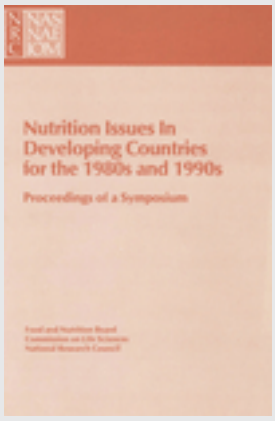

Nutrition Issues in Developing Countries for the 1980s and 1990s: Proceedings of a Symposium

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Food and Nutrition Board, National Research Council

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Commission on Life Sciences
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PREFACE

This symposium, which was held on December 9, 1985, at the National Academy of Sciences in Washington, D.C., explored the critical issues for nutrition in developing countries. The purposes of the meeting were to examine the economic and environmental determinants of nutritional problems and determine priorities for resolving them and to explore prospects for the future.

The symposium was organized by the Committee on International Nutrition Programs (CINP) of the Food and Nutrition Board (FNB), which is an element of the National Research Council's Commission on Life Sciences. The committee, which has existed since the 1950s, has prepared assessments on many important topics in international nutrition, including priorities and directions for programs, policy, and research.

To permit a broad and interdisciplinary view of international nutrition issues, the participants were drawn from the fields of nutritional sciences, agricultural economics, and public health and included persons who are active in research or in agencies that have a role in international nutrition programs. Halfdan Mahler examined the relationship of nutrition programs to primary health care. John Galbraith discussed historical processes in the economic development of the western nations and drew parallels to the agricultural economics of the developing nations. John Mellor analyzed food consumption and production trends in the developing nations. John Waterlow outlined priorities for the nutritional sciences over the next two decades and the potential for biological research to assist in alleviating malnutrition. Lincoln Chen examined the role of international agencies in solving nutrition problems of developing countries.

FNB is grateful to the committee for assembling such a distinguished roster of speakers and particularly to Abraham Horwitz, the symposium chairman and former chairman of CINP. The idea for the symposium was developed by Sol Chafkin and Jean-Pierre Habicht, both former members of CINP and FNB.

The CINP and the FNB are grateful to Virginia Hight Laukaran, who prepared the proceedings for publication; to Sushma Palmer, Director of the FNB staff, and Linda Meyers, formerly of the FNB staff, who, assisted by Marianne La Veille, organized the symposium; and to Susan Barron, of the FNB staff, and Michelle Daniel, who were responsible for preparing the manuscript.

The Food and Nutrition Board hopes that the presentations and discussions that are recorded here will stimulate the application of current knowledge and the growth of new methods to alleviate the food and nutrition problems that persist in many parts of the developing world.

Kurt J. Isselbacher, Chairman
Food and Nutrition Board

CONTENTS

INTRODUCTION

This year, the Committee on International Nutrition Programs has been entrusted by the Food and Nutrition Board with the responsibility of organizing the annual symposium that the board sponsors. True to its purposes, which turn around the word "international," the committee chose more than a subject, an intellectual exercise in perceiving the future almost already upon us. The focus should be the developing societies of the world, particularly the poverty-stricken families eking out an existence; the time, all the years up to the turn of the century; the objectives of the exercise, to perceive and identify major critical issues that impinge upon the deprived and impair their health and nutritional status.

In choosing the time span up to the year 2000, the committee felt that it was a reasonable period for experienced scientists, endowed with exceptional wisdom, to "star gaze" and foresee how the nutritional problems and their determinants may evolve and what implications they may have for policies, programs, and research. Not everybody is impressed with the year 2000 as being a magic date, when everything will be brighter and everyone will be healthy and better off.

What we all should hope--and strive for--is that the twenty-first should be a more humanitarian century with greater concern for human development and well-being. For many, this century, whose end we foresee, has been the most cruel one in the history of mankind. Man-made crimes in the name of all sorts of reasons and unreasons have been varied and abundant--despite the marvels brought about by science and the arts, the other face of this century, which has enlightened our lives.

Hunger and malnutrition in the developing countries are on the increase, even on the basis of the limited information we have. This trend may well continue for the rest of this century. Poverty, population growth, overcrowding, unemployment, lack of food availability and of purchasing power, and behavioral patterns act synergistically to induce malnutrition and high morbidity and mortality. In absolute numbers, malnutrition is for many the most important social problem in the developing world. It is also so because it can affect human beings

in all stages of life, from conception to senescence. In a number of them, it impairs intellectual development, school performance, and labor productivity and produces a pessimistic outlook on life.

With reference to specific nutritional deficiencies, it is unforgivable that still no fewer than 250,000 children become blind every year for lack of vitamin A and that at least 3% of those living in the highlands become cretins. We have well-tested, highly cost-effective technologies to control both problems. Still, we have not applied them systematically.

By its very nature, malnutrition is a complex problem for which there is no panacea. It results from environmental stresses on human beings poorly endowed genetically and metabolically. And these stresses are related to economic, social, biological, and agricultural determinants. We know most of them and how they act to induce malnutrition, but we do not know all their synergisms and antagonisms and their pathways in nature. This remains a large area of basic and applied research that could have significant program implications.

We are aware that fiscal, monetary, and other economic policies, whose social consequences have not been carefully thought through, may have negative impacts among the poor, worsening their health and nutritional status. We are still struggling to understand the macroeconomics-nutrition connection. The on-going economic recession, particularly in the debt-ridden developing countries, is for us of great concern. We feel that the therapies recommended may be aggravating the patient's condition. Austerity measures, even with the best intentions, may be hurting badly those in the lower strata of the income scale. In certain countries, we can infer from the information available that this is already happening and that the numbers are increasing. For this reason, we are convinced of the need of economic adjustment policies "with a human face," to use the felicitous expression of Richard Jolly. This will require in every country a careful analysis, looking for measures that, at least, will palliate the impact of the on-going recession on the poor. It should be done by the government and international agencies concerned and by a mix of experienced professionals, not exclusively economists.

We all believe that food production per se, although fundamental, does not solve the problem of hunger and malnutrition, at least in the short run. Frequently, food consumption and utilization are interfered with by a web of economic, environmental, social, and behavioral determinants that must be identified and controlled. Some of them are country-specific. We understand the concepts of "food entitlements" and "food security" and their significance, but they seem difficult to implement.

Despite the complexity of the problem, we have witnessed in the last 20 years an increasing number of successful programs that combine cost-effective health and nutrition interventions, improve food consumption, target mothers and children at greater risk of death and disease, and monitor and evaluate the different activities. These efforts have resulted in sustained and significant declines in infant and early childhood morbidity and mortality, malnutrition, and low birthweight and an increase in breast-feeding and better weaning practices. What is more important, these outcomes have occurred in countries with a severe recession but with adequate health and nutrition policies, supported and financed by the government and effectively implemented. In some of them, the situation is considered to be "a paradox of economic backwardness [despite] health development." For many, this is a prescription for the short term that can be successful, while economic development and sound agricultural and social policies create the conditions in the long term to prevent acute ill health and malnutrition.

Science has contributed during this century fundamental discoveries of nutrients and nutritional processes in animals and human beings. We do not apply in the developing world everything that is known and has been proved effective, and we should. At the same time, we expect that pending issues will be unraveled, both conceptually and technically, so as to enlarge the scope of possibilities for controlling malnutrition through adequate policies and programs.

We find ourselves at a crucial period. Malnutrition is on the increase as a result of man-made decisions and actions. We have more knowledge than we are using to reduce the deleterious effects of the problem. Furthermore, hunger and malnutrition do not have the political

support that is required for sustained government decisions and appropriate investments in order to apply well-tested technologies and search for new ones.

How is malnutrition going to evolve up to the end of the century? How will its major determinants influence present trends in developing countries? Are the prescriptions needed to reduce the magnitude and consequences of this problem different from the ones in use? What is the role of the international organizations--multilateral and bilateral? These and related questions were posed to the distinguished scientists that are with us today. We hope their thoughts will be both illustrative and provocative and will contain suggestions to stir the imagination of those whose role is to investigate basic issues, as well as those whose role is to transform scientific evidence into realities of well-being.

Abraham Horwitz, Chairman
Committee on International
Nutrition Programs (from
1980 to 1986)
Food and Nutrition Board

PROSPECTS FOR BETTER NUTRITION THROUGH PRIMARY HEALTH CARE

Halfdan Mahler

The governments of the world decided in 1977 that a main social target in the coming decades should be the attainment, by all the people of the world by the year 2000, of a level of health that will permit them to lead socially and economically productive lives. This goal has become known as "health for all"--an approach in which health is considered in the context of its contribution to, and promotion by, social and economic development. In the Declaration of Alma-Ata in 1978, the same governments proclaimed that the key to achieving that target was primary health care. That is, essential health care should be made accessible at an affordable cost with methods that are practical, scientifically sound, and socially acceptable and that involve other sectors in addition to the health sector. Those last few words--"sectors in addition to the health sector"--are essential to an understanding of the reorientation of the health system, and not just the health care system, that is required if health for all is to become a reality.

"Health for all" embodies the basic objective of the World Health Organization (WHO) defined in its constitution as "the attainment by all peoples of the highest possible level of health." It means accessibility for all persons to all levels of the health system. As a process, it demands the reduction within and between countries of the unacceptable differences in health status and in allocation of health resources. But let me not place undue emphasis on "levels," "processes," and "systems." Health for all refers most of all to people and therefore starts far from the hospital and clinic. It begins in homes, in communities, in schools, in fields, and in factories, where people live and work. It includes what people themselves can do to shape their lives and those of their families, to be free of the preventable burden of disease and disability, and to make the most of their social, economic, intellectual, and cultural potential. It is the fulfillment of that potential that leads to socially and economically productive lives.

NUTRITION AND PRIMARY HEALTH CARE

It is within this broad definition of the goal of health for all, and of primary health care as the key to attaining it, that WHO is promoting proper nutrition and wrestling with the consequences of malnutrition. The practical implications of this approach are best summed up in the two vital roles that the health sector plays in preventing and managing malnutrition. The first is a direct role in implementing health interventions that have an impact on the nutritional status of individuals, families, and communities, including the application of specific nutritional concepts at all levels of the health system.

Monitoring the growth of infants and young children is a good example of a core primary health care activity that promotes health and prevents malnutrition. Growth and development are reliable indicators not only of overall child well-being, but also of the quality of the environment in which children live. At the same time, meeting the special nutritional needs of women is essential to ensuring their health and the health of their offspring. Malnutrition, including anemia, is a major underlying cause of maternal morbidity and mortality and a particularly serious problem for women who start their pregnancies too early in life or who have too many pregnancies too closely spaced. Moreover, the nutritional status of women influences their chances of having normal pregnancies and deliveries and of giving birth to children with adequate weight, as well as their ability to breast-feed without detriment to their own health.

Because periodic checks of the health and nutritional status of children and their mothers imply regular contact with health services, they also provide ideal opportunities for imparting health-improving and health-preserving messages about appropriate nutrition. Such contact could expose those in need to a full range of preventive, diagnostic, therapeutic, and rehabilitative services--whether at the first point of contact between individuals and the health system, where primary health care starts, or, after referral, through intermediate and central levels, where more complex problems can be dealt with.

The second vital role of the health sector is an indirect one and has to do with the multiple external causes and contributing factors of malnutrition. It includes advocating sound nutritional policies by advising those in the nonhealth sectors on the probable consequences of their actions for nutrition and health and by undertaking joint action with them to improve nutritional status. The best example of this indirect role concerns agriculture. To say that agriculture has an impact on nutrition and health, with respect both to the food produced and to the livelihood provided for most of the world's people, is to flirt with the obvious. Yet, I wonder how often agriculture and health sit down at the same table to discuss the impact of the policies and programs of the former on the priorities and plans of the latter.

We are keenly aware of the contribution that the right choice of agricultural policy can make to human health, especially by providing cheap calorie sources for people whose main problem is getting enough to eat. However, the main impact of agricultural policies and programs on nutrition and health occurs via the employment and income of laborers, who constitute most of the rural poor. Choices affecting employment in agriculture--including pricing decisions, cultivation of food crops vs. nonfood cash crops, land use and land reform policies, and selection of capital-intensive vs. labor-intensive technology--are thus critical in determining appropriate nutrition and the preservation of health. How often are these choices taken seriously into account?

Health professionals have an important responsibility to make clear to agricultural professionals the health consequences of their decisions. To do so, however, we must first make certain that the message of health that we send to agriculture is relevant, accurate, and timely. That is why effective, efficient food and nutrition surveillance schemes are critical for generating the kind of data that will permit health professionals to convey clear and convincing messages about the probable outcomes of agricultural policies and programs.

PROMOTING INTERSECTORAL ACTION FOR HEALTH

Nutritional status is the result of complex interactions of many individual, household, community, national, and international factors. Food must be produced and procured, whether directly or through cash payment, in exchange for labor, or by some other means. It must then be stored, prepared, cooked, distributed, and consumed. Dependent persons--the very young, the very old, and the infirm--must be fed and cared for. Finally, ingested food must be digested, absorbed, and used by the body.

To return to my earlier observation about the reorientation of the health system and the involvement of nonhealth sectors in achieving health for all: The major health policy declarations of the last decade, including the Declaration of Alma-Ata in 1978 and global and regional strategies and plans of action for health for all, have all stressed that health is a social goal that has to be integrated into overall development strategies and that a wide range of actions must contribute to its achievement. Thus, WHO uses the comprehensive term "health system" to signify all the interrelated elements that contribute to health in homes, educational institutions, workplaces, public places, communities, and the physical and psychosocial environment.

There is no need to belabor the importance of intersectoral action for health, central as it is to national, regional, and international health policy. What is necessary is to define, in operational terms, what kind of collaboration is required, with which sectors, and through what social, economic, political, and administrative mechanisms, if the consensus concerning the approach is to be translated into effective action. Moreover, it is essential that common goals be agreed on and that all concerned contribute actively to their realization.

THE ROLE OF NUTRITION IN HEALTH AND THE HEALTH SECTOR'S INVESTMENT IN NUTRITION

Malnutrition can be defined in many ways. What I would call a "health equilibrium model" describes it as a

state of imbalance (whether deficiency or excess) at the cellular level between the supply of nutrients and energy and the body's need for them to ensure maintenance, function, growth, and reproduction. If viewed from this perspective, malnutrition is a major public health problem the world over, not only in developing countries, where wasting and stunting are but its most conspicuous signs.

Malnutrition is rampant in industrial countries, where obesity ranks first in importance with its allied conditions--hypertension, cardiovascular disorders, and (the circumstantial evidence continues to mount) some kinds of cancer. The industrial countries face the deadly combination of faulty dietary habits and inappropriate life styles, including the uses of tobacco and too much alcohol and the lack of sufficient exercise or even genuine relaxation. The result is nutritional disequilibrium having just as disastrous consequences for health, even if they are not as dramatic, as the stereotypical skin-and-bones image at the other end of the malnutrition spectrum. We are only beginning to appreciate the irony of the coexistence of ill health from nutritional deficiency and ill health from nutritional excess.

A Haitian creole proverb that I find delightful in its simplicity and directness says a great deal about the interrelationship between nutrition and health in the part of the world that concerns us here: Sak vide pa kampé--"An empty sack cannot stand on its own." A block at any stage of the normal flow of nutrients and energy from the external environment to body cells, starting with food availability and ending with metabolism, can prevent our sack from standing, that is, can produce malnutrition and ill health.

In general, three important factors regulate the way a person strikes a balance between demand for energy and nutrients and their supply: quantity and quality of available food, health and physiological status, and behavior, including psychosocial state. For example, most malnutrition seen during periods of natural or man-made disaster is due to a temporary, acute deficiency of food intake. Malnutrition in developing countries generally results from the combination of a chronically marginal food intake with a high frequency and duration

of illness. Moreover, malnutrition in industrialized countries has its roots mainly in behavioral factors. The underlying causes of malnutrition in each of these environments are closely linked to such circumstances within and between families, regions, and countries as availability and distribution of food, purchasing power and production possibilities, information and education, and access to health and other social services.

Broadly speaking, in developed countries and among minority elites in developing countries, the amount and variety of available food poses no particular problem, and the main role of the health sector is to influence knowledge and behavior regarding healthy life styles. But the situation is dramatically different for the majority in developing countries. Food availability itself (apart from choice in relation to quality) is a serious problem. A major focus of the health sector in this environment must be to keep the body as free from disease as possible to permit maximal benefit of whatever food is available. We have begun to understand that the disastrous nutritional status of so many of the world's poor is due to a large extent to the presence of infection and disease, as well as to the absence of food.

The high incidence and severity of many diseases in the developing world are due to an unbroken cycle of infection and malnutrition, each reinforcing and capable of initiating the other. Children in particular often have defense mechanisms compromised from the start by low birth weight and are further assailed by a series of stresses that include measles, whooping cough, and repeated episodes of diarrhea and malaria. Each event sets back a child's growth and development; if the interval between events is too short, a spiral leading to death all too often results.

The primary health care approach to community health problems is particularly well suited to break this cycle of infection and malnutrition, because it can bring so many essential elements to bear simultaneously. For example, individual, family, and community involvement is the key to ensuring that necessary, but simple and inexpensive, preventive action is taken. Information and education help mothers and other family members to understand how to keep their children healthy, why their children might not be growing properly, and how to treat

infection. Proper nutrition is important both as a preventive measure and as part of treatment. Safe water and basic sanitation, with personal hygiene and food safety, are essential to preserving health. Oral rehydration salts are an important essential drug that can be made available to all. Immunization prevents infectious diseases that can precipitate malnutrition. And maternal and child health care, including family planning, has a mutually reinforcing effect on the health and nutritional status of mothers and children.

THE LESSONS WE ARE LEARNING

Eight years after the unanimous adoption of health for all as our main social target, can we say that our high expectations about primary health care's contribution to better nutrition are being justified? Information coming in from around the world gives rise to legitimate optimism in this regard. It shows that properly designed and implemented routine primary health care is having an impact on nutritional status in environments as varied as Botswana, China, Colombia, Egypt, El Salvador, Kenya, Lesotho, Nicaragua, Sri Lanka, and Thailand. The varied degrees of success registered in these and other countries have at least four features in common:

- The primary health care activities being pursued in each have explicit nutritional objectives as measures of their successful outcome.
- Health care components are carefully selected to match identified problems, and their implementation is sustained at an adequate level and for an adequate period to be effective.
- Monitoring and evaluation are built-in facets of service delivery and allow flexibility for swift corrective action where necessary.
- Community involvement is considered a prerequisite, not only in making use of services, but in developing suitable mechanisms for the planning, operation, and control of community health care programs.

Not long ago, I visited an African country in the least-developed category that offers a striking example of a system of primary health care that, against enormous odds, is coping admirably with threats to the nutritional and health status of its entire population. The country's essentially agrarian economy has been badly shaken by a severe drought that has afflicted the country for almost 4 years. But its national coordinator of rural development has been able to announce that no one has died as a result. How is it that drought has brought only hardship to this country but spelled disaster in so many others? One reason is that it was able to prepare itself, thanks to a long-term commitment to the setting in place of a permanent, simplified, and highly effective primary health care infrastructure. The country has long had an operational food and nutrition "early-warning system," including some 500 small health posts that conduct regular surveys to monitor nutritional status. People have survived the drought, because there were timely responses to it, including the organization of supplementary feeding programs through the health care system.

CONCLUSION

The universal acceptance of primary health care as the means for achieving health for all is a milestone in the prevention and control of malnutrition. There are many examples of families, communities, and nations of widely varied degrees of wealth, stages of economic development, and geographical location that are managing to protect and improve nutritional and health status by applying the principles of primary health care. Many others will do so in the near future. The problem of malnutrition, for all its devastating seriousness, is reasonably well understood, and ways of dealing with its underlying causes are sufficiently developed for us to make progress on this front, provided that we have the necessary political commitment.

We are engaged in nothing less than the slow, sometimes discouraging, but ultimately moral struggle to break the vicious circle of poverty, malnutrition, disease, and despair. Let us exploit to the fullest the

finely crafted tools that we have at our disposal--health for all as our objective and primary health care as our means to achieve it--in preventing and tackling the problems associated with hunger and malnutrition. We have every reason to believe that our long-term investment in health and development will ultimately succeed.

DISCUSSION OF DR. MAHLER'S PAPER

DR. BENTLEY: It seems to me that there are no simple solutions. There is a lack of understanding on the biological side. What will be the motivation for and role of behavioral research?

DR. MAHLER: Not until I worked in India did I manage a program that used both economists and social scientists. Ever since, it has been very difficult to convince the directors at WHO that it is worth investing in social or behavioral research. I think the WHO member states are beginning to see that if you want to translate laboratory knowledge from clinical trial or epidemiological studies into reality, there is a huge gap which requires behavioral research. Nothing is more humiliating than the case of tuberculosis control efforts. Despite the revolutionary introduction of standard chemotherapy 25 years ago, with reductions in the cost of treatment and diagnosis to a hundredth of what it was, compliance with required treatment is no more than 15 or 20%. This is because the kind of behavioral research that is needed has not been done. I believe that in nutrition there is an important need for such research.

DR. NESHEIM: Some have argued that the solutions to the problems of malnutrition in the world were only to be achieved through economic development, and I think I understood from your discussion of a primary health care system that the interventions that can be undertaken in primary health care have a role to play in immediately alleviating problems of malnutrition. Perhaps these two views can be integrated.

DR. MAHLER: In Asia, for example, if the health sector comes together with the agricultural sector, there

are many avenues for making more calories available and thereby preventing and ameliorating malnutrition. Given that health is part of the soft social sector, compared with the harsh realities of economic growth, I believe that one can do much to ensure that the nutrient value will be more appropriate and better used and that nutritional interventions will be supported through the primary health care approach. Even in countries where economic growth has been limited, it is still possible to have a useful discussion of the relationships of productivity and consumption.

ECONOMIC POLICY AS A HISTORICAL PROCESS: THE MEANING FOR AGRICULTURE AND NUTRITION

John Kenneth Galbraith

To understand the current problems of agriculture and nutrition in the poor countries, more gently called the Third World, and to appreciate the causes of present deprivation and famine, we must first be aware of a major error in our view of economic development in recent decades. Next only to our failure to perceive fully and to act on the consequences of nuclear conflict, it is the most compelling error in social perception in our age. Our mistake is in believing that the advanced industrial countries, socialist or capitalist in their developed form, are a guide and model for the poor countries, whose economic development and social development are less advanced. It is an error that arises from the failure of the older industrial countries to understand their own history or to appreciate the sources and well-springs of their own development and modern well-being.

We must recognize before all else that economic life is a process. It has its own dynamic and sequence with an appropriate policy--an appropriate course of public action for each stage in the long sequence. There is also a need to avoid wrong action resulting from policies that are relevant only to the later stages of the development process.

In all the early stages of economic development, the appropriate, efficient, and necessary emphasis is on agriculture. This was true in Europe before the Industrial Revolution, in the United States in the last century, and in imperial Russia. The reason for this agricultural emphasis is simple and forthright: the first essentials of life are food and textiles, and agriculture provides these. (There is still, apart from the oceans, no other considerable source of food.) In the last century, when public minds in the United States turned to economic development, they turned to agriculture. Specifically, they turned to the best design for the tenure and use of public lands: to education emphasizing rural schools and to agricultural experimentation. This educational emphasis led to the legislation that produced the country-wide network of agricultural experiment stations and agricultural and mechanical colleges. Eventually a

canal and later a rail transportation system were developed largely in the service of agriculture. This required extensive borrowing that was not always repaid. Later came the agricultural extension services. From Alexander Hamilton on, thought, but no comparable thought, was given to manufacturing--to industrial development. It was not that industry was believed unimportant; rather, at that stage in the development process, agriculture was rightly seen as having the highest claim. The example of the United States is cited not to suggest our superior wisdom in this matter; the early emphasis in the other industrial countries differed in detail, but not in substance. Agriculture--not least in Britain--was called and treated as "the basic industry."

The older industrial lands have now largely forgotten this part of their own experience. When the question of the design for economic development in the new countries is raised, developed industrial countries look at their present industry, not at their past concern for agriculture, as their guiding example, and they stress industrialization. The growth of urban industry is thought to be the true test of economic development; agriculture is assumed to be already developed. This is greatly at variance with the real requirements of the historical process.

There is another, more recent and more important error. Much of the advice flowing from the older industrial countries reflects the modern ideologic attitudes toward economic development. From the western democracies comes the case for free enterprise, still called "capitalism" by the courageous; notably this is upheld by the present American administration. From the socialist world comes word that development should be in a socialist frame of reference. Proponents of each system look at what they have, reflect favorably on its merits, and recommend and sponsor its export to predominantly agricultural lands.

Again there is neglect of history. The case for capitalism or socialism was not seriously debated before the arrival of urban industry. It was not a compelling issue in eighteenth-century Europe or nineteenth-century Russia or post-colonial America. It was recognized,

instinctively if not explicitly, that agriculture has its own particular social and economic patterns, problems, and tensions. The methods of agricultural cultivation, the scale of holdings, cultivation by independent proprietors or tenants, and the form of tenantry were the basic questions. These last (in France, later in Mexico, to a marked extent in Russia, China, and Cuba, and now in Central America)--and not the question of capitalism or socialism--have provided and still provide the seeds of revolution. They, not the question of capitalism vs. socialism, are the issues relevant to the agricultural stage of economic development.

In these last decades nothing has been more futile and on occasion nothing has been more costly and dangerous in national effort and lives than the concern as to whether the new, predominantly agricultural countries emerging into nationhood after World War II should have a capitalist or a socialist pattern of development. I propose that, to the agricultural country, both patterns are irrelevant; agriculture has its own, different system.

In the Vietnam years, my experience in that part of the world gave me occasion to admire the accomplished American ideologist who, on passing through an Asian jungle, could tell whether it was a capitalistic or Communist jungle. He exercised a similar skill when he came to an agricultural village. In reality, agriculture has its own design, given not by ideology, but by the practical accommodation to agricultural need and circumstances. We make a grave and foolish mistake when we carry over to agriculture the ideological concepts and debate relevant to the mature industrial world and in doing so delay or abort the very development we seek. As Marx himself urged, the debate between socialism and capitalism must be left until there is capitalism. We must accept the existence of an earlier third system--the agricultural system--and identify and pursue the policies relevant to it. Perhaps but for an accident--or error--of history we would have done so.

In France in the late eighteenth century, a group of French philosophers--Francois Quesnay, Anne Robert Jacques Turgot, Pierre Samuel Du Pont de Nemours--joined to produce a set of economic ideas that has since been known as the agricultural or physiocratic system. It did

not survive and develop as a separate course of economic thought relevant to agriculture, but instead was swept into discard by the Industrial Revolution and the rise of urban capitalism. It was unfortunate that a current of economic and social thought relevant to agriculture did not endure and develop, withstanding the great competitive prestige of the industrial system. Let me now consider what the essence of a modern agricultural system would have been if it had developed.

We would agree, I think, that the agricultural system has one basic design that is both socially stable and economically efficient. That is the cultivator-operated land holding--the farm unit. Responsibility for this unit lies with the woman or man who works it and is related in scale to what the operator can accomplish with her or his own labor and intelligence. It is the only agricultural structure that, if it exists, no one seeks to change. Nothing over the centuries has been more persistent and eloquent than the efforts of landlords to make the case for large and personally rewarding holdings. To this end they have proclaimed their affection and compassion for workers, share-croppers, and tenants and the need of the latter for a superior guiding intelligence. On none of these points--efficiency, stability, or intelligence--have they made the case. Nothing, as I indicated earlier, has been more conducive to social tension or revolution. The cultivator-operated land holding must be central to any discussion of an agricultural system.

From the case for the cultivator-operated farm unit there comes, in any discussion of an agricultural system, the question of land reform. Land reform is widely celebrated in principle in our own day, but it is wonderfully resisted in practice. In recent decades, there have been far more land reforms in legislation than in fact, especially when the political power structure that reflects the landed interest has remained intact. In talking of land reform, we must always be careful to distinguish between the theoretical and the actual; it is the second that counts.

One of the clear lessons of modern socialism is that it does not easily pre-empt the self-motivated farm proprietor. There are serious problems of efficiency and motivation in the large-scale state farm or collective,

and it is incorrect to assume that what is relevant for industry is relevant for agriculture. What is needed is for new and poor countries not to burden their agriculture with the ideological baggage of the developed lands. Again, we must recognize the separate character of the agricultural system.

The next characteristic of the agricultural system, as distinct from the modern industrial system, is the important role of education. This is particularly evident in the basic owner-operated proprietorship, which requires more educated and intelligent workers than large landed holdings. The situation is no different for tenants or share-croppers. Landlords have rarely been diligent proponents of education. They might be better off if tenants are not too inconveniently intelligent. The independent proprietor, however, must be intellectually competent, so there is a compelling need in agricultural development for a good educational system.

The mature industrial countries especially have gravely misunderstood their own history. In the eighteenth and particularly the nineteenth centuries, when these countries thought of the instruments of progress and development, it was the educational system that came immediately to mind--not steel mills, but schools. Schools were rightly taken to be the natural counterpart of improving agriculture. No error in the advice given to the new countries in recent decades has rivaled that which places investment in industrial apparatus ahead of investment in human capital. Education, needless to say, is important also for acceptance and use of better agricultural methods and technology. There is much in the modern agricultural practice of the older industrial countries of the United States, the Soviet Union, Canada, Australia, and western and eastern Europe that is useful or applicable to the new lands: such technologies as grain hybrids, fertilizer, soil and water management and pest control methods. There is also much that is not useful, and a difficult distinction must be made here. In my years in India, I struggled with the assumption of American agricultural advisers that, if something was used successfully in Iowa, it was applicable, pari passu, to the Punjab. Attention that was given to horticulture, home economics, or poultry husbandry was thus diverted from the absolutes of cereal

production, pest control, and soil and water management. For the appreciation and use of the aspects of the new technologies that can be applied, the agricultural system requires, above all, a well-educated and well-motivated farm population.

I do not suggest that the agricultural system--this agricultural stage in economic development--excludes industrial investment. In its early stages, this investment must have a strong agricultural orientation. Roads and transportation facilities, storage facilities, irrigation works, and fertilizer plants are examples of such agriculturally required investment. Such investment must be given the appropriate priority, as was recognized by the older industrial countries. Their early investments, in turnpikes, canals, railroads, dams, and grain elevators had, as a matter of course, a primary service to agriculture. In the new countries, it matters little whether this investment is under public or private auspices. In earlier times, this was not a great issue in the industrial countries either. The important thing then, as now, was to obtain the requisite facilities in the most efficient and expeditious manner possible.

There is one investment, which is shouldered these days by many agricultural countries, that the industrial lands did not have to make in their agricultural stage: investment in a military establishment and in expensive military hardware. The United States in a comparable stage of development was blessed by having virtually no military expenditures at all. We must surely agree that the industrial countries should be persuaded not to sell such weaponry to the new and poor agricultural lands and that these lands should renew their determination not to buy such weaponry. Nothing is less consistent with the agricultural stage of development than a complex and costly military apparatus.

I strongly urge the abandonment of the present practice in numerous new countries of keeping agricultural prices low as a concession to urban workers and dwellers or to gain political rewards from stable prices. The Food and Agriculture Organization of the United Nations recently has drawn impressive attention to this policy (FAO, 1985). In the developed countries, price controls must sometimes be part of an anti-inflation strategy, acting better and less painfully than

unemployment and recession as a brake on the wage-price spiral. A strong case can also be made in agriculture for price-support policies to ensure a stable and predictable return for the producers on their efforts and investment. This is a standard, indeed universal, practice in the industrial countries and has rendered major service in some countries, such as India. One must react with unease to the numerous efforts in the new countries to keep food inexpensive through public action. This type of policy produces current advantages at the cost of long-term shortages; it would be preferable to pay higher prices now as an encouragement to greater production later. Although the food problems of many new countries, notably those of sub-Sahara Africa, challenge the conscience and compassion of such countries as the United States and Canada, which have food to spare, I strongly urge resistance to any policy intervention that denies local cultivators the full market return for their products--that sacrifices the future to the present.

Finally, as we consider the agricultural system and its improvement, let us not forget that this development must be for all who are engaged in agriculture, specifically that is, for both women and men. All who are familiar with agriculture in the new lands know the problem--that women, in great and often insupportable measure, do the hard farm work, and men enjoy social and political recognition and whatever preference in education, living standard, and leisure can be afforded. In my years in Asia, I could never help noticing that it was the men who attended and gave instruction at meetings on better agricultural methods. On the way to and from such meetings, we could see the women doing the hard work in the fields.

It has long been recognized by theoreticians and emphasized in principle, if not in practice, that equality of the sexes must be a primary goal in the agricultural system. It is not only a compelling social norm; it is also an economic requisite. Only when women are fully and intelligently a part of the agricultural system does development proceed efficiently. In former times, slavery, peonage, and serfdom were brakes on agricultural development and supporting technical progress, and today women are the source of subordinate, abject, and unenlightened toil. One should not think

that improvement will be easy; changes in familial relationships can be more readily discussed than achieved. The availability of women as a working class is far from unpleasant for men, and educated women are much more difficult to subdue.

Economic life is a continuing process of transformation. Although we can hardly fail to recognize this, we systematically deny its practical implications. Countries in the later stages of development, whether socialist or capitalist, look at their own achievements and their own ideologic design and urge their model on countries in the earlier stages. Countries in the earlier stages look with envy at those in the later stages and assume that they also can adopt the policies and actions they see. To overcome this conspiracy of error, we must recognize that the more developed economic systems were preceded and anticipated by agricultural systems.

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DISCUSSION OF PROFESSOR GALBRAITH'S PAPER

DR. ROHDE: Some countries would claim that our apparent wisdom in following the agricultural paradigm rested on the unavailability to us of the industrial or military one and that this was simply a happenstance of history. How would you respond to them? Some have argued that it is possible to telescope all the progress of time and jump over the difficulties of development. Must every country recapitulate the process through which other countries developed?

DR. GALBRAITH: I certainly did not mean to suggest that one country's process has to be recapitulated. As I said, some technical achievements in the developed countries, notably here in the United States, are transferable and lead to, for example, the "green revolution"

in India; but there is no easy answer. At the earlier stages of economic development, countries are only slightly removed from hunger, and food production is the center of agricultural development. Nothing is accomplished by expenditures for steel mills, machinery, fancy airports, and arms. Governments must be encouraged to avoid responding to these kinds of demands.

MR. BUTZ: In your summary, you regretted the export from socialist countries of the organizational structures of their agricultural economies and also the export from capitalist countries of technological approaches to development. Would you comment on the export from capitalist countries of their economic organization for agriculture?

DR. GALBRAITH: The owner-operated farm is an agricultural design that combines efficiency with social tranquility. I do not consider this the exclusive possession of the United States or of the capitalist world; however, it does resemble capitalist norms more closely than does the collective farm.

DR. KIM: In Ethiopia, I believe expenditures in the military sector are not insignificant. Are we being hypocritical by giving military equipment, as well as cash, to Ethiopia when the government itself considers internal strife (such as that involving the Eritrean Liberation Front), and some of the problems in neighboring countries to be major aspects of resource allocation?

DR. GALBRAITH: You have a point. There is an unhappy quality to giving food while governments are using needed resources for military budgets or operations. But let us not be too particular in these matters. It is impossible to look at those scenes of starvation and say, "We are going to withhold grain until the governments reform." I think we cannot do that.

FOOD PRODUCTION, FOOD SUPPLY, AND NUTRITIONAL STATUS*

John W. Mellor

Social, humanitarian, and economic concerns dictate that the pressing problems of hunger and malnutrition in the developing countries be solved. Although authoritative figures vary widely (see Poleman, 1981), the National Research Council (1977) cited the FAO and World Bank estimate of more than 450 million hungry or malnourished people. In my view, around a billion people lack the standard of nutrition needed to support an active, healthy life; most of them live in the developing countries of Asia, Africa, and Latin America.

In most developing countries, productivity-increasing technological change in agriculture is necessary for solving chronic problems of hunger and malnutrition. Preliminary results from research of the International Food Policy Research Institute (IFPRI) in Malaysia, India, and Africa (Kumar, 1981; Pinstrup-Andersen, 1985) indicate a strong positive relationship between increased food production and calorie consumption by the poor. A recent major analysis of time-series data for India showed that per capita food production and the price of food are two of the dominant determinants of fluctuations in rural poverty. Increases in per capita food production and reductions in the price of food can be achieved only through cost-reducing technological change in agriculture (Mellor and Desai, 1985). This close relation between food production and poverty means that it is necessary to understand the dynamics of food production growth if one is to understand changes in nutritional status.

To set the more general framework for analyzing these issues, a review of recent trends in population, food production, and trade in the Third World is needed, together with an examination of the prospects for food production and consumption in various areas of the Third World. On the basis of those data, we can discuss the need for an agricultural strategy of development in the

*The assistance of several colleagues at the International Food Policy Institute, particularly Richard H. Adams, Jr., is acknowledged.

Third World and the impact of such a strategy on the rural and urban poor.

PAST TRENDS IN POPULATION AND FOOD PRODUCTION IN THE THIRD WORLD

Between 1961 and 1980, food production in the developing world increased at an annual average of 2.6% (Table 1), only slightly faster than the average annual population growth of 2.5%. Thus, on a per capita basis, food production in the Third World as a whole increased by only 0.1% per year. However, this aggregate figure covers sharply different rates of food production growth in various regions. For example, in Asia, an area that was once considered famine prone, per capita food production increased by 0.4% per year, but in sub-Sahara Africa, the new food-deficit area, per capita food production fell by a shocking 1.1% per year.

The sharp decline in food production in sub-Sahara Africa commands our immediate attention. On the one hand, the roots of this food crisis in Africa go back a long way, to include such factors as a series of poor crop years, low government investment in agriculture, and unfavorable public agricultural policies (see Mellor et al., in press; Eicher, 1982). On the other hand, the crisis includes the notable absence of any proven technological packages for small farmers in most of the rainfed farming systems of Africa. The new seed-fertilizer technologies commonly associated with the green revolution have only barely touched Africa; the principal green revolution crops, wheat and rice, have not been staple food crops in Africa (Eicher, 1982).

According to Table 1, consumption growth outpaced production in all the major areas of the developing world. In sub-sahara Africa and in North Africa and the Middle East, the rate of growth of consumption greatly exceeded that of production. Yet in these two regions, the large flow of imports from the developed world actually helped to raise consumption. Only in sub-Sahara Africa have recent agricultural years been so poor that even massive imports of food have been unable to stave off a decline in per capita consumption. Net imports of

cereals to the developing countries (excluding China) rose from 14 million tons in the late 1960s to nearly 50 million tons in the early 1980s. For sub-Sahara Africa, the increase was from 1.5 to 8.5 million tons.

In the Third World, two principal forces tend to fuel a steady rise in food consumption: population growth and

TABLE 1 Growth in Population and in Production and Consumption of Major Food Crops in the Developing World[a]

Country Group	Average Annual Growth Rate in Population, 1961-1980, %	Average Annual Growth Rate in Production of Major Food Crops,[b] 1961-1980, %	Average Annual Growth Rate in Consumption of Major Food Crops,[b] 1966-1980, %
Developing countries[c]	2.5	2.6	3.0
Asia (excluding China)	2.4	2.8	3.0
North Africa and Middle East	2.7	2.5	3.9
Sub-Sahara Africa	2.8	1.7	2.2
Latin America	2.6	2.8	3.1

[a]Reprinted with permission from Paulino (1986).
[b]Includes cereals, roots and tubers, pulses, groundnuts, bananas, and plaintains. Rice is in husked form at 80% of unhusked paddy.
[c]Includes 104 Asian, African, Middle Eastern, and Latin American countries. People's Republic of China not included, because of lack of consistent consumption data for the period covered.

per capita income growth. The manner in which these two dynamic forces interact is illustrated in Table 2, which depicts five stylized phases of food demand and economic growth.

The first row of the table shows an early stage of economic growth in which people are very poor, desperately wishing to consume more food, yet unable to do so because of low incomes. In this stage, poverty causes high death rates and hence only modest rates of population growth.

TABLE 2 Hypothetical Comparison of Growth in Demand for Agricultural Commodities at Different Stages of Development[a]

Level of Development	Proportion of Population in Agriculture, %	Rate of Population Growth, %	Rate of Per Capita Income, % Growth	Income Elasticity of Demand[b]	Rate of Growth in Demand,[c] %
Very low income	70	2.5	0.5	1.0	3.0
Low income	60	3.0	1.0	0.9	3.9
Medium income	50	2.5	4.0	0.7	5.3
High income	30	2.0	4.0	0.5	4.0
Very high income	10	1.0	3.0	0.1	1.3

[a]Adapted from Mellor (1966).
[b]Percent increase in demand for each 1% increase in per capita income.
[c]Sum of population growth rate and the product of per capita income growth rate and income elasticity.

The result is a 3% or less growth rate in the effective demand for food--a rate that can be met by more effort on a slightly expanded land base.

As development occurs, the population growth rate increases; even more important, income begins to grow rapidly. The two together increase the growth rate of demand for food by some 30% over that in the earlier phase (see the third row of Table 2). Such a rate of growth in food demand exceeds all but the highest rates of food production growth. Thus, a high rate of technological change in agriculture is needed in this stage of development (row 3 of Table 2).

However, even the countries with the most impressive rates of technological change in agriculture have recently been unable to keep up with growth in food demand. For example, the 16 developing countries with the highest growth rates in production of basic food staples in the period 1961-1976 collectively more than doubled their net food imports during the period (Bachman and Paulino, 1979). Most countries in the high-growth-rate, medium-income stage of development find it necessary to rely on food imports to meet their surging food demand.

In the later stages of development, population growth rates decline, and growth in income has less effect on the demand for food. Meeting food demand then becomes more manageable, particularly because high rates of growth in food production have become institutionalized. Food imports becomes unnecessary, and agricultural surpluses begin to accrue.

In the modern Third World, many developing countries are currently in the high-growth-rate, medium-income stage of development. They therefore depend heavily on food imports to meet their food needs. According to Table 3, between the periods 1961-1965 and 1973-1977, net food imports by the Third World increased by a factor of 4.3, from 5.3 to 23 million tons per year. They have since doubled.

A close reading of the data in Table 3 suggests that increasing per capita income is the dynamic factor underlying the surge in food imports in the Third World. For example, in the table, countries with the highest rate of per capita growth in gross national product experienced a 6.6% annual growth in food imports between

TABLE 3 Net Imports and Growth Rates for Imports and Exports of Food Staples in Developing Countries, 1961-1965 and 1973-1977 and Projections of New Imports to 2000[a]

Country Group	Net Imports per Year, Millions of Tons			Annual Growth Rate, 1961-65 to 1969-73, %	
	1961-65	1973-77	2000[b]	Exports	Imports
Developing countries	5.3	23.0	80.3	2.1	5.4
By region:					
Asia[c]	6.3	10.9	-17.9	2.5	3.5
North America and Middle East	3.6	10.6	57.3	-2.0	7.3
Sub-Sahara Africa	-0.9	2.9	35.5	-4.6	7.1
Latin America	-3.7	-1.4	5.4	3.6	6.9
By GNP per capita growth rate:					
<1.0%	1.6	8.0	39.5	-5.1	7.7
1.0-2.9%	2.8	-1.1	-48.5	1.8	3.3
3.0-4.9%	1.7	4.0	24.1	4.8	5.5
≥5.0%	4.7	12.1	65.2	2.9	6.6

[a]Personal communication, Paulino *et al.*, International Food Policy Institute.

[b]Projections are based on differences between extrapolations of 1961-1977 country trends in production and aggregate projections of demand for food, animal feed, and other uses; projections of demand for animal feed were assumed to follow country growth rates of meat consumption, i.e., no change in feeding efficiency. A basis for this assumption is being pursued at International Food Policy Research Institute, but results are not yet available.

[c]Excluding People's Republic of China.

1961-1965 and 1969-1973. The countries in the next highest growth category also had a high rate of increase in food imports, more than doubling their imports from the first to the second period. The only exception to this finding is the slowest-growth countries (less than 1.0% per capita increase in GNP), many of which are in sub-Sahara Africa. On the whole, the magnitude of food imports by these countries reflects the impact of food aid and assistance programs. During the period 1976-1978, these slowest-growth countries received about 35% of their total cereal imports from food aid (Huddleston, 1984).

FOOD PRODUCTION AND CONSUMPTION PROJECTIONS TO THE YEAR 2000

On the basis of a straight-line projection, by country, of 1961-1980 production data, food production in the developing world is projected to increase at an average annual rate of 2.9% between 1980 and 2000 (Table 4). That is slightly faster than the United Nations projection of an average annual increase of 2.1%. On a per capita basis, food production in the Third World as a whole is projected to grow at 1.0% a year between 1980 and 2000. This impressive aggregate figure covers widely different rates of food production growth in various regions. For example, in Asia per capita food production is projected to increase at an average annual rate of 1.4%, and in sub-Sahara Africa per capita food production is projected to fall by 1.2% per year.

With respect to consumption, if present trends in per capita income growth continue, the consumption of major food crops in the developing world as a whole is projected to increase at an average annual rate of 2.7% from 1980 to 2000 (Table 4)--nearly as fast as the production of these commodities. Among the regions, the projected growth of food consumption is slowest in Asia: 2.3% a year. Annual consumption growth in Asia would be about 0.6% slower than the increase in food output, but significantly faster than population growth. In sub-Sahara Africa, food consumption is projected to grow at the fairly high rate of 3.6% a year, which would be over 1.0% a year faster than production.

TABLE 4 Projected Growth Rates of Population and Consumption of Major Food Crops in the Developing World, 1980-2000[a]

Country Group	Projected Average Annual Growth Rate in Population, 1980-2000, %	Projected Average Annual Growth Rate in Production of Major Food Crops,[b] 1980-2000, %	Projected Average Annual Growth Rate in Consumption of Major Food Crops,[b,c] 1980-2000, %
Developing countries[d]	1.9	2.9	2.7
Asia (including China)	1.5	2.9	2.3
North Africa and Middle East	2.7	2.9	3.8
Sub-Sahara Africa	3.3	2.1	3.6
Latin America	2.1	3.0	3.2

[a]Reprinted with permission from Paulino (1986).
[b]Includes cereals, roots and tubers, pulses, groundnuts, bananas, and plaintains. Rice is in terms of milled form and thus excludes rice bran.
[c]Based on 1977 trend estimates and 2000 projects of trend income growth.
[d]Includes 105 Asian, African, Middle Eastern, and Latin American countries. People's Republic of China included.

What caveats should we have in mind in using such simple projections based on past food production and consumption? First, the base period for consumption estimates (1966-1980) was one of unusually rapid income

growth in many developing countries. Extrapolation from that period therefore assumes that rapid income (and economic) growth will reassert itself in the near future. The current view on this point is generally pessimistic. The slowdown in world trade and the overcharge of debit make it difficult for the nascent potentials for increased productivity from research successes to assert themselves.

Second, for the least developed countries, this base period was one of rapid growth in foreign aid, which sustained food consumption in otherwise retrogressing economies.

Third, there are signs that major countries with a potential to increase the rate of growth of demand, in contrast with the fast-growth countries of the 1960s and 1970s, are misallocating their capital sufficiently to cause demand for food to grow more slowly than supply. Given the technological potential of the 1980s and 1990s, it appears that the developed countries will be able to meet the increasing import needs that inevitably accompany increased economic growth in the developing world.

STRATEGIES OF ECONOMIC DEVELOPMENT

Given the key role of agricultural production in reducing poverty and improving nutrition, it is useful to examine the outlines of an agricultural strategy of development. Such a strategy can best be distinguished by reference to other strategies of economic development.

In the 1960s, much attention was given to the so-called capital-intensive strategies of development. These strategies, which may be typified by reference to G. S. Feldman (Mellor, 1976), the intellectual father of the growth strategy of the Soviet Union, focus on the production of capital goods. In such a strategy, the great bulk of resources is channeled to large-scale industries--notably steel and machine-building--that maximize capital formation and economic growth. The diversion of capital resources into agriculture and production of consumer goods is actively discouraged in the short run, so as to maximize long-term industrial growth. A capital-intensive strategy of development thus

places little emphasis in the short term on improving agricultural production or the nutritional status of the poor. Over the long term, these problems are supposed to be solved by the massive growth in capital investment in factories and machines that is to take place.

The inability of any capital-intensive strategy of development to produce economic growth with equity has prompted renewed interest in an agricultural strategy of development (see Mellor, 1966; Mellor and Johnston, 1984). Such a strategy has three basic characteristics: it emphasizes the production of consumer goods, especially food; it emphasizes increased employment, with respect to both labor supply and labor demand; and it emphasizes international trade and comparative advantage. Each of these characteristics has important implications for the pattern and pace of food production growth, and each constitutes a sharp contradiction of a capital-intensive strategy of development. Emphasis on consumer goods is central to an agricultural strategy, because agriculture is basically an industry that provides consumer goods. But several other features need to be stressed.

First, food and employment are two sides of the same coin. As shown in Table 5, budget shares for food among the poor range between 47% and 79%. A high-employment policy creates a large increase in the demand for food. If more food is not forthcoming, food prices will rise, the real cost of labor will increase, and investment will swing to more capital-intensive processes (Mellor, 1976). Thus, any strategy of development that entails labor mobilization will also require the wage goods--particularly food--to support economic growth.

Second, by stimulating the growth of employment opportunities for the poor, an agricultural strategy of development also increases the ability of the poor to buy food. Technological change in agriculture increases the income of land-owning farmers, who spend a large proportion of their new income on a wide range of goods and services. Studies in Asia (e.g., Bell and Hazell, 1980; Hazell and Röell, 1983) have suggested that typically 40% of increments in income of farmers is spent on locally produced nonagricultural goods and services. This expenditure helps to provide new income and employment opportunities for the poor, because it focuses on such

TABLE 5 Budget Shares Spent on Food among the Poor in Selected Cities and Countries[a]

City/ Country	Low-Income Population Group	Budget Share, %	Reference
Bogota/ Colombia	Lowest 25%	59	Musgrove (1979)
Barranguilla/ Colombia	Lowest 25%	65	Musgrove (1979)
Cali/ Colombia	Lowest 25%	68	Musgrove (1979)
Caracas/ Venezuela	Lowest 25%	47	Musgrove (1979)
Maracaibo/ Venezuela	Lowest 25%	58	Musgrove (1979)
Brazil, urban	Lowest 30%	51	Gray (1982)
Brazil, rural	Lowest 30%	65	Gray (1982)
India	Lowest 20%	71	Mellor (1978)
Sri Lanka	Lowest 10%	79	Sahn (unpublished)
Thailand	Lowest 10%	67	Trairatvorakul (1984)

[a]Reprinted with permission from Pinstrup-Andersen (1985).

labor-intensive sectors as local transport, consumer services, health, and housing. It also helps to build the type of small-scale industry that stimulates further rural growth and development.

Third, an agricultural strategy of development helps to produce the export goods needed to fuel the development process. To succeed, a development strategy requires the importation of large quantities of capital-intensive goods--for example, fertilizer and pesticides for agriculture and steel and petrochemicals for industry. In most developing countries, such imports must be paid for through increased exports. An agricultural strategy of development, which stresses the increased production of agricultural and labor-intensive goods, helps to supply goods for export.

AGRICULTURAL DEVELOPMENT AND THE NUTRITIONAL STATUS OF THE POOR

In most developing countries, an agricultural strategy of development is an important--but not necessarily sufficient--means of improving the nutritional status of the poor. Changes in total food supplies affect their nutritional status only to the extent that their food consumption is directly affected. In many developing countries, calorie-protein deficiencies might well exist in the presence of plentiful food. Thus, efforts to increase total food output should be coupled to attempts to determine how they will affect the nutritional status of various types of consumers.

During the last 15 years, urban consumers in many developing countries have benefited greatly from technological efforts to increase food production (Pinstrup-Andersen, 1985). Much of the economic surplus generated by new high-yield seeds and fertilizers has gone to urban consumers in the form of cheaper and more plentiful food. The effect of these efforts has sometimes been magnified by trade and pricing policies that ensure the flow of low-priced food staples to urban consumers. However, the extent to which the poor and the malnourished have shared in these consumer gains is not clear. On the one hand, it appears that the absolute gain obtained by low-income consumers was smaller than that obtained by higher-income consumers. On the other hand, if expressed as a percentage of current income, the gains were larger for the poor (Hayami and Herdt, 1977; Pinstrup-Andersen, 1977). The reason is that the poor tend to spend a smaller total amount, but a larger percentage of their income on food.

One of the problems involved in assessing the impact of technologic change in agriculture on the poor is related to the makeup of their diets. Contrary to what might be expected, the poor tend to spend a substantial percentage of their food money on relatively expensive calorie sources. For example, it is not unusual for the urban poor in Latin America to spend more on meat than on any other commodity. Musgrove (1979) found that meat expenditures exceeded cereal expenditures among the poorest quartile of the population in 5 of 10 Latin American cities surveyed.

Relatively little research has been done on the impact of technological change on nutritional status in rural households. However, recent research at IFPRI has indicated that such change--under the appropriate circumstances--can have a significant impact on the poor. For instance, in the Muda region of Malaysia, the introduction of high-yield seeds and fertilizer led rice yields to increase from 700 to 1,200 kg/hectare (Pinstrup-Andersen, 1985). As a result, expenditures on food increased by 10%, and consumption of home-grown rice increased by 15%. Total calorie consumption by all the households in the region rose by 7%. Even more important, calorie consumption by the poorest 30% of the households increased by 14%. Improvements in protein consumption were equally impressive. In Muda, the number of households with protein consumption below the recommended daily allowance fell from 16% to 3.4%, for a reduction of about 80%.

CONCLUSIONS

Protein-calorie deficiencies are widespread in many Asian, African, and Latin American countries. Absolute poverty, poor health, and lack of knowledge of nutrition are among the principal reasons for the high prevalence of malnutrition.

Under these circumstances, most developing countries would be well-advised to pursue an agricultural strategy of development. Technological change in agriculture is often an important, but not necessarily sufficient, condition for solving the problems of hunger and malnutrition in the developing world by not only increasing the total amount of food available to malnourished groups, but also helping to increase their ability to purchase food. Through direct and indirect multiplier effects, technological change in agriculture helps to increase the purchasing power of the poor by supporting the creation of new employment opportunities in a variety of labor-intensive sectors (e.g., agriculture, trade, and transport).

In the short run, growth in technology might not be sufficient to meet the immediate needs of nutritionally disadvantaged groups, and specific efforts might be

needed to increase the availability of food and the ability of poor households to obtain it. These efforts might include attempts to reduce the price of food commodities to malnourished groups (e.g., food subsidy programs) and efforts to increase their purchasing power (e.g., food-for-work programs). The pursuit of such efforts will require developing countries to increase their attention to nutritional goals and objectives. Policy decisions, for example, must consider the types of people in greatest nutritional need and the policy instruments that are most appropriate for aiding them.

The developed countries have a critical role to play in ensuring the success of nutritional policies in the Third World. Food aid and imports are often essential for the creation of effective food-for-work and food subsidy programs. The developed countries have the funds and the technical expertise to assist developing countries in pursuing a long-term strategy of technological change in agriculture. Such assistance by the more mature economies can help to relieve the onerous problems of malnutrition and food deprivation in the Third World. Hunger is an affront to the dignity of all mankind, particularly if we have the means to prevent it.

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DISCUSSION OF DR. MELLOR'S PAPER

DR. GARZA: With respect to technological breakthroughs, we seem to be at a crossroads in agricultural policy and nutrition in this country. What do you think developed countries should do to maximize the benefits of these breakthroughs for developing countries? There is a greater potential than ever before to widen or narrow the production gap between developed and developing countries, if we realize the full promise of these technologic breakthroughs. It might be useful to ask what we should do, rather than what the developing countries should do, to maximize the benefits of new technologies.

DR. MELLOR: The principal thing we can do is to help them build a modern basis for applying scientific advances in their own country. This requires that national agricultural research systems be developed. The stronger the national agricultural research system, the greater the speed with which basic science can be borrowed and strategic science can be adapted from other countries. National systems of this kind require higher education, and the process can be accelerated by assistance with institutional development. We always comment that developing countries have to do most of it themselves; here we are talking about what we can do around the periphery This is very critical, and it is going to become much more critical over the next decade.

There has been considerable anti-elitism in the world over the last decade with respect to developing countries; but it is the countries which have been somewhat elitist, in the sense of developing a large cadre of highly trained people, that have been able to implement the more personnel-intensive projects needed to reach the poorest people. From the point of view of the poorest people, more trained personnel are needed.

It might be useful to compare Africa and Asia. Training of personnel has been extensive in many parts of Asia. We are now seeing a tremendous range of programs reaching the countryside in Asia and an increase in emphasis on reaching the poorest people. Africa does not have the personnel to do that, and the development problem appears to require increased labor productivity more than land productivity. However, it can be shown

that labor productivity in Africa cannot be raised without raising land productivity, in terms of yield per acre. Thus, even in Africa, the problem is to apply modern science and technology to increase crop yields.

DR. GALDI: I am puzzled as to why this discussion has emphasized production, rather than consumption. Over the world as a whole, it is evidence that there is sufficient food, in the form of vegetable products. Use of meat is costly and wasteful. What should the policy be in the Third World to press for the importance of nonmeat diets?

DR. MELLOR: The reason I have emphasized production is that I am talking about a strategy in which agriculture is central, and production puts income into the hands of many people. The purchasing power of the majority of the rural people in Asia and Africa cannot be raised unless their productivity--which is primarily agricultural--is increased. Increasing nutritional status will require improving incomes of the lowest socioeconomic groups and increasing their production.

The critical view of livestock consumption is derived from the United States. Livestock production in Asia, by contrast, tends to be very labor-intensive; in the Gujarat state in India, almost without exception, producers are very poor women. You have to think about what you are doing to increase purchasing power when you increase demand for milk by higher-income people.

My impression is that nutritionists are again recognizing that there are problems in trying to meeting dietary needs entirely from vegetable sources, or even entirely from carbohydrate sources. There is a problem in raising the fat content, in view of the difficulty of ensuring sufficient caloric requirements. We are seeing the wisdom of consumption of at least a small amount of animal protein, and that small amount is probably somewhere near the Taiwanese consumption, but not the U.S. consumption. We need to consider where the developing countries are today; their problem is related to production more than you might think.

EMERGING PRIORITIES FOR THE NUTRITIONAL SCIENCES

J. C. Waterlow

There will be no nutritional science, and hence no useful discussion of priorities, unless there is a continuing flow of young people into the study of the subject. What challenges face them? They will find a degree of polarization among people working in nutrition (Waterlow, 1981). It is a commonplace that malnutrition results from poverty. Here are two quotations from the same number of the United Nations University (UNU) Food and Nutrition Bulletin:

> On . . . the use of external bilateral and multilateral instruments to build a global economic order of significantly greater equity (within as well as among countries), I am rather pessimistic, at least as far into the next 15 to 20 years as I can see (Joseph, 1985).
>
> It is realistic to contemplate the elimination of hunger and malnutrition if and when governments adopt social, economic, agricultural, educational, and health policies that have enabled countries with a wide range of political systems to achieve this goal in a surprisingly short time. . . . The encouragement and assistance that international, bilateral, and voluntary agencies can provide will make a critical difference (Scrimshaw, 1985).

We note in passing that Scrimshaw did not include nutrition in his list.

Those statements and reflections were presumably addressed to governments and other organizations. However, at the end of the road, whatever is achieved depends on people. What should a young person do who wants to make a contribution? Grant told us at the International Congress of Nutrition in San Diego 4 years ago that we have to stimulate political will. That advice was, I suppose, given to us as citizens, not as nutritionists. In this climate of opinion, many people feel that their best contribution is through the social sciences, management, administration, and so forth.

It is not unnatural that the biomedical scientists should feel on the defensive. What can we contribute, other than to act as a conscience for governments, as

Gopalan of India put it at the World Health Assembly some years ago. If the biomedical scientists are on the defensive, it is partly our own fault. In the United States and United Kingdom, nutritional science has gained much of its strength from animal husbandry, as is obvious if we look at the institutions in these countries and the traditional nutritional journals. I do not think it would be unfair to say that perhaps the greater part of scientific output in nutrition is irrelevant to Third World problems. That is natural enough, as long as most nutritional science is done in developed countries.

It might be supposed that the way to build a bridge between the social and biomedical components of nutrition is by multidisciplinary discussions, as in this symposium. However, I like very much a phrase in Galbraith's autobiography: "Discussion is a vacuum designed to fill a vacuum" (Galbraith, 1982). We get a smattering of each other's point of view, but that is no substitute for a proper basic training. Richard Jolly, in his address at the last International Congress of Nutrition (in press), spoke of the importance that Barbara Ward attached to professionalism. I fully agree. There is no subject in which professionalism is more needed than in nutrition. In what other subject would you find that, of all the professors and writers, including me, so few have had any basic training in what they profess? In what university, for example, can one find a proper degree course in developmental nutrition--equivalent, say, to a degree in agricultural economics? I will not enlarge further on the subject of training, except to say that, if I had control of a great deal of money, I would give priority to establishing such university departments in Third World countries or strengthening them where they exist. It is sad that national and international agencies, with few exceptions, seem to find great difficulty in providing long-term institutional support in developing countries (United Nations University, 1984). At the same time, we all say that a major bottleneck in long-term measures for the prevention of famine is the lack of local infrastructure and technical know-how. Is there not some hypocrisy here?

Let me now come somewhat closer to my title: priorities for nutritional sciences. In defining priorities, the scientist needs some guidance from

policy-makers and planners on the general framework within which he is to operate. Is the aim of policy to improve the nutritional state of virtually the whole population in poor countries? Or is it to eliminate the severe cases? I have not seen the distinction thoroughly discussed in relation to nutrition and malnutrition, and certainly not with the passion that surrounds the controversy over high blood pressure--whether to try to shift the distribution of blood pressure in the population as a whole or to concentrate resources on those who are clearly at risk.

For nutrition, the two policies can be promoted together, and they are coming closer together. The "trickle-down" approach through overall economic development seems to be losing ground in favor of the "basic-needs" approach (Streeten *et al.*, 1981) or "development with a human face" (Jolly, in press). The emphasis has changed over the years; there is now much talk of community participation and of increasing the social mobility of women (Joseph, 1985). Be that as it may, such policies are largely in the province of social scientists, economists, and politicians.

The second approach--what Streeten *et al.* (1981), using a military analogy, called "precision bombing"--lies squarely in the province of the health sector. Such a strategy might well be unpopular in the present climate, because it goes against the principle of prevention for all and is reminiscent of the out-of-fashion hospital approach. Nevertheless, opinion does seem to be moving in that direction, as judged by a recent World Bank paper (Lipton, 1983). The practical difficulties are enormous, but I believe that they can be overcome through the primary health care system, if it is properly geared to that strategy. Moreover, I think that such a strategy will have a "trickle-up" effect. Is it not the case that, whatever the causal mechanism, birth rates tend to decrease as infant mortality falls?

I referred to "severe cases," and it is precisely the problem of defining "severe" that should indicate the priority for nutritional sciences in the next decade. The difficulty, of course, is that nutritional status is a continuous variable, so it is artificial to draw a line between those who should and those who should not be called severely malnourished. Nevertheless, in real life

it has to be done. The analogy with blood pressure applies here also: the doctor, confronted with this continuous variable, has to decide on the level that warrants treatment. In Britain, we have just finished a very large trial of the effects of lowering the cutoff point of blood pressure for antihypertension treatment. It appears that the gains are small in relation to the enormous cost of hypotensive drugs. Thus, the choice of where to place the cutoff point depends on two things: biological knowledge (how the risks vary in degree and kind as one moves down the ladder of worsening nutritional state) and practical considerations (such as the size of the group at risk, how it can be reached, and the resources needed to deal with it).

For nutritional research on all problems, the same general question applies: how best to match resources and results. However, the different problems are in different stages of development. In the case of vitamin A deficiency, iodine deficiency diseases, and anemia, there is a great body of knowledge, although, of course, it is never complete and there have been some exciting scientific developments in recent years. Interest in these conditions is high, and we have the technology for prevention. I judge that it is largely a matter of resources and sometimes of political will. It is remarkable, for example, that in southern Germany 30% of women still have goiter (Elton, 1978). Scientific knowledge of other conditions is more or less in its infancy, and we do not even know how important they are. Examples are trace-element deficiencies and the effects of mycotoxins. There is also protein-energy malnutrition. The magnitude of the problem of malnutrition is enormous; there is a great deal of knowledge, but it has serious gaps. Until those gaps are filled, we cannot have a rational policy for prevention.

I shall now discuss three examples of gaps in our knowledge on the effects of energy and protein deficiency that I think should have a high priority for nutritional science in the next decade. Protein takes second place to energy, because, as is widely accepted, an intake that provides enough energy will usually supply enough protein. There are important exceptions, but those concerned with policy, such as the Food and Agriculture Organization (FAO) and the World Bank, are surely right

to concentrate first on energy intake. The three subjects deserving priority are body size, adaptation, and resistance to infection.

BODY SIZE

The best way of coping with a deficit in energy intake, is to be small. But how small? To normalize for differences in height in adults, it is convenient to use the body mass index (BMI): weight (in kilograms) divided by the square of height (in meters), or kg/m^2. The acceptable range of the BMI has been given in the United States as 19-25 (Bray, 1979). The upper limit has been well defined by many studies on the risks associated with overweight. The lower limit of 19, below which risks are said to increase again, is probably an artifact of life in industrialized countries (Rhoads and Kagan, 1983). People tend to have low weight if they are heavy smokers, alcoholics, or in some way ill. In contrast, the average BMI of healthy people in Third World countries is typically about 19 (Eveleth and Tanner, 1977), so half the population is lighter than this. Shetty (1984) in Bangalore has described poor Indian laborers who are active and apparently fit with a BMI of 16. It is interesting that, in the famous semistarvation experiment of Keys *et al*. (1950), the BMI of the American volunteers had fallen after 24 weeks to about 16, like that of the Indians. However, unlike the Indians, the Americans were physically and psychologically in a poor state. Young women with anorexia nervosa often have a BMI of about 14, while free of symptoms and indeed hyperactive. I am not saying that it is acceptable to have such a low BMI; what I am saying is that to my knowledge no one has systematically explored the functional effects of low body weight in adults or attempted to define a rational lower cutoff point for BMI.

Children have a different and even more difficult problem. In the community, nutritional state usually has been assessed by deficit in weight for age, compared with a standard based on children in the United States. Leaving aside the question of whether the standard is appropriate, the index weight for age is unsatisfactory, because it lumps together children of low weight for

height with those of low height for age. Physiologically, these are different conditions, which, of course, can appear together. Children who are short for their age are sometimes called chronically malnourished, but I have called them "stunted"; the word might not be a good one, but it describes what we actually see. The distinction between low weight for height and low height for age is of great public health importance. If we remove from the "malnourished" category children who are simply stunted, with normal weight for height, the prevalence of malnutrition in preschool children will, in general, be reduced by a factor of at least 5 (Table 1). This is not just an attempt to fiddle with the numbers by changing the rules of the game. It is obviously essential to reach a decision on the question: "Are stunted children malnourished in any useful sense of the word?"

I think it is incontrovertible, from the work of Martorell (1985) and others, that stunting in the Third World is determined mainly by environmental, and not by genetic, factors. Two opposing views about its significance have been put forth. The first, exemplified by the economist Seckler (1982), is that stunting is a useful adaptation: a small child needs less food and is therefore less likely to die when food is short. Anyway,

TABLE 1 Prevalence of Malnutrition in Children Less Than 5 Years Old According to Diagnostic Criterion

Condition	Proportion of Children, %		
	Vietnam Refugees	Napalese	Sri Lankans
Malnourished, according to weight for age	66	56	32
Malnourished, excluding those who are only stunted[a]	11	7	7

[a]Reduced height compared with international standards, but normal weight for height.

what is the point of having long legs? As Mark Twain said, nature is wonderful--our legs are always long enough to reach to the ground. The other view is that every child has a right, according to the United Nations Declaration of Human Rights, to develop his full genetic potential. Both these views are based on values. It is better for a child to survive than to die, but this is not a sufficient criterion. Performance must be considered, and here there is some disagreement in the evidence. If the hillman in Nepal can carry 100 kg, twice his body weight, from the plains of India to the frontiers of Tibet, which none of us here could do, can we say that he is handicapped by being small? Several studies have shown that, in terms of maximal working capacity per unit of body weight, these stunted children are as fit as or fitter than their taller and heavier counterparts, although in absolute terms they might still be handicapped. A study in India showed that adolescent boys who had been stunted from childhood and were short for their age had less chance of earning wages as farm laborers and were therefore perhaps condemned to a vicious circle of poverty (Satyanarayana et al., 1979).

It is well established that environmentally produced stunting is associated with some impairment of mental function and behavior. However, stunted children grow up in a generally deprived environment; before any conclusion can be drawn, one has to control for macroenvironmental and microenvironmental factors. For example, in a recent study in Jamaica, differences in height accounted for only 10% of the variance in IQ. The mortality associated with a given degree of stunting in Zaire is different from that in Bangladesh (Van Lerberghe, 1983). Several similar studies have been conducted, but many more are needed to get a clear idea of what it means to be stunted. It is not going to be easy to get a general answer to the question of whether stunting matters.

One can take the position that any handicap matters, but not much can be done about it until one knows the cause or, more precisely, the relative importance of different causal factors. I believe that stunting is nutritionally determined, that it results from a relative deficiency of protein or factors associated with protein (see Golden, 1985), and that it can be prevented with specific nutritional measures. Whether such prevention

should have a claim on scarce resources will depend on what we find out about the extent of the handicaps.

ADAPTATION

The Indian laborers that I mentioned earlier were very thin, with only 6% body fat, but apparently fit. They also had very low food intakes. Many groups of people seem to subsist quite well on energy intakes much lower than their estimated requirements, even when allowance is made for their low body weight. I believe that the new FAO/WHO/UNU (1985) requirement estimates are based on sound physiological evidence. However, most of it came from work in developed countries. What are the possibilities of some mechanism of long-term adaptation to low intakes? At least half our energy intake is needed for the essential processes of maintaining life, represented by the basal metabolic rate (BMR). In the Indian subjects whom I have cited as an example (Shetty, 1984), the BMR was 17% below the expected rate; that constitutes a considerable saving. In theory, several factors could contribute to this saving: lower rates of protein turnover and ion transport; more efficient formation of ATP, the basic unit of energy transduction in the body; and more efficient use of ATP. All these are hypothetical, but possible (Waterlow, 1986). A useful economy can possibly be achieved by a summation of many small changes. Because they are small, they will be difficult to detect and measure, but we should at least try.

The next need for energy is for physical activity. For most activities, although not for all, energy cost is proportional to body weight, so here again the small person has an advantage. If one has a given task to perform, such as walking 5 miles or plowing a field, and time is no object, there could be a most economical rate of doing it--neither too fast nor too slow. The findings of physiologists vary on this, and the optimal rate depends on the load. I think it quite likely that for many purposes it is more efficient to work slow than fast and that people have developed by experience the most economical pattern of work. We badly need accurate studies on this subject under the conditions of developing countries.

Skeletal muscle contains two types of fibers, the so-called fast-twitch and slow-twitch fibers, with different functions. There is some evidence that the slow fibers are biochemically more efficient than the fast fibers and use less energy for the production and maintenance of a given force. The relative proportions of these two types of fibers in a particular muscle are not necessarily the same in every person. Therefore, one would expect that people with a higher proportion of slow fibers would be able to work more economically. Exercise physiologists believe that the capacity to be either a sprinter or a marathon runner is determined by genes, not by training. Perhaps Third World people have undergone a genetic selection of fiber types that allows work to be done in the most economical way.

I have discussed these speculations in more detail elsewhere (Waterlow, 1986), but they open lines of research relevant to the problems being considered here.

INFECTION

So much has been written on nutrition and infection that I hesitate to add to it. I wish to refer here not to specific infections, such as measles and malaria, that are preventable by specific measures, but to the much less well-characterized diarrheal diseases and respiratory infections. The point is often ignored that the biggest risk factor for dying from an infection is to be very young. Figure 1 is based on data from the Pan American Health Organization (PAHO) Child Mortality Survey (Puffer and Serrano, 1973). Even if the neonatal period is excluded, twice as many deaths occur between the ages of 1 and 6 months as between the ages of 6 and 12 months. Almost half the deaths were attributed retrospectively to diarrheal disease, even though most of the children were breast-fed. The prevalence of diarrhea is certainly higher in the second 6 months, but the mortality is higher in the first 6 months.

Why should these infants be so susceptible? Evidence is accumulating that growth in both weight and length in these poor communities begins to falter in many cases well before 6 months of age, presumably because the mothers, themselves undernourished, cannot produce enough

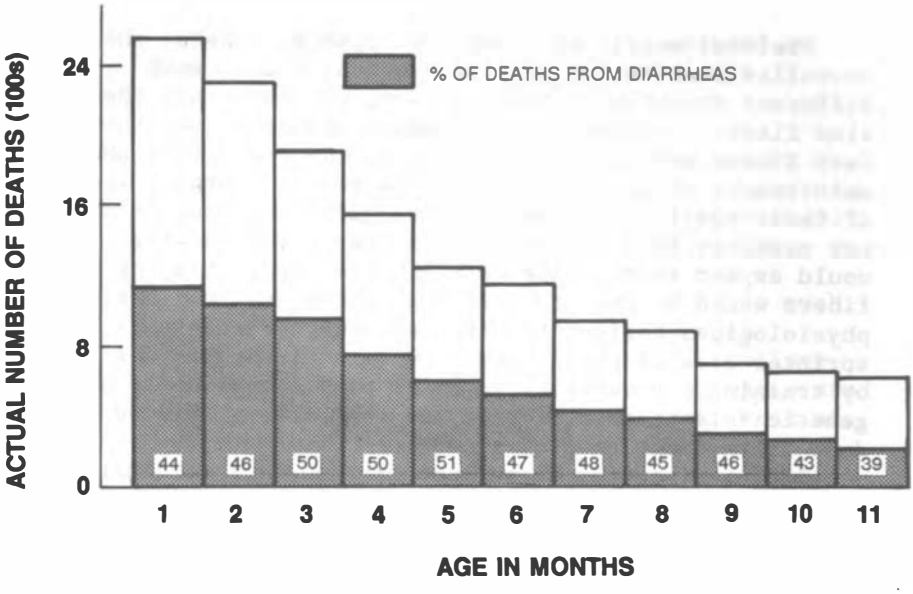

FIGURE 1 Proportion of postneonatal deaths in first year of life attributed to diarrheal disease. Data from Puffer and Serrano, 1973.

milk. There is also evidence, from somewhat older children, that nutritional status has little effect on the incidence of infections, but much influence on the duration and severity of infections (Tomkins, in press).

From observations of these kinds, I draw two conclusions--one specific, the other more general. The specific conclusion is that a baby well nourished during the first 6 months of life will have a very good chance of withstanding the infections that are almost inevitable during the weaning period. I am glad that WHO is now giving more attention to the question of early supplementary feeding, whenever it might be needed to maintain the health and growth of the child.

My general conclusion is that the programs that during the last 2 decades have focused on the preschool child (up to the age of 5 years) have to a large extent been misdirected and wasteful, in that they have not taken enough account of the biology of young children and

of the natural history of disease in this age group. The pattern of mortality in the first year that emerged from the PAHO survey was for me a true eye-opener. It ran counter to what I had been taught, which was that children in developing countries are likely to be healthy for the first 6 months of life, provided that they are breast-fed. In our emergent priorities, much more attention should be given to the first year, because that is when the future of the preschool child is determined. As a practical recommendation, I suggest that, wherever there is a system for recording deaths, they be tratified and reported in monthly age groups for the first year. This simple measure would provide a rapid and sensitive index of the effectiveness of preventive efforts.

SUMMARY

I have taken the opportunity of this important meeting to suggest some ideas that are speculative or controversial. I would like to end by making clear what I am not saying.

- I am not saying that there is no role for macromeasures of the kind discussed by other participants here. To do so would be presumptuous and ridiculous. But such measures take a long time, so we need an emergency strategy.
- I am not saying that the kind of operational research being done under the auspices of the Subcommittee on Nutrition of the United Nations Administrative Committee on Coordination with the leadership of Dr. Horwitz is not necessary and valuable.
- I am not saying that action must wait for research. As a doctor, I do my best to treat a patient even if I do not fully understand his disease.

I am saying that rational choices about priorities for action require more biological knowledge than we have. My job has been to answer the question: What kind of knowledge? I have given some examples, but the list is far from complete. There are plenty of challenges for the young scientist who wants to make a contribution in

nutrition. Let me end by stressing again the vital importance of basic research in nutritional science as a foundation for effective policies. The point was made very eloquently by Hirschman (1963):

> The lag of understanding behind motivation is likely to make for a high incidence of mistakes and failures in problem-solving activities and hence for a far more frustrating path to development than the one in which understanding paces ahead of motivation.

It should not be necessary to say this again more than 20 years later, but unfortunately it is.

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DISCUSSION OF PROFESSOR WATERLOW'S PAPER

DR. MARTORELL: Dr. Waterlow has said a number of very important things, particularly on the subject of small body size and on whether stunting merits concern. I would like to present for consideration a scenario in which we have moved into the twenty-first century, and economic development has already taken place. There are no problems of malnutrition, and a group of nutritionists is told by a government, "We don't have any small people anymore and we need them for intergalactic travel. Fuel and food requirements will be reduced if flights are staffed with small people. So, the question is, what is the formula for small people? How can we produce small people?" The answer would be that one would need to interfere with development in early childhood--and would require frequent infections, particularly diarrheal diseases; very poor diets, with nutrient deficiencies and limitations in energy; and problems with infant feeding, such as inappropriate timing of complementation of breast milk. The formula would specify these and other factors, and we would have to admit that production of small people would be very inefficient, because many children would die. There would be effects other than small size on a variety of functions, including mental development. There would be reduced immunocompetence and more severe infections. Wasting would also result; small people could not be produced without wasting, because the two conditions are very closely related. In summary, the formula for small people would be infection, poor diets, and malnutrition during early childhood.

If we focus on the causes of small body size, rather than on small body size itself, we obtain a different perspective on whether stunting merits concern. Focusing on small body size alone is misleading. Males who survive the tumultuous early period and become small adults are able to function in most settings, but agricultural productivity may be impaired. For small adult females, there are likely to be problems in reproduction, and the next generation would be affected. Although the energy requirements for agricultural tasks might be reduced and less food might be needed to survive and work, small body size should not be seen as an adaptation. It is the formula for producing small people that I want to emphasize as the problem.

DR. WATERLOW: I agree that we need to know the causes. I take the simplistic view that the deficit in linear growth is an effect of inadequate protein intake; it is related to a specific factor or some substance associated with protein. I do not agree that biologically the phenomena of wasting and stunting are necessarily connected. In real life, of course, they are often connected, but there is no statistically valid association throughout the world between stunting and wasting, as Dr. Mahler has shown. Still, I agree that we need a better analysis of the causes.

DR. SCHORR: My question has to do with nutritional assessment. In the light of Dr. Mellor's comments on the numbers of malnourished people in the world today, are the current nutrition assessment tools and derived indicators sensitive, specific, and adequate to detect the extent of malnutrition, and are the types of data being reported or the methods of reporting accurate? What type of research or practical applications would improve the quality of data for assessing the severity of global malnutrition?

At the nutrition congress, Dr. Rohde addressed some of these issues. Perhaps he could speak on this issue. Is there a problem with this reporting? Is it a problem with severe malnutrition or mild-to-moderate malnutrition? What sorts of things can be done? There appears to be some sort of a gap between assessment and accurate reporting.

DR. WATERLOW: Of course there is a problem. The whole thing is a continuum from perfectly healthy to dead, and you can assess where you are on it through various anthropometric methods. What we all want to know are the functional consequences of being at any point on the continuum--not an easy thing to determine. It will be necessary to decide what functions you are interested in--physical work, mental development, or behavior. The relation between an anthropometric deficit and a functional deficit depends strongly on culture and on all sorts of factors. The risk of excess mortality at a given weight deficit is about 5 in Bangladesh and 1.5 in Zaire. Presumably, there is a range of different factors in these two countries. The same would apply to any

functional deficit, and this idea that you can take some measurements and assess them in some sort of accurate way is simply a cloud. What we can do is identify children who are in a serious nutritional state. There might be some argument at the edges, but anyone who has worked in clinical nutrition can do this. Those are the people whom I am suggesting we concentrate on. Otherwise, we are doing nothing.

UNIDENTIFIED SPEAKER: In the slide you showed [Figure 1], the case-fatality declines over the preschool years, with the peak in the age group of 1 month. How much of that was not confounded by the low birth weight of these babies? This makes us wonder how early is early enough for intervention, such as changes in maternal nutrition during pregnancy.

DR. WATERLOW: That is a very good question. It was not the case-fatality ratio that declined, it was the actual number of deaths. I left out the neonatal period. Results of the work in Guatemala and Costa Rica suggested that a very high proportion of the neonatal deaths result from prematurity. There are, of course, other complications. I agree that we should intervene as early as possible in pregnant women. Dr. Whitehead's results in West Africa suggested that supplementary feeding of pregnant women can have a significant effect on birth weight. So, I agree, we should start as early as possible.

DR. ROHDE: There is considerable basis for debate over the question of functional significance of smallness, and one can look at it either from the perspective of Dr. Martorell (how to get a small population) or from the perspective that Dr. Waterlow has offered (how to deal with this huge problem in the world and focus our resources on the people who need them the most). The latter gives us the perspective that Dr. Waterlow offered of looking at the most severely malnourished and deciding what can be done about them, what the functional consequences are, and which of them are most in need of help. I suggest a compromise. I think that the implication in the comments is that, if we start early enough and take the appropriate measures, we will not have to tolerate either wasting or stunting.

We should start interventions very early, as was just pointed out, during the prenatal period, or (as Dr. Martorell suggested) even one generation ahead. We should look for healthier mothers and healthier children, monitor the growth of the children, and do something about it in the first 6 months of life. Thus, we do not wait until we have a malnourished child on our hands who all of us find to constitute an almost impossible clinical task. That is how we have to approach it. Although the preventive approach does commit us to do something for every child, a later approach to those who are malnourished does not seem to be within our capacity.

DR. WATERLOW: I like to agree with compromises. I agree with you, Dr. Rohde, about a concentration on the first 6 months of life. I also think that for countries where there are many seriously malnourished children, we have to do something about it. We have to show a willingness and an ability to save those children's lives. This will also make a contribution to mothers' understanding of how to treat their children.

UNIDENTIFIED SPEAKER: If we omit the very severely malnourished child, how comfortable are you that we know what anthropometric criteria should be applied during the first 6-12 months of life to identify the small child that you and Drs. Martorell and Rohde have referred to?

DR. WATERLOW: That is impossible to answer. How appropriate are criteria? All we can do is work according to results. What an ordinary person does, I think, in looking after children is say that, if they are at a particular weight at a particular age, they are pretty healthy and, if they are beginning to fall below that, they are not. This attempt to define quantitative cutoffs, granted that we have to have growth charts and references, is not terribly useful.

UNIDENTIFIED SPEAKER: I would like to return to nutritional science. As you said, we are in a state of transition in nutritional science. Much of nutritional research is retreating or being partitioned among the basic sciences these days, and room for nutrition itself in the laboratory is disappearing.

At the same time, advances in genetics might entirely change the way we view requirements within the next 10-20 years. I suspect that the role of nutritionists will change, and even the name. I am concerned that the baby not be thrown out with the bathwater in all this--that the multidisciplinary focus on human beings be maintained in this process.

With regard to your recommendation that more institutes of higher education and nutrition be set up in developing countries, I am worried about the degree to which people are willing to invest in such institutions. If they are unwilling to send students to industrialized countries to study science and to pay for a full course of study--not just 3 or 6 months, but the full 5 years that it takes to bring people to the expertise expected of scientists here--we are going to be fostering a form of international apartheid where we have different standards. We have a misleading separate-but-equal concept of what institutions will do overseas. Do you see that as a concern as to the amount that should be invested in these institutions?

DR. WATERLOW: Thank you for your comment about nutritional science in general. As far as the institutions are concerned, I was not suggesting that vast numbers of completely new institutions be established. My own work has always been in a special institute within a university and medical school. Universities and medical schools need to be strengthened. My attitude has been that people from developed countries have the responsibility to help to develop the intellectual potential of people in the developing countries. I do not accept that there are necessarily going to be first- and second-class citizens. In Jamaica, we have a master of science course in nutrition that is recognized as being good as any. There is no reason for the situation to be otherwise--and it is not--for courses in India and other parts of the world. I think that it is a colonialist point of view to say that it is bound to be worse because it is there, rather than here.

NUTRITION IN DEVELOPING COUNTRIES AND THE ROLE OF INTERNATIONAL AGENCIES: IN SEARCH OF A VISION

Lincoln C. Chen

INTRODUCTION

Before I address the subject of the role of international agencies in helping to solve nutrition problems in developing countries, I would like to offer a few words about terminology. By the term "international nutrition," I mean the major problem of contemporary humankind: the deprivation of essential nutrients in a world of plenty among disadvantaged peoples, mostly in low-income countries. Our focus is directly on the nutrition-health-food consumption triad, which complements broader concerns related to food production, income generation, and socioeconomic development. My assigned topic does not lend itself to intellectual abstractions. Rather, I have chosen to deal with the subject in the role of an advocate, drawing broadly from my experience in Bangladesh and India.

There is enormous diversity among agencies working in international nutrition. Muscat (1983) and Berg and Austin (1984) have recently reviewed the work of many of these agencies. Broadly speaking, these may be classified as multilateral intergovernmental, bilateral governmental, and private. The United Nations family of technical and donor agencies are the most prominent of the multilateral intergovernmental agencies. Among these, I have counted at least 19 that undertake nutrition-related. The most significant United Nations agencies are the World Health Organization (WHO), United Nations International Children's Emergency Fund (UNICEF), Food and Agriculture Organization (FAO), United Nations University, United Nations Development Program, and World Food Programme. Some multilateral agencies deal primarily in financial resource transfer, including the World Bank (International Development Agency and International Bank for Reconstruction and Development), International Foundation for Agricultural Development, and one or two regional banks that are showing early interest. Not entirely insignificant (although disclaiming a nutritional mandate) is the International Monetary Fund (IMF), which has played a critical role in

recent macroeconomic adjustments. Multilateral approaches have also been highly successful in nurturing research. In food and agriculture, the Consultative Group on International Agricultural Research consortium supports 11 international research centers, including the fine work of the International Food Policy Research Institute. In the health-nutrition field, the International Center for Diarrheal Disease Research in Bangladesh and the Institute of Nutrition of Central America and Panama in Guatemala have made useful research contributions.

Bilateral agencies are equally diverse, involving the foreign assistance arms of many governments. At least 10 bilateral agencies fund nutrition programs. (Bilateral donors include the United States, United Kingdom, Canada, Australia, Denmark, Norway, Sweden, West Germany, Italy, Netherlands, and Japan.) They often work closely with or through their national technical organizations. In the United States, the U.S. Department of Agriculture, the National Institutes of Health, and the Centers for Disease Control have worked closely with the Agency for International Development; and the Committee on International Nutrition Programs of the National Research Council's Food and Nutrition Board has helped to consolidate the knowledge base of many nutrition issues in developing countries. Finally, several governments have created privately structured research funding agencies--the Swedish Agency for Research Cooperation with Developing Countries, the International Development Research Centre of Canada, and the Australian Development Assistance Bureau.

The work of these public agencies is joined by the private efforts of foundations, international voluntary agencies, and universities. The major private American foundations are Ford, Rockefeller, and Carnegie; several new foundations are emerging in Europe, Japan, and the United States. The most visible international voluntary agencies are CARE, Catholic Relief Services, and Oxfam.

All public and private organizations work and interact with the research and training services of universities, particularly in the nutrition-related fields of public health, agriculture, economics, and management. The universities, in both developed and developing countries, are highly diverse and have various degrees of interest in international nutrition.

The primary coordination mechanism for nutrition is the Administrative Committee on Coordination's Subcommittee on Nutrition of the United Nations. The Subcommittee on Nutrition is supported by an independent Advisory Group in Nutrition and has as constituent members almost all relevant multilateral and bilateral governmental agencies. The Subcommittee on Nutrition has performed some useful coordination and advocacy functions in recent years, including the commissioning of a series of state-of-the-art reviews.

FUTURE CHALLENGES

The remainder of the 1980s and the 1990s will surely present daunting nutritional challenges to the international community. That hunger and malnutrition will persist is certain; however, the magnitude, character, and trend over time are uncertain. These will be shaped by at least four basic forces:

- International economics. For most developing countries, particularly in sub-Saharan Africa and Latin America, the most optimistic economic scenarios project slow, stagnant, or even negative economic growth well into the 1990s (World Bank, 1985). Many developing countries--already handicapped by the vestiges of colonialism, including underdevelopment of physical assets, institutional infrastructure, and human resources--face a hostile international economic environment marked by heavy international indebtedness, adverse prices for primary products, protectionism within developed countries, and reduction in concessional development assistance. The nutritional and welfare impact of the crisis is being exacerbated by pressure from organizations dominated by developed countries, such as the IMF and private banks, to undertake structural adjustments to achieve short-term balance-of-payment equilibrium (Jolly and Cornia, 1984). Such macroeconomic adjustment policies have invariably involved currency devaluation, inflationary pressures, unemployment, wage reductions, and cutbacks in government social services, including the withdrawal of food subsidies. These short-term adjustments are being pursued

with inadequate consideration of their impact among the poor and disadvantaged, who would likely shoulder the burden disproportionately.

- Technological change. A host of modern technologies of consequence to nutrition are likely to come on stream in the remainder of this century. Recent experiences in agriculture and health suggest that the effects of technologic transformation can be mixed. The green revolution in agriculture has enabled substantial food production increases but these have been limited to well-endowed, resource-rich farms. National food self-sufficiency has been attained in some Asian countries. The employment and distributive effects of agricultural modernization have been mixed and have not made sufficient impact on poverty and malnutrition (Sen, 1982). There is great excitement over the potential of medical technologies. Wide-scale dissemination and adoption of simple, cost-effective technologies, such as oral rehydration for diarrhea and basic immunizations for common childhood infections, could dramatically promote child survival, including improved nutrition. However, technological campaigns focused on single problems without balance (e.g., birth spacing, behavioral and environmental improvements, and building capacity of a stable, effective service infrastructure) could lead to the paradox of improved child survival with increased malnutrition.

- Agricultural extension and health care organizations. The impact of these technologies ultimately will depend on the capacity of agricultural extension and health care systems in developing countries to ensure access to and use of new technologies. The organization of health care, for example, has demonstrated both passive acceptance of western models and indigenous creativity. The western model of hospital care, medical professionalism, curative-biased technologies, and fee-for-service private systems all have been transplanted successfully to the developing world. Highly creative indigenous organizational forms, however, have also evolved, such as the Chinese barefoot doctors, low-cost and simplified delivery systems for illiterate populations, and the use of mass media and social marketing for dissemination of health technologies.

Through it all, two basic processes predominate. The first is the bureaucratization of health, i.e., the establishment of very large, state-funded, state-operated health systems dominated by technical-bureaucratic functionaries. In these systems, bureaucratic imperatives dominate, and a major task is to develop support and incentive structures to promote health outputs that meet the objectives of the system. The second, equally powerful, is the commercialization of health. Except in some strictly socialist countries, there has been enormous growth of the private, fee-for-service systems--doctors, pharmacies, and indigenous systems. But, as in rich countries, the commercially driven systems do not address health problems or venture into communities in which profit is low. Thus, a major challenge is how to shape both the bureaucratically dominated public sector and the profit-seeking private sector to optimize the health of all people, rich and poor alike.

- Domestic development. Another significant trend is rapid socioeconomic change in many developing countries. The spread and penetration of private markets, rapid urbanization, and an emerging middle class in many developing countries are being accompanied by shifts in life style and dietary patterns (Latham, 1984). Traditional diets--often based on coarse, less-expensive cereals (sorghum and millets)--are being forsaken by middle-class consumers oriented toward more refined and expensive cereals (wheat and rice). The shift of land use from subsistence food production to cash crops, the increased penetration of markets into rural food exchange systems, and greater dependence on wage employment all will exert important nutritional effects. Many urban centers contain a growing pool of unskilled poor working in an informal economy. Among these disadvantaged groups, female-headed households are increasing, and there is the likelihood of a continuing decline in breast-feeding. Many developing countries will witness polarization between a growing middle class with dietary affluence and the disadvantaged rural poor, whose productive land assets are inadequate to generate balanced traditional diets, or the urban poor, who lack the stable wage employment that would permit them to purchase adequate diets in the marketplace.

The worst-off region undoubtedly will be the low-income countries of sub-Saharan Africa. Coping simultaneously with rapid population growth (2.7%), decreasing per capita food production (where 70% of the labor force depends on agriculture), and stagnant overall economic growth, these countries face awesome nutritional prospects. Agricultural production, because it depends on diverse environments, requires as yet undeveloped technologies and land management systems. Moreover, inappropriate price policies have operated as disincentives to primary food producers. The health infrastructure is weak or nonexistent. These long-term problems are exacerbated by political instability and environmental-climatic disasters that generate large refugee movements.

In the Near East and North Africa, the nutritional picture is decidedly more mixed and too varied for generalization. Several high-income oil-exporting countries have major nutritional problems, owing to weak social development--e.g., in women's education, roles, and work. This social backwardness is compounded by the weakness of health services.

The most successful developing countries in the last decade have been those of Southeast Asia with fast-growing economies. These countries have been blessed with economic vigor, the accumulation of strong human and institutional resources, good agricultural and health research and extension systems, favorable food production environments, and strong transport and physical infrastructure. Southeast Asia, however, continues to experience rapid urbanization, which leads to commercialization of the food economy with its attendant hazards, including the decline of breast-feeding. Furthermore, as much labor-intensive manufacturing has shifted to these countries, the formal and informal urban sector has grown correspondingly, drawing unskilled women into the workforce; and that has had major consequences for family nutrition.

Malnutrition is much more intractable in South Asia, where three large countries--India, Pakistan, and Bangladesh--are burdened by mass absolute poverty. Impoverishment and landlessness in these primarily agrarian economies have not decreased. Aggregate food production has increased steadily and, if food were

distributed equitably, would be sufficient to feed the populations. Food production, however, has come from resource-rich regions, and the gains in food production have not been translated into effective purchasing power to enable the poor to command adequate diets. Rural poverty and malnutrition in South Asia therefore has become disconnected from food production and agricultural modernization.

Latin American economies are more advanced than those of Asia or Africa. However, the international economic crisis has profoundly affected virtually all Latin American countries, precipitating severe economic adjustments that undoubtedly will have profound effects on the poor (Jolly and Cornia, 1984). Because most of the population depends on market economies in urban centers, the employment and wage effects of economic policy adjustments can be expected to affect the welfare of disadvantaged subgroups of the population directly.

EVOLUTION OF THE FIELD

How well will the international nutrition community respond to these challenges? The health of any field is characterized by fresh ideas, learning, and the evolution of new approaches to problems. International nutrition is no exception and has accomplished much in the last several decades (Berg and Austin, 1984). An early biological phase contributed remarkable scientific advances in the understanding of the role of vitamins and minerals in human nutrition. In the 1960s, food production and the "protein gap" dominated the agenda. Food production was perceived to be the major problem, and protein inadequacy the key to the crisis. The approaches were thus often technical, such as the development of high-yielding varieties of cereal grains, single-cell proteins, fish-protein concentrate, and amino acid fortification.

By the early 1970s, recognition of the complexity of the determinants of malnutrition fueled support for a holistic approach that recognized the multiplicity of causation and recommended complementary interventions. This phase, called "integrated nutrition planning," ultimately foundered because, although conceptually

valid, it was impractical and incompatible with the focused application of limited resources and the administrative alignment of organizations.

Throughout the 1970s, the integration of nutrition into several key development sectors (such as health and agriculture) took hold firmly. The "health for all by the year 2000," primary health care, and UNICEF GOBI-FFF* movements gave impetus to the dissemination of simple, cost-effective health and nutrition technologies (Nutrition in Primary Health Care, 1984). Integration of nutrition into the agriculture and food sectors was slower, but productive. Earlier agricultural research to improve the protein content of cereals through genetic breeding was disappointing and perhaps misdirected. By the late 1970s, however, sophisticated methods for food policy analysis provided intellectually powerful tools to consider the impact of food price policies and marketing systems on food consumption in disadvantaged populations (Timmer, 1985).

By the end of the 1970s, concern over the protein gap had faded, and energy deficiency commanded center stage. It had become apparent that global food resources, if distributed equitably, would be sufficient to feed the world's people. Sociopolitical dimensions of the nutrition problem thus gained ground (Harriss and Payne, 1984). The political perspective was reinforced by the dramatic nutritional strides made in some socialist countries. By the 1980s, however, the picture was decidedly more mixed. Some country assessments might have been overly optimistic (such as China); others, burdened by economic stagnation, were forsaking distributive objectives for market-oriented economic growth strategies (such as Sri Lanka); and still others across the political spectrum were showing remarkable rates of economic growth and nutritional improvement (such as Cuba, South Korea, Chile, and Costa Rica) (Scrimshaw, 1985).

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*GOBI-FFF is the abbreviation for the combination of growth monitoring, oral rehydration, breast-feeding, immunization, family-planning, food, and female education, which have been promulgated as inexpensive community-based strategies for primary health care.

CRISIS

The past can inform and guide the future, but cannot ensure it. International nutrition is in an "identity crisis." In my opinion, the crisis stems from three factors.

First, the malnutrition problem is vast and tenacious. Progress in combating it has been slow.

Second, the identity crisis has organizational origins. The United Nations has specialized agencies--and thus constituencies--for agriculture, food, health, children, population, education, culture, trade, finance, environment, labor, refugees--but none for nutrition. Nutrition in WHO has been accorded low visibility and organizational status (Muscat, 1983). In FAO, although nutrition has divisional status, it is considered a minor subject. Malnutrition among children is high on UNICEF's agenda, but the nutritional components of the GOBI-FFF campaign have fared less well than health technologies. Nutrition funding constitutes only about 1% of United Nations Development Program and World Bank commitments (World Bank, 1984). Because the problem is complex and involves many actors, nutrition has been subsumed organizationally under other rubrics. Nutrition suffers from the adage: "Everybody's business is nobody's business."

The third source of the crisis is intellectual. Nutrition does not command the excitement of the research frontiers in the "new biology," nor does it compete in global significance with international economic relations. In many academic centers, nutritional interests have declined, owing in part to funding cutbacks. After decades of good work, the nutrition community can no longer agree even on the magnitude of the global problem (Food and Agriculture Organization, 1977; Reutlinger and Selowsky, 1976). Estimates of the world's malnourished range from 350 to 1,200 million. Controversy surrounds the food intake necessary to satisfy minimal requirements. Some have even argued that there is no such thing as a "safe allowance." There is also debate over the use of physical growth as a measure of malnutrition. With the knowledge base fundamentally so unstable, the nutrition community appears to be rudderless and to have little to offer in furthering understanding or problem-solving.

LESSONS LEARNED

The search for a future vision should begin with a reaffirmation of the lessons learned by the nutrition community over the last several decades. These lessons could form the first step toward an honest appraisal of needs and opportunities leading to an articulation of a future vision. What are these lessons around which broad-based consensus can be mobilized?

PROBLEM CLUSTER

The character of the malnutrition problem in developing countries is clear. The primary deficiencies are those of protein and energy, vitamin A, iron, and iodine. Malnutrition is not a single problem, but rather a cluster, or a system, of related problems. The cluster is highly heterogeneous in developing countries and displays enormous diversity. Definitional ambiguities notwithstanding, the numbers affected by protein-energy malnutrition are very large indeed (350 - 1,200 million). More modest, but nevertheless significant, are iron-deficiency anemia (350 million), vitamin A blindness (6 million), and iodine-deficiency goiter (150 million) (Latham, 1984). These deficiencies, particularly protein-energy deficiency, are inextricably linked to poverty (Jolly and Cornia, 1984; Reutlinger and Selowsky, 1976; Sen, 1982). Like poverty, malnutrition is a tenacious problem deeply influenced by income, employment, productive assets, wages and prices, human behavior, and health. The long-term solution to protein-energy malnutrition is thus linked to the eradication of poverty. Extensive program experience, however, has demonstrated that nutritional advances can be made within existing economic constraints and that nutrition programs indeed are important components of efforts to alleviate poverty (Berg and Austin, 1984).

MULTIPLE DETERMINANTS

The causes of malnutrition are multiple, and approaches toward its solution must be flexible and locally adaptive. Multidimensional complexity, however, can overwhelm feasibility and practicality (Berg and

Austin, 1984). Thus, the multidimensional nature of malnutrition should be observed in introducing nutrition as a dependent variable into a range of sectoral activities. Such integration, however, should be undertaken only if diffusion and ambiguity are minimized. Effective program translation must build on political, organizational, and disciplinary realities. The solution to malnutrition does not have a single answer; the nutrition community should avoid false promises or unrealistic expectations.

POLITICAL ECONOMY

Malnutrition does not recognize political boundaries. It is primarily a product of the process of social exploitation and discrimination. A necessary condition for the elimination of protein-energy malnutrition is improvement in the distribution of effective demand for food (Harriss and Payne, 1984). Such distribution of food entitlements have been achieved across the political spectrum. Radical political solutions, although intellectually satisfying, are not sufficient in themselves, even if necessary in some political settings.

INTERVENTIONS

Experience over the last 2 decades has conclusively demonstrated that malnutrition can be dramatically reduced, if not eliminated. In a variety of countries across the political spectrum, the problem has been solved--in Chile, Cuba, China, Costa Rica, South Korea, Sri Lanka, and a few countries of the Caribbean. These positive experiences and their lessons need to be analyzed and widely disseminated. Among the common characteristics are political and resource commitments to equitable forms of development, including investments in nutrition services.

There are also enormous opportunities for integrating nutrition into primary health care and food policy analysis. Primary health care is a feasible, cost-effective vehicle for the delivery of basic nutritional services (Nutrition in Primary Health Care, 1984). The nutritional components of primary health care are well

recognized: breast-feeding, growth monitoring, oral rehydration, immunization, nutrition education, food and micronutrient supplementation, and treatment and rehabilitation of the severely malnourished. Indeed, the wide dissemination of several key health technologies (such as oral rehydration and measles immunization) could generate enormous nutritional benefits. Similarly, nutrition can be improved through consumption-oriented macroeconomic policies in the food and agricultural sectors (Timmer, 1985). Food policy analysis affecting prices and marketing provides greater specificity to and thus increases the power of broader socioeconomic development policies.

Particularly responsive to intervention are micronutrient (iron, vitamin A, and iodine) deficiencies. These are also linked to poverty, but they are highly responsive to targeted technical intervention. Iron and iodine fortification of salt, vitamin A fortification of sugar, and the mass distribution of vitamin A supplements are feasible and highly cost-effective.

KNOWLEDGE GAPS

Despite much research and experience, major knowledge gaps remain. The field today lacks strong, sustained human and institutional capacity to address major policy and operational issues. How are international economic adjustments and malnutrition linked? How can these policies adapt to short-term fiscal austerity while protecting nutritional status in the disadvantaged? What are the cost structures and impact of nutrition delivery systems? How can these public systems be improved through better matching of individual incentives with overall program objectives? How should limited nutritional resources be targeted to prevent severe, moderate, and mild cases? Is nutrition behavior rational from the health vantage point, and what is the role of nutrition education? These questions need to be answered according to specific people, times, and places. The problems and solutions are likely to differ between regions. Thus, filling these knowledge gaps requires investments in building human and institutional capacities in developing countries.

IN SEARCH OF A VISION

Today, more than ever before, the international nutrition community needs to think anew about how it will address the fundamental challenge of malnutrition. It should consider program clarity and effectiveness, mobilization of resources, and international agency actions--all parts of an articulated vision for the future.

PROGRAM CLARITY AND EFFECTIVENESS

In the past, the nutrition field has been overwhelmed and bogged down in extraordinary complexity (Berg and Austin, 1984). Yet it has been demonstrated that simple, practical, and cost-effective actions can make a difference. These actions need to be articulated and disseminated with clarity, conviction, and confidence. Relevant here are the recent initiatives in health technology promulgated by UNICEF and WHO. Mass programs based on dissemination of oral rehydration and immunization have gained enormous public, congressional, and international agency support.

Cost-effective actions along several fronts are feasible. Elimination of iron, vitamin A, and iodine deficiency globally is feasible technically and financially. The nutritional components of primary health care are well recognized and can be implemented. Nutrition is a critical component of recent international initiatives in the mass dissemination of oral rehydration therapy and basic immunizations. We are increasing our capacity to apply the tools of food policy analysis to ensure that access of the poor to food is considered within food production, price, and marketing strategies. In all such endeavors, we need to set priorities and simplify the inherently complex nature of malnutrition to develop feasible organizational structures for effective operations at the field level.

RESOURCES

Most of the resources necessary for combating malnutrition must come from within the developing

countries themselves. Given the current international economic climate, however, developing countries require more financial resource transfers under concessional terms. Development assistance continues to represent a major share of flexible, investable resources for problem-solving. A major question, therefore, is how to increase concessional assistance, particularly that directed at alleviation of poverty and malnutrition.

The Task Force on Concessional Assistance of the Development Committee (an interministerial committee of 18 World Bank and IMF member governments of developed and developing countries) recently concluded that foreign assistance is likely to grow at 2% per year in real terms for the remainder of the 1980s--a decline from the 4% during the 1970s (Development Committee, Task Force on Concessional Flows, 1985). The explanations for this decline in the growth rate of foreign development assistance are complex. The task force failed to find any evidence of the "aid fatigue" syndrome. With few exceptions, the public in developed countries is not hostile to foreign assistance, and the alleviation of poverty and hunger commands much stronger support than other development investments. In a 1982 poll commissioned by the Chicago Council on Foreign Relations, 60% of the respondents said that they viewed "combating world hunger" as a "very important" objective of the United States (Eberstadt, 1981). Only 5% felt that it was "not important." Combating world hunger was far ahead of "protecting American business abroad," "ensuring our Allies' security," or even "matching Soviet military strength."

The task force noted that the volume and allocation of foreign assistance depend on a dynamic process between the general public, the legislature, the executive branch, and special-interest groups. Within the range of public support, there is far more scope than heretofore appreciated for creative leadership by the executive or legislative arms of government in response to public initiative.

Nor does political conservatism in developed countries explain the situation. Conservative politics might have dampened the growth of concessional assistance, might have shifted the pendulum away from the "basic needs" approach to development, and certainly has

singled out some activities (e.g., population) for critical review. Interest in addressing global hunger and malnutrition, however, commands wide support across the political spectrum (Eberstadt, 1981, 1985). In fact, many consider hunger and malnutrition as legitimate claimants for subsidized concessional transfers, as opposed to other development investments under pressure to obtain capital from private commercial sources.

How, then, do we explain the sense of dwindling support for international assistance, including nutrition programs? In part, the problem results from the increasing isolation of the international nutrition community from its public and special-interest constituencies. International agencies have both developing-country and developed-country constituencies. But many agencies have become increasingly isolated from the public and parallel interest groups in both developing and developed countries, such as voluntary agencies, religious bodies, universities, and business. Many agencies have also become disconnected from the acute food crisis, which commands much public attention and support. The outpouring of public support for addressing the sub-Saharan famine underscores this phenomenon, and international agencies need to find ways of linking attention-capturing short-term disasters to longer-term nutritional efforts.

INTERNATIONAL AGENCIES

International agencies face a dual challenge. On the one side, the mobilization of political and financial support from advanced countries requires a clear articulation of nutritional needs and practical, feasible, flexible actions. On the developing-country side, the agencies need to play a facilitating role to enable developing countries to apply knowledge and resources to their problems in a flexible and locally adaptive manner.

The role of international agencies in this linkage process can be enlarged first through an honest assessment of their strengths and weaknesses. The World Bank recently reviewed its nutrition lending program and concluded that the bank appears to be particularly strong in project development, sectoral analysis, and the planning and management of large-scale projects (World Bank, 1984). It explicitly recognizes organizational

weaknesses in undertaking innovative pilot demonstrations, support of nongovernmental initiatives, food aid, and acute emergencies. Similar internal assessments by other agencies would be useful. Although most reports dealing with the United Nations call for more "coordination" (Muscat, 1983), the problems of coordination in the United Nations system are endemic, not peculiar to nutrition. Coordination should be promoted, but the need is not for more coordination, but rather for leadership. Any of the key international agencies could, if it wished, exert such leadership. Coordination becomes problematic only if there is much activity, and occasionally conflict within a system.

Progress will depend on strong people and institutions, particularly within developing countries--an obvious fact that has been insufficiently recognized in nutrition. Among the actions that should be considered are the following:

- An information dissemination and documentation center could play an advocacy role and could link the nutritional concerns of the public, universities, and voluntary agencies with international agencies. The center could also disseminate and analyze experiences that have demonstrated effectiveness in meeting nutritional problems.
- A nutrition project development facility is needed to train professionals in the design and management of nutrition projects. If properly used, international resources that are already available could be applied at increased levels to the investment in nutrition with far greater effectiveness.
- Intellectual resources need nurturing in both developing and developed countries. Building capacities in developing countries for food policy analysis and health and nutrition policy and management would strengthen the underpinning of the field as a whole. Universities are particularly relevant in this regard.
- The special program approach has been highly successful in promoting public attention, the participation of the scientific-technical community, organizational visibility, and financial resources. A special nutrition program launched by international agencies should be considered.

- Finally, an international funding consortium should be considered to provide sustained, systematic support for international nutrition research (Mitra, 1982). In agriculture, the Consultative Group on International Agricultural Research has been highly successful, and a similar consortium for international health and nutrition has been discussed, but has yet to crystallize. Bureaucratic and territorial instincts should be set aside in preference to the pooling of resources to support a global and long-term attack on malnutrition.

CONCLUSION

Program clarity and effectiveness, resource mobilization, and specific actions by international agencies would all be components of a vision--with moral force--to underscore an international commitment to the elimination of malnutrition. The World Food Conference in 1974 concluded with the mandate that within a decade "no child should go to bed hungry." Today, more children than ever are hungry. At the threshold of the twenty-first century, we will look back on the twentieth century as one marked by remarkable advances in science and technology. Modern science has brought unprecedented affluence (and hazards) to much of humankind, including the capacity to produce sufficient food for all the world's people. Can the promise be fulfilled?

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DISCUSSION OF DR. CHEN'S PAPER

DR. McGUIRE: Many people have concluded that the hunger problem is due to political factors and governments themselves, including the U.S. government and its foreign aid policies. In many ways, these policies do not reflect the kinds of poll results you cited. How do you think individuals in developed countries can help individuals in developing countries, given that working through governments or international organizations is often ineffective? Because the World Bank and other United Nations organizations all work through governments, the individual initiative is stifled.

DR. CHEN: If one looks at international nutrition and developing communities, one sees that too much activity has been taken over by government and government agencies, and this has acted as a funnel for communication between developed and developing countries and among developing countries.

More participation by the public is needed, including a variety of different sectors and including voluntary agencies and universities. It is a shame that the natural spirit of collegiality and professionalism among universities is not being adequately promoted. In a

broader historical perspective, we should recognize that many developing countries are going through a postcolonial period. Governments in developing countries often do not feel confident in their own rule, and that accounts for turmoil. Many government activities strengthen government's hand, and I think there is a need for sympathy and understanding. But international agencies and government bodies need to promote more independent, nongovernmental interactions as well.

DR. GASSER: Would you care to comment on the role of multinational businesses in the development process, especially as it relates to nutrition?

DR. CHEN: I have spent 12 of the last 15 years in Bangladesh and India. The role of multinational businesses in both countries is very small, compared with that in other countries, particularly in Southeast Asia, Latin America, and probably parts of Africa. Multinational businesses seem to play a very important role, some of it adverse. However, I was asked to talk about the international agencies in particular.

DR. ALLEYNE: I listened with interest to your comments about the multiplicity of international agencies and their different agendas and proposals. One of the things that often concerns us is the capacity of developing countries to cope with these so-called international agencies. You did not address mechanisms for strengthening the national capacity to bring order out of the chaos that many international agencies bring.

DR. CHEN: I agree with your comment. I think I addressed the need to develop capacities within developing countries. One of the most important roles of advanced education in developed countries is not necessarily the accumulation of knowledge but the confidence acquired by those who have been exposed to advanced societies and who then take roles in developing countries so that they can cope with the outside interests in their countries. This is important, because the interactions are multiple and confidence in dealing with them is much needed. There might be a role here for the institutions of developed countries.

II INVITED COMMENTS

INVITED COMMENTS

ABRAHAM HORWITZ

If the ideas discussed here are not translated into policies and programs, they will fall into a vacuum and be replaced by other ideas, which will be worse or perhaps better. As I consider the papers presented here and think about what has been said in the discussions, I believe we need to consider how all this can be translated into clear-cut policies and programs. This will be difficult, especially in view of the obstacles that some governments present with regard to the problem of malnutrition, but we must pursue it and we must look also at the fundamental role of international agencies.

Both governments and international agencies have a key role in nutrition policies and programs. Recognizing the weaknesses of governments, we must help them to identify the major issues, to recognize available and potential resources, and to bring the resources together into clear-cut objectives and programs. Governments also have a role in coordinating international efforts, rather than in being coordinated by them.

To begin to give some thought to the implications of what has been said here, we will first hear comments from several panelists.

SOL CHAFKIN

In a Latin American country, I once asked the leader of an important labor union, "What is the objective of the union?" He said, "Mass, mass, mass." In a sense, this has characterized demands by both the health and nutrition communities for more of this, more of that, and more of the other thing. Health and nutrition problems have been perceived as solvable "if only we could get more." It is going to be necessary to redeploy, redeploy, redeploy the available resources to achieve a particular objective. This is not necessarily because of today's political configurations; I think it is going to be the wave of the future beyond the year 2000.

In the issues identified thus far, there was some star-gazing, although perhaps not as much as I would have liked. With two or three exceptions, the issues are the same as those I remember from the 1970s. At the World

Food Conference in 1974, many of the same issues were highlighted; however, the two or three issues that were not are highly significant. In economic development, especially as practiced by national governments and international agencies, it used to be that, when all else failed, you started a bank, and if the bank failed, you started another bank. A parallel in nutrition has emerged since the 1970s: if all else fails, you start a project, and if the project fails, you start four more. This is very important and wise, because you have to do something to create constituencies. If you are lucky, perhaps the fourth of the four projects will work. In this way, it is possible to move forward. Another significant factor is the invention, by the leadership of WHO, UNICEF, and others, of GOBI-FFF. It is a striking invention and a striking demonstration that strong leadership can cause specific problems to receive specific attention. Something different in both nature and degree has happened as a result of initiatives that were not present, as I recall, in the 1970s.

The second difference between the issues in the 1980s and 1990s and those in the 1970s is that in the 1980s, as Dr. Waterlow has noted, the concept of standard nutritional requirements has been challenged. I have taken that challenge seriously, because in essence it says, "markedly low food energy intakes seem to allow normal activity" and people can lead healthy lives. The implication is profound. If we have seen this, and we do not have evidence of impairments, we might not have looked hard enough. However, if there are no impairments, then there is an interesting status quo and a great opportunity for benign neglect. The argument implies that, if you can do normal activities with low caloric intake, then the nutrition problem is diminished. The prevalence of malnutrition in developing countries is anywhere from 5% (probably less than 10%) of, say, 340 million or 1 billion, and it is important and must be dealt with.

The key problem that I see with this is that our interpretation of "normal" in this kind of situation is status quo--that is, you are where you are. If, however, you are interested in development, in what Dr. Mahler called socially and economically productive lives, you are certainly not there. I suggest that the development

process, in the smallest units of society--the household or community, for instance--requires abnormal activity, and that abnormal activity can represent an expenditure of energy that changes the markedly low food energy intakes.

It might be necessary to prime the energy pump to accomplish all those difficult, time-consuming, painful tasks that communities have to experience to organize themselves, such as negotiating with Dr. Mahler or his lieutenants or the local government or digging the well. Presumably, these tasks will be undertaken after spending a great deal of time digging in very rough soil and carrying very large loads. At the end of the day, typical development schemes call for recipients to attend a community meeting to organize a project.

The third significant difference that I observed is also in Dr. Mahler's field, primary health care. I view primary health care as a mechanism for organizing a community. We are, I hope, long past the romanticizing of the words "community participation," which Dr. Waterlow noted as one of the fashionable rallying cries that appear from time to time. Initiatives or opportunities for development are needed for communities to act on those opportunities. Otherwise, they will have to invent those opportunities. The communities represent, as Dr. Mahler said, a pool of energy. The pool might be small and ingenuity might exceed energy; but, without this energy, we are going to be stuck with bureaucracies of the kind that people are uncomfortable with. Community organization must be incorporated; it must have a juridical personality to take on projects, borrow money, and be sued. The significance of the idea of the primary health care center is that it is a way of organizing a community; it is not the only way, but it is one way to start the process. Primary health care will not solve all the problems of development, but it will demonstrate, as I have witnessed in the United States, how a health approach or a nutrition approach can be the most effective way of organizing a community. It is an issue that you can get your arms around and do something about. Those are the three significant advances that I heard reflected in this morning's discussions.

I also noted Dr. Waterlow's passing remark that we had better have some kind of an emergency strategy.

Dr. Chen also referred to a chasm between events that lead to emergency actions--such as hunger, famine, and disaster--and the activities of the international agencies. This suggests to me that perhaps an emergency strategy can be developed that runs for 5 or 10 years and takes advantage of public support to respond to a crisis. The most astute of the nongovernmental agencies are beginning to try to convince their contributors to stay with Africa after the crisis of famine is over, but there is a need for a better articulation of what an emergency is. The Ethiopian famine emergency can be compared with what happens every day in a disaster household to a child who is at risk all the time and whose mother is at risk all the time and unable to function effectively.

There is a need for a safety net or food security or some other kind of protection that uses existing food resources, whether from overseas food aid or from local products. There are precedents for localized food reserves, but a strategy is needed to foresee and plan for emergencies of various sizes over the next 10 years that require the kind of support we are talking about.

I am suspicious of health ministries, despite Dr. Mahler's changes and fresh ways to redefine problems. I urge those who worry about food to watch their programs as they enter into collaboration with health ministries.

Finally, in examining the severe malnutrition problem that Dr. Waterlow mentioned, I have a suspicion that many of the severely malnourished are in what might be called disaster households. The mother is in trouble; she could be abandoned, sick, unemployed, too young--regardless, more than food or health care is needed. It is often a matter of a broad range of social services, of which I am also suspicious. This same problem can be seen in some places in Harlem in the United States, as well as in Latin America or India. If the food distribution center or the health center were next door, the mother would not take the sick child there, because she is simply unable to function.

RICHARD JOLLY

I want to emphasize opportunities for action, because I think many people here are in a good position to think

creatively about nutrition interventions. First (this ties in with Dr. Chafkin's comments regarding differences in nutritional realities as they exist today), there is a major difference between the malnutrition we are talking about today and the malnutrition we talked about in the 1970s and even before. Historians in the next century or perhaps even in the 1990s will have to describe at least the early part of the 1980s, and quite possibly the rest of the 1980s, as a period in which malnutrition systematically increased in most countries, whereas there was a good deal of economic progress in the 1950s, 1960s, and 1970s. Although there were fluctuations, with periods in which malnutrition increased in some countries and decreased in others, I think we will see increasing malnutrition, in many more countries in the 1980s, rather than even a leveling or a decrease. That is certainly true of Africa and most of Latin America and increasingly true in the United States, in Britain, and probably (if one had the data) in the Middle East. Asia, I think, presents a much more mixed picture; in terms of numbers of people, the situation in India and China has improved, and, because of the numbers, this is highly significant. But in terms of countries, the tendency is alarming. This ties in with Dr. Chen's point about the role of the international agencies. Not only is no international agency concerned directly with nutrition (I am not saying that we ought to have that), but we have a systemic and systematic international neglect that is actually worse than simple neglect. The net balance of international pressure on countries at the moment is to worsen nutrition, to worsen health expenditures, and so forth, and that is what we must reverse.

In the context of Dr. Chafkin's remarks, I would like to focus on five key points that have come out of this symposium.

First, underlying what every speaker said was explicit recognition of nutrition and poverty concerns as an essential objective of policy. This is in one sense trivial. In the 1970s, we were saying all that, but my point is that we have gone back. A lot of people are saying that we need to bring a concern for poverty back into development. It is not only long-term development policy we are concerned with; it is also short-term adjustments. If you talk to any minister of finance or

any political leader in most parts of Africa or Latin America or if you listen to the speeches made at the United Nations, you will hear how the problem is to survive economically in a situation of unprecedented economic pressure. In the jargon, this amounts to adjustment policy. We need to bring concern with poverty and nutrition into adjustment policy, because adjustment policies are dominating economic policy in developing countries. This leads to "adjustment with a human face," as I have written about elsewhere. When it came to the struggle of World War II in Europe and I think to some extent in the United States, the economic priority was clearly to use economic resources for the effort. There was no problem at all in incorporating human nutrition concerns into that national strategy. The result was that the nutritional status of the population in Britain and a lot of other countries at the end of World War II was better than ever before, despite the diversion of resources. There is nothing theoretically or practically contradictory about combining human concerns with tough economic realities.

Second, we need to consider bringing the human and nutrition indicators into economic policies. The nutrition field is currently dominated by GNP, balance of payments, and inflation rates. What we need are indicators, such as food balances. Admittedly, we have the statistical difficulties of defining malnutrition or severe malnutrition precisely. These were well elaborated in several of the presentations. Nevertheless, I see nothing wrong with choosing a standard related to what a country thinks is politically reasonable. If one could measure the change in relation to such a fixed standard, the deterioration that we have been talking about would be more visible. Efforts are needed to strengthen international collection of data on the human indicators and to put them alongside the GNP and the other economic indicators, to show that adjustment of development policy must be concerned with the human dimensions. Indicators of this kind would create an opportunity to bring the human dimension back to development. The international agencies have an important role in developing these data.

Third, as Dr. Waterlow and Dr. Mahler stressed, there is need for action within countries on food and health

together. Having been in development from an economic point of view for many years, only when I joined UNICEF 3 or 4 years ago did I begin to appreciate fully the health dimension of the nutrition problem. I am convinced that that was not just a weakness on my side. I have seen a systematic difficulty in the last year in getting the problem across in Africa. We have done very well in raising money for food, food in kind, food in cash.

Something like 40% of health programs and 45% of water programs were funded from emergency appeals. Donors have cross-examined recipients, saying, "Surely you are trying to slip in, in the name of an emergency, this health program or this water program, when we are really concerned with hunger." This shows the misperception that I think this particular community has a major role in correcting. People can die of thirst or die of disease as quickly, and sometimes if they are young they will actually die of hunger, more quickly, despite its visibility as a public issue.

Even last week when a friend of mine drafted a piece for USA Today on child needs in Africa, the editor struck out the health dimensions, unable to see that it was relevant to the problem of malnutrition in Africa. I agree with Dr. Mahler's phrase, "When one can get people together on the ground, the sparks will fly." This is what we need to encourage at the country level: bringing people together who can tackle their nutrition problem in a way that matches the resources and capacities of the country. I liked Dr. Waterlow's underlining of the specific actions--with respect to vitamin A, goiter, etc.--as well as the general need to tackle the poverty problem.

Fourth, the international consortia of nutrition action and support, which Dr. Chen suggested, will be important. I hope the international agencies will play their part. Of course, donors should be included, and the nongovernmental organizations have an important role, too.

Fifth, I would like to expand on the need for support for nutrition research institutions in industrial and developing countries. In particular, I point to the problems in Africa. As opposed to the situation in the 1960s and even the 1970s, there is a very large number of well-trained and competent Africans who are ready to take

the lead in this. Unfortunately, many of them are no longer in their own countries, but instead are employed by international agencies or research institutions somewhere else. Conditions in Africa have deteriorated so much that it is difficult to keep together the critical capacity of competent people with minimal resources to tackle their own problems. This is a problem that needs and deserves international support--to maintain people in their own countries who have the capability to function. In the 1960s, Makerere University in Uganda, the University of Ghana in Legon and the University of Dakar were some of the great institutions concerned with nutrition. I learned recently that the library in Legon has not received a journal since 1975. The students have not even enough paper to write on. Bringing the best people to Britain or the United States is not in the interest of tackling these problems. What is needed is to support them in their own countries with resources and in other ways. It would be a major contribution to recognize that--at a time when nutrition is worsening in the world and capacity is at best stagnant and in many parts of developing countries (particularly in Africa) actually worsening, if not almost gone--the problem is not a lack of potential or trained people, but a lack of support.

I still believe that we should not be too depressed. We have seen, beginning with the television programs on the famine in Ethiopia in October 1984, a great change in public perception and awareness. An article in Britain about Bob Geldof stated that the recent public response shows that it is not true that the younger generation does not care. The enormous support for Band-Aid there, Live-Aid here, and so forth shows a potential to be drawn on, and that potential changed government policy noticeably. Our constituency is not only governments, but also public opinion. One needs to get across to the public the importance of health and water, as well as food, but also the potential for action. This can be done and is vital. In developing countries in the last year and one-half, there have been some very important points of hope, despite all the pressures.

When political leaders become aware of what can be done, they can respond. The idea that the Third World is ruled entirely by dictators with no concern for their

people is neither true nor particularly helpful. One should not underestimate the lack of awareness of what can be done at low cost. That is the significance of what we have seen at UNICEF and at WHO. In some key components of primary health care, immunization, oral rehydration, etc., you can get across to political leaders that things can be done even in times of great constraint, and it is amazing what political leaders themselves will do to generate support and promotion. For example, a million rehydration therapy packets were distributed worldwide in 1974, and we estimate that it doubled in the last year alone and that in 1985 it will be something like 200 million. The cost of oral rehydration is low, and if there is a political appeal, I think there is a chance for it to be taken seriously if we not only promulgate the vision, but present specifics to support that vision.

PAUL LUNVEN

I want to raise one issue regarding nutrition in the 1980s and 1990s. It was mentioned by Dr. Mellor and is what I consider one of the major issues for the 1990s: the need for urbanization.

It seems that the world's food supply is winning the race against population increase. For example, average dietary energy available to all developing countries has improved as much as 10% between the mid-1970s and the early 1980s. However, this global figure should not conceal the deep inequalities in some countries and in various population groups.

The striking fact is that in the 1980s in a number of towns in developing countries, street riots were triggered by changes in food prices; this happened in Brazil, Tunisia, Morocco, Peru, and many other places according to United Nations population statistics. Between 1980 and 2000, the world urban population will rise from 31% of the total population to 44%. Much of this population is already living in large townships, shantytowns, and slums in cities. In absolute figures, this increasing percentage means that, between now and the year 2000, 500 million people will move to towns and create enormous problems for governments in ensuring food

supplies and looking at nutritional problems with respect to food quality.

When people move to the city, their dietary patterns shift drastically. They can no longer rely on food that they grow themselves. The adoption of an urban life style means that they tend to use particular quick foods and snacks that must be absorbed by the body quickly. Traveling to and from work and cooking present competing demands. Employed mothers have difficulty in breast-feeding their babies, and publicity induces them to buy processed foods with low nutritive value.

The only way to address this situation, which I believe will worsen in the coming decade, is to help food systems to adjust to the increasing demand for food, especially processed foods. This implies a number of strategies that have been mentioned here--looking at better production, marketing and distribution of food, and pricing and subsidy policies. In addition, special nutrition programs are needed for deprived urban population groups. A major task for governments and international agencies is to formulate strategies and policies that will enable the world of the 1990s to cope with this fundamental issue. As Dr. Mellor said, agricultural strategies, agrarian reform, and irrigation are needed to improve the food situation. We need to design strategies and policies to address employment and nutrition. Unfortunately, these require time, and it might already be too late. Agrarian reform to address the nutritional demands of the year 2000 cannot be implemented overnight.

III PANEL DISCUSSION

PANEL DISCUSSION

DR. WATERLOW: I would like to react to what Dr. Chafkin said about emergencies or disasters. I was not trying to say the obvious, that a strategy is needed for disasters and famines. I had in mind the more serious cases throughout the world, the most seriously deprived families, which are at greatest risk of severe malnutrition, the disaster families. The reasons for the problems of these families are different in different areas. In Jamaica, for example, it is usually some kind of family disruption, such as abandoned mothers. In one group I read about in Kenya, it was most often because the mother was unmarried--an unacceptable situation in Kenya, as opposed to the Caribbean. In Nepal, the key factor is lack of land. Although the conditions vary, everywhere one finds the 10% that are in a very bad state. That is what I was referring to in discussing an emergency strategy; I am not thinking simply of the famine situation in the Sahara.

DR. MAHLER: People have been emphasizing the developmental ideology--whether we are playing development by proxy or not. Most of us who came into development work some 35 years ago began as missionaries. The first director general of WHO told me in Delhi in 1951: "The trouble with you, Mahler, is that you have too much sympathy for those poor Indians. What you need to develop is empathy with their predicament. Then, perhaps, you can start seeing what kinds of problems they can tackle themselves." This is a very important thing in nutrition, too. I was nearly fired from WHO because in 1956 I said, "It is not a question of amino acids; it is a question of calories," and the nutrition adviser was not there.

The emphasis should be on developing the capacities of nations to solve their own problems and on developing the self-reliance to try to tackle these problems through research. There is a lot of impatience in the donor community. We provide countries in need with preconceived development packages neatly contained in envelopes--conventional envelopes. Development in my language means getting out of envelopes; that is the etymologic sense of the word "development." The development technocrats are anxious to provide new kinds of envelopes, so that they can bask in the sunshine. A

lot of our demoralization has been with those envelopes, and we will gradually have to give others the capacity, rather than looking for our own catharsis. If we let the nationals be themselves in dealing with their problems, we have every reason to believe that it can be done.

I am grateful that somebody mentioned the Tropical Disease Research Program, the World Bank, and the United Nations Development Programs, organizations that have shown that one does not have to play it by proxy, but that the first objective can be developing local capacities. The second objective is developing, as fast as possible, new solutions to old problems. This is difficult, but an absolute sine qua non in the global food and nutrition situation. There is no reason to become disillusioned, cynical, or skeptical. The rich man always has a tendency to say that the poor man should be very rational; however, coming from a poor family, I can say that it is difficult to be rational when you are poor; and this is true for a poor country, too. It is remarkably difficult to make rational decisions when you cannot afford to take any risks, because, lacking the money to learn through doing, you cannot learn.

DR. MELLOR: I will go on directly from Dr. Mahler's point, with which I agree. In economic matters, what we are fighting against is an orthodox view generated in the developed countries that systematically plays down the human element. If one wants to raise money, it is not respectable to talk about supporting food subsidies. I am pleased to say that the World Bank has just released or is about to release a document that disproves that oversimplification. A country which is economically squeezed cannot afford just any food subsidy. But well-targeted food subsidies in the urban areas, as Dr. Lunven has been stressing, are an essential component of policies that lead to high agricultural prices as a way of stimulating agricultural production in rural areas. It is a rational combination--one that was brought out earlier here. Virtually every industrial country practices this policy in one way or another. At the moment, the dominant international economic orthodoxy still focuses on how to cope with debt, how to get a country back on the right track so that it can seek financial assistance. But the international good-financial-housekeeping seal of approval is obtained by abandoning

these things. The international community has an obligation to affirm that the human dimension is not just a byproduct of the economy. It is both an end and a means for reaching the very economic solutions that people want. It is a parallel action to offset the misleading view, particularly in the last 5 years, of what good economic policy is. Leaders understand in a very basic way that you cannot starve your people to pay your debts.

DR. SAI: I would like to comment on the issue of training. A question was asked earlier about training, and I think the question was slightly off focus. It appeared that the questioner was trying to say that training could be done better in the more industrialized countries. There are technical advances for which the training needs to be done externally; however, linkages have to be made to ensure that training facilities in Africa have access to some of the technologies or the scientific expertise needed for more comprehensive training.

With respect to training, the international community has refused to listen to us for about 10 years. We have been trying to make people recognize that the training issue is going to return to haunt us when money is available for doing something; and if we do not obtain funds rapidly, we are not likely to succeed, regardless of how much money we start pouring into the field.

We are trying to develop African expertise in Africa for African work. I do not think getting a lot of international experts to concentrate on Africa will do the job. In fact, it often creates an unhealthy competition that leads to the demise of African programs. When we talk about training, the time is now. Richard Jolly has mentioned that in Ghana and elsewhere the core of trained nutritional scientists and others on which to build another training approach seems to be disappearing. If we do not move quickly, it will disappear. Re-establishing the situation could be difficult.

Finally, let me plead that it is not necessary to say that people should train practically. Doctorates and master's degrees are needed. The idea that people have to train in the subject, but not necessarily have degrees, should be buried for a while. People should

have degrees that are relevant in the specialties they are choosing. In addition to the facility that has been mentioned, we need to begin another facility immediately to start re-establishing what should be included in training for the food and nutrition problems of Africa.

DR. MELLOR: We have a series of studies at the International Food Policy Research Institute (IFPRI) on the question of improvement over time, particularly in India. The extent of improvement is striking in the lowest-income people, and we can document it, particularly in agricultural production. It is important not to stop where Lincoln Chen did, saying that we can show that there are still some problems somewhere in India, and leave the impression that the green revolution has not been so great. One must spread it to other areas; I think that Dr. Chen would agree that there is a need to extend it to the marginal areas.

As a matter of fact, much of Bihar and West Bengal do not have poor resources. They have rich resources, but are being held back by inappropriate agricultural policies. In the central plateau, where the resources are poor, yields per acre have grown considerably in 20 years. Incomes of the poorest people were lower than they were in Africa 15 years ago and have increased considerably. Although it has not done as well in these areas as in southern India, it has spread, and we need to extend it farther.

DR. CHEN: If we had this meeting in India, I think there would be a very strong polarization within the Indian community. Although there has been progress, particularly in the green revolution in the Punjab and in southern India, there are deplorable areas in Bihar, in West Bengal, in Orissa, in Madhya Pradesh and in large cities. The particular question I was addressing was whether agricultural modernization in itself leads to the reduction of poverty and improvement in nutrition. In other words, the technological transformation, as John Mellor himself has said, needs to be accompanied by employment, wages, and access to productive assets, rather than only by redistribution of programs. I believe our office supported some of the IFPRI studies in southern India. I agree with some of the findings that

you have reported from Tamil Nadu, but I was pointing out that the Indian policy-makers themselves would not agree that everything is all right and that food self-sufficiency has been achieved. On the contrary, there are very serious worries that 30 million tons of food are deteriorating in storage and that the income and consumption levels of 150-300 million people are below those required for adequate diets. We are talking about the question of balanced growth.

DR. HORWITZ: Dr. Chen, will you elaborate on two of your proposals for action--the Nutrition Project Development Facility and activities to improve information dissemination and documentation?

DR. CHEN: I was hoping that the members of the panel representing international agencies and people in the audience would carry these ideas further. I have not thought in detail about their implementation. I would note that you suggested the Nutrition Project Development Facility in an early paper.

DR. HORWITZ: The Subcommittee on Nutrition is exploring this possibility now, and we will see what comes out of that; but I agree with you. My impression is that for governments, even those which Dr. Mahler wants to be free to be themselves, the moment eventually comes when they need to present their proposals for funding. Funds are not easy to find today in the international community. Some of us have felt that it would help just to invest available resources better at the national level, let alone to seek international assistance.

DR. MAHLER: I want to make it clear that I did not say "governments"; I said "people," and there is a big difference. The United Nations system was set up for people, not for ephemeral governments. They are more or less representative of a lot of people, but it is important to remember that they were set up for the sake of people. Therefore, we have to manipulate the system whenever it is necessary, particularly if governments are not permitting us to get to where the action should be in mobilizing people themselves, in examining their needs. That is what I meant.

DR. GWATKIN: I was interested that the question of whether we are doing better or worse came only from the next-to-last commentator in our conversation. I thought that this would be fundamental in a discussion of nutrition issues for the rest of the 1980s and the 1990s.

This unresolved question of whether nutritional status is better or worse is a very persuasive argument in favor of the kind of documentation facility Dr. Chen was suggesting, and I know that there have been conversations about this within the nutrition community as well. I second his suggestion that this be given serious consideration. The need for it is brought home by a striking example. A top-priority item should be simply tracking nutritional trends--what we are doing best, what we are doing worst, what we are improving in. This would be comparable with what has traditionally been done for birth rates and death rates. It is particularly important if there is some possibility, as you suggest, that the two might start moving in different directions. I have long assumed that the two would move in similar directions. Nutrition is important in keeping mortality low. If death rates are falling, we need not be too concerned about independent nutritional measures, because we can assume that nutrition is improving. I am not prepared to abandon that assumption yet, but there is an argument that it is going the other way; that is an important reason to start collecting independent information. That is in part because of the mortality information; but, even more important, for the reason that Richard Jolly implied, this kind of information is needed if we are going to have economic progress with a human face. I would suggest that this is something that the Food and Nutrition Board might look into.

DR. MERTZ: Some 10 or 20 years ago, birth control would have been a prominent topic in a conference like this. Although most speakers have mentioned birth control or child spacing here, it was only in passing. I wonder why that is so. Have we given up on the concept?

DR. MAHLER: Dr. Mertz, I agree that perhaps it was pushed aside in the discussion, although I wanted to bring some emphasis when I spoke of maternal and child welfare, including family planning, because I speak from the health angle.

I believe that "God does not speak to an empty stomach," as Gandhi said. The food and nutrition issue is a powerful instrument to address concerns of families, their home economics, future vision, and hopes. A broad-based food and nutrition program gives a much better opportunity to address family planning and make people feel the need for child spacing and education. Food and nutrition must be used as much as possible as one of the vital points of entry to reach families in need in addressing family planning.

DR. CHEN: You are raising a very important point. In our push in health and nutrition technologies in some regions and societies, careful attention needs to be paid to the balance of technologies made available. The rapid population growth in Africa is a very serious concern. I also expressed concern about the introduction of single isolated health interventions and technologies without adequate attention to such problems as birth spacing. It is of deep concern, although in other countries it might not be as important. In some regions, I believe that it is incumbent on the scientific community to generate the knowledge and the support for a balanced technological approach.

DR. SAI: Unhappily, we are beginning to feel that the population issue is a nonissue, or at any rate an issue not subject to critical intervention in the same way as other issues. That might not be serving the cause of development. I agree with what Dr. Chen has just said, that any approach to the needs of people, especially women and children, should consider their roles in society, their educational and employment needs, and population planning. If we look at this question from the point of view of maternal and child health, anyone working in maternal and child health in Africa who omits family planning for child spacing is omitting one of the most powerful preventive medicine tools that is available today.

DR. ROGERS: Dr. Galbraith has suggested that we were trying to impose characteristics of development that were perceived from the perspective of developed countries. If I recall correctly, in the days when the United States

was a developing country and had an agricultural base, large families were very desirable. I expect, although I do not know it for a fact, that that was true in other agrarian societies as well. If we go back to the comments made earlier about the development process, we should look at it from the perspective of those countries and acknowledge that it is only with the certainty of alternative employment, and with it the certainty of a full stomach and good health, that we can even start to talk about substantial changes in fertility.

All of us are aware that rapid population growth underlies many of the problems we have been discussing here, but I viewed the absence of discussion about family planning as healthy. We want to address nutrition, maternal and child health care, and the role of women as the most basic issues. When we do that effectively, population control will come along quite well.

DR. LUNVEN: Dr. Mertz is right in saying that there is a decline in emphasis on family planning, and there are various reasons. There are doubts about its efficiency, and some governments, such as in Mexico, have been considering that increased population is desirable. The goal that the Mexican government has set is for 100 million people by the year 2000.

Conditions have changed in 10 years, and man-made and natural disasters have changed the picture. The viewpoints of governments have also changed. On the basis of the World Bank report, the African countries that met in the original conference last year produced the Harrari Declaration. In it, they agree with the World Bank's statement that, whatever the amount of external assistance provided for agricultural development in Africa, the race for economic development cannot be won if the population problem is not taken care of. It was a voluntary declaration that they would adopt population policies to limit population growth.

DR. JEFROM: I would like to address my question to either Dr. Mellor or Dr. Lunven; both spoke of urbanization or labor movement as affecting agricultural production. Having lived in both developing and developed countries, I assumed that the impact of urbanization was not as disastrous in developed countries as in developing

countries. Some planners have suggested that decentralization should be promoted in developing countries. What are the tradeoffs?

DR. MELLOR: I think the issue probably should be seen less as a matter of urban vs. rural than as a matter of the pattern of urbanization. What we have had is a megalopolis--one city that dominates the country and becomes extremely large. There has been a pattern of capital-intensive import displacement and export-led strategies of growth that has driven this pattern of urbanization.

The alternative is a much more diffuse pattern of urbanization in which market towns are developed throughout the rural regions with different towns of different sizes. This took place in much of western Europe and North America during their growth from an original agrarian base. This pattern of urbanization produces more employment than the alternative pattern, which has lower per capita costs for central services in the urban area. I think no country would want to remain primarily rural, because that would mean that the production pattern and the consumption pattern are both mostly agricultural, and there is not much variety in that. There is almost no margin for error; if bad weather strikes, food consumption has to be cut. Presumably everyone wants to diversify consumption and production, and that calls for urbanization. However, there could be a much healthier pattern of urbanization.

Investment patterns, rates of return of various programs, and so on would be different if the bulk of the urban population were in towns of 10,000 to 100,000, rather than cities of 10 million. When we start examining the mix between health and nutrition, we must think in terms of the nature of the development strategy and its effect on the pattern of urbanization.

UNIDENTIFIED SPEAKER: For about a decade, there has been a division between people whose objective is to reduce the misery of mankind and those who look for strategies for growth and simply have not produced any food or any employment.

What was not achieved by the disaffection with the growth strategies of the 1950s and the early 1960s is a

reorientation of growth in a way that creates employment, values people's health, and leads to productive lives. I am not saying that the objective is necessarily growth per se. However, if a family cannot do anything to improve its economic well-being, improving its health and nutritional status will not solve its problems. It leads to continuous dependence on handouts from UNICEF or some other organization. We need to show humanitarian audiences that there is something more than improving the physical well-being of people. People need to have some other objective and some way in which they are integrated into the society and its larger economic activities. Even given the humanitarian concern, the choices in development should be considered, and choices should be made that are related not only to the objectives, but to the instruments used to move toward the objectives.

DR. MAHLER: To prevent our darkness of today from becoming our doubt of tomorrow, we need to increase our information on food and nutrition. I claim a knowledge about some things in India, and I disagree violently with some of the statements that have been made about India. We recently returned after 25 years to 100 villages chosen at random in southern India, and there had been dramatic changes for the better. So, let us not just say blankly, "Well, nothing has been happening in India." Modernization can be shown in this random sample of 3 million in southern India. It is important to challenge ourselves to look at our information base. We need better information so that we are able to say things with greater relevance.