Editors' note: As we approach the end of the 20th century, we will, in Nutrition Reviews, take an occasional look back at developments of the last half-century that have established the underpinnings of public health nutrition as we know it and practice it today. This is also a span of time over which this journal, having begun publication in 1942, has addressed important developments in nutrition and health. Our first retrospective is contributed by Dr. José María Bengoa, one of the fathers of international public health nutrition. Dr. Bengoa, whose career has spanned more than 50 years, witnessed the origins of the international nutrition agencies and served in leadership roles at the Pan American Health Organization and the World Health Organization (WHO) from 1955 to 1964, and as director of the WHO Office of Nutrition from 1964 to 1974.

This paper reviews the birth and evolution of the international nutrition agenda. International nutrition issues of today are discussed, as are recommendations and projections for the future.

Birth of the International Nutrition Agencies

At the end of World War II, one of the most pressing international problems was the nutrition status of populations in countries and regions that had been occupied by the Nazis. There were men, women, and children barely able to move, with losses of up to 40–50% of their body weight and other symptoms of extreme famine. The scientific community reacted swiftly, and groups of experts were formed to visit the most afflicted areas. Thus, the United Nations Relief and Rehabilitation Administration (UNRRA) was born in 1944, a year before the end of the war. Leading nutrition scientists were called upon by President Franklin D. Roosevelt to organize emergency services for those suffering from starvation. UNRRA concluded its operations in 1947, when the worst was over.

UNICEF

The European experience of UNRRA was later useful when aid was organized to assist developing countries that periodically suffered from periods of starvation. UNRRA had large quantities of food left over, and as a result, a new organization was established: the United Nations Children’s Emergency Fund (UNICEF). A new scientific committee was created to develop a food distribution plan for all countries in need. Because of the high availability of skim milk, the committee suggested that it be used for children over the age of 1 year. The committee also proposed distributing whole milk to younger children and codfish liver oil as a supplement to children of all ages. The UNICEF program was well received by all countries.

UNICEF, almost always in collaboration with the World Health Organization (WHO) and the Food and Agriculture Organization of the United Nations (FAO), has had a role in the development of programs aimed at improving the nutrition status of mothers and children. When skim milk was no longer available, new products were proposed to replace it. UNICEF had an important role in the promotion and distribution of these products.

Perhaps the best-known of UNICEF’s programs is the Infant Health and Survival program. It includes four specific activities: (1) monitoring growth and development, (2) supporting oral rehydration activities, (3) promoting breastfeeding, and (4) encouraging immunizations. The premise on which this program was based is that it is important not only to save lives and decrease mortality rates, but also to take care of the several lives that are saved and the vulnerable children who live in terrible conditions.

UNICEF also led the fight against iodine deficiency and promoted many other programs. One of the most important events was the World Infancy Summit UNICEF organized in New York City in 1990, in which government leaders and scientists from the international community adopted a series of goals to protect the lives, health, and normal development of children worldwide. One objective was to reduce by half the prevalence of infant malnutrition and eliminate micronutrient deficiencies.

Unlike other specialized agencies, such as FAO and
WHO, UNICEF does not receive fixed quotas of money from governments. Instead, it relies on volunteer support. Indeed, the UNICEF staff has a high degree of social responsibility and sense of humanitarianism.

The Marriage Between Health and Agriculture: FAO

Sir John Boyd Orr, a Scottish nutrition researcher, pioneered the symbolic marriage of health and agriculture. He made the revolutionary statement that “if there isn’t enough bread for everybody, there can’t be cake for anybody.”

By 1945, the idea of joining health and agriculture had already been considered by scientists from all over the world. At the famous 1943 Conference on Food and Agriculture in the United States during World War II, the need to have the agriculture and health sectors collaborate to confront the world’s growing nutrition and agriculture problems became evident. Thus, the creation of FAO occurred in Quebec in 1945 under the initiative of the French scientist and physician Dr. André Mayer, father of Dr. Jean Mayer. The first director of FAO’s nutrition division was also a physician, Dr. W.R. Aykroyd.

Since its inception, the FAO Nutrition Division has had a large and capable group of professionals advise governments on nutrition issues. FAO’s mission is global, and it tries to address all food and nutrition challenges. But how could this holistic strategy be carried out in countries that had only one or two professionals responsible for studying, analyzing, defining, and executing strategies and evaluating national nutrition problems? Unfortunately, despite the efforts of Drs. Mayer and Aykroyd and others, the marriage between the health and agriculture sectors did not occur right away at the national level, owing to the lack of interest in nutrition displayed by the agricultural ministries. Nevertheless, the FAO Nutrition Division conducted an important series of tasks, particularly in the areas of intake surveys, school nutrition, nutrition policy, and education. The FAO Nutrition Division not only gave direct counseling to governments but also organized many regional meetings and published excellent technical reports.

World Health Organization

Three years after the creation of FAO, WHO was created in 1948. The early nutrition activities of WHO were modest. From 1948 to 1955 only one person was responsible for problems related to nutrition. The first director of the WHO Nutrition Unit was the Australian scientist Dr. F.W. Clements. His primary interest was endemic goiter, and one of WHO’s first reports focused on this topic. The second director of the WHO Nutrition Unit was Dr. J. Burges, a Scottish scientist with a strong background in public health and considerable experience in the nutrition problems of Asia, where he had lived for several years, in Kuala Lumpur, Malaysia. But a single person could have only a limited impact on the nutrition problems of the world. Although at the time, the number of independent countries was smaller owing to the existence of colonies, completing the lofty tasks and goals of this assignment was nearly impossible.

When I joined WHO in 1955, my responsibility was to travel around five continents with the goal of identifying some of the problems and offering assistance with specific preventive measures. I also assisted with human resources through WHO scholarships. Although relatively modest, this task had the benefit of showing countries that international solidarity existed.

The WHO nutrition strategy differed from that of FAO in that WHO emphasized the prevention of nutrition problems, beginning with community health centers. The objective of these preventive programs was mainly to control protein-calorie malnutrition, anemia, xerophthalmia, and endemic goiter. These actions were carried out based on previous studies of the nutrition status of populations. In the first FAO-WHO expert committee meeting in Geneva in 1949, it was stated that “FAO’s emphasis is on the production, distribution, and intake of food, while that of the WHO is on nutrition and its relationship to health maintenance and disease prevention.” The meetings of the FAO-WHO expert committees favored the marriage between health and agriculture and convened every 2 or 3 years over several decades. The technical reports that grew out of these meetings became doctrines of scientific and applied nutrition.

Kwashiorkor and the Protein Gap: International Agencies Respond to an Evolving Problem

At the first session of an FAO-WHO expert committee, in 1949, kwashiorkor was discussed and the collection of data on clinical aspects and intake patterns of affected areas was made a priority. The well-known report by Brock and Autret about kwashiorkor in Africa was published and subsequently followed by other publications.

In 1935, Cicely Williams published an article in Ghana on kwashiorkor. This article spurred several scientific meetings between 1950 and 1970 in which kwashiorkor was the main topic discussed. Years later it was learned that the meaning of this word in the local language of Ghana was “the illness of the first child when the second child is born.” According to Williams, the treatment for kwashiorkor was skim milk rich in proteins. At the time, it was believed that the main nutritional problem of the world was protein deficiency. Many international meetings had “the protein gap” as their central theme. There was not a single international food or nutrition forum in which the world protein crisis was not debated. The top scientists of these times were present when the Protein Advisory Group (PAG) was created in 1955 under the initiative of WHO.

It was for this reason that when FAO and WHO were created, one of the first tasks to which large amounts of resources and energy were dedicated, in collaboration with
UNICEF, was to search for new sources of nonconventional proteins. The top research centers in nutrition began to develop new high-protein formulas to improve protein deficiency in developing countries. The mixtures being produced, using cotton, fish, soy, millet, or corn flour as a base, were tested for acceptability, tolerance, toxicity, and so on, before their use was authorized.\(^9\)

From this vast search for new protein sources that characterized the period 1950–1970, only Mexico excluded itself. A group from the Children’s Hospital in Mexico City, headed by Federico Gomez, perceived the problem of malnutrition more from a general perspective and less from concern for the specific lack of protein. Gomez’s team asserted that the main cause of undernutrition was energy deficits rather than protein deficits, as many scientists believed.\(^10\)

In the 1970s, Donald McLaren, a British scientist working in Lebanon, also claimed that the main problem of malnutrition was calorie, rather than protein, deficiency.\(^11\) Scientists from other countries, including Chile and India, concurred. The PAG changed its name to the Energy and Protein Advisory Group, and the entire scientific community trembled.

My personal experience during those decades was to learn that the famous kwashiorkor was actually predominant in countries where the staple foods were tubers, roots, and sugar and where breast-feeding was prolonged, as in many African countries. In the countries where staple foods were cereals and breast-feeding was terminated early, kwashiorkor was infrequent, but marasmus was predominant in infants less than 1 year old.

The Three Agencies

FAO, WHO, and UNICEF have directed efforts toward several nutrition issues in addition to malnutrition, such as local food production and nutrition education\(^12\) and strengthening local government agencies, but a detailed discussion of these is beyond the scope of this paper.

In concluding this brief historical review of the actions of FAO, WHO, and UNICEF, I will list the goals set forth by these organizations and stressed at the 1992 International Conference on Nutrition in Rome.\(^13\) Participatory governments pledged to eliminate the following by the turn of the century:

- hunger and deaths caused by hunger,
- starvation and illness owing to nutritional deficiencies in communities affected by natural and human catastrophes, and
- iodine and vitamin A deficiencies, and to greatly reduce the following:
- starvation and chronic hunger,
- undernutrition, especially in children, women, and the elderly,
- other micronutrient deficiencies, including iron deficiency,
- food-related transmitted and nontransmitted diseases,
- social and other barriers to breast-feeding, and
- inappropriate sanitation and lack of hygiene.

Backup Organizations

During the 1970s, two new institutions began their activities in international nutrition: the World Bank and the United Nations University (UNU). Both entities have contributed significantly to the fight against undernutrition around the world.

The World Bank

The World Bank began its efforts in nutrition in the mid-1970s. Alan Berg, who studied nutrition problems for more than 30 years, did research in India and then in Washington, D.C., for the World Bank. His books, of which there are several, are of great significance and value to the nutrition community.\(^14\)–\(^16\)

The World Bank has stated that “Malnutrition is everybody’s concern, but it is nobody’s main responsibility.” Even if that statement sounds slightly exaggerated, many fields have had an influence, for better or worse, on nutrition.

Before joining the international nutrition scene, the World Bank evaluated its potential role in this area by asking two vital questions: Is malnutrition a development problem and, therefore, a problem that the bank should address? Are there feasible measures that can be adopted to address the problem? The bank concluded that malnutrition was a cause and consequence of underdevelopment. The central opinion of the bank was that in many countries it would be impossible to raise the per capita income in one generation sufficiently to solve the problems facing malnourished populations. Thus, there was no need to wait until a certain level of development was reached to improve the nutrition status of the populations in question.

With this belief, the bank began to finance four large projects in four countries: Brazil, Colombia, India, and Indonesia. For the bank, the results obtained were satisfactory despite the fact that serious problems existed at the beginning.

Owing to the difficulty of evaluating the impact of the programs, Berg stated that those responsible for formulating policy have three options: (1) to conclude that these programs (targeted supplementation, markets that sell products below market price [i.e., subsidies], food fortification, education) have only a moderate impact, (2) to postpone the final decision about investments in nutrition, possibly for several decades, while waiting for more precise assessment methods, or (3) to accept the commonsense conclusion that malnourished people will benefit if the means to improve their nutrition are offered. According to Berg, “The third option is the correct one.”

I agree completely. In the field of nutrition science
today we do not have to prove that drinking milk is beneficial, but we do need to ensure that children are drinking milk.

The United Nations University

The UNU’s activities in nutrition also have a pioneer, namely, Nevin Scrimshaw. His influence in the development of programs to fight hunger were decisive through the creation of nutrition research centers on five continents.

Created in 1973 by the General Assembly of the United Nations, the UNU is a relatively young institution that is based in Tokyo. Unlike regular universities, it does not have enrolled students, professorships, or a campus. The UNU is headed by a group consisting of a dean and three vice-deans who serve as an administrative council along with 24 members designated by the Secretary General of the United Nations and the General Director of UNESCO (United Nations Education, Science, and Culture Organization). Members are elected from a wide geographic area and according to several criteria. The purpose of this institution is to be an international guide in nutrition sciences, graduate education, and the dissemination of knowledge.

In 1975, approximately 20 experts from all over the world met in Tokyo to establish a work program and recommended the following areas as priorities: hunger in the world, human and social development, and utilization of natural resources.

The UNU works in conjunction with several affiliated institutions and has a network for specialized studies, such as chronic energy deficiency, iron deficiency, nutritional assessment, and food composition. The UNU journal Food and Nutrition Bulletin continues the communication role previously assumed by the PAG journal, and is an excellent mode of communication among scientists from all over the world.

The work of the UNU on “hidden hunger” is of special interest. Nevin Scrimshaw once summarized the problem as follows: “This kind of hunger is responsible for most of the mortality and morbidity that afflicts these populations and for the permanent damage in their physical capabilities and cognitive development. Latin America suffers proportionally to a lesser degree from the acute nutritional diseases than other developing regions. However, it is being greatly affected by the different forms of hidden hunger.”

The Subcommittee on Nutrition

While the specialized agencies of the United Nations (UN) were being established, various governments stressed the need for adequate coordination and cooperation among nutrition agencies. This became more evident when new institutions of the UN were incorporated. In 1947, a small group called the Subcommittee on Nutrition (SCN) was created. Its role was to coordinate and prepare technical reports and to publish semiannually the journal SCN News, an informative synopsis of work being conducted in world nutrition. SCN has performed an excellent job under the guidance of its three-term president, Dr. Abraham Horwitz, and its technical secretary, John B. Mason. Recently, Richard Jolly, UNICEF executive subdirector, was named president of SCN.

Nutrition Programs: Past and Present

Certain similarities as well as differences exist between past and present nutrition programs. For example, in almost every country indirect food subsidies have been eliminated and replaced by targeted programs aimed at poorer segments of the population. Although the former programs allowed the price of some basic food products to decline for the entire population, the latter attempts to benefit only the most needy. This change appears reasonable and possibly less expensive to implement. However, distribution mechanisms should be improved to decrease the number of links in the chain as well as corruption at various levels. In countries with relatively low poverty rates, the direct subsidy program is advisable, but in countries with higher poverty rates (up to 60–80%), the choice between these two systems should be studied further.

Supplementary nutrition programs in conjunction with nutrition education have been for decades the basis of nutrition actions taken by local health centers. Thus, these kinds of programs, referred to in some countries as compensatory programs, are not new. In fact, they are merely methods of income redistribution and should continue until improvements in employment statistics and salaries are realized.

The difference between the nutrition programs in developing countries of the past and those currently being carried out is that the newer ones have greater coverage, thanks in part to the support of the World Bank. The original programs were not poorly conceived but, rather, were carried out on too small a scale with few resources and, on occasion, as pilot tests. The World Bank provided the resources to transform humble ideas into big programs. The services or components of these “compensatory” programs can be summarized as follows:

- strengthening of institutions, including educational,
- supplementary foods to vulnerable groups,
- targeted financial assistance,
- health and nutrition services,
- nutrition education,
- treatment of anemia,
- small-scale food production,
- food technology,
- water supply and sanitation control, and
- food commercialization.

The financial support for these programs is between
tries have a larger aging population with a higher mortality risk. In conjunction with the increase in life expectancy, the general mortality rate has increased during the population.

women live 6 years longer than men in developed countries. This, in and of itself, represents a significant advance in the world’s social and nutritional problems. The worldwide mortality rate will have declined 3%, from 9.6 to 9.3 per 1000. These trends will have an enormous social impact. Although it appears contradictory, the general mortality rate has increased during the last decade in developed countries because these countries have a larger aging population with a higher mortality risk. In conjunction with the increase in life expectancy, the general mortality rate also increases, owing to an older population.

Life expectancy has increased worldwide and now stands at 66 years. It should be remembered that in 1981, the global goal for life expectancy was 50 years. Today, women live 6 years longer than men in developed countries and 3 years longer in developing countries. Average life expectancy is 77 years in developed countries and 51 years in developing countries.

In the past, a world infant mortality rate of 50 per 1000 births was considered an attainable goal. Currently the world average is 64, with rates of 120 per 1000 in less developed countries and 7 per 1000 in more developed countries. Three countries in Latin America—Chile, Costa Rica, and Cuba—are close to the desired values because of their excellent networks of health services and education.

A greater difference exists between maternal mortality rates in developed and developing countries. Although developed countries exhibit a rate of 10 per 10,000 births, the rate in less developed countries is approximately 520 per 100,000 births or more than 50 times that in developed countries. This is a good index with which to measure the inequalities in development that exist between rich and poor countries.

Of the 50 million deaths that occur worldwide each year, 80% are in developing countries. Half of the mortalities there are due to infectious diseases and parasites. Today, 4 million children worldwide die of acute respiratory illnesses, the leading cause of death in children. The second leading cause is diarrhea, which kills 3 million children between birth and 5 years of age—80% of them before they are 2 years old. Malaria kills 1 million children each year between birth and 5 years.

Fortunately, there has been a substantial decrease in the prevalence of some infectious diseases around the world, thanks to vaccines provided by the United Nations Extensive Immunization Program. However, the problem is far from solved. There are still 3 million deaths each year from diseases that could have been prevented with vaccination. Of these, one-third are from measles. Tuberculosis is also being increasingly detected around the world: 8 million new cases are diagnosed each year, of which 7,600,000 are in developing countries. Almost 3 million deaths per year are attributable to tuberculosis, mainly in people 15 to 59 years old. Several more cases are projected in the coming years resulting from AIDS.

The goal of having at least 90% of newborns with birth weights of at least 2500 g has been proposed, in other words, a low-birth-weight rate of no more than 10%. The current rate has not improved in recent years except in Latin America, where 31 countries have almost reached the recommended weight.

According to WHO, one-third of children younger than 5 years are undernourished. Of these, 70% live in Asia, 16% in Africa, and 3% in Latin America. Acute malnutrition has decreased in all regions except Africa. Today, it is estimated that 27% of Africans, 42% of Asians, and 12% of Latin Americans are afflicted by malnutrition.

Micronutrient malnutrition is also a serious problem, particularly with regard to iron, iodine, and vitamin A. More than approximately 250,000 children go blind each year because of vitamin A deficiency. These statistics highlight some of the positive strides that have been made as well as the mountainous task that remains.

Fernando Monckeberg of Chile wrote that improvements in nutrition are required to escape poverty. This argument is in contrast to the view held by many that poverty must first be eliminated to improve nutrition status. According to Monckeberg, actions undertaken in Chile through a food and nutrition policy with direct emphasis on malnourished children led to a notable decline in poverty.

I believe that the vicious cycle of undernutrition-poverty-undernutrition can be broken by attacking and resolving undernutrition and improving quality of life, as Monckeberg points out. But this vicious cycle can also be broken, as it has been in developed countries, by breaking the poverty wall with a global socioeconomic policy plan implemented with specific strategies, such as those utilized by WHO, FAO, and UNICEF.
The Future

Although the future is uncertain, I am sure that opportunities in the field of nutrition will be plentiful. We seem to be viewing nutrition as the beginning and end of life itself, the foundation for good health, and implicated in almost all pathologies. We are at the dawn of a vast expansion in the field of nutrition. Significant changes have already occurred and will continue to occur. Nutrition scientists actively participate in the fields of immunology, molecular biology, oncology, geriatrics, phytochemicals, and others.20

Recent advances in the area of nutrition and immunology have been extraordinary. We now know that nutrition status plays a role in specific and nonspecific components of the immune system that can alter cellular and humoral immunology. A number of nutrients are involved in these processes, including protein, fat, zinc, iron, vitamin A, the B vitamins, and copper. In short, a whole new world of research is emerging in this area.

Another emerging area of interest is the study of the effects of nonnutrient substances in foods, such as the work of Grande Covian, who wondered how the 150 nonnutritional substances in potatoes act in the body.21 As well, certain nutrients, in addition to their nutrition function, might have disease-preventive effects, such as β-carotene, vitamin C, vitamin E, and selenium. According to Gopalan,20 close to 20 chemical substances found in foods may have disease-preventive properties. For this reason, it has been suggested that dietary recommendations be revised to include not only nutrients but also other substances found in foods.

Further areas of current and future interest include the possible role of fetal undernutrition in the development of chronic degenerative diseases in adulthood, the relationships among lifestyle, nutrition, and aging, and the connection between genetics and nutrition.

These thoughts support the notion that the science of nutrition has satisfied our deepest longings for knowledge that can benefit humankind. They also indicate that the future is full of questions that must be addressed by all of us.

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