition in the LDCs. To the extent that animals can utilize plant materials which cannot be digested by humans or can convert waste from human consumption to an edible food form they are an efficient source of essential amino acids. The limiting factor in utilizing animals as a major source of protein is that their growth and health (productivity) in most LDCs requires supplemental feeding with feed grains or the use of land that could be used for production of plant food for direct human consumption.

Since humans can convert the available amino acids in such plant food directly, the loss in conversion to animal protein is a decrease in both caloric and protein availability to the human population.

Until, or unless, food grains can be produced surplus to human needs, the production of livestock must generally be limited to forage produced on land which will not produce edible human food or on the waste from production or consumption of human food.

Except for the areas in Africa or Latin America where cattle raising is perhaps the only efficient way of utilizing large grazing areas for food production, increasing both caloric and protein availability must for some time depend largely on improvements in the yields and protein quality of traditional food grains.

In the absence of adequate animal protein there are several measures for improving the protein fraction of a diet. The first is to increase protein availabilities by increasing the yields of cereal grains, the major world source of protein. The second is to increase human consumption of available, higher protein foods by concerted attention to increased production of local food legumes. The third, is to improve the protein quality and protein content of existing foods such as cereal grains. The fourth is to develop new protein foods by exploiting available indigenous protein sources such as peanut meal, cottonseed or fish; by adding the limiting amino acids to grain products or by use of other protein concentrate supplements. These measures may require extensive concomittant efforts to modify LDC dietary habits to accommodate the enhanced protein intake in the critical post-weaning period.

An advantage of increasing yields and upgrading cereal grains through an improvement in the protein component and of developing new sources of protein is to increase nutritional flexibility and alternatives for creating an adequate diet. If there is adequate dietary protein from grains or

other foods, than other cheap sources of calories such as root starches, which are poor in protein, or lipids, which have no protein, may be drawn upon to fill the caloric deficiency without fear of magnifying protein deficiencies. The protein gap can also be bridged through improvement of the nutritional quality of cereals and grain legumes by improved amino acid balances. Basic and adaptive research on these elements of the under-nutrition and malnutrition problem is being carried forward on corn, wheat, sorghum, rice, and the grain legumes in U.S. universities, the USDA, and U.S. research foundations.

In addition to increasing yields and protein content of cereal foods, processing technology can make plant materials usable and acceptable for human food, thus closing the undernutrition and malnutrition gaps. Such technology involves milling, removal of toxic and unpalatable substances, and creation of nutritional foods for direct human consumption from sorghum, cactus seed, peanuts, soybeans, and other plant materials normally used for livestock feed, or discarded.

The search for improved foods, new sources of foods, and increases in the supply of food from proven sources involves trial, demonstration, training, and research on development of fresh-water fisheries, new crops, plant and animal pest and disease control, and improved farm storage. Paralleling these activities is the gradual regionalization and expansion of A.I.D.-supported adaptive research on major cereals and grain legumes

for the four geographic regions, and the development of an adaptive research component for the sorghum, corn, wheat, and rice research on protein and yield improvement, extending that research into the less developed countries. This adaptive research will be complemented by research and training in soil fertility, soil and water management, and the development and use of fertilizers.

B. The Relationship between Malnutrition, Human Resources and Population

It has been estimated that between one-half and two-thirds of the world's population suffers from some form of malnutrition. This disorder is most significant in the young, adversely affecting infants, preschool-age children and, to a lesser degree, school-age children. Slight, prolonged imbalances in protein intake during the formative years can cause irreversible changes in physical growth. It is apparent that the irreparable stunting caused during childhood malnutrition will manifest itself in a lower capacity for physical work in the adult stage.

In the past few years science has found that malnutrition in infants apparently also causes permanent mental retardation. Motivation, interest in learning and other personality and behavioral factors have been found to be adversely affected by malnutrition.

The interrelationship among malnutrition, infectious disease, mortality and population are often not recognized by non-technical personnel. Malnourished children have low resistance to infection. Thus common childhood diseases which a healthy child can combat often prove fatal to one who is in a weakened condition from protein-caloric deficiencies.

This is one of the major reasons why child mortality rates in LDCs are from 20 to 40 times higher than those of the United States and Western Europe. It has been estimated that upwards of three million children in the developing areas die annually from malnutrition. This fact is usually hidden since these deaths often are recorded as being from diarrhea, parasites and infectious diseases. The chief causative factor is malnourishment.

These historically high mortality rates, and the changes in these rates being induced by public health disease prevention programs, modern drugs, etc., are closely related to population growth. People resigned for decades and centuries to high mortality rates in children are not receptive to information on the advantages of family planning. The deeply ingrained need to be sure of at least a few surviving children to care for them in later years is a strong motivation for large families. For parents to adopt family planning and thus produce only a few children is to risk their death in childhood and the consequences of their own old age, alone and unprotected.