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9. ABSTRACT

Only in the past five years have nutrition specialists begun to explore the social and economic dimensions of malnutrition in developing countries. The existing literature is limited both in its analysis of the problem and in its proposals for action. Various hypotheses advanced have not been seriously tested in national settings. Until such analyses are conducted, the only sound arguments for efforts to reduce malnutrition will continue to be ideological and ethical. The causes of malnutrition have been found primarily among the malnourished, and not in the social order in which they live. There has been no serious examination of the alternative hypothesis: that the persistence of widespread malnutrition is largely a reflection of the social and political organization and choices of development strategies. Child feeding programs have usually not been very effective because social, economic, and institutional barriers often prevent these programs from meeting their nutritional goals. In developing countries, groups having the greatest need are often legally or functionally excluded from the benefits of child feeding programs, as well as from other social welfare measures. What is needed is a change in the research priorities of the nutrition community. It should focus its attention on developing a better analysis of the problem in its social context. The basic assumption that nutritional standards can be improved without altering economic development strategies may well be wrong.

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**NUTRITION AND NATIONAL DEVELOPMENT: ESTABLISHING THE CONNECTION**

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It has only been in the past five years or so that nutrition specialists, joined by planners, economists, and other social scientists, have begun seriously to explore the social and economic dimensions of malnutrition in developing countries and to probe the relationship between nutrition and national development. The most comprehensive single work done in this area is Alan Berg's The Nutrition Factor: Its Role in National Development (Washington, D.C.: The Brookings Institution, 1973). A wide sampling of the literature is provided in the proceedings of a 1971 conference at M.I.T. which contains a range of articles and essays on the different issues involved.<sup>1</sup> Some other major contributions include Joy's "Food and Nutrition Planning," Journal of Agricultural Economics (January 1973); Call and Levinson's Nutrition Intervention in Low Income Countries: A Planning Model and Case Study (Cornell International Agricultural Development Mimeograph #34); and Levinson's Morinda: An Economic Analysis of Malnutrition Among Young Children in Rural India (Cornell/MIT International Nutrition Policy Series, 1974).

The underlying propositions of these and other works is that malnutrition should properly be a priority concern of development policy and that its eradication will require a new scale of effort and commitment involving the collaboration of many institutions, disciplines, and sectors which heretofore have not been concerned with the problem.

In support of these propositions, the literature first examines some of the economic and social ramifications of malnutrition in an attempt to

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<sup>1</sup>Alan Berg, Nevin S. Scrimshaw, and David L. Call (eds.), Nutrition National Development and Planning (Cambridge, Mass., and London, England: The MIT Press, 1973).

demonstrate why governments in developing nations should augment their efforts to improve nutritional standards. Second, it provides a more extensive analysis of the determinants and characteristics of malnutrition. And finally, it offers some concrete proposals on how governments should proceed to diagnose and confront the problem. Writers in this field have sought to create a new framework for analyzing and attacking malnutrition-- a framework in which socioeconomic and developmental considerations take precedence over the purely medical manifestations of poor nutrition.

Despite its theoretical and practical contributions, the literature, as it stands, has serious limitations both in its analysis of the problem and in its proposals for action. Most disappointing is the failure to explore satisfactorily the full range of variables conditioning nutritional status and affecting efforts to confront malnutrition. Particularly neglected are macro-level social, institutional, economic, and political factors-- even though the literature consistently signals their critical importance. Moreover, a variety of different approaches to the problem are advocated with insufficient analysis of their real prospects for successful implementation and results. And throughout the literature there are many assumptions and inferences unwarranted by available evidence. These limitations and omissions reflect in some measure the newness of the field, but we believe that they are also the result of certain conceptual biases and inadequacies.

This paper will critically review a representative sample of the literature, purposefully focusing on its limitations and shortfalls rather than providing a balanced assessment of its strengths and weaknesses.

Our observations are intended primarily to contribute to discussion and debate concerning appropriate directions for empirical research and theorizing in the field.<sup>2</sup> The paper is organized into three sections corresponding to the three major strands of the literature--the socio-economic consequences of malnutrition, its determinants and characteristics, and solutions offered to the problem.

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<sup>2</sup>It should be noted that most of the literature to which we refer was written before 1972 and is often based on research carried out earlier. We understand that a number of the authors cited are now pursuing studies consistent with the needs identified in this paper.

### THE CONSEQUENCES OF MALNUTRITION

Nutrition advocates have sought to build the case that malnutrition is a major obstacle to broader economic development efforts. The major thrust of their argument derives from an extrapolation to national dimensions of the effect of nutritional deficiencies on the individual. The logic is straightforward: malnutrition--by contributing to illness, impaired physical and mental abilities, and a shorter life span--reduces the productive potential of the individual, and consequently, a country with a sizable portion of its population malnourished is likely to have a lowered national productive capacity. Investments to improve nutritional standards are therefore justifiable not only on welfare or humanitarian grounds but also as stimulants to economic growth. The most complete statement of this argument is contained in Berg.<sup>3</sup> Selowsky and Taylor<sup>4</sup> on the basis of some heroic but plausible assumptions have tried to measure the productivity losses in Chile due to malnutrition.

The case, however, is based on the faulty presumption that increasing a person's capacity or potential will necessarily result in a growth in both his and his country's productivity. The translation of improved individual capacities into greater individual and national productivity is by no means automatic. It is largely dependent on the ability of the society

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<sup>3</sup>Alan Berg, The Nutrition Factor (Washington, D.C.: The Brookings Institution, 1973).

<sup>4</sup>Marcelo Selowsky and Lance Taylor, "The Economics of Malnourished Children: An Example of Disinvestment in Human Capital", Economic Development and Cultural Change, 22 (October 1973), pp. 17-30.

to make effective use of such capacities--which in turn is a function of economic demands, social organization, and the availability of complementary inputs. Enhanced individual capacities, whether they are brought about by better nutrition, education, or new technologies, may and often do go unused. Providing an unemployed person with a tool kit may facilitate his finding employment, but it does not contribute to national productivity if he remains idle or the work he does simply replaces work already being done by others. The fact that, in most developing countries, rates of unemployment and underemployment are high suggests that the existing capabilities of large numbers of individuals are already poorly utilized.

To assert that investments in nutrition will augment national productivity and growth, it must be demonstrated that, for a given country, either (1) growth is being constrained by physical and intellectual limitations of the work force which are traceable to malnutrition or (2) widespread malnutrition is itself an obstacle to effective organization and to the more efficient use of other inputs. There has, to our knowledge, been no attempt to investigate whether either of these circumstances hold for any developing country. And even where they did pertain, expenditures to bring about improvements in nutritional status would still have to be compared with alternative growth-generating investments to complete the case for such expenditures.

Other social costs attributed to malnutrition are the added burden

placed on already overtaxed health services<sup>5</sup> and the reduced efficiency of educational systems.<sup>6</sup> There is substantial (although by no means conclusive) evidence indicating that early and severe malnutrition does interfere with later learning, particularly when malnutrition is accompanied by other deprivations as is usually the case. Similarly, it has been shown in several countries that malnourished children are more subject to illness and require hospitalization more often and for longer periods than well-nourished youngsters. It is thereby concluded that reducing malnutrition would increase the efficiency and improve resource utilization in health and education. The conclusion is applicable, however, only for those countries where low-income, nutritionally vulnerable groups have achieved reasonable levels of access to health and education services and where the quality of services provided them is a serious concern of public authorities. In the large numbers of underdeveloped countries where schooling and medical care is largely reserved for middle- and upper-class groups, improving nutrition standards is unlikely to contribute much to increasing efficiency or effectiveness of health and education systems.

Finally, several studies argue that malnutrition, by contributing to high rates of child and infant mortality, may be frustrating efforts of countries to limit population growth.<sup>7</sup> In many (although not all)

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<sup>5</sup>J. M. Benoga, "Curative Aspects of Malnutrition and Rehabilitation of the Malnourished Child" (paper presented at the United Nations Children's Fund [UNICEF] Eastern Mediterranean Region Food and Nutrition Seminar, Beirut, January 26-29, 1970), p. 6; Giorgio Solimano and Fernando Monckeberg, "Desigualdades Alimentarias y Estado de Salud de la Poblacion," CEPLAN (in press).

<sup>6</sup>A. Picasse de Ovaque, "Malnutrition as a Limiting Factor in the Development of Education" (paper presented at U.N. Protein Advisory Group meeting, Paris, June 1972).

<sup>7</sup>The argument is presented in James E. Austin and F. James Levinson, "Population and Nutrition: A case for Integration," Health and Society, Spring 1974, and in Berg, The Nutrition Factor, Chapter 3, pp. 31-39.

countries, reductions in birth rates have followed the achievement of relatively low rates of infant mortality. One explanation of this phenomena is that families are unlikely to restrict births voluntarily unless they are assured of the survival of a certain number of offspring. The conclusion drawn is that investments in nutrition, which should lead to decreased infant mortality, are also likely to result in reduced rates of population growth. The available evidence, however, does not support that conclusion. The issue is, first of all, more complex as declining mortality and fertility are associated with a wide variety of other social and economic changes. And while birth rates appear to decline with reductions in infant mortality, the ultimate consequences for family size and population growth are still unknown.<sup>8</sup>

In short, despite considerable speculation, not much hard data has yet been produced concerning the economic implications of widespread malnutrition or the likely consequences of improvements in nutritional standards. The various hypotheses that have been advanced relating nutrition to economic development, population growth, and resource utilization in health and education may be correct over a broad range of societies, but they have not, to our knowledge, been seriously tested in even one national setting. Until such analyses are produced, the only sound arguments for efforts to reduce malnutrition will continue to be ideological and ethical.

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<sup>8</sup>For a review of the empirical evidence, see T. Paul Schultz, "Interrelationships between Mortality and Fertility" (paper prepared for conference on Policy Interventions to Affect Fertility, Resources for the Future, Inc., Washington, D.C., March 1975), Chapter IV.

### THE DETERMINANTS OF MALNUTRITION

Nutrition specialists have given considerable attention to identifying the determinants of individual and family nutritional status, generally concluding that they are complex and varied, and that malnutrition is a result of the interaction of a multiplicity of social, economic, and environmental variables. In numerous studies nutritional status has been related to family income and size, parents' educational levels, food prices, the nutritional value of available foods, customs and beliefs of consumers, and the availability of health care and sanitary facilities.

Levinson<sup>9</sup> has made the most thorough attempt so far to sort out these different factors and measure their relative importance. Several studies have focused on the income variable alone<sup>10</sup> and have shown that family income is a major determinant of diet quantity. Evidence also indicates that increases in income are generally translated into improved nutritional status, although some observers have noted that modest additions to income may result in dietary changes detrimental to nutrition.<sup>11</sup> Other research has suggested the detrimental effects of traditional beliefs and customs and of certain common adaptations to modernization (e.g., the replacement

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<sup>9</sup>F. James Levinson, Morinda: An Economic Analysis of Malnutrition Among Young Children in Rural India (Cambridge, Mass.: Cornell/MIT International Nutrition Policy Series, 1974).

<sup>10</sup>FAO Consumer Survey Listing; H.K. Bennett, The World's Food. (New York: Harper & Row, 1954); Operations Research Group, Food Habits Survey-Gujarat and Maharashtra (conducted for the Protein Food Association of India, 1969).

<sup>11</sup>Alan Berg, "Increased Income and Improved Nutrition: A Shibboleth Examined," International Development Review, 12: 3(1970).

of breast feeding by bottle feeding).<sup>12</sup> The relationship between infection and malnutrition has been well established<sup>13</sup> and in some settings nutritional status has shown to vary with age, sex, and family size.<sup>14</sup>

These studies and others have contributed importantly to an understanding of those family and individual characteristics associated with malnutrition. So far, however, there have been no serious attempts to relate these family-level determinants to the broader social, economic, and political variables which underlie them. The failure to establish such relationships has, in our view, resulted in an incomplete and possibly misleading analysis--which, as we will discuss below, often ends in prescriptions of questionable validity.

The importance of systemic and structural factors are recognized by nutrition writers. Berg asserts that "basic to every approach described in this study is the consideration of malnutrition as a problem whose causes and solutions are embedded in the broader economic system"<sup>15</sup> and argues that "the most telling reason for the neglect of the problem

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<sup>12</sup>Cicely D. Williams, "Self-Help and Nutrition: Real Needs of Underdeveloped Countries," Lancet, February 13, 1954; J. C. Likimani, "Report on Nutrition in Kenya," Proceedings of the Eastern African Conference on Nutrition and Child Feeding (Washington, D.C.: U.S. Government Printing Office, 1969).

<sup>13</sup>Michael C. Latham, "Diet and Infection in Relation to Malnutrition in the United States," New York State Journal of Medicine, 70: 558(1970); Kevin S. Scrimshaw, The Effect of the Interactions of Nutrition and Infection in Pre-School Child Malnutrition (Washington, D.C.: National Academy of Sciences, National Research Council, 1966).

<sup>14</sup>Levinson, Morinda; Joe D. Wray and Alfredo Aguirre, "Protein-Calorie Malnutrition in Caordelavia, Colombia: Prevalence, Social and Demographic Causal Factors," Journal of Tropical Pediatrics, 15-16 (September 1969).

<sup>15</sup>Berg, The Nutrition Factor, p. 7.

of malnutrition may be the isolation of the power structure from its effects."<sup>16</sup> Cravioto states that "protein-calorie malnutrition is a man-made disorder characteristic of the lower segments of society, particularly of preindustrial society when the social system (consciously or unconsciously) creates malnourished individuals generation through generation through a series of social mechanisms."<sup>17</sup> Levinson observes that "the equity problems inherent in these [investment-oriented] patterns of development are reflected in widespread malnutrition."<sup>18</sup> But these authors and most others have not pursued the kinds of analysis and discussion which their statements imply are necessary. Joy<sup>19</sup> and Mellor<sup>20</sup> are among the few writers who do discuss broader macro-level variables, but their efforts are limited and largely lack empirical bases.

The literature, for example, contains little systematic discussion and virtually no empirical research findings concerning the influence of government economic, agricultural, or social policies on the incidence of malnutrition in a country--even though the consequences of these policies on nutritional status may be several times the magnitude of any direct efforts to reduce malnutrition and, in addition, may seriously

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<sup>16</sup>Ibid., p. 2.

<sup>17</sup>Joaquin Cravioto and Elsa R. De Licardie, "The Effect of Malnutrition on the Individual," in Berg, Scrimshaw, and Call (eds.), Nutrition, National Development and Planning, pp. 3, 4.

<sup>18</sup>Levinson, Morinda, p. 2.

<sup>19</sup>Leonard Joy, "Food and Nutrition Planning," Journal of Agricultural Economics, January 1973.

<sup>20</sup>John W. Mellor, "Nutrition and Economic Growth," in Berg, Scrimshaw, and Call (eds.), Nutrition, National Development and Planning, pp. 70-73.

affect the results of such direct efforts. Moreover, malnutrition is generally treated as a static phenomenon unrelated to the profound changes occurring in most developing countries brought about by such events as the end of colonialism, the emergence of economic and political dependency, the spread of industrialization and urbanization, the extension of communications, and rapid population growth.<sup>21</sup> Whether the result of government intervention or external forces, these transformations have affected a large portion of the world's population resulting in significant shifts in occupational structures, family and community relationships, consumption possibilities and habits, geographical mobility, and so on.

These broad socioeconomic changes are not neutral; they benefit certain individuals, groups, or classes while prejudicing others. Some of the changes may be working in the direction of improved nutritional standards, while others are detrimental--but one would suspect that, taken together, they are transforming the nature of malnutrition problems in many countries. The failure of nutrition analysts to take account of these historical processes and adequately to explore government policy actions has resulted in unsatisfactory and incomplete explanations of the causality of malnutrition.

The general neglect of systemic, institutional, or historical factors among nutrition writers is to a certain extent deliberate. Call and Levinson state that their discussion of determinants will be limited to those which lend themselves to intervention.<sup>22</sup> Berg argues for the identification and

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<sup>21</sup>One exception is Jov, "Food and Nutrition Planning," who does observe that poor nutrition is often associated with change as well as poverty.

<sup>22</sup>David L. Call and F. James Levinson, "A Systematic Approach to Nutrition Intervention Programs," in Berg, Scrimshaw, and Call (eds.), Nutrition, National Development and Planning, p. 166.

analysis of "not the entire complex of causes but those major determinants subject to policy levers."<sup>23</sup> This approach may appeal to those who are interested in "getting on with the task of solving the problem," but its advocates have not convincingly demonstrated that the factors they have selected are, in fact, any more subject to change than the complex of causes that are disregarded.

The analyses provided have a fundamentally (if unintentionally) conservative bias. The causes of malnutrition are found primarily among the malnourished, and not in the social order in which they live. Since it is the characteristics of the malnourished and their families which function as the determinants of malnutrition, changes are required only for those suffering nutritional deficiencies and not for the rest of society. There has been no serious examination of the alternative hypothesis that the persistency of widespread malnutrition is largely a reflection of social and political organization, institutional and economic arrangements, and choices of development strategies. Malnutrition is reduced to the status of a technical problem whereby nutritional standards lose any significance as criteria against which the performance of different social orders and development policies might be measured.

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<sup>23</sup>Berg, The Nutrition Factor, p. 238.

SOLUTIONS AND PRESCRIPTIONS

Berg asserts that "new techniques and technologies are now available to governments to provide shortcuts to substantially better nutrition and well-being for people of much lower incomes and at an earlier time than previously was possible."<sup>24</sup> Other nutrition authorities may be less optimistic (and more realistic), but their writings indicate that they agree that means do exist for significantly improving nutritional standards in third-world countries without altering their chosen patterns of economic growth and development or introducing fundamental changes in political or social arrangements in those countries.

Mellor, for one, argues the contrary, stating that "currently dominant approaches to economic development have little place for improved nutrition as either a short-run welfare objective or as a means of achieving economic growth."<sup>25</sup> What evidence exists would seem to support Mellor in that the only underdeveloped countries which have reportedly successfully controlled malnutrition are those few that have undergone radical social revolution (i.e., China, Cuba, and North Vietnam).<sup>26</sup> Moreover, the growing

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<sup>24</sup>Ibid., p. 30.

<sup>25</sup>Mellor, "Nutrition and Economic Growth," p. 70.

<sup>26</sup>For recent information and analyses of health and nutrition in these countries see: Vincente Navarro, "Health, Health Services and Health Planning in Cuba" (unpublished manuscript, Department of Medical Care and Hospitals and International Health, Johns Hopkins University, 1972); Nevin Scrimshaw, et.al., "Report of the Indochina Study Mission on Humanitarian Needs for Rehabilitation and Reconstruction, North Vietnam, 30 March - 17 March 1973," in Relief and Rehabilitation of War Victims in Indochina, Part III: North Vietnam and Laos, hearing before the Subcommittee to Investigate Problems Connected with Refugees and Escapees, the Committee on the Judiciary, United States Senate, Ninety-

body of research on issues of distribution indicates that economic development in many countries is providing distressingly limited gains to low-income groups while sustaining (and, in some cases, worsening) inequities among social classes.<sup>27</sup>

These doubts notwithstanding, writers in the field of nutrition and national development have devoted considerable effort to formulating prescriptions for improving nutritional status in third-world countries. They have defined and developed the concept of nutrition planning, basically an adaptation of standard planning formats used in other areas, and they have presented a more systematic and comprehensive examination of available measures for confronting nutrition problems.

Nutrition planning models have been constructed by several writers.<sup>28</sup> With some variations, the planning sequence in nutrition generally includes the following steps: (1) problem definition, (2) establishment of plan objectives, (3) comparison of alternative measures, (4) final selection of interventions and their integration into a unified program, and

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26(continued from previous page)

Third Congress, First Session, July 31, 1973 (Washington, D.C.: U.S. Government Printing Office, 1973); and Joe P. Wray, "Health and Nutritional Factors in Early Childhood Development in the People's Republic of China" (prepared for The Report of the Early Childhood Development Delegation Visit to the People's Republic of China, November - December 1973, February 1974).

27 For a survey of the literature and an extended bibliography see William R. Cline, "Distribution and Development: A Survey of the Literature," Journal of Development and Economics, 1 (1975) pp. 359-400.

28 Nutrition planning models are presented and discussed in each of the following references: Berg, The Nutrition Factor, pp. 233-247; F. James Levinson and David Call, Nutrition Intervention in Low Income Countries: A Planning Model and Case Study (Cornell Agricultural Development Mimeograph 34) (Ithaca, N.Y.: Cornell University, Department of Agricultural Economics, 1971); Joy, "Food and Nutrition Planning"; and Agency for International Development, Office of Nutrition, "Planning Nutrition Programs: A Suggested Approach," January 1973.

(5) subsequent evaluation of results. The literature recommends the utilization of such standard planning techniques as systems analysis, cost-benefit and cost-effective analysis, and linear programming in nutrition planning, and considers different institutional and administrative arrangements for the development and implementation of nutrition activities.

The planning process usefully provides a systematic framework for organizing relevant information and cataloging possible actions. Where applied, it should lead to a more comprehensive diagnosis of nutritional problems--including information concerning the magnitude of different deficiencies, their geographical location, the most vulnerable social groups, and the immediate causes of malnutrition. Likewise the planning exercise should result in consideration of a broader range of policy alternatives than has traditionally been the case and permit some comparison among them.

In attempting to apply the planning guidelines offered, however, nutrition planners in developing countries will face practical and conceptual difficulties which are not given sufficient attention. Even as nutrition writers have argued that expenditures on nutrition should be considered as investments in human capital (similar to expenditures on education), no method exists for comparing investments in nutrition with those in other areas, and, consequently, there is no way to determine the quantity of resources that would appropriately be designated for a nutrition plan. Second, the setting of objectives (i.e., citing a specific deficiency, a numerical target, and a time frame)--which is assigned particular importance--remains largely an arbitrary and intuitive exercise. There are

still no criteria on which a planner can rationally choose among, for example, eradicating vitamin A deficiency, reducing protein-calorie malnutrition among 0 to two-year-olds, or eliminating nutritional deficiencies from the diets of pregnant and lactating women. No single yardstick has been developed against which the benefits of achieving different objectives can be measured. Moreover, there are no means available for estimating the time and expenditure required to meet proposed goals--or even adequately appraising their feasibility.

These limitations raise serious doubts about the utility of cost-benefit or cost-effectiveness analysis in making program choices. Cost-benefit analysis involved the calculation of all of the projected costs and benefits of different programs; once these are known, comparisons can then be made among alternative courses of action. Presuming that costs of different measures can be reasonably accurately projected--which is by no means certain--the stark fact remains that it is not currently possible to forecast the nutritional results of alternative interventions, let alone translate the expected benefits into monetary terms (or into any other single dimensional scale of values) for purposes of comparison.

Cost effective analysis is somewhat less ambitious, involving only the comparison of programs with similar objectives. Its application in nutrition planning, however, again requires a forecasting of the nutritional results of different programs. And, to our knowledge, there does not yet exist the necessary empirical data or theoretical bases for a reasonably accurate estimation of the impact on national nutritional standards, or on such indicators as mortality, morbidity, or growth, of a school-feeding program, a nutrition education campaign, or most other

interventions. At this stage cost-effectiveness analysis can at best be utilized for guidance in implementing program choices. Once it is decided, let us say, to distribute milk to children under six, cost-effectiveness techniques might help in determining the efficiency of different forms of distribution. But neither cost-benefit nor cost-effectiveness calculations are likely to be of major assistance to nutrition planners in the selection of alternative measures or program objectives.<sup>29</sup>

These operational difficulties aside, there remain more important conceptual issues. Berg and Muscat, who have contributed importantly to the development of the concept of nutrition planning, offer it as a means of overcoming the "dilemma" that "some of the major factors and policies influencing nutritional status--agriculture, income redistribution, transport, and so on--are outside the interest and reach of those who are supposed to be looking after their country's nutrition, and those who do formulate such policies do not specifically include nutrition needs as part of their planning equation."<sup>30</sup> In fact, the nutrition planning process, as it is presented by these and other authors, does not resolve this dilemma. Indeed, nutrition planning is presented largely as an exercise in the formulation of a composite program of standard nutritional interventions. The measures most strongly recommended by Berg (food

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<sup>29</sup> Abbott and Levinson have provided a set of guidelines for applying cost-effectiveness analysis in nutrition programming. Their view of its utility is, of course, more optimistic than our own. See Philip C. Abbott and F. James Levinson, "Assessing Alternative Nutrition Strategies: An Application of Cost Effectiveness Analysis" (paper presented at the Joint FAO/WHO Committee of Experts on Nutrition, Ninth Session, Rome, 11-20 December 1974).

<sup>30</sup> Alan Berg and Robert Muscat, "Nutrition Program Planning: An Approach," in Berg, Scrimshaw, and Call (eds.), Nutrition, National Development and Planning, p. 248.

fortification, new seed varieties, nutrition education and institutional feeding)<sup>31</sup> largely represent traditional approaches to nutritional problems. No real response is given to the critical questions of how changes in broader national policies might be incorporated into nutrition plans or how nutrition considerations could be included in the plans of other sectors (or even the extent to which nutrition objectives are compatible with policy goals in the other sectors).

The specific interventions given most attention in the literature include nutrition education, new foods and fortification schemes, child-feeding programs, improved health and sanitation services, and increases in agricultural productivity and improved marketing systems. Both Berg<sup>32</sup> and Call and Levinson<sup>33</sup> provide ample discussion of each of these interventions. The measures, as they are generally presented, have several important features in common: They require (1) no significant changes in the distribution of income or wealth in a country, (2) no change in the consumption habits of that sector of the population that is already well-nourished, and (3) no real shift in development strategies or priorities. In short, they are actions which can be added to the current array of services provided by governments without any basic reorientations of existing policies.

Several writers in the field do question this dominant approach.

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<sup>31</sup>Berg, The Nutrition Factor, pp. 196-197.

<sup>32</sup>Berg, The Nutrition Factor.

<sup>33</sup>Call and Levinson, "A Systematic Approach to Nutrition Intervention Programs."

Joy emphasizes the importance of increasing the purchasing power and hence the effective demand for food among low-income groups.<sup>34</sup> Mellor argues that direct interventions are likely to make only modest improvements in nutritional standards, and that a serious confrontation of malnutrition would require countries to turn to substantially different processes of economic growth focusing on the production of food, employment generation, and generally increasing incomes of the poor.<sup>35</sup> Schatan also suggests that overcoming malnutrition will require sharp breaks with current development strategies.<sup>36</sup> The implications of these recommendations and conclusions, however, have yet to be seriously examined.

The potential effectiveness of the standard interventions themselves remains open to question. As the following brief review will illustrate, distressingly little information exists about the effects of such interventions where they have been attempted, and nutrition writers have not subjected them to rigorous analysis based on what evidence does exist.

#### NUTRITION EDUCATION

The basic hypothesis of nutrition education is that improved nutritional standards could be achieved if people made better use of the resources already available to them (i.e., if they changed their behavior in nutritionally beneficial ways). The first task for nutrition analysts, which has still not been accomplished satisfactorily, is the accurate identification of

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<sup>34</sup>Joy, "Food and Nutrition Planning."

<sup>35</sup>Mellor, "Nutrition and Economic Growth."

<sup>36</sup>Jacobo Schatan, "The First Target," CERES, March-April 1974.

those practices and beliefs which are detrimental to nutrition and health, and which, at least in principal, could be modified despite the constraints of poverty. For example, contrary to the widely held assumption, the evidence seems to suggest that the poor utilize their food budgets in nutritionally efficient ways and that little improvement could be expected from shifts in purchasing habits. A further area of investigation is the extent to which certain practices and beliefs that appear to be nutritionally detrimental serve other objectives which may be as biologically or socially important as nutrition. Finally, it has yet to be demonstrated that educational campaigns are an effective means of producing changes or alterations in family or group behavior patterns.

#### FORMULATED FOODS, FOOD FORTIFICATION, AND NEW GENETIC VARIETIES

We group these three different types of interventions<sup>37</sup> because the objective of each is to provide, through the application of new technologies, nutrients or combinations of nutrients at lower cost than could be obtained from standard food items. Their purpose is to help overcome protein, vitamin, and mineral deficiencies. Since they do not reduce the cost of basic foodstuffs, these interventions do not address the fundamental problem

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<sup>37</sup> Formulated foods bring nutrients together in new combinations and are designed to substitute or replace existing products. They may be based on mixtures of traditional foodstuffs or on unorthodox nutrient sources. Their purpose is to provide more nutritional value for the same cost or the same nutritional value for less cost than the products which they replace. Food fortification is the addition of one or more nutrients to a standard food product. New genetic varieties of seeds, as we are using the term here, are designed to produce standard foodstuffs of higher nutritional value than possible with traditional seed varieties.

of inadequate overall food or calorie consumption. They can, however, be of considerable importance in areas where overall consumption is adequate (or nearly adequate) but specific deficiencies persist. Their relevance elsewhere depends on the extent to which the particular deficiency they are designed to overcome can be alleviated despite caloric insufficiencies.

Fortification of foods with vitamins and certain minerals has long been practiced in industrialized societies and its value has been demonstrated in a variety of circumstances. In many developing countries, however, the introduction of fortification schemes may encounter special problems including the absence of central processing facilities for the food to be fortified as well as the costs added to the food item. Formulated foods and new genetic varieties, which have largely been developed to provide lower-cost means of satisfying protein needs, may prove to be largely irrelevant if protein malnutrition is, as much evidence seems to indicate, principally the result of caloric limitations.<sup>38</sup>

#### CHILD-FEEDING PROGRAMS

Child-feeding programs, particularly school lunch and breakfast programs, continue to represent the single most common nutrition intervention in developing countries, absorbing upwards of 90% of all direct expenditures for improved nutrition.<sup>39</sup> On their face, feeding programs appear as a logical response to nutritional problems. Through these programs, nutrients can, in principal, be supplied to individuals with inadequate diets who could not otherwise purchase or secure additional food.

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<sup>38</sup>Joy, "Food and Nutrition Planning."

<sup>39</sup>Call and Levinson, "A systematic Approach to Nutrition Intervention Programs."

In practice, however, a variety of social, economic, and institutional barriers often prevent these programs from meeting their nutritional goals.<sup>40</sup> In developing countries, the most nutritionally vulnerable groups (i.e., marginal urban and low-income rural populations) typically have only limited access to those institutions generally charged with managing feeding programs, and often turn out to be legally or functionally excluded from the benefits of these as well as other social welfare measures. The stratification, skewed distribution of income and public services, and other social factors responsible for their vulnerability to malnutrition, tend also to prevent low-income groups from participating in programs supposedly designed to alleviate malnutrition. Further research on public institutions and services in developing countries would be useful here, particularly studies focused on those legal and other factors which work to restrict access of low-income groups.<sup>41</sup>

#### HEALTH AND SANITATION SERVICES

Poor health, particularly gastrointestinal infection among children, can lower nutritional status and precipitate malnutrition by reducing appetites, provoking the direct loss of nutrients, or decreasing the capacity of individuals to absorb nutrients. Consequently, direct measures

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<sup>40</sup>For an extended discussion of these barriers see Peter Hakim and Giorgio Solimano, "Supplemental Feeding as a Nutrition Intervention: The Chilean Experience in the Distribution of Milk" (Cambridge, Mass.: MIT International Nutrition Planning Program, Discussion Paper No. 2, May 1975).

<sup>41</sup>An example of the kind of research we have in mind is Emmanuel de Kadt's "Aspectos Distributivos de la Salud en Chile," in Bienestar y Pobreza (edition prepared by CEPLAN; Santiago, Chile: Ediciones Nueva Universidad, 1974).

to improve community health standards among nutritionally vulnerable groups could significantly contribute to reductions in the incidence of malnutrition. Particularly effective measures in this regard are immunization campaigns, improved sanitation and disposal facilities, and expansion of the general range of curative and preventive medicine that community health clinics can provide.

In essence what is required is a reorientation of health and sanitary services so that, first, they are accessible to low-income groups and, second, they provide appropriate sorts of services to meet the needs of those groups--neither of which is currently the case in most developing countries. The redirection and extension of health and sanitary services is probably a sound proposal for nutritional improvement, but it is extremely difficult to achieve in practice in the face of the demands of politically influential groups (e.g., public employees, white-collar workers, and organized sectors of the working class) and the resistance of largely conservative medical communities.<sup>42</sup>

#### AGRICULTURAL SUPPLY AND MARKETING

Increasing the supply of commodities through improved agricultural prices, new technologies, or more efficient marketing systems is probably a necessary condition for improving nutritional standards in most countries, particularly since the drastic redistribution of food consumption is a rare occurrence. It is, however, far from being a sufficient condition

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<sup>42</sup>For a discussion of the sociopolitical factors influencing the provision of health care services in developing countries, see Vincente Navarro, "The Underdevelopment of Health or the Health of Underdevelopment: An Analysis of the Distribution of Human Health Resources in Latin America," International Journal of Health Services, 1: 4 (Winter 1974).

as the issue is most often not one of insufficient supply, but rather of inadequate demand or purchasing power on the part of the malnourished.<sup>43</sup> Increased production and availability of foodstuffs can, in some situations, result in lower prices or increased national incomes. Whether improved nutritional standards result depends largely on who receives the benefits. Lower farm prices, for example, may mean only minor savings in retail costs but significantly smaller income for near subsistence farmers. Studies and evaluations are still lacking regarding the nutritional consequences of new agricultural technologies. Where such technologies increase the competitive advantage of large landholders who generally have better access to necessary complementary inputs like credit facilities, water, and fertilizer, their introduction may produce nutritional declines in rural areas.

We do not want to suggest that these standard nutritional interventions cannot work or that they should not be attempted when the opportunity exists. Their relevance and consequence for really getting at the problem of malnutrition, however, still remains to be demonstrated. The interventions require harder and more thoughtful examination by nutrition analysts and a more precise delineation of what can and cannot be expected of them under different sorts of conditions.

What is called for is a change in the research priorities of the nutrition community. Rather than continuing the search for new arguments to justify expenditures on nutrition programs or for new interventions

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<sup>43</sup>See particularly Joy, "Food and Nutrition Planning."

and more elegant techniques to attack the problem, attention, we believe, should be turned to developing a better analysis of the problem in its social context. In particular, empirical data and conceptual frameworks are needed for understanding the social, economic, and historical determinants of malnutrition and the consequences for nutritional standards of different development strategies, public policies, institutional arrangements, and technological changes. It may well be that the basic assumption which underlies much of the analysis and prescriptions of most nutrition writers--namely, that significant improvements in nutritional standards can be achieved without altering current economic development strategies in most countries--is wrong. These strategies and the patterns of distribution, consumption, and production they sustain may be incompatible with any serious efforts to alleviate malnutrition.



REFERENCES

- Abbott, Philip C., and Levinson, F. James. "Assessing Alternative Nutrition Strategies: An Application of Cost Effectiveness Analysis." Joint FAO/WHO Committee of Experts on Nutrition, Ninth Session, Rome, 11-20 December 1974.
- Agency for International Development, Office of Nutrition. "Planning Nutrition Programs: A Suggested Approach." January 1973.
- Austin, James E., and Levinson, F. James. "Population and Nutrition: A Case for Integration." Health and Society, Spring 1974.
- Bengoa, J.M. "Curative Aspects of Malnutrition and Rehabilitation of the Malnourished Child." Paper presented at the United Nations Children's Fund (UNICEF) Eastern Mediterranean Region Food and Nutrition Seminar, Beirut, January 26-29, 1970, p. 6.
- Bennett, M.K. The World's Food. New York: Harper & Row, 1954.
- Berg, Alan, The Nutrition Factor: Its Role in National Development. Washington: The Brookings Institution, 1973.
- Berg, Alan, and Muscat, Robert. "Nutrition Program Planning: An Approach." Nutrition, National Development and Planning. Edited by Alan Berg, Nevin S. Scrimshaw, and David L. Call. Cambridge, Mass., and London, England: The MIT Press, 1971.
- Berg, Alan, Scrimshaw, Nevin S., and Call, David L. Nutrition, National Development and Planning. Cambridge, Mass., and London, England: The MIT Press, 1971.
- Call, David L., and Levinson, F. James. "A Systematic Approach to Nutrition Intervention Programs." Nutrition, National Development and Planning. Edited by Alan Berg, Nevin S. Scrimshaw, and David L. Call. Cambridge, Mass., and London, England: The MIT Press, 1971.
- Cravioto, Joaquin, and De Licardie, Elsa R. "The Effect of Malnutrition on the Individual." Nutrition, National Development and Planning. Edited by Alan Berg, Nevin S. Scrimshaw, and David L. Call. Cambridge, Mass., and London, England: The MIT Press, 1971.
- FAO Consumer Survey Listing.
- Hakim, Peter, and Solimano, Giorgio. Supplemental Feeding as a Nutritional Intervention: The Chilean Experience in the Distribution of Milk. Cambridge, Mass.: MIT International Nutrition Planning Program, Discussion Paper No. 2, 1975.

- Joy, Leonard. "Food and Nutrition Planning." Journal of Agricultural Economics, January 1973.
- de Kadt, Emmanuel. "Aspectos Distributivos de la Salud en Chile." Bienestar y Pobreza (edition prepared by CEPLAN). Santiago, Chile: Ediciones Nueva Universidad, 1974.
- Latham, Michael C. "Diet and Infection in Relation to Malnutrition in the United States." New York State Journal of Medicine, 70: 558 (1970).
- Levinson, F. James. Morinda: An Economic Analysis of Malnutrition Among Young Children in Rural India. Cambridge, Mass.: Cornell/MIT International Nutrition Policy Series, 1974.
- Levinson, F. James, and Call, David L. Nutrition Intervention in Low Income Countries: A Planning Model and Case Study (Cornell Agricultural Development Mimeograph 34). Ithaca, N.Y.: Cornell University, Department of Agricultural Economics, 1971.
- Likimani, J.C. "Report on Nutrition in Kenya." Proceedings of the Eastern African Conference on Nutrition and Child Feeding. Washington, D.C.: U.S. Government Printing Office, 1969.
- Mellor, John W. "Nutrition and Economic Growth." Nutrition, National Development and Planning. Edited by Alan Berg, Nevin S. Scrimshaw, and David L. Call. Cambridge, Mass., and London, England: The MIT Press, 1971.
- Navarro, Vincente. "Health, Health Services, and Health Planning in Cuba." Unpublished manuscript, Department of Medical Care and Hospitals and International Health, Johns Hopkins University, 1972.
- Navarro, Vincente. "The Underdevelopment of Health or the Health of Underdevelopment: An Analysis of the Distribution of Human Health Resources in Latin America." International Journal of Health Services, 1:4, (Winter 1974).
- Operations Research Group. Food Habits Survey - Gujarat and Maharashtra. Conducted for the Protein Food Association of India, 1969.
- de Nyague, Picasso A. "Malnutrition as a Limiting Factor in the Development of Education." Paper presented at U.N. Protein Advisory Group meeting, Paris, June 1972.
- Schattan, Jacobo. "The First Target." CERES (March-April 1974).

- Scrimshaw, Nevin S. "The Effect of the Interactions of Nutrition and Infection in Pre-School Child Malnutrition." Washington, D.C.: National Academy of Sciences/National Research Council, 1966.
- Scrimshaw, Nevin S. et al. "Report of the Indochina Study Mission on Humanitarian Needs for Rehabilitation and Reconstruction, North Vietnam, 10 March - 17 March 1973." Relief and Rehabilitation of War Victims in Indochina, Part III: North Vietnam and Laos. Hearing before the Subcommittee to Investigate Problems Connected with Refugees and Escapees, the Committee on the Judiciary, United States Senate, Ninety-Third Congress, First Session, July 31, 1973. Washington, D.C.: U.S. Government Printing Office, 1973.
- Selowsky, Marcelo, and Tavor, Lance. "The Economics of Malnourished Children: An Example of Disinvestment in Human Capital." Economic Development and Cultural Change, 22 (October 1973), pp. 17-30.
- Soliman, Giorgio, and Monckeberg Fernando. "Desigualdades Alimentarias y Estado de Salud de la Poblacion." CEPLAN (in press).
- Williams, Cicely. "Self-Help and Nutrition: Real Needs of Underdeveloped Countries." Lancet, February 13, 1954.
- Wray, Joe D. "Health and Nutritional Factors in Early Childhood Development in the People's Republic of China." Prepared for the report of the Early Childhood Development Delegation Visit to the People's Republic of China, November-December 1973. February 1974.