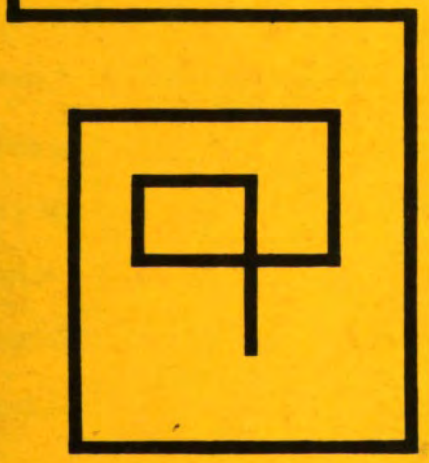
THE A.I.D. NUTRITION PROGRAM STRATEGY



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PREFACE

The Agency for International Development is using its talent and resources to help nations improve the well-being of their people. The experience of recent years has left no doubt about the importance of nutrition for quality of life, and has seen an increasing confidence that effective action can be taken without waiting for large scale improvement in the general standard of living.

This Nutrition Sector Strategy statement sets forth a realistic approach for marshalling an increased AID effort to make a significant impact on the nutrition problem. We strongly believe not only that this strategy sets forth the most appropriate manner in which Agency resources can be applied to the nutrition sector, but also that the prospects are good for achievement in collaboration with host countries.

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Part I - Introduction and Principal Program Conclusions

An A.I.D. Nutrition Program is potentially a major tool to help the poor and usually neglected masses in the LDCs share in the benefits of development.

During the past few years, nutrition has assumed a priority role in A.I.D., the U.N., IBRD, and in other international bilateral aid programs, reflecting a growing body of research findings which indicate that protein-calorie malnutrition in the latter stages of pregnancy and in the first few years of life retards the development of the body and the brain. This affects the development of a nation's human capital potential and therefore has serious developmental implications. For these reasons it is this group which merits highest priority attention within a nutrition program.

During the past five to ten years, promising new technologies and planning techniques have been evolving which offer promise for achieving a significant impact on this problem.

AID's programs have spearheaded a number of these technological developments and approaches. The U.S. has a strong capability in many of the key areas required to combat the problem so that a strong U.S. input into the total bilateral/multilateral donor scene makes sense. New Agency approaches and the need to focus and concentrate resources have been considered in a recent reassessment carried out at all levels, up to that of the inter-Bureau Advisory Council, with participation by the AID Administrator. This resulted in a reaffirmation that combatting malnutrition is a high priority objective in the Agency, and the recommendation that the problem be attacked by multi-faceted, but coordinated, efforts in agriculture, health, education, family planning, Food For Peace and

food technology programs -- with pre-school children and pregnant and nursing women as its prime target group.

The problem of protein-calorie malnutrition is to receive primary attention (although this will usually require meeting vitamin and mineral deficiencies to some degree).

Methodologies for analysis and planning must be available to LDC planners to help them determine the cost-effectiveness of alternative solutions to the malnutrition problem across major sectors. This will require technical assistance in how to use existing analysis and planning methodologies to develop national nutrition strategies. The keystone of AID's nutrition effort should be assisting countries to develop their capability for planning and implementation of programs which will reduce malnutrition.

In addition to the central inter-sectoral approach the AID strategy will concentrate on the following activities in various sectors:

- In agriculture, to support work to expand low-cost protein sources in crops and to encourage consideration of the malnutrition problem as a major factor in agricultural planning. Efforts to expand total food production, of course, continue to be a core element in the attack on malnutrition.
- In health, to study and combat the problem of nutrient malabsorption and the synergistic effects of infection, disease and poor nutrition, and to integrate nutrition, health and family planning delivery systems where feasible and desirable.

- In education, to find most effective means of overcoming nutritional ignorance and low motivation in order to improve food behavior.
- In new food technology, to develop low-cost protein staple foods as a major goal.
- In child feeding, to make programs an integral part of a borader nutrition strategy.
- In family planning, to develop integrated health, nutrition and family planning delivery systems where feasible and desirable, and to determine more specifically the relationship between population growth and nutrition as a basis for future program guidance.

This paper states the rationale and strategy for A.I.D.'s nutrition program and describes the recommended approaches. In substantial measure, they are already reflected in on-going programs. But further strengthening is needed, particularly at the individual country program level.

Part II - Rationale

More than one and a half million people have been added to the world population since 1900. It has been estimated that by the year 2000 the globe will carry in excess of six billion inhabitants regardless of the success of family planning programs. Without success the population figure might easily reach seven to eight billion.

Concern with the world's food supplies tends to be confined to calculations of man's caloric requirements and the capability of agriculture to meet these needs. This is a dangerous over-simplification.

When looking at global food needs, concern with caloric requirements is inadequate. For normal sustained growth, man must have protein, minerals, vitamins, essential fatty acids and, it would appear, specific carbohydrates. The proteins are the key components for man, and they are even more important to the growing infant or child. An international meeting convened by the Secretary-General of the United Nations on the protein problem in May 1971, noted that "Protein malnutrition, which is a problem of crisis proportions for developing countries, must be recognized by the entire world community as a threat to world peace and stability which it can ignore only at its own peril". Mounting evidence of the implications of malnutrition and recommended ways of combatting it have been put forth by dozens of U.S. and international professional groups. In 1963, the Third World Food Survey estimated that at least 20 percent of the population of developing countries was undernourished and that 60 percent received diets inadequate in nutritional quality.

The effects of malnutrition on the health of the pre-school child are most alarming. Two-thirds to four-fifths of all deaths that occur in the LDCs are

within the under-five age group which constitutes 20 percent of the population. Some 30 percent of children in the LDCs fail to reach the age of five. Chronic protein deprivation is largely responsible for high child morbidity and mortality rates, though the deaths may be attributed officially to diseases such as dysentery, measles, tuberculosis or pneumonia. In fact, infection frequently exacerbates the effects of malnutrition, while existing chronic malnutrition may end in death caused by an infection.

This point is well illustrated by a study carried out by the Institute of Nutrition of Central America and Panama (INCAP) in four Guatemalan villages. The cause of 222 deaths was determined and compared with that recorded in the Civil Register. Nearly 40 percent of the 1-4 age children who died had edema, skin lesions, hair change, apathy, and the other signs of acute kwashiorkor. The other 60 percent, for the most part died in the course of relatively brief episodes of either diarrhea of infectious origin or complications of common childhood infections, which are rarely fatal to well-nourished children. Improved nutrition would not only eliminate the deaths caused by kwashiorkor but would also markedly decrease the number of deaths apparently due primarily to infection. Recent Pan American Health Organization studies in Latin America show malnutrition to be either the primary cause or a major factor in 50 to 75 percent of the deaths of one-to-four year olds.

Clearly, the first result of widespread malnutrition is high child mortality. But not all malnourished children die. Hundreds of millions of those who live have been malnourished and suffer serious deprivation of the opportunity to realize their full human potential. The FAO and WHO estimate the toll to be as many as two-thirds of all surviving children in the LDCs.

The deprivation often begins prior to birth. In the last trimester of pregnancy and the first two years after birth, a child's brain reaches nearly 90 percent of its structural development. During this critical period, a deficit of protein can impair the brain's growth. Autopsies have revealed that young children who die of protein-calorie malnutrition may have less than half the number of brain cells of adequately nourished children in the same group. While it is difficult to distinguish the effects of protein deficiency on child development from other aspects of poverty in the child's environment, there can be no serious doubt that there is a relationship between severe malnutrition in infancy and mental retardation -- mental retardation which many scientists are coming to believe may be irreversible.

Malnutrition attacks the body as well as the mind, seriously limiting physical growth. The Director of the National Institute of Nutrition in India reports that 80 percent of the nation's children suffer from "malnutrition dwarfism". The FAO estimates that more than 300 million children from these groups suffer "grossly retarded physical growth".

Nutritional anemias in pregnant mothers also contribute to the precarious health of the newborn, and to maternal deaths in childbirth. Studies in India, Mexico, Poland and Venezuela indicate that the prevalence of nutritional anemia in pregnant women can range from 21 to 80 percent.

Although it is difficult to assess the magnitude of the effects of Vitamin deficiency, estimates have been made that in India alone, out of the four million cases of blindness that exist, 25 percent are of nutritional origin, and this figure is probably low since children blinded by Vitamin A deficiency disease often do not survive.

Thus, the consequences of malnutrition affect very immediately both quality of life and quality of people.

Whether "quality of life" is defined by outside experts or by people of the LDCs themselves, the definition includes as highest priorities such objectives as (a) preventing unnecessary premature death of infants; (b) preventing the pain and suffering brought on by serious and debilitating childhood illnesses; and (c) ensuring the health and well-being of people of all ages. The results of programs which reduce the incidence of malnutrition are fewer illnesses, less apathy, unnecessary deaths and blindness and children with some chance of achieving their physical and mental potential rather than laboring through their lives with avoidable handicaps. Such programs visibly improve the quality of peoples' lives.

Quality of people is of course directly related to the social and economic development of the LDCs. Since a serious degree of protein malnutrition may retard physical and mental development by as much as 20-25%, its widespread existence has drastic implications on the productivity potential of a nation's human resources. A lower degree of mental development means fewer people able to absorb basic education; it means fewer people able to undertake higher levels of technical training; and fewer people from which leadership can be drawn. How much closer might the LDCs be to their social and economic goals if the wastes of malnutrition could be altered -- the wasted budgetary expenditures for preventable illnesses, blindness, waste of education investments due to malnutrition-caused dropouts, and the economic loss of productivity resulting from a physically and mentally debilitated work force.

The benefits of investing in a mentally and physically healthy population were recognized by the military. Between 1956 and 1957, 32 studies of the nutritional status of the armed forces and civilians of friendly nations were undertaken to determine what steps could be taken to prevent malnutrition in order to reduce absenteeism and to increase work output. The value of the lost manpower productivity far exceeded the costs of prevention, thus indicating that corrective nutrition programs were justified on a cost/effectiveness basis. It is even more important to recognize the benefits of improving the quality and quantity of the civilian work force. The adaptation of new technologies requires new skills, and people capable of being trained to perform these skills -- whether a Green Revolution farmer, an engineer, or a machine operator.

The new nutrition technologies offer one powerful means for affecting the well-being, and the income potential, of the poorest strata in the LDCs. A.I.D.'s nutrition efforts thus represent one of the Agency's more direct responses to the problem of the unequal distribution of the benefits of economic growth as highlighted in the Policy Determination on Employment and Income Distribution (Oct. 2, 1972) and the PPC Policy Background Paper to this Policy Determination. They redistribute real income in favor of the poor, without depending on redistribution of money income.

Part III - Strategy

The most general, pervasive long-run solution to the problem of malnutrition would be to raise the per capita income of the bulk of LDC populations. However, sole reliance on broad income growth is not satisfactory because:

(1) It would at best take decades to raise per capita income to levels at which purchasing power increase could wipe out the bulk of malnutrition among the poorest 30-40%.

(2) And even if incomes of the poor were raised substantially, the combinations of poor feeding habits, malabsorption, protein-draining infections and the unavailability of nutritious low-cost foods, would continue to prevent adequate nutrients reaching and benefiting the critical target groups.

While a systematic comprehensive attack on malnutrition would address actors affecting near-term income growth among the malnourished populations, he central thrust of a strategy of nutrition per se is to operate from the food upply side and build adequate nutrients into the diet eaten by the bulk of the opulation, particularly the poor. Special efforts must be made to provide good utrition to the pregnant women and nursing mothers and children up to about age ive because nutrition from the womb through the first few years of life is ritical for future mental and physical development.

Two mass coverage routes are technically feasible and appear consistent ith the need for providing a low cost food supply for the bulk of the population:

(a) greatly improving the nutrient content of the basic food supply grown;

(b) fortification of the food supply.

Route (a) has two main branches: breeding more and better quality protein content into the basic grain staples of LDC diets, and increasing production while lowering costs (increasing per acre yields) of the more nutritious legumes or in some cases other high protein foods. This route has major advantages: it is an ideal way of reaching virtually all of the population, including the very poor, the isolated, and the most critical segment, viz., pregnant women and nursing mothers and infants -- particularly since the first branch requires no organization or administration of mass nutritional services or education although some may be useful to help create a consumer preference for the more nutritious grain varieties), and the administrative effort needed for the second branch would be largely for informal education.

However, this route does have some limitations:

1. some nutrients cannot or are unlikely to be bred into the staple foods, e.g., minerals, vitamins, and perhaps some of the essential amino acids;
2. cost/price relationships may continue to discourage production and consumption of the more nutritious staples, and the cost of offsetting subsidies may in some cases be higher than that of subsidies needed to sustain fortification to reach the nutritionally deprived parts of the population; (These cost relationships are not yet established, due to the early developmental stage of the

relevant alternative technologies and the lack of experience and analysis.)

3. processed foods, on which a large and growing portion of LDC populations depend increasingly, may lose much of the nutrient value of their raw food inputs unless proper quality control methods are established in food processing plants.

Consequently the technology and pilot applications of route (b) also ıeed to be developed, to establish the best pattern of complementarity between :he two approaches, for the variety of LDC socio-economic and ecological ;ituations. Although people who grow their own food supply and others in rural ıreas are reached best by making the staple crops more nutritious, some kinds of 'ortification may round out their nutrient requirements, and may also be more otent in reaching the increasing number of those -- largely in urban areas -- ho depend heavily on processed foods. Fortification has many patterns, nvolving both the public and private sectors. Two main branches are (a) adding utrients to established mass consumption foods in ways that avoid significant iscernible alterations to the consumer, and (b) developing new low-cost food roducts that are attractive to LDC consumers.

Careful cost/effectiveness analyses are needed of alternative means of ıss coverage of critical population segments in the varying environments - ;sessing alternatives within each of the two general routes and between the)utes. These will need continual reassessment as the rapidly changing ;chnologies evolve, including some forward estimating based on assumptions of .kely attainable technological advances to guide choices between alternative & D investments. The strategy will be progressively to broaden the range of

echniques from which components can be drawn and fitted into LDC programs and lso to narrow the lines of exploration if and as cost/effectiveness analyses how conclusively where the greatest advantages lie.

An adequate strategy also requires some other lines of effort to omplement the twin central thrust via changing crop production and fortification.

1. Rapid population growth is a prime cause of malnutrition in LDCs, for several interlocked reasons. This problem is being given the highest priority attention by A.I.D. in any case. The concern in developing a nutrition strategy is first to note the great importance of lowering population growth rates as a means of reducing malnutrition and, second, to shape nutrition and population activities to take maximum advantage of some important opportunities for mutual support. The latter efforts can save costs rather than add them.
2. Intestinal infection results in malabsorption of nutrients present in the food consumed. This is most severe and serious with the key infant group and contributes to the high rate of infant malnutrition and death. Consequently, work to establish the extent and nature of this problem and the most effective means of coping with it is a very important element of A.I.D.'s nutrition strategy.
3. The consumption of nutritious foods depends on consumer preference as well as on availability and price. Consumer preferences depend

not only on taste, convenience and the like, but also to some degree on what people think they should eat. Recognition by LDC people of significant health advantages of one eating pattern as compared to another, influences the pattern of their food demands -- particularly on the demands of mothers for food for their infants and young children. This is the hypothesis of the widespread nutrition education programs. Part of the A.I.D. strategy is to test this hypothesis in a fashion that discriminates among both audiences and techniques in seeking to establish comparative cost/effectiveness of information, education and communication efforts. This includes the development and evaluation of innovative types of education and mass communication on nutrition themes. There appears to be very low-cost or virtually no-cost opportunities to include communication efforts as part of development programs that will be undertaken any way.

4. The growing evidence that the critical group to reach with a more nutritious diet is pregnant and nursing mothers and preschool infants and children merits the exploration of supplemental strategies pinpointed at this group and taking maximum advantage of progress along the other strategy lines, e.g., seeking means to channel the more nutritious foods that become available more effectively and efficiently into available delivery systems for this target group.

In develop AID's nutrition strategy, it has been recognized that little will happen to affect nutrition in the LDCs, except as incidental effects

(positive and negative) of programs aimed at other objectives, until national policy makers understand that malnutrition is a major problem, are aware of potential solutions, and are prepared to establish program goals and allocate significant resources to attain them. In recent years there has been a growing recognition of the importance of combatting malnutrition, but policy makers such as national planners are still moving cautiously in attendant resource allocation, due to some uncertainty about the costs and likely consequences of various programs. Many governments have not hesitated to initiate child feeding programs when there has been free or low-cost food available (thereby reducing the amount of funding commitment required) and where they could clearly perceive other than nutritional benefits. By contrast, the benefits of widespread fortification are more difficult to measure since there is little experience to go by, and there are questions not only of initial capital costs but of how the increased product cost would affect consumer buying.

Therefore better data are required on the various program possibilities in terms of how they work, what they cost, under what conditions they are most suitable, what results they are likely to attain, etc., as well as a systematic way of assessing a country's malnutrition problem and of choosing the most appropriate approaches to its solution.

This can largely be accomplished by including the nutrition dimension in the analysis of the various relevant sectors such as agriculture, education, and health. These analyses should reveal the potential for achieving various levels of nutrition impact through given investments in these sectors. Traditional program techniques are currently being evaluated systematically by the Agency to provide better data on costs and benefits. In addition, the Agency is

developing techniques for nutrition planning on a national, inter-sectoral basis. The first effort has just been completed in Ecuador and has resulted in the publication of a first manual on a suggested approach to planning national nutrition programs. The manual, refined by LDC planners in a workshop, has now been given wide circulation and the Agency is following up by providing technical assistance to countries wishing to explore the application of such planning techniques. The Agency also plans to encourage and assist the development of a number of country cases to serve as demonstrations and to refine the techniques. Cases will include both single sector analyses and planning and two or three inter-sectoral analysis in which actions in different sectors can be compared.

The Office of Nutrition will continue to work on the refinement of the basic methodologies, will disseminate information to the field, will initiate demonstration activities in several countries in collaboration with USAIDs, and will develop the U.S. technical assistance capability which will be required to respond to requests for assistance. USAIDs are requested to encourage nutrition analysis and planning and provide such assistance as may be consistent with their country strategies and programs. TA/N will arrange for communication among the country planners in the form of circular mailings and will organize workshops as the work proceeds in order to provide for exchange of information and to hasten the refinement of sectoral and inter-sectoral planning techniques.

The Agency exchanges information on nutrition with international agencies such as FAO, WHO, UNICEF, and the IBRD toward the refinement of this approach.

Some of the international agencies have taken part in the A.I.D. Planners Workshops and are conducting their own planning workshops in which A.I.D. personnel assist. The goal is a consistent worldwide strategy.

Part IV - Program

IV-A. Nutrition and Agriculture

In the agricultural programs of most developing countries, emphasis is placed on ensuring an adequate food supply to feed the population and on increasing the export of crops which can earn foreign exchange. In fact, the objective of "feeding the people" usually means providing an adequate quantity of calories - a full stomach. Thus, high priority is given to increasing production of staple grains or roots and tubers. When nutritional quality of food is considered, it is usually in terms of the relatively higher-priced foods such as meat, fish and dairy products. Efforts to establish a dairy industry or to increase animal production do aim at augmenting good quality protein production. However, they are not likely to have a large-scale impact on the masses of people who have the greatest nutritional need and lowest purchasing power. This is not to argue against such programs; it is merely to point out that in many countries they will not by themselves achieve any significant nutritional impact among the poor and should not be justified on those grounds at this time. Advances in the technology of producing animal protein, especially through agriculture, could alter this situation in some countries.

The agricultural research and operational programs of international assistance agencies tend to reflect these objectives of local caloric sufficiency and export potential. Accordingly, greatest attention is being paid to increasing crop yields, especially cereals, encouraging better use of fertilizer and pesticides, weed control, water management, timely planting, and similar activities geared toward increasing local production of traditional crops

nd toward adapting new technologies. In fact, more food per capita and more utritious food are both requirements for substantial reduction of LDC mal-utrition. The goal of providing more food is being pursued vigorously worldwide, but ut there is need for a more discriminating and potent attention to food quality, articularly to increasing the protein content of the diets of the poor.

Modifications in agricultural policies and programs could help to bring bout a major and near-term impact on the protein problem. A.I.D.'s R & D program as already incorporated this stress of direction toward food quality and it is ncreasingly evident in the programs of the international agricultural research enters. It needs to be deepened and spread throughout LDC research and operational rograms.

eeding Research

Research in breeding has already resulted in the identification of new gher protein varieties of some cereals such as corn, sorghum, rice and wheat. otein quality can also be improved.

An example is the discovery in 1964 at Purdue of the opaque-2 gene which proved protein quality of corn markedly by increasing the content of the tritionally-limiting amino acids lysine and tryptophan. Studies on young ildren in Latin America have demonstrated that the new maize variety is ual to skim milk when fed at an adequate level in the diet. This genetic eakthrough occurred eight years ago, but had a number of deficiencies with gard to yield and quality.

These deficiencies are being overcome and types which are expected to be re generally acceptable, both agronomically and from the consumer viewpoint,

are expected to be released soon for production in developing countries by the International Center for Improvement of Maize and Wheat (CIMMYT).

Similar progress, but not quite as striking as the opaque-2 in maize, is currently being made at the research level in developing varieties of wheat, sorghum, and rice, with higher protein content and quality.

Reviews and assessments of current research and applied breeding programs can help assure a nutritional direction without detracting from current agricultural objectives such as increased yields:

(1) After review, an order of priorities should be established for cereal breeding programs, based on consideration of (a) which nutrients are most lacking in LDC diets, (b) which are least efficiently provided by other means, such as fortification, and (c) which nutrients can be most readily introduced by breeding.

(2) The current results of breeding efforts should be further analyzed to determine whether there has been ad adverse effect on consumer acceptability-processing characteristics, taste and cost. Such knowledge should guide breeders as they proceed in the selection of desired breeding characteristics -- i.e. those with a realistic utilization potential.

(3) The directions and magnitude of breeding efforts should be studied to determine whether the program is receiving appropriate emphasis in the A.I.D. budget in relation to other efforts by other countries and agencies, and in relation to other agricultural and nutrition programs, and changes made when indicated.

Green Revolution

While more total food has become available with the Green Revolution, inadequate recognition and attention has been given to its nutritional impact. In India, for example, there is some evidence that the Green Revolution is creating a shift in land use away from the protein-rich food legumes to cereals. This is actually decreasing the availability of low cost protein. Among the many factors involved is the desire for the greater profit which may be realized from increased cereal yields compared with that of food legumes. In order to be able to predict and plan for such adverse developments, the nutrition and agriculture offices of A.I.D. have set up a study group to review and monitor the nutritional aspects of the Green Revolution.

. Research and production management support must be encouraged to increase the yield of food legume varieties so that they may remain competitive with cereals, and to provide greater quantities at lower costs in any case. Such research should consider not only total legume yield but also better processing characteristics, quicker cooking time and avoidance of alterations which may adversely affect taste or nutrition.

The different breeding programs should be regularly subjected to cost analysis so that the relative cost/effectiveness of alternate approaches for achieving higher yield and improved nutrition can be determined.

In December 1970 a workshop of experts in plant breeding and fortification, nutrition economics, food processing, and food habits recommended that a Joint Research and Development Planning and Evaluation Group be set up by A.I.D. to inter alia: provide general guidance to ongoing A.I.D. supported agricultural and technological efforts to improve the nutritional quality of cereals by

breeding and fortification, with consideration of costs, processing and distribution. The Joint Group has been established, and staff of the Agriculture and Nutrition Offices are developing and reviewing all Agency breeding and fortification projects. One major objective is to develop new policy guidance that A.I.D. can use in seeking to expand and sharpen the attention given to nutrition goals by the international agricultural crop research centers.

Nutrition/Agriculture Planning in the LDCs

Given an interested government official it is usually possible with some external funding to set up a pilot demonstration project on an operational activity in one small area. It is, however, difficult to move from these modest projects to a broader area or to the national level. The usual reasons are an inadequate budget and pressures from many sources to support a variety of programs. Thus it is difficult to get Agriculture Ministers to address the nutrition problems in their countries, especially since nutrition has traditionally been thought of as being the responsibility of the health sector. Granted, LDC health officials must be prepared to offer guidance on the nature, magnitude, and location of nutritional problems to help the agriculturalists decide on what to do and where to do it, but major actions by Agriculture decision makers -- such as nutrition-oriented modifications in agricultural policies -- could probably provide a greater impact on low-cost protein availability than efforts in any other single program area.

For example, a pricing policy which would reward the farmer for growing protein crops such as high lysine corn or selected food legumes and make available low-cost protein foods to consumers could have a wide spread effect on

improving the diets of the rural poor. Such policies are not likely to come forth unless attention is given to good nutrition as a national goal.

One step toward accomplishing this goal is to include in the agricultural sector analyses that form the basis for future aid programming an assessment of the nutritional implications of the country's sector strategy in relation to its nutritional problems. (Ideally, all assistance agencies such as FAO, the World Bank, other lending agencies, and the Foundations would also make a similar analysis).

Missions should begin immediately to include the nutrition dimension in their dialogue with host governments over agricultural assistance, should inform host governments of recent developments in nutrition planning techniques and technological progress, and should advise governments of the availability of A.I.D. and other assistance in this field. Where feasible, analysis of the nutrition question is to be included in agricultural sector analyses immediately. By FY 1975, all Mission agricultural program submissions should include a statement of country nutrition goals and an analysis of the way in which these goals are being addressed in the country's agricultural program.

In summary, the Agency will endeavor to use its agricultural programs to bring about a significant nutrition impact by: (a) expanding R & D efforts in plant breeding to give greater attention to nutrition, food processing, and food economics; (b) including the nutrition factor in agriculture sector analysis; and (c) including in the Missions' program submissions an analysis of the country's nutrition problems and the way they are being addressed by the country's agriculture program.

IV-B. Nutrition and Food Technology

In most developing countries, the low-income masses have a common consumption pattern: the staple is a grain or tuber, from which most of the protein and calories in the diet must come; the staple is usually supplemented with vegetables and occasionally with small inexpensive bits of fowl, meat or fish (a full portion of meat, fish or fowl being consumed only on special occasions); the diet is usually monotonous, since the choice of inexpensive nutritious foods is limited.

The infant is nursed for several months and may then be abruptly transferred to the adult diet, of which the prime ingredient is the cereal, root or tuber staple. Intermittently and in small amounts, the child may receive some packaged milk or weaning food, often imported and expensive. The well-meaning but nutritionally ignorant mother may dilute the milk or weaning mixtures below the minimum levels necessary to assure efficient utilization, or commonly reduce protein food intake (e.g. beans) during diarrheal infections when the child is suffering severe protein loss. This results in the child being deprived of protein when he most requires it for brain and body growth. Alternatively, children in many countries are breast-fed too long without a solid food supplement resulting in insufficient protein intake after the sixth month.

Since it is unlikely that there will be an early and significant increase in the income of these masses, other means must be explored to increase the nutritive content of the foods traditionally being consumed and/or to create new foods which will be readily available, low in cost, and acceptable for use by infants.

A promising possibility for doing this is through fortification of the basic staple with proteins, vitamins and minerals. The cost of vitamins and minerals is very low and it is simple and inexpensive to add these during the fortification process. In addition, for some protein-vitamin relationships they must be included in the fortification even where protein is the major objective.

Most cereals contain from eight to 12 percent protein, which however is of limited value since it is usually deficient in one or more of the essential amino acids.[1/] Some staples such as cassava are extremely low in protein, and fortification with amino acids is of little value. However, the protein quality of such foods can be improved by adding protein concentrates derived from oilseeds, fish or legumes which are high in protein and have a good amino acid balance. Vitamins and minerals must also be added to the staple as part of the fortification mix to insure that the protein is properly utilized and to create a food capable of sustaining growth.

It is now possible to synthesize the amino acids deficient in: wheat (lysine); corn (lysine and tryptophane); and rice (lysine and threonine). The prices of these amino acids have been reduced as a result of new technologies, and it appears likely that they be reduced even more, with sufficient demand.

1/ Proteins are composed of long chains of nitrogen-containing compounds known as amino acids. Of the 20 or so amino acids needed by man, all but eight can be synthesized by the body. These eight have been labelled "essential amino acids". The nutritional quality of a protein is determined by its quantitative and qualitative amino acid composition. The shortage of an essential amino acid limits the utilization of all other amino acids present. Wheat, e.g. is deficient in the amino acid lysine. This means that when all of the lysine has been used up in protein syntheses, the body cannot use the other amino acids that wheat contains to form protein. The needed additional lysine, however, may be supplied by the other foods eaten with the wheat. Should the diet not include such foods, an alternative is to add synthetic lysine to the wheat to improve the quality and boost the quantity of the utilizable protein in the wheat. This is the principle of amino acid fortification.

The cost of adding vitamins and minerals is already quite low. While other costs for such things as distribution, packaging, and processing must also be considered, they appear to be relatively modest; therefore, fortification of cereals appears to be economically feasible.

The Agency has taken the lead in demonstrating the feasibility of fortifying staples. A large-scale wheat fortification project is under way in Tunisia, a corn fortification project in Guatemala, a rice project is being carried out in Thailand, and a cassava fortification project is progressing in Brazil. In each case technologies are developed for the addition of the fortificants to the staple. Optimum levels of fortification are determined through nutritional testing on animals and human subjects. Tests are made to confirm that the basic food is not altered to the point where its processing characteristics or its taste are adversely affected. The stability of the fortificants is also confirmed after use in traditional food preparations to insure that food processing has not destroyed nutritional value. The question of costs must be resolved by subsidy or by passing on the added cost to the consumer. In the latter case, testing must conform that the improved product is not passed up by the low income target population.

Meetings are being scheduled that will expose potential users of these techniques to the field trails and to plan the transition from research and demonstration to implementation. Africans, Asians, and Latin Americans from cassava-producing countries met in Brazil in 1972 to review the progress of the cassava fortification project there and to consider the relevance of the technique for their countries. In September 1973 millers, nutritionists, and those who control cereals policy in about a dozen wheat-eating countries will convene in

Tunisia to examine the wheat fortification project and to develop the procedures required to launch national programs.

The feasibility stage in fortification technology will be completed by mid-1975 by which time it is anticipated that a number of countries will be undertaking to fortify portions of their major staples. India is already fortifying centrally-baked bread in increasing quantities.

New Protein Foods

Another route to producing low-cost nutritious foods is via the commercial food sector. Several formulated nutritious foods are already being distributed through regular commercial channels: in Guatemala and Colombia, a low-cost food mixture, Incaparina, is marketed; in South Africa and Zambia, Pronutro has achieved commercial viability; fledgling efforts in Colombia (Duryea) Ethiopia (Fafa) and other countries have been made but product viability is yet to be established. Snack beverages containing protein are being successfully marketed in Hong Kong (Vitasoy) and Thailand (Vitamilk).

Other new products are being developed and tested in government laboratories and in the laboratories of the food companies. Interest is high, but there are numerous problems to overcome before products reach a stage of successful widespread distribution. In fact, for every success, there has been a large number of failures, due especially to the problems of high cost or poor acceptability.

From 1966 to 1971, the Agency has helped to create a momentum on the part of U.S. food companies to enter this field by financing 14 feasibility grants to U.S. food companies to explore the development and marketing of new protein foods. Four or five of the projects will most likely result in viable enterprises.

In itself, this is a relatively modest achievement, and it is recognized that these foods initially will be available primarily in urban areas, to people with relatively high purchasing power.

Many companies have begun to make high protein food products for such reasons as self-protection against possible market penetration by competitors. The General Foods Corporation has developed a high protein, low-cost macaroni which it is offering through various licensing arrangements to LDC companies. Nabisco is pursuing efforts at producing fortified crackers and cookies. Coca Cola has produced the first carbonated protein drink and is seeking distribution arrangements in several countries. Other companies are developing their own formulations. A.I.D. has stimulated this momentum and continues to maintain liaison and offer guidance to the U.S. private food sectors but the Agency does not plan any additional financial incentives. Instead, OPIC has in operation a similar program managed by the Agribusiness Council.

A.I.D. is now providing high protein food grants to encourage LDC food companies to carry out feasibility studies or to purchase technical assistance to develop low cost high protein foods. A three-year program starting in FY 1972 will provide assistance for some 30-40 projects out of which perhaps a dozen products will be brought into production. The priorities in this program are staple foods which reach large numbers of people (fortified pasta, bread, tortillas, chapati, etc.) and weaning products which will permit availability of an indigenous product at about half the cost of an import, which is usually the only weaning food available.

AID supports a modest research effort aimed at developing technologies that can be made available generally to the food industry to spur protein food

production. In many cases, the industry has invested many millions of dollars in R & D and there is no need for government support, (e.g. development of textured vegetable products in the form of meat, seafood, and fowl analogues). In other cases, work is being carried out on esoteric protein sources which may prove to be feasible in the longer range future (e.g. protein from algae, leaves, etc.) and such efforts are also inappropriate for A.I.D. support. A.I.D. research effort is limited to products or processes which are likely to have widespread low cost application in the LDC's in the near future. For example, A.I.D. supports a project to develop ways of improving wheat based products (with emphasis on North Africa and South Asia), a project to determine the feasibility of developing low cost high grade coconut flour (likely pilot plant in Philippines or Ivory Coast), and a project to develop protein foods by extrusion technology (currently in Chile and adaptable elsewhere).

IV-C. Nutrition and Child Feeding Programs

1. Food For Peace - History and Program Evolution.

Under the authority of P.L. 480, Title II (Food For Peace), the United States donates food for distribution in programs of emergency disaster relief, child feeding, and in other social and economic development schemes. Food is donated through U.S. registered voluntary agencies, international U.N.-related agencies such as UNICEF and the World Food Program, and through government-to-government channels.

In the early years of the program (begun in 1954-5) the emphasis was on initiating and then expanding programs. In a time when the U.S. was possessed of huge surpluses, there was great interest in "disposal"--and in fact disposal of agricultural surpluses was written into the legislation as an objective.

During this period there was a tendency throughout the Agency to look at the Title II program as an add-on which was not really an integral part of the development program. The major program concerns of the Agency were such things as avoiding diversion of commodities, whether the food grants interfered with normal marketing, and other administrative and management questions. The Agency devoted more manpower to auditing the programs than it did to program development and monitoring. The major image of the program was one of relief and humanitarianism.

In the mid-1960's the Agency began to shift the program away from the concept of relief, with the exception of emergency disaster relief which was and remains a priority, and more toward development. Programs providing food to the chronic economically needy, particularly those serving families with able bodied men were phased down. Emphasis was placed on promoting two types of programs:

(1) community development, food for work and other self-help programs in which the food was used as payment in kind to put people to work on improvement of the community, and (2) supplementary feeding programs for children enrolled in schools, in a maternal-child-health center type of scheme, or in some other institution-based program. The Agency formally established priorities assigning the highest level to programs reaching pre-school children* with a second priority to school feeding schemes.

About the same time, the Agency began to take steps to improve the program's effectiveness as a tool to combat malnutrition. After two unsuccessful attempts, the Agency, supported by the Department of Agriculture, suceeded in convincing the Congress that the wording and concept of "surplus disposal" should be removed from the legislation and that a major objective of the legislation should be combatting malnutrition. This was achieved with the Food For Peace Act of 1966. The legislation provided that the Secretary of Agriculture take into consideration overseas food sales and donation needs when planning domestic agricultural policies and programs. It also permitted providing foods other than those in surplus. Subsequently, steps were taken to upgrade the nutritional quality of the foods distributed.

When people subsisting on a very low protein diet (such as those in areas where cassava or plantains are staple) are fed high protein foods such as non-fat dry milk (NFDM), the Vitamin A deficiency is exacerbated (it having been

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* As used here and throughout, such programs also included pregnant and nursing women.

removed with the fat). This can cause eye diseases leading to blindness. To solve this problem, Vitamin A and D are now added to the non-fat dry milk being shipped overseas. It has been standard practice to fortify wheat flour shipments with Vitamins B_1, B_2, Niacin and Iron as is done in the U.S., in addition since there was widespread calcium deficiency among the poor in the LDCs, the U.S. began to fortify wheat flour shipments with calcium. When it became apparent in 1966-7 that the supply of NFDM would be sharply reduced (as had occurred on two previous occasions), and since most child feeding programs were dependent on this commodity as a protein source, the government and private industry joined hands to create special nutritious, blended mixtures such as CSM (a corn-soy-milk mixture with vitamins and minerals added) and WSB (a blend of wheat flour, soy and vitamins and minerals) which could be served in a variety of ways in child feeding programs. Lysine fortified bulgur was made available for emergency disaster feeding, and a new "instant" CSM was used in Bangladesh. Soy-fortified oats are now being programmed, and in general, the nutritive value of the Food For Peace commodity shelf has been drastically improved.

2. Evaluation of FFP - Until recently, the expansion of supplementary child feeding programs has been accepted without question as being desirable. Certainly a strong case can be made that children's diets are improved and that the programs are popular with political leaders and with the people who participate in them, but when one approaches the question of the relative cost/effectiveness of alternate approaches to reach similar objectives it becomes apparent that there are many unanswered questions concerning such programs. What percentage of children do they reach and are they likely to reach the neediest

children even if expanded? What are the costs of such expansion -- in money -- in scarce trained personnel -- in warehousing -- transportation, etc.? Are the foods actually supplemtal to the diet or do they supplant food that would otherwise be served the child? Does the food given at a maternal child health center for distribution actually reach the child, or is it sold, or eaten by the family as a whole, or used to feed animals? Are habits and demands being created which would be hard to deal with if an external food subsidy were withdrawn? To what degree do the foods matter nutritionally? In the case of school feeding, do the programs have any demonstrable effect on enrollment, on drop-out rates, on attendance, or on classroom performance? Under what conditions are supplementary feeding programs most likely to be effective, and how do they fit into country strategies? And what are the costs of delivering a given amount of selected nutrients when compared to other alternatives?

To find the answers to these questions, the Agency has undertaken a project to evaluate supplementary feeding programs for children. A literature search has been completed, a research protocol has been developed and reviewed by a panel of experts, and field evaluations will begin in three countries early in 1973. The project should be completed by the end of the year and will provide a better basis for guiding the Agency's policies and programs in child feeding as part of a broad nutrition strategy.

A.I.D. is also conducting an evaluation of the blended foods distributed under the FFP program to determine whether and to what degree they are meeting the objectives for which they were designed. Field evaluations have been completed in India and the Philippines, and will shortly be completed in Brazil.

The results of these evaluations will be available in 1973 and will provide answers to questions regarding degree of acceptability, types of use, extent to which they reach target populations, their potential for commercialization, etc. The evaluation should also reveal the reasons for the relative effectiveness of these commodities in different programs. The results of these evaluations, the Agency's own on-going self-analysis and the recently completed evaluation of P.L. 480, Title II (known as the Checchi report) will be useful to the Agency in its long range planning in nutrition in general and Food For Peace in particular. Meanwhile, a number of actions are already identified which could enhance the effectiveness of child feeding programs in reaching A.I.D. nutrition goals.

Among these are the following:

(1) Combatting malnutrition should be made an integral part of the A.I.D. development program and child feeding programs an integral part of the A.I.D. nutrition strategy. The latter will require a change in field project design, presentation, and processing.

(2) Through the programming process, LDCs should be encouraged to develop nutrition programs in which child feeding programs may be a component, with specific time-related goals.

(3) The Food For Peace programming process and Nutrition programming process should be formally linked by requiring Office of Nutrition review and concurrence of all child feeding programs.

(4) Selected field personnel should be trained to handle nutrition programming, including child feeding programs. Where university contractors or

other intermediaries are used, they should work closely with Mission program and Food For Peace Officers to assure that child feeding programs are consistent with country and Mission priorities.

(5) The U.S. registered volagencies should be encouraged to concentrate on those interested and more needy LDCs in which governments may not be equipped for the task. Consideration will be given as to the need for strengthening volagency capability to do this through the provision of programmatic grants described in the section on Food For Peace and Nutrition.

(6) A greater incentive to the development of preschooler nutrition and feeding programs should be provided by offering technical assistance and other resource aid (manpower training, education materials, weighing scales, etc.).* This effort should receive special stress.

(7) The relative effectiveness of "take-home" programs as compared to on-site feeding should be studied to determine the feasibility and desirability of pursuing this approach.

(8) School feeding programs for children above the elementary school level (Grade 6) should be gradually phased out.

(9) Operational studies should be undertaken to determine the effects of greater concentration with improved diets and intensive nutrition education

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*As was demonstrated in the Agency's highly successful "Operation Ninos" program in Latin America in 1963-65, the provision of equipment on a one shot basis can help to generate expansion of such programs. Despite the fact that AID and every nutrition authority has for years stressed the importance of pre-schooler programs as compared to school feeding, the ratio of school children being reached is still about 4 to 1, due to the fact that school children represent a captive and easy to reach group and pre-schoolers do not. Reaching them via feeding programs will require some assistance in developing an infrastructure. Expansion of multi-purpose, health delivery systems, that achieve mass coverage of the most basic health services for mothers and young children at costs LDCs can afford, will provide a ready vehicle for at least the information/guidance part of efforts to reach this primary target group. Experimentation with supplemental feeding through the same network may be tried where feasible.

in school feeding programs on pupils in the first two to three years. (There is some evidence that nutritionally deprived pre-schoolers can "catch-up" to their cohort peers with a proper diet and intellectual environment.)

(10) Schools should be encouraged to introduce weighing programs to provide a basis for monitoring nutritional status of the population.

(11) Where possible, food fortification and new local nutritious food development schemes should be linked to local child feeding programs since these efforts can be mutually re-enforcing. The provision of a reliable initial market for these foods can make the difference in their commercial viability, while the availability of local low cost nutritious foods can provide a helpful basis for continuity following phase-out of U.S. commodity assistance.

(12) The United Nations Agencies such as FAO, WHO, UNICEF, and the World Food Program should be encouraged to adopt similar policies.

(13) U.S. food donations should be concentrated in those countries in which the child feeding program is a part of an overall nutrition strategy or where there is evidence that the child feeding program can be the cornerstone of a developing nutrition strategy.

3. Role of Voluntary Agencies - Since over half of the child feeding programs in the LDCs have voluntary agency participation, and since these agencies (such as CARE, Catholic Relief Services, Church World Service, etc.) sustain a volunteer force of about one million persons overseas, AID has been trying to stimulate the voluntary agencies to shift their activity concentration from food distribution per se to comprehensive programs involving manpower training, nutrition education, utilization of domestically-produced protein foods and

nutrition supplements, and programs which generally aim at providing a basis for prevention of malnutrition over the long term without dependence on external assistance.

As a first phase effort, AID conducted a three-year program (1969-70-71) of providing modest "incentive grants" to permit the agencies to undertake new nutrition projects. Projects were undertaken mostly with the objectives of improving the effectiveness of feeding programs by training manpower, educating consumers, or combining the delivery of complementary services such as nutrition, health and family planning. These projects generated an augmented flow of voluntary agency resources into nutrition programs.

For the future, it is proposed that the Agency fund incentive block grants to selected voluntary agencies who would wish to tool up for a broader nutrition program, including making modifications in policy and program priority and, with such funds, be able to add the staffing, undertake the training, etc. required for wider and more sophisticated nutrition planning. The agencies would assume the major responsibility for management and make some sub-grants for area or country projects. An important stipulation will be that Food For Peace resources would serve as interim support only for programs that could continue in operation independent of external assistance and not collapse if the Food For Peace contribution were discontinued.

4. Food For Peace and Nutrition Inter-Office Relationships. The Office of Food For Peace and the Office of Nutrition have been cooperating in a number of ways, including the following:

(1) Both offices participate in the interagency committee (chaired by USDA) which considers proposed new foods for inclusion in the Food For Peace program,

(2) TA/N, as well as the regional bureaus, is invited to sit in on the FFP sub-committee which reviews supplementary feeding programs,

(3) TA/N provides recommendations to FFP on the size of rations to be allotted in programming various commodities,

(4) FFP, as well as the regional bureaus, was represented on the TA/N committee which reviewed all volagency incentive grant proposals,

(5) FFP participated in the planning for the TA/N-sponsored evaluations of blended foods and child feeding programs,

(6) FFP, as well as the regional bureaus, participated in the TA/N chaired committee which reviewed industry grants for the commercial development of low cost high protein foods,

(7) FFP and TA/N both participate with regional bureaus, the Disaster Relief Coordinator, the Voluntary Foreign Aid Staff and the Volagencies in the planning of the significant emergency disaster relief programs,

(8) FFP field and Washington staff participate in the TA/N-sponsored Agency-wide In-Service Workshops on Nutrition which take place every two years.

IV-D. Nutrition and Health

Malnutrition causes more deaths and wreaks more havoc on the health of young children in the LDCs than any other single disease. Yet, the need in the LDCs to give this problem the highest priority -- or even a high priority has been overlooked. Although medical personnel in the LDCs recognize the fact that malnutrition is a major public health problem, national nutrition programs conducted by health ministries tend to emphasize treatment and rehabilitation rather than prevention. Unfortunately, few public health physicians exist in the LDCs; hence, the LDCs tend to support hospital based rehabilitation programs that reach only small numbers of people and are relatively costly on a per patient basis.

There are some encouraging signs that this is beginning to change. For example, the Ministers of Health of the Americas, meeting in Santiago, Chile in October, strongly recommended that the prevention of child malnutrition be given a high priority.

In providing an analysis and rationale for a health program, the Agency's Office of Health* has rated the key nutrition-related health problems as (1) the inefficient use of food energy and nutrients, due to widespread infections which impede intestinal malabsorption, and fevers which increase body metabolism and cause nutritional imbalance through accelerated calorie and protein use, and (2) the problem of health delivery capability resulting in a situation whereby only 10 percent of populations in developing countries have ready access to health care.

*Much of the following discussion is taken from the A.I.D. paper on "The Health Issues" prepared by Dr. Lee Howard, Director, Office of Health, TAB.

Food is wasted in two ways:

(a) Disease and infection, when accompanied by fever increases the body's metabolism and raises energy requirements drastically. This can make impossible the retention of protein by the body even with very high protein and calorie intake. Hence disease and infection can cause malnutrition. Conversely, malnutrition reduces the body's ability to ward off infection.

(b) Food energy waste also occurs from failure of food absorption from the intestine as a result of food and water pollution.

If the problem of intestinal malabsorption is responsible, in some countries -- as alleged -- for food losses of up to 20-25%. and if it were possible to prevent the disorders which result in malabsorption, it might be possible to make an impact on malnutrition through an effective disease prevention program. To determine the nature and magnitude of the malabsorption problem and the current status of knowledge regarding causation, cure, and prevention, the Office of Nutrition, in collaboration with the Office of Health, sponsored a mini-conference on the subject, convened by the National Academy of Sciences Committee on International Nutrition Programs on AID's behalf. The conference concluded that current knowledge has not advanced to the point of isolating specific etiology, let alone identifying treatment or prevention measures other than environmental sanitation. Nevertheless, the conference was useful in providing the necessary guidance in research and operational activities which will hasten the acquisition of the knowledge necessary to make program judgments. In addition, it gave current researchers a clear focus on the kind of research priorities required. Hopefully, this also will spawn such research with the financial support of agencies other than A.I.D.

It would appear that solutions lie in improvement of man's environment through water protection, waste disposal, and public education regarding the consequences of continuous contamination of food, water, and soil with human intestinal wastes. A modest A.I.D.-sponsored research project is under way to attempt to identify feasible operational programs to deal with this problem.

A quantum increase in the availability of traditional, hospital and physician-based health services is unlikely in the near term due to the great expense this would involve and the great demand it would make on manpower resources and administrative capacity. Innovative alternatives must be identified as well as techhiques for combining the delivery of Health, Nutrition and Family Planning Services for greater effectiveness. As part of a strategy that overlaps Health, Nutrition, and Family Planning, the Agency is currently exploring the feasibility of establishing multi-purpose integrated delivery systems in several countries. The results of this effort will provide a basis for future decisions on programming technique and level of effort desirable.

It is important to note that aspects of better health, nutrition and family planning can be "delivered" outside the formal government facility which is usually referred to by the term "delivery system". Such other routes must play an important role if the cost of running a widespread government apparatus (even if it achieves cost reductions via intergration) is not to prove a major stumbling block to the feasibility of expanding Health/N/FP delivery.

IV-E. Nutrition and Education

While varying in degrees of fervency, there is an almost unanimous opinion among nutrition workers that widespread ignorance of nutrition is a major factor in the malnutrition problem. Accordingly, a wide variety of projects are in operation which aim to teach people (usually mothers) something about the choice of foods for the family diet, how to prepare or serve certain foods, and the causes and means of preventing malnutrition. There is a widely felt belief that all nutrition education is good and more is better. On closer scrutiny, there is reason to question this assumption.

Programs vary greatly in terms of:

(1) The message -- is it general (nutrition), nutrient specific (eat protein), or commodity or product specific (eat beans with your rice).

(2) The medium -- verbal messages via loudspeaker or radio, written messages via poster, newspaper, etc., visual demonstrations, various combinations,

(3) The frequency of exposure,

(4) The motivation being addressed - (pride, guilt, duty, love, etc.)

(5) The target -- mothers directly, mothers indirectly (through the child), fathers, children.

The relative effectiveness of different techniques under different conditions is not known. There is little information on the nature and extent of behavior change realizable through various techniques and there is no known basis for estimating costs and other inputs required to bring about a desired

level of change. Such knowledge is necessary to permit effective planning of the education component of nutrition programs, and accordingly, the Agency has initiated an evaluation designed to provide some of these answers. An exhaustive literature search has been completed and an evaluation methodology has been developed and reviewed by a panel of experts. The methodology is being modified and field testing will begin in 1973. There is irrefutable evidence that consumer behavior is being modified all the time by the use of mass media by the advertising industry. There is justifiable complaint that these powerful resources are generally being used to promote non-nutritious or even nutritionally deleterious consumer behavior (by promoting soft drinks, processed foods, high fat and carbohydrate snacks, bleached flour breads, etc.). This resource can be applied to promoting good nutrition rather than bad.

Under A.I.D. auspices, a "Madison Avenue" advertising agency has explored in three countries the possibility of applying advertising techniques to promoting better nutrition. These initial surveys suggest the feasibility of launching nutrition education programs using government-owned radio stations and complementary media. A modest one-country, single problem project to test this will begin in Ecuador in 1973 and be completed in 1975.

It is planned that other countries and different problems will also be tested so that desirable broader data will be available at an early date. More substantive data on techniques, costs, and impact would provide national planners with a basis for deciding on the feasibility of such programs in their countries.

A.I.D. is currently sponsoring work on the development of strategies for the application of modern educational technologies in the area of nonformal education. In addition to literacy, family planning and basic homemaking and

job skills, nutrition education should be a priority subject since information on the effect of diet on health and well being is basic to the welfare of the masses of lower income people. The Office of Education and Human Resources and the Office of Nutrition are cooperating on a project to test the use of modern educational technologies in improving consumer behavior. Strategies being developed by the Agency at this time will address the problem of too-early weaning and abrupt transition from high-protein breast milk to low-protein cereals or tubers. A protocol for field testing will be developed in 1973 and applied in 1973-74.

A.I.D. also conducts a modest program of developing and testing new education tools and techniques which fill identified gaps: e.g., the use and evaluation of a simple weight chart on which the weight gain of the child is plotted over the first few years of life to give the mother warning of malnutrition when the indicated weight falls below a prescribed range. The chart is usually used to promote nutrition education in supplementary feeding programs. It has been very much in demand (millions have been distributed in over 30 countries) and appears to be a very low cost technique, both for motivating mothers to try harder to improve their child's nutrition and for helping them to manage such efforts.

In summary, the A.I.D. Nutrition Education strategy concentrates on innovating techniques in face-to-face and mass media programs and in cost evaluation and impact, with a view to providing planners with a basis for choosing the nutrition education components of their nutrition programs.

IV-F. Nutrition and Family Planning

There are three principal relationships between nutrition and family planning which can be differentiated as follows:

(1) Better spacing of children leads to smaller families, more favorable food availability and better maternal health, and thus results in better nutrition.

(2) The provision of health and nutrition services along with family planning services may have several benefits:

(a) by indicating concern for people's well-being, it may result in a greater willingness to take advantage of family planning services.

(b) it may remove a religious or cultural barrier to visiting centers which are identified solely as family planning centers.

(c) it may create a more efficient way of delivering the several services.

(3) Better nutrition, by reducing child mortality, may reduce the need for large families which many people desire in order to ensure surviving heirs.

These relationships have the following implications:

(1) The implication to A.I.D. of the "better spacing, smaller families" argument is to give high priority in a nutrition program to family planning. The Agency is, of course, giving highest priority to encouraging family planning for a number

of reasons, going well beyond nutrition.

(2) In some cases, new family planning programs have encountered resistence on the part of governments and on the part of potential practicioners. The reasons may be religious, or there may be a belief that the programs are directed "against" non-white populations; and, in some countries it is politically not feasible to adopt a program -- with foreign assistance and urging -- which has essentially a "negative" connotation of reducing populations or preventing births. In such situations family planning programs may be more acceptable if they are part of a more comprhensive program for responsible parenthood with the "positive" aspect of preventing illnesses or saving the lives of their existing children. There is already some evidence emerging that mothers who see their children visibly improved in a nutrition program develop a greater confidence and trust in the program which has provided the nutritional benefits and become more receptive to family planning.

In some countries, food distribution networks extend into areas which are not reached by health or family planning centers. Adding family planning services to these centers would enable such programs to reach remote areas which would not otherwise be reachable for many years. This is especially true in the case of programs operated by non-government organizations, such as the U.S. registered

voluntary agencies. These agencies, long involved in food distribution programs, have begun in recent years to conduct programs of nutrition and family planning, but their efforts have been relatively modest. They could become a major resource for developing and extending integrated health-nutrition-family planning programs if they opted to give this objective their highest priority and if they could obtain additional resources. Since the availability to them of Food For Peace commodities is being reduced and since governments have begun to assume management responsibility for some of the school lunch and other programs in which these agencies formerly played a vital role, it may be an opportune time for them to consider a major shift in program emphasis. A.I.D. should encourage and assist in this effort.

As indicated in the section IV-D, "Nutrition and Health", the Agency is currently exploring the feasibility of assisting countries to establish multi-purpose integrated delivery systems combining health, nutrition and family planning services.

An inter-Office and inter-Bureau committee is helping to coordinate the efforts among the offices of Health, Population, Nutrition and Education, and between these and the Regional Bureaus. These efforts and those of the voluntary agencies will be studied to determine the conditions under which various combinations of services are most desirable, the relative importance of each of the services in influencing acceptance of the others, and the relative costs for delivering the various services. Alternative systems will be tested and evaluated in terms of cost and effectiveness. This will produce information which will be useful to guide the developing nations and A.I.D. in future programming.

Family planning and nutrition programming have similar problems with respect to reaching target populations and it is significant to note that in most cases the programs share a common goal: to reach fertile mothers. The family planning program seeks to provide her with the why and wherefore for spacing of children and preventing unwanted pregnancies; the nutrition program seeks to provide her with the why and wherefore for providing the existing young child with a diet which will prevent the onset of malnutrition.

It is estimated that at this juncture family planning programs reach only about ten percent of fertile women; the percent of women being reached with nutrition services is unknown, but is likely to be not much greater.

The extent to which combined services are being provided is unknown, but it may be assumed that there are many cases in which combined services are not being provided. Given the recognized need for improving and expanding delivery systems for both of these services (as well as for various health services), it would be logical to explore the possibilities of "piggy-backing" respective delivery systems and providing for combined services in new delivery networks.

A clear statement on the question of motivation for family planning being influenced by better nutrition and reduced infant mortality was produced by the President's Science Advisory Committee:

"That reduction of population growth is essential to achieving a balance between food supply and food need is an obvious, easily understood, and widely appreciated fact."

"There is, however, another more complex, less well-known, and crucially important relationship between nutritional needs and family planning. Surveys of

the attitudes of married couples in developing countries show that the numbers of children desired are higher than in the developed nations. Furthermore, the average number of live births per woman in the developing countries is 30 percent greater than the desired number of children."

"Emphasis on the desire for heirs leads to large families. Only one son may be needed for ritual or economic purposes but it is common to want two sons to insure against the death or incapacity of one. Couples must average four children to obtain two sons."

"Availability and efficacy of pills, intra-uterine devices and other technical means for birth control are largely irrelevent until couples have secured the desired number of living children."

"If we assume the necessary preconditions for reducing fertility rates in the developing countries are low infant and child mortality and a public awareness that mortality is low, then we have the apparent paradox that a reduction in mortality will reduce rather than raise the rate of population growth."[1/]

Berg and Muscat[2/] have further analyzed the issue concluding as follows:

"Population stability in the past was maintained by the higher rates of both births and deaths. With mortality declining

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1/ The World Food Problem, A Report of the President's Science Advisory Committee, The White House, May 1967. Vol. I, P.14.

2/ Berg, Alan and Muscat, Robert, "Nutrition and Development: The View of the Planner". Paper prepared for May 1971 meeting of the U.N. Secretary-General's Panel to formulate a United Nations Strategy Statement on the Protein Problem Confronting the Developing Countries. Minea.

in the developing countries, clearly the only acceptable route to re-establishment of stability (or much slower growth), is a regime of low rates of both births and deaths. Although further lowering of child mortality is not sufficient by itself, fertility is unlikely to come down to acceptable levels without it. Thus, paradoxically, an important contribution to lower population growth may be to keep children alive."

The implications of these hypotheses are of profound importance in determining programming directions; yet, only a relatively modest level of effort is being directed to the study of these relationships. Field studies in India by Revelle of Harvard and Taylor of Johns Hopkins will add considerably to our understanding, but their results will not be available for several years, and their relevance to other countries will be limited. Several other small studies have been carried out and several broader ones have been proposed for Indonesia, Haiti, and elsewhere, and these might also produce useful additions to our knowledge, but instead of responding to requests for support of a variety of projects, it would appear to be more prudent for A.I.D. to plan a more systematic approach to tackling this question. What is the current state of our knowledge in this area? What do we need to know to permit proper planning by governments and by A.I.D.? What kind of studies are needed to provide us with this knowledge and in what magnitude? Are the pre-conditions for such studies available -- in terms of data, manpower, etc?

To find the answers to these questions, A.I.D. will convene in 1973 a mini-conference at which selected experts, including those currently involved

in research on this question, will develop appropriate recommendations for the Agency. The Offices of Population, Nutrition and Research are collaborating in this effort.

IV-G. Other Considerations

1. Institution-Building in the LDCs.

In most of the LDCs, institutional capability and availability of competent personnel are inadequate for developing and carrying out the multi-disciplinary nutrition programs described herein. The existing training programs, third-country or U.S., are on too modest a scale to make any real impact on needs in trained manpower. While there has been every effort made to involve local personnel in research projects (and certainly individual knowledge and capability are enhanced), this contributes little to building institutions. It would appear that an adequate institutional background in the LDCs that would permit operation of an effective nutrition program will entail more substantial initial inputs from outside.

These might be in the form of institutional development grants, providing U.S. institutional collaboration for development of an independent LDC capability. Where meaningful local institutional strength, contributions and interest are evident, Missions should examine project elements for eligibility under institutional development assistance.

In the meantime, every opportunity for bridging the gap in institutional capability should be utilized. The Agency, e.g. employs local personnel and institutions to the maximum extent in research and development activities. It holds international meetings and workshops in LDCs where on-the-site nutrition projects can serve effectively as focal points for study of project status and applicability elsewhere. One such meeting on cassava fortification was held in Guatemala last year under the auspices of the Institute of Nutrition for

Central America and Panama, another is scheduled in Tunis this year on wheat fortification, and another in Brazil on legume improvement.

2. Relations with the U.N. Agencies

The objectives and approaches of the U.N. Agencies do not always coincide with those of A.I.D. Nevertheless, the Agency and the U.N. Agencies share knowledge and collaborate in reaching scientific policy positions on nutrition issues through various means including:

-- The U.N. Protein Advisory Group (PAG), the body with a mandate to provide nutrition guidance to WHO, FAO, UNICEF and other member agencies -- these positions are reviewed by a Nutrition Advisory Committee and adopted if appropriate, obviating the need for independent and duplicatory study;

-- ECOSOC and the General Assembly, in Board and Council meetings;

-- U.N. attendance at AID-sponsored nutrition conferences, and A.I.D. participation in U.N. Agency-sponsored conferences.

The Agency, while not wishing to exert disproportionate influence on decisions concerning nutrition, but desiring to avoid what had become a widening gap between positions, has recently intensified the dialogue, and now acts as a more active U.N. member state, exercising the role and responsibility of a Board of Directors member.

Major goals in Agency-U.N. relations are: (a) attaining international consensus on priorities and a consistent strategy stressing the need for LDC governments to assume major responsibility for undertaking nutrition planning and programming; and (b) appropriate division of labor among the various international and bilateral agencies to avoid overlapping, competition and to ensure

that essential areas of activity are covered. This latter may result in promoting country concentration by the different agencies, thus promoting effective programming and making it easier for A.I.D. to maintain its strategy of concentration on a limited number of potentially high impact activities.

3. Ecological Considerations.

Faced with a multiple of the difficult and complicated problems of fostering development, nations are often not immediately concerned with environmental problems. Nevertheless, the Agency can take some actions during the process of conducting nutrition programs to minimize environmental problems without compromising development.

An arrangement has been worked out with the American Institute of Chemical Engineers, a private professional society affiliated with LIFE, under which the Society will work with A.I.D. to prevent environmental pollution attributable to nutrition and food science development activities. An AIChE Committee has been set up for this purpose, and professional volunteer experts are being recruited to provide technical information and support. It is hoped that the following activities will emanate from this project:

a. Information on solid waste disposal and other environmental protection aspects in the food processing industry will be disseminated to the LDCs through the medium of the regular newsletter distributed by LIFE.

b. LIFE will solicit and the AIChE Committee will respond to request for technical assistance in plant design to incorporate provision for proper waste disposal and other environmental protection activities.

c. One or two pilot projects may be undertaken by the AIChE Committee in AID's behalf to test the economic as well as technical feasibility of re-

covering polluting waste material such as whey, for processing into edible protein products, thus decreasing environmental insult while increasing protein supply.