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WORLD HEALTH ORGANIZATION
TECHNICAL REPORT SERIES

No. 245

JOINT FAO/WHO
EXPERT COMMITTEE ON
NUTRITION

Sixth Report

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WORLD HEALTH ORGANIZATION

GENEVA

1962

JOINT FAO/WHO EXPERT COMMITTEE ON NUTRITION

Geneva, 18-25 April 1961

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JOINT FAO/WHO EXPERT COMMITTEE ON NUTRITION

Sixth Report

The Joint FAO/WHO Expert Committee on Nutrition met in Geneva from 18 to 25 April 1961. The session was opened by Dr P. Dorolle, Deputy Director-General of the World Health Organization, on behalf of the Director-General. Dr Hazel K. Stiebeling was unanimously elected Chairman.

A representative of the International Labour Office and a representative of the United Nations Children's Fund attended the sessions.

I. INTRODUCTION

The terms of reference of the Joint Committee, accepted by the governing bodies of FAO and WHO, have been quoted in earlier reports but can usefully be repeated here. They are as follows :

1. To advise the Directors-General of FAO and WHO in the problems of nutrition which might receive the attention of the two organizations and to assist in co-ordinating their respective programmes in this field.
2. To advise either Director-General or both on any technical problems concerned with nutrition which they may submit to it.

The Joint Committee had at its disposal working papers and background documents relating to the various agenda items, prepared by the secretariat and specialists outside the Organizations. These were valuable in its discussions and in the preparation of the report. As at previous sessions, the Committee reviewed the programmes of the two Organizations and then gave particular attention to other subjects on the agenda which were of particular interest to FAO and WHO.

The Joint Committee noted with satisfaction the following additions to the permanent staff :

(a) WHO : Research Officer in Nutrition at Headquarters ; Regional Nutrition Advisers, one each to the South-East Asian, Western Pacific, and American Regions ; an interregional Nutrition Adviser for the Eastern Mediterranean and African Regions ; and two nutrition officers to two zones in Latin America.

(b) FAO : Regional Food Technologist for Latin America ; Regional Home Economist for Latin America ; Regional Nutrition Officer for Africa ; nutrition officers.

for co-operation with UNICEF, one each in (1) Latin America, (2) Africa and (3) India, Burma and Ceylon; and an Administrative Officer for Headquarters.

The importance or priority rating of individual items is not necessarily synonymous with the length or exhaustiveness of their treatment in this report. As in the past, the attention given by the Committee to the numerous subjects on the agenda varied according to the extent and nature of the consideration given to each by previous Committees, the urgency of the problem, the stage of progress reached, and the present possibilities of early effective application of new findings.

An understanding of the scope of the total programme in nutrition of the two Organizations can best be obtained by re-reading the reports of all the previous meetings of the Joint Expert Committee.

At this meeting the Joint Committee was especially interested in new activities and trends within FAO and WHO that are of great significance for nutrition. These include:

- (a) the Freedom from Hunger Campaign of FAO which is serving to direct the attention of the world to the need for greater action in the battle against malnutrition and to provide additional funds to support action for its eradication;
- (b) the new research programme of WHO, which has enabled the Nutrition Unit to initiate studies and to develop broad plans of far-reaching importance;
- (c) government programmes (assisted by UNICEF in close collaboration with and under the technical guidance of FAO and WHO) to improve maternal and child nutrition; these give FAO and WHO the opportunity to develop jointly broad nutritional activities.

The Joint Committee also was impressed with the effectiveness of the continuous concentrated attention to specific problems within the interest of FAO and WHO, particularly nutrition education, protein malnutrition and its solution, the appraisal of nutrient requirements, studies of food consumption, developments in food science and technology including food additives, and individual deficiency diseases such as endemic goitre, nutritional anaemias, pellagra, beriberi and avitaminosis A.

It noted and commended the greater concentration on selected subjects in the programme of conferences and advisory activities. For example, specific technical problems have, properly, brought FAO into closer relationship with industry; this may result in nutritional considerations being given due weight in the production of food and in food technology. The increasing contacts between the Organizations and training centres in food technology will likewise influence food developments.

These new orientations place additional responsibilities on staff. The ever-increasing demands of countries, especially the newly emerging ones, likewise add to the work of the Organizations. The Joint Committee predicted that it would be necessary to continue to increase, in number and variety of qualifications, the nutrition personnel of the Organizations.

Enhanced activities and the need for closer attention and direction in the field have, wisely, led the Organizations to increase the strength of their regional staffs.

One of the most striking aspects of international work has been the geographical expansion of demands during the past few years. The rapid increase in the numbers of newly independent states in Africa has enlarged the list of Members of all United Nations agencies. The governments in many of the new countries require no convincing of the importance of food and nutrition and have made clear their desire to obtain technical assistance from FAO and WHO.

The Joint Committee called attention to many points in the work of the Organizations and believed that the following principles should continue to guide future activities :

(a) In planning for economic and social development, consideration of national nutritional needs should receive the highest priority. This can best be accomplished by the participation of personnel with experience in nutrition in such planning.

(b) Long-range objectives and continuity of personnel and influence are essential to sound and effective efforts. This continuity can be improved by closer linking of the programmes and personnel of the international agencies to national institutions of higher learning and to other permanent centres.

The Joint Committee was strongly of the opinion that educational and training programmes (at both the professional and the subprofessional levels) in developing countries must be accorded the highest priority so that these countries will be able, as rapidly as possible, to obtain qualified nutritionists and auxiliary personnel. Hence the stress on training programmes at degree level (see p. 47) in nutrition and in related subjects (such as food science and home economics).

Because of the importance of these educational programmes, the Joint Committee urged that there should be the fullest co-operation with and support for universities and other educational institutions in developing countries. These institutions obviously have a key role not only in training but also in research developments.

At the fifth session, the Joint Committee expressed the view that it should in the future pay special attention to the evaluation of the results achieved by WHO and FAO and to the progress made in carrying out its previous recommendations. The Joint Committee noted that the subject of evaluation had been discussed at a number of regional seminars and meetings and that short-term consultants had been employed to give some guidance on this matter.

The Joint Committee believed that both Organizations had many achievements to their credit, not least their contribution to the new awareness of nutrition now evident in all continents. It was suggested, however, that each of the Organizations should now place more emphasis

on the evaluation of the success, or promise of success, of the various types of programmes, since only through this means can the direction of future progress be satisfactorily decided.

An evaluation of nutrition education programmes in three Latin American countries carried out by an FAO/WHO consultant was considered by the Joint Committee to be particularly valuable. The report stressed the importance of careful programme planning. For this purpose adequate basic information is needed on such matters as agricultural production and potential; economic, cultural and educational development; nutritional and health status of the population; and the available resources, such as finance and personnel. Further, short- and long-term objectives also need to be clearly defined. This is essential as a basis for evaluation at later stages in the progress of any project. The Joint Committee considered that this report could provide helpful guidance to countries embarking on applied nutrition programmes and that it should be given wide distribution.

The Joint Committee wished to acknowledge the great assistance provided by the Secretariats of the two Organizations and hoped that it would be possible for all members of staff, whether at Headquarters, at Regional Offices, or in the field, to be informed of the Committee's belief in the importance of their work, both individually and collectively.

The need to stress the "total" approach to nutrition and the inter-relationships between different programmes having a common goal becomes more and more urgent. The Joint Committee believed therefore, that everything possible should be done to extend the spirit of co-operation evident among the Secretariats of FAO and WHO, so that all staff members, permanent or temporary, technical or administrative, and irrespective of their Organization or of the source of funds for their work, would regard themselves as partners in a challenging enterprise—the improvement of the health and prosperity of nations.

2. CONFERENCES, COMMITTEES AND SEMINARS

Regional

(a) The first session of the Regional Nutrition Committee for the Middle East was held in Cairo in November 1958. While a series of FAO/WHO regional nutritional conferences have been held in other regions, this was the first regional meeting of its kind in the Eastern Mediterranean. The Committee reviewed nutrition problems in countries in the region and considered the need for surveys of food consumption and the state of nutrition, the training of nutrition workers, the development of national nutrition services, and the formulation of national nutrition policies.

(b) An FAO Nutrition Meeting for Europe held in Rome in 1958 was attended by experts from 14 European countries and representatives from WHO. The meeting gave particular attention to food consumption with special reference to fat consumption. Education and training in nutrition were also discussed, and proposals were made which led to the Symposium described in Section 15 of this report.

(c) A seminar on Problems of Food and Nutrition in Africa south of the Sahara was organized in 1959 by FAO and WHO with the collaboration of CCTA and the Belgian Government for the participants of the three previous training courses held for Africa. The problems of food consumption and supplies, nutritional status, supplementary feeding and nutrition education programmes, and the organization of food and nutrition committees and institutes were reviewed and recommendations made for future action and research.

General

(a) A Symposium on Human Nutritional Diseases, sponsored by WHO, FAO and the Pathology Section of the United States National Institutes of Health, was held in Princeton in June 1958. The prevalence, clinical manifestations, pathology and pathogenesis of vitamin A deficiency, beriberi and endemic goitre, as well as the research needed, were discussed. The proceedings of this Symposium were published in *Federation Proceedings* (Supplement No. 2, Part II, Volume 17, September 1958).

(b) A meeting on Malnutrition and Food Habits was held in Mexico in September 1960, attended by experts in nutrition and the social sciences. The principles and difficulties involved in combating malnutrition, and particularly protein malnutrition, by means of changes in the food habits of people in different parts of the world were discussed. This meeting, the third on problems associated with protein malnutrition in which the Josiah Macy Jr. Foundation has generously co-operated, was sponsored by that Foundation and the World Federation for Mental Health and supported by WHO, FAO and UNICEF.

* * *

Other meetings and seminars are referred to in relevant sections of this report.

The Joint Committee was favourably impressed by the number, the diversity and the quality of these meetings. The convening of meetings to deal with specific problems was welcomed as a trend which should be encouraged. It further expressed the hope that the governments in the various regions would see the usefulness of such meetings and workshops and would increasingly assume responsibility for their organization.

3. FOOD CONSUMPTION

Adequate knowledge of the patterns and levels of food consumption as well as related socio-economic factors is needed to formulate effective food and nutrition policies. Two main sources of knowledge on food consumption are the Food Balance Sheets and the Food Consumption Surveys.

Food Balance Sheets

Only the most economically advanced countries now produce Food Balance Sheets on a regular basis, and this information is supplied by the governments to FAO at its special request. In some cases, in order to stimulate the interest of national authorities, tentative Food Balance Sheets are prepared at Headquarters for comments and revision by national experts.

In 1960 an intensified effort was made to obtain the basic information for the Third World Food Survey and at the same time to encourage individual countries to continue work on Food Balance Sheets on a permanent basis. Consultants of both the Statistics and the Nutrition Divisions as well as Headquarters staff of FAO have made vigorous attempts to close the gap in this information, with special emphasis on the under-developed areas.

Food Consumption Surveys

Work in relation to Food Consumption Surveys has been intensified within the limits of available resources, and this will continue. For the formulation of sound food policies, the data obtained in household surveys should supply not only data on food consumption but also socio-economic information. Work has already been initiated with the assistance of two consultants in preparing a draft programme of Food Consumption Surveys for discussion at regional meetings, with a view to the developing regional and national survey programmes. The first of these regional meetings will be convened in October 1961 and will be followed by others in 1962 and 1963.

In order to assist the training of personnel and to encourage uniformity in methods a Manual on Household Food Consumption Surveys was prepared for publication in 1961.

4. NUTRITIONAL REQUIREMENTS

Calories

The basic approach and methodology adopted by the first FAO Committee on Calorie Requirements and revised by the second Committee have received the wide approval of national and international authorities concerned with nutrition and health. The Joint Committee noted with interest that the standards already in use in some countries have been revised to conform with the recommendations of the Calorie Committee. However, as pointed out in the Report of the Calorie Committee, there are several questions which need further attention in order to establish the methodology on a more satisfactory basis.

Activity factor

While recognizing the great importance of this factor, the Calorie Committee postulated that, in the absence of more precise data, the activity described for the reference adults could be taken as average for the countries considered. This assumption, which was felt necessary for immediate practical purposes, has yielded results generally in accordance with observed national averages of need. The growing knowledge of energy expenditures would, however, justify a review of the question of energy expenditures in different activities, although data for agricultural populations, especially in the developing countries where they form by far the largest single group, are still scarce and need to be augmented. Moreover, as a practical guide for those interested in the feeding of workers, there is presently a need for estimates of the calorie requirements for different kinds of work and activity in different conditions. This need could probably be met by giving several examples for different age and sex groups such as those already included in the Report of the Calorie Committee. Further investigations on energy expenditures and time and motion studies in population groups engaged in different occupations ought, however, to be encouraged.

Body size or weight

The Calorie Committee suggested that body weight be used in estimating the effect of body size on energy requirements, inasmuch as data on weight are generally fairly readily available. This recommendation was to be applied "only to well-nourished persons in whom the relationship between height and weight is not unusual" and who are neither grossly fat nor overly thin; otherwise "ideal" rather than actual weight was to be used. It is known that body build of various populations varies widely; variations in body composition have also been reported.

The basis of the Calorie Committee recommendations for adjustments required for body size needs to be more precisely defined in the light of these considerations.

Requirements for children

Evidence is accumulating that (a) differences in calorie requirements between boys and girls may start earlier (i.e., before 11 years) than had been previously postulated; (b) present suggested requirements may be low for a substantial proportion of boys in the 13-17 age group if they are very active physically; (c) the peak of calorie requirements of girls may appear earlier (i.e., by 12 years rather than 14) and may be somewhat higher than previously postulated. Therefore a review of the statement of the calorie requirements for children, laying stress on differences in activity and in rate of development, may well be useful and should be incorporated in the proposed new edition of the report.

Requirement at "retail" level

Since the basic recommendations of the Calorie Committee relate to the "physiological" or actual intake of food, and this often has to be compared with food supplies at the "retail" or kitchen stage, allowance must always be made for the difference between these two values, i.e., wastage due to discard of food in the kitchen as well as at the table. The Calorie Committee suggested that in most countries waste of edible food might not exceed 10% of the calories at the "retail" level, although it cautioned that "no single figure for waste can be universally satisfactory" and recommended the use of a specified percentage for waste "based on the best estimates available in the country concerned". In addition to the waste of food occurring between the "retail" and "physiological" levels, losses of food occur also at all stages of production, storage and distribution. Since these losses are of importance in correlating requirements with supplies and in various aspects of general economy, it is necessary to look again into the adequacy of data on waste and losses of food. The Joint Committee noted that FAO is encouraging national authorities to collect more adequate data on losses of food at various points between production and consumption, particularly in connexion with Food Balance Sheets and Food Consumption Surveys.

Correlation of estimates and intakes

Whereas it is desirable to test estimates of calorie requirements derived from theoretical and experimental considerations against the observed intakes of different population groups in order to assess the reasonableness

of the estimates, it is important to check whether or not the observed intakes do result in optimum health and efficiency of the population concerned. Criteria for such an assessment have, of course, to be defined (see *Wld Hlth Org. techn. Rep. Ser.* 137, 1957).

In view of these and related considerations, the Joint Committee recommended that FAO and WHO should take the following steps for the revision of the Report on Calorie Requirements :

1. A review based on the examination of as much of the relevant material as can be collected should be prepared jointly by the Secretariats as a basis for the revision.
2. Specialists in this subject should be consulted by correspondence on the proposed revisions.
3. Consideration should be given to the need for convening a third committee only if the above two steps prove inadequate for the purpose in view.

Energy value of foods and diets

The problem of calculating the number of calories which a diet does, in fact, provide, as distinct from what it would provide if all the protein, fat and carbohydrates were completely digested and absorbed, is still complicated and no clear-cut solution has yet been found. The problem was discussed in 1947 by the FAO Committee on Calorie Conversion Factors and Food Composition Tables, which prepared a report on Energy-Yielding Components of Food and Computation of Calorie Values. The conclusions in this report were as follows : " The correct chemical approach is by the extension of analytical work to include all substances covered by 'carbohydrates by difference'. Further studies of the digestibility of these substances are also required. Only when all the constituents of food have been determined and their physiological effects defined, can their role in metabolism and their full value be accurately described."

Research has been proceeding along the lines suggested by the FAO Committee. Necessary investigations should be continued until sufficient data are available to develop a uniform method for the calculation of calorie values for international use.

This, however, does not appear to be an urgent matter, because differences are not great when different methods are applied to mixed diets.

A recent study, for example, has shown that the difference between the highest and lowest calorie values of a national food supply, as calculated by four different methods, is of the order of only 2%. Considering the magnitude of the errors involved in estimating food consumption as well as nutritional requirements by present methods, the errors involved in the calculation of calorie values are clearly of no practical importance.

Protein

The report of the FAO Committee on Protein Requirements, published in 1957, has proved of great interest and has stimulated much research on the subject. In the introduction to its report the Committee stated: "The provisional nature of this report must be emphasized. Its quantitative recommendations are, throughout, tentative."

The Joint Committee reviewed the many comments which have been made concerning this report and discussed the importance of the large amount of new knowledge on the subject which has accrued since the meeting of the Committee on Protein Requirements. The main comments which have been received concern the following points:

- (a) the concept of a tentative amino-acid pattern and the relative merits of basing such a pattern on a hypothetical mixture or on a food protein such as that of egg or milk;
- (b) the level of the tryptophan yardstick and the proportions of other amino-acids upon which the present pattern is based;
- (c) the effect on total requirements of amino-acid imbalances and of sources of nitrogen other than essential amino-acids;
- (d) the adequacy of the estimated requirement of the reference protein;
- (e) the need for greater attention to the availability of amino-acids in the diet as consumed;
- (f) the effect of level of protein intake on amino-acid requirements;
- (g) the "optimal" levels of protein intake and the question of protein reserves;
- (h) the interrelationship between protein requirements on the one hand and energy content of the diet on the other, as well as the presence and availability of other nutrients;
- (i) methods for assessment of dietary protein values and the expression of these in such terms that comparisons can readily be made with estimates of human requirements;
- (j) the need for more complete guide-lines for supplementation of the diet to improve both the quality and the quantity of its protein;
- (k) the needs for protein (and other nutrients) when the calorie needs are high;
- (l) the comparison of suggested requirements with the actual intakes of well-fed and healthy population groups;
- (m) the metabolism of proteins in disease with a view to making recommendations for improved feeding in sickness and convalescence.

In view of the discussions on this subject, the Joint Committee recommended that the Report on Protein Requirements be reviewed by a joint FAO/WHO group to be convened as early as possible. The available new information, particularly on the points listed above, should be assembled prior to this meeting. The scope of the considerations involved is such that it may prove useful to have direct consultations, preceding the meeting, between the Secretariat and specialists in this field.

Calcium

FAO and WHO have made joint arrangements for convening, in May 1961, an Expert Group on Calcium Requirements.

* * *

The Joint Committee was unanimous in urging continued interest in the problem of nutrient requirements such as those for vitamins and certain minerals. The interaction of various requirements and the effects of environmental conditions, e.g., climate, are of particular relevance to international work, which is conducted under conditions of great geographic and dietary variation. It urged that FAO and WHO should continue to give attention to the problem of nutritional requirements and maintain close co-ordination with national bodies concerned with this problem.

A great need exists for definition of criteria of adequacy for nutrients and for agreement on methods of defining requirements. It may well be that the most immediate contribution that can be made by expert committees on requirements is along these lines rather than by premature pronouncements on figures as yet unsupported by adequate evidence.

5. FIELD INVESTIGATIONS ON NUTRITIONAL DISORDERS

Protein malnutrition

South India

With support from WHO, an investigation of the prevalence of protein malnutrition was undertaken in South India. Surveys in the four South Indian states among the poorer sections of the community, which represent about 85% of the total population, revealed the incidence of frank kwashiorkor in about 1% of the children examined. Marasmus was found to occur twice as frequently as kwashiorkor. Among the contributory causes were poverty, ignorance, underfeeding, unsatisfactory supplementary feeding and infection. There was considerable growth-retardation among children of pre-school age, and other signs suggestive of protein-calorie malnutrition were encountered in an appreciable proportion of children examined, some of whom also showed clinical evidence of deficiency

of vitamin A and of vitamin B complex. The investigation was further extended to demonstrate the beneficial effects on the health of pre-school children of supplementary feeding and of diets based on cereals and pulses in appropriate proportions. These studies should indicate possible approaches to the prevention of protein malnutrition in India.

Malaya

A survey of kwashiorkor among pre-school-age children in Malaya was conducted by a WHO team consisting of a clinician and a social anthropologist. The object of this survey was to ascertain the extent and cause of protein malnutrition and to assess the relative importance of each factor and combination of factors that contribute to the development of kwashiorkor in Malaya. The final report of this survey is not yet available.

Anaemias

(a) The fifth Joint FAO/WHO Expert Committee on Nutrition, which met in October 1957, pointed out the urgent need to investigate iron-deficiency anaemia, since this was considered to be by far the commonest type of anaemia prevalent in the tropics and subtropics.

WHO sponsored a study, under the auspices of the Indian Council of Medical Research, on anaemia dealing with (1) the general pattern of incidence and the response of cases of anaemia to certain therapeutic measures, (2) the pattern of anaemia in pregnancy and (3) the prevention of anaemia in pregnancy. These studies, begun in April 1958, were undertaken at the Nutrition Research Laboratories, Hyderabad; the King George Medical College, Lucknow; and the Institute of Obstetrics and Gynaecology, Madras.

In one group of over 400 women of child-bearing age, some 20% had haemoglobin levels of 10 g per 100 ml or less. In another group of over 1000 pregnant women, 42% had levels of less than 10 g per 100 ml. In pregnant women with apparently normal haemoglobin values in the first trimester, a combination of 5 mg folic acid and 320 mg ferrous gluconate was more effective in helping to maintain haemoglobin over 10.5 g per 100 ml throughout pregnancy than either of the two drugs given alone. Later reports on these investigations are awaited.

(b) An investigation of anaemia in Mauritius, to determine the prevalence and type of anaemia and possible methods of prevention, was begun in 1956 and continued until 1959.

In this study a survey which covered 4167 people from various sections of the community revealed a high incidence of anaemia in men, women and children. The anaemia was mainly hypochromic and microcytic, and the incidence varied a great deal, the range being 15%-64%. The distribution of anaemia was similar to that of hookworm infection and had no

relation to schistosomiasis. A detailed study in a subsample of 92 anaemic subjects revealed a distinct association between the worm load and blood-haemoglobin levels.

In therapeutic trials a good response to treatment with iron in small doses was observed. Feeding trials have provided evidence that enrichment of the national diet with iron would be an effective public health measure against this anaemia.

(c) During a health and nutrition survey in Northern Rhodesia in 1957/58, widespread anaemia of the hypochromic, microcytic type was found, with the highest percentage in infants and young children. An association of this anaemia with malaria was found in about 50% of the infants.

(d) In Peru a field study of the prevalence of anaemia in relation to hookworm infection was begun in 1960.

Pellagra

A WHO team of a medical and a non-medical nutritionist in Basutoland completed the nutrition survey begun in 1956. Pellagra was found to be the most common dietary-deficiency disease. It occurred throughout the territory and showed a seasonal variation in incidence. Cases appeared most frequently and with greatest severity from October to February, with a peak in December. Fresh cases, however, appeared throughout the year. It was found most frequently among pregnant and lactating women, herd boys and agricultural workers.

It was observed that persons who habitually drank heavily the locally made and fortified alcoholic beverage were particularly prone to suffer from pellagra. The large consumption of alcohol, it was found, markedly reduced food intake and could thus be one of the contributory causes of the higher incidence and greater severity of pellagra among these persons.

The annual reports of the Health Service indicate that the disease is on the increase. It is estimated that during the pellagra season 15% of the population suffers from the disease, and that among heavy drinkers, 50% are affected.

Avitaminosis A

(a) In the course of the investigation into the causes of protein malnutrition in Malaya, a WHO consultant reported that hypovitaminosis A was also not uncommon in rural areas. Xerosis conjunctivae, with night-blindness and often with Bitot's spots, was seen in young children in every region visited. Cases of xerosis and of scars of the cornea and a few cases of total blindness were seen in school-age children. The development of

the acute deficiency condition appeared to have been associated most often with an attack of communicable disease, particularly measles. Kwashiorkor and xerophthalmia were also often found to occur together.

(b) A clinical examination of 1675 children, conducted by a WHO medical nutritionist in three different locations in rural parts of Northern Rhodesia, showed a high incidence of the eye symptoms and skin changes associated with vitamin-A-deficient diets. Very low values of plasma vitamin A and carotene were found in a high proportion of the children examined. An inadequate intake of vitamin A is not only an important factor in causing blindness but also appears to be associated with a high mortality rate.

Endemic goitre

WHO has assisted Thailand, Basutoland, Lebanon and Pakistan with programmes on endemic goitre.

(a) A survey in Basutoland revealed an average prevalence of 41% with a range of 30%-50% according to the district.

(b) The survey in West Pakistan was confined to school children in eight district centres extending from the plain north of Lahore to the foothills of the Himalayas near Chitral. The percentage of goitre increased from 11% in the plain to 71% near Chitral.

(c) The survey in Lebanon was carried out in 3421 school children in communities located at sea level, in the plain, on the hills and in high mountain valleys. The average prevalence of goitre was 49%, with only 5 out of a total of 20 communities having less than 40%. The highest prevalence (80%-90%) was found in the high mountain valleys, suggesting that a thorough survey might reveal the existence of endemic cretinism. From what evidence there was, the cause appeared to be iodine deficiency.

Iodization of all salt for human consumption has been recommended in all three countries as an effective measure for control and prevention. A monograph, *Endemic Goitre*, with reviews on all aspects of the subject by well-known workers, has been published.¹

Dental caries

A WHO consultant visited French Polynesia in 1960 to carry out a survey to assess the state of nutrition in the territory and to advise on an immediate and long-term programme to deal with nutritional problems.

¹ World Health Organization : *Monograph Series*, No. 44, 1960.

Dental caries was found to be the most important problem. Of the school-age group, 83% had severe dental caries, and such caries frequently resulted in the complete loss of teeth at an early age. In a group of 100 young people 21 years of age, 25% had no teeth at all. The fluorine content of the water is very low and the food consumed is highly sophisticated.

6. NUTRITION RESEARCH PROGRAMME

The Eleventh World Health Assembly in 1958 adopted a resolution as a result of which WHO accepted responsibility for promoting and co-ordinating medical research as one of the means of promoting health and ensuring freedom from disease. Subsequently the group of Temporary Advisers on Medical Research Planning stated that :

“ WHO has an important part to play in, and a great responsibility for, the development and dissemination of scientific knowledge on a world basis. In this it supplements national organizations and philanthropic institutions.

“ The research programme of WHO should be primarily concerned with :

“ (1) the solution of those problems which are better resolved by world co-operative endeavour than by local groups ;

“ (2) the solution of major problems when local effort is inadequate, whether by limitations of the research potential of the area or by the nature of the problem.”

An informal meeting of WHO Advisers on Nutrition Research was convened in Geneva in March 1959, which advised the Director-General on problems in the field of nutrition research which might receive support from WHO. In February 1960, WHO consultants made a more detailed survey of the current trends of nutrition research in the light of the recommendations made from time to time by the various Joint Expert Committees on Nutrition and by other expert committees dealing with specific problems, such as calorie and protein requirements, goitre, iron-deficiency anaemia, etc., and prepared, in consultation with FAO, a report on nutrition research. This report was reviewed by a WHO Scientific Group, which met in New York in March 1960. The Group examined the relative importance of problems in which further knowledge was needed and recommended to the Director-General of WHO that research should be undertaken in certain subjects which it regarded as extremely important. These recommendations cover a wide field from epidemiological studies on nutritional disorders to purely laboratory studies on nutritional requirements and the metabolism of nutrients. There was, however, a unity of purpose underlying these recommendations. It was the considered view that information gained in all such studies was needed for a better understanding of malnutrition, and that when such information became available it would help in devising preventive measures.

The Joint Committee was informed of the action taken by WHO to develop a nutrition research programme based on the recommendations of the Scientific Group, and that the programme was being implemented. It was pleased to learn that there had been consultation between WHO and FAO in the preliminary planning of the programme. The Joint Committee recognized, however, that for the fullest development of necessary knowledge, research in all areas of interest to WHO and FAO is essential, and hoped that FAO would be able to participate in the future.

Researches on iron-deficiency anaemia

A WHO Study Group on Iron Deficiency Anaemia, which met in Geneva during September/October 1958, made certain specific recommendations for a programme of investigations. Two consultants were appointed by WHO to study the problem in the regions concerned. They made broad recommendations on the lines of research to be undertaken and on the institutions and investigators to be entrusted with work on specific problems in the collaborative programme of research in iron-deficiency anaemia. The programme was finalized recently, and the projects are expected to go into action soon.

* * *

The Joint Committee recognized the need for the expansion of facilities for research scholars. The demand on the staff of research groups in universities and institutes—a matter of concern to long-established centres as well as new ones, and in all countries—is so great that an increase in personnel is essential.

Both FAO and WHO can help by maintaining an awareness of this problem in the development of their research interests and programmes and by stimulating Member Governments to provide additional support to their local institutions.

In relation to nutrition research the Joint Committee recognized the contributions which the international agencies can make in furthering the advanced training in research of younger nutritional scientists. In this regard, it felt that WHO should stimulate governments to make available support for advanced research training in nutrition. In discussing this, the Joint Committee was impressed by the excellent example of the André Mayer fellowship which is administered by FAO, and the WHO participation in the award of the research scholarship of the Swedish National Association against Heart and Chest Diseases. It is hoped that similar support may become available for research fellowships in nutrition so as to assist in promoting an intensified research programme.

7. NUTRITION AND INFECTION

A grant made by WHO to INCAP allowed a preliminary survey of the association between nutritional and diarrhoeal diseases to be carried out in Central America. This has led to a long-term study, supported by funds from other sources, which will greatly assist in defining the parts played by infection and malnutrition in causing morbidity.

Another activity designed to assist countries in developing services for the prevention of diarrhoeal disease, and which can also provide information on the infectious and other causes of diarrhoeas, is the formation of the WHO advisory teams. Paediatricians with experience in nutritional disease participate in this activity. A number of countries have already been visited, and a long-term programme of visits is planned.

The report of the fifth Joint Expert Committee recommended studies of the interrelationship between nutrition and infection. The Joint Committee was pleased that WHO has been able to stimulate research in this area and to support specific studies on the interrelationship between infection and nutritional status. The practical significance of the increased morbidity and mortality from infection in malnourished individuals also requires emphasis and further study. It noted with satisfaction that an Expert Committee on Nutrition and Infection is to be convened in 1962. The suggestion was made that the preparation of a review monograph on this subject would be useful at this time as a stimulus to research and as a reference document for the forthcoming Expert Committee.

The Joint Expert Committee noted the recently published study on tuberculosis comparing the effect of domiciliary and sanatorium treatment with that of chemotherapeutic agents. The results have been interpreted to suggest that the response (assessed clinically, radiologically and bacteriologically) to chemotherapy was not influenced by the qualitative and quantitative adequacy of food intake. The Committee felt, however, that the question of nutrition and tuberculosis needed further examination in all its aspects.

8. THE EFFECT OF NUTRITION ON PREGNANCY AND LACTATION

Expectant and nursing mothers, infants and children constitute vulnerable groups of a population from the nutritional standpoint and merit special consideration. The usual diets of women in most of the developing countries have been found nutritionally inadequate, and the special needs of pregnancy and lactation seem to have received little consideration.

Hence these states of physiological stress may aggravate chronic dietary inadequacy and thus adversely influence the course and outcome of pregnancy, foetal growth and the health and growth of the infant. It must be emphasized, therefore, that a high priority should be given to a study of maternal and infant malnutrition and of possible preventive measures.

Nutrition and pregnancy

Earlier studies as well as recent observations have indicated that the nutritional status of the maternal organism during pregnancy may be reflected in the condition of the offspring at birth, but further studies of the effect of nutrition on pregnancy in the human being are needed. Some particular aspects of this problem seem to merit further investigation.

Pregnancy wastage

A great deal of information is available on the effect of nutrition on the course of pregnancy in experimental animals. The practical significance of these observations from the point of view of human beings, however, requires cautious appraisal.

The incidence of pregnancy wastage—abortions, miscarriages and stillbirths—among poorly fed communities appears to be unusually high. A better understanding of the cause or causes of this wastage is needed before preventive measures can be properly directed. How much is the result of malnutrition and how much attributable to poor obstetrical care? The possibility that the elimination of congenitally damaged foetuses may contribute to the high wastage also requires investigation. It is clear from studies in animals that maternal malnutrition can be responsible for foetal deaths. This question requires further elucidation in human beings through comparison of congenital malformations in ill-nourished and well-nourished populations.

Gain in body weight during pregnancy

Under-nourished women tend to show a lower gain in body weight during pregnancy than well-nourished women. The significance of this finding, however, needs clarification. Even among well-nourished populations there is still inadequate information regarding the most desirable weight gain and the significance of different degrees of weight gain during pregnancy. In pregnancy there are obviously profound changes in body composition, and any changes in gross body weight should be studied in relation to concurrent changes in body composition. To elucidate the significance of the low gain in body weight observed among under-nourished pregnant women, it would be desirable to investigate and compare changes in body composition during pregnancy among well-fed and under-nourished

women. Also in the assessment of the significance of body-weight changes, the possible role of different levels of activity among pregnant women of different socio-economic groups in relation to their calorie intake (see page 9) may need consideration.

Toxaemias of pregnancy

A high incidence of preclampsia and eclampsia has been reported among pregnant women of low socio-economic groups in some parts of the world. Conflicting views have been expressed as to the possible role of malnutrition in the pathogenesis of toxaemias of pregnancy. The question arises of whether the high incidence of pre-eclampsia and eclampsia observed among some under-nourished populations is the result of poor antenatal and obstetric care or the effect of malnutrition. In communities with inadequate maternal health services and poor nutrition it should be possible to devise field experiments which would serve to throw light on this problem.

Birth weight of infants and incidence of prematurity

Several studies have indicated that the average birth weights of infants of poorly nourished mothers are significantly lower than those of well-fed ones. It has also been shown that the incidence of prematurity, using the birth-weight criterion, is higher in malnourished populations than in well-nourished ones. The practical significance of these findings from the standpoint of neonatal mortality deserves further attention.

The effect of maternal malnutrition on foetal storage of nutrients

Maternal malnutrition during pregnancy may reduce the foetal stores of nutrients and thereby contribute to the development of nutritional deficiency disorders in the infant. Studies on this subject, particularly in relation to vitamin A and iron, should be extended. In addition, the question of the transport of nutrients across the placenta and, indeed, the role of the placenta in nutritional physiology deserve careful study, with regard to both the foetus and the mother. It is possible that defects in the placental transfer of nutrients even in adequately nourished mothers adversely affect the foetus or reduce the nutrient storage in the newborn infant.

Maternal nutritional requirements in pregnancy

The above topics are examples of some of the suspected influences of maternal malnutrition on the health of the mother during pregnancy and on the foetus. The main problem is not whether these effects actually occur but at what dietary levels they appear. Evidence is, however, necessary for making recommendations on desirable levels of nutrient intake during

pregnancy and for planning improved maternal care programmes. Further, the basis of the existing recommendations regarding nutrient allowances requires careful reappraisal. Recent observations have indicated the successful outcome of pregnancy in women subsisting on seemingly inadequate diets. The optimum maternal nutrition requirements in pregnancy which would ensure the proper health of the mother, a normal pregnancy, and a satisfactory condition of the infant at birth require redefinition.

Nutrition and lactation

Considerable information regarding the output and chemical composition of breast milk in under-nourished populations has been gathered in recent times. Further work, especially to increase our understanding of the factors in the growth failure of breast-fed infants, is, however, indicated.

The effect of dietary supplementation on the output and chemical composition of milk

A great deal of information is available in the field of animal husbandry pointing to the effect of improvement in diet on the output of milk. Although some studies on this aspect have been carried out in human subjects, the need for further studies is apparent. It would be desirable to investigate how far, in poor communities, the nutritional status and the growth pattern of infants in the first six months after delivery could be improved by supplementation of the mother's diet.

Nutritional requirements in lactation

Recent observations indicate that, in spite of their inadequate diets, women of low socio-economic groups are able to breast-feed their infants successfully for prolonged periods. The effects of such prolonged lactation on the health and nutritional status of the mother require careful assessment. The need for further consideration of the question of nutritional requirements in lactation has to be emphasized. In considering this problem, the possible role of hormonal factors in influencing nutritional requirements has to be taken into account. The period of lactation constitutes a period of even greater nutritional stress to the mother than the period of pregnancy. Studies designed to ensure adequate nutrition for the nursing mother should therefore receive more attention than hitherto.

As an outcome of discussion of the foregoing aspects of the problem, the Joint Committee recommended that :

1. Research on different aspects of the problem of nutrition in pregnancy and lactation should be encouraged, and this should be accorded high priority in the research programme of WHO.

2. An expert group on nutrition in pregnancy and lactation should be convened at an early date to consider critically the different aspects of the problem outlined above. In such consideration the impact of socio-economic, cultural and environmental factors which might be expected to condition the nutrition situation should also receive adequate consideration. This expert group, in addition to considering the problems discussed above, should attempt to define nutritional requirements in pregnancy and lactation.

9. PROTEIN-CALORIE-DEFICIENCY DISEASES

Protein-calorie-deficiency diseases continue to be a major concern of the nutrition programmes of FAO, WHO and UNICEF. A comprehensive account of earlier phases of work is to be found in the Fifth Report of the Joint FAO/WHO Expert Committee on Nutrition.

Owing in large measure to efforts on the part of FAO and WHO during the past decade, the occurrence of kwashiorkor has been recognized in many countries of the world. The disease is now identifiable clinically as being substantially the same entity wherever it occurs; its etiology is generally well established, and much of its pathogenesis has been elucidated. By referring to this syndrome as "protein malnutrition" the importance of protein deficiency in its etiology has rightly been emphasized. This has led to the introduction of measures designed to improve the quality and to increase the quantity of protein in foodstuffs available for the feeding of young children.

Over the last 10 years it has also been recognized that in infants and pre-school children a state of malnutrition exists which is often referred to as "pre-kwashiorkor". This level of nutriture is characterized by retardation of growth and development, associated with evidence of inadequate intakes of protein and calories. It is a precarious state from which the child may be readily precipitated by one of several circumstances into the acute phase of kwashiorkor.

In developing countries a high percentage of children from lower-income families may show retardation of growth and development due to inadequate feeding. The prevalence of protein-calorie-deficiency diseases is increasing in some countries as a consequence of the rapid spread of industrialization and urbanization and the resulting adverse changes in food habits. One common result is the premature termination of breast-feeding and the use of overdiluted cow's milk, thin gruels and cooking water from cereals as substitutes.

Much attention has been given to the clinical differentiation between kwashiorkor and marasmus. There is widespread agreement that kwashiorkor usually results from consuming food deficient in protein relative to

calories and that marasmus is the consequence of insufficient food. As the widespread use of the term "marasmic kwashiorkor" suggests, kwashiorkor may be superimposed on any degree of marasmus.

The high prevalence of deficiency-disease syndromes makes it urgent that attention be directed to practical methods for their prevention. Kwashiorkor has tended to engage the exclusive attention of many workers. The attention of these investigators and of those responsible for preventive and corrective programmes should be directed, without decreasing the interest in kwashiorkor, to all aspects of the problem of protein-calorie-deficiency disease.

The following outline illustrates the specific sequences that may occur :

The breast-fed infant is usually adequately protected until about six months of age, by which time the calorie and protein requirements begin to exceed the supply available from breast milk alone. The situation is often aggravated by a diminution in the quantity of breast milk. As long as the infant is put to the breast the mother usually fails to recognize the need for food from other sources. Consequently she does not appreciate that the failure to gain weight is a result of underfeeding. In some cases the infant may develop diarrhoea due to its malnutrition and is then subjected to further calorie restriction, being given only thin gruels and the cooking water from cereals.

During this period infections may supervene owing to the increased opportunities for ingestion of contaminated water or foods, to the ingestion of infective organisms through environmental contamination, to exposure to respiratory and other infections such as measles, whooping cough and chicken-pox. Anorexia, vomiting and diarrhoea often follow, leading to further restriction of the diet. Infections also aggravate the nutrient deficit as a consequence of increased nitrogen loss in the urine.

Recognition of this interplay of influences is important in understanding the etiology and pathogenesis of the various forms of protein-calorie-deficiency disease. To clarify the relative roles of the multiple influences responsible, critical studies are needed of the intake of breast milk and of other food of children under two years of age, and investigations of the metabolic effects of calorie restriction and of infection among children under six years of age. The suitability of foods and feeding regimens for periods of nutritional stress resulting from infections needs to be investigated. Investigations are required of the nutritional rehabilitation of the marasmic child, including the management of such deficiencies as avitaminosis, nutritional anaemia, and electrolyte disturbances which may be associated.

Improved understanding, by physicians and auxiliaries, of effective preventive practices is essential. Quantitative data on breast-feeding as discussed in item 3 below are particularly needed. The use of appropriate supplementary foods available to the household which will provide adequate

nutrients during the transition from dependence on the mother's milk to weaning, together with proper water and food sanitation, must be taught. Indeed, the nutritionist's preoccupation with food alone must give way to concern with all the influences responsible for under-nutrition.

In order to ensure a wider appreciation of the multiple etiological factors and many clinical forms of deficiency disease prevalent among infants and young children in nearly all technically under-developed countries, the Joint Committee recommended the following :

1. The regional preparation and widespread distribution of informative summaries of present knowledge regarding protein-calorie deficiencies with emphasis on both treatment and prevention. Different summaries should be prepared at levels appropriate to physicians, to nurses, and to auxiliary workers in health, education and agriculture.
2. The use of simple standardized forms for recording graphically the weights of individual infants and pre-school children. Where practical, the length of infants and the height of other children should be included. It is important to obtain height and weight data on well-fed children within the same populations in order to establish suitable standards. For these measures to have value, however, auxiliary personnel must be taught not only the techniques of the measurements but also the probable nutritional significance of growth failure.
3. An intensive effort over a two-year period in selected centres to obtain and analyse such data and relate them to information on feeding practices and infections. Although admittedly difficult to obtain, quantitative information on maternal milk supply at various periods of lactation should also be sought.
4. Much greater attention in all nutrition and public health programmes to the major role of infections in the development of nutritional deficiencies, and special emphasis on the frequency with which diarrhoeas of infectious origin and measles precipitate fatal cases of marasmus and kwashiorkor. The increased mortality from infections in malnourished children should also be a matter of concern.
5. More emphasis on the frequent co-existence of several different deficiency states such as kwashiorkor, marasmus, avitaminosis A, ariboflavinosis, pellagra and anaemia. Descriptions of these conditions should be disseminated in order to facilitate their recognition.
6. Major efforts directed towards the improvement of feeding practices during and immediately following weaning, especially in countries in which marasmus and kwashiorkor are prevalent.
7. Evaluation of the relative role and interplay of factors such as poverty, ignorance and social customs in the inadequate utilization of locally available foodstuffs for the feeding of infants following weaning.

8. Special attention to developing locally available foods of satisfactory dietary protein value suitable for feeding children of this age group (see Fifth Report, p. 49).

9. Studies of infant-feeding practices. All educational efforts should include attention to the sanitary preparation of food and water and to environmental hygiene.

10. The organization of a number of regional programmes for evaluation of the treatment of various forms of protein-calorie deficiency, in order to determine the optimum level of feeding and the desirability of using supplements of electrolytes, iron, or vitamin preparations.

10. REVISION OF INTERNATIONAL CLASSIFICATION OF NUTRITIONAL DISEASES

The Joint Committee was informed of the plans of WHO for revision of the *International Classification of Diseases* and of the expanded use of this Classification for both statistical and diagnostic purposes. The Joint Committee recognized the great need to obtain better data on the prevalence of nutritional diseases. It was, accordingly, pleased to comply with the request of the Regional Advisory Committee on International Classification of Diseases (Scientific Publication No. 53, PASB, Washington, D.C.) that it review and comment on the provisional classification of diseases of nutritional origin.

The Joint Committee proposed that extensive revision be made in the listings of nutritional diseases in keeping with the advances in the understanding of these conditions and in order better to reveal the role of nutritional factors in morbidity and mortality. The Joint Committee considered the possibility of classification of nutritional diseases on a basis of the nutrient involved in etiology and on the basis of syndrome. It believed that placing the emphasis on the nutrient would be of the greatest usefulness. It proposed that the tentative classification below be subjected to tabulation trials, including multiple-cause tabulations where possible, in a number of regions in order to determine the problems which may arise in its application; that further problems of definition and application which may be so identified should be submitted to the WHO Expert Committee on Assessment of Nutritional Status to be convened in 1962; and that after suitable revision by that group this classification be considered a basis for revising the classification of nutritional diseases in the *International Classification of Diseases* in 1965.

In such diseases as tropical ulcer, diarrhoeas of infectious origin, tuberculosis, measles and bronchopneumonia, malnutrition is almost

always a contributory cause of morbidity or mortality. Accordingly, the Joint Committee recommended that death certificates include mention of severe malnutrition whenever it occurs concurrently with the immediate cause of death or primary disease. In addition the Joint Committee believed that recognition should be given to the occurrence of diarrhoea as a consequence of under-nutrition, and it recommended that the revised classification of diarrhoeal diseases include such a category.

Proposed classification

Nutritional Diseases

I. *Hypoalimentation*

1. Protein-calorie deficiencies
 - A. Kwashiorkor (including marasmic kwashiorkor)
 - B. Marasmus (e.g., athrepsia, cachexia, extreme wasting)
 - C. Unspecified (including starvation in adults, famine oedema)
2. Mineral deficiencies ¹
 - A. Iodine
 - B. Fluorine
 - C. Selenium
 - D. Calcium
 - E. Other
3. Vitamin deficiencies
 - A. Vitamin A deficiency
 - (a) xerophthalmia, keratomalacia
 - (b) other (e.g., night-blindness)
 - B. Thiamine deficiency (including beriberi)
 - C. Niacin deficiency (including pellagra)
 - D. Ariboflavinosis
 - E. Deficiency of other B-complex vitamins
 - (a) vitamin B₆ deficiency
 - (b) other
 - F. Ascorbic-acid deficiency (including scurvy)

¹ Iodine deficiency is an essential element in the etiology of endemic goitre; in many areas, fluoride deficiency can be an important contributory factor in the etiology of dental caries; while it is recognized that these diseases are considered elsewhere, inclusion of these two mineral deficiencies calls attention to their medical and public health importance. Iron deficiency is considered under iron-deficiency anaemia. The syndrome resulting from calcium deficiency is still to be conclusively identified. The Committee desired that the question of these particular mineral deficiencies be especially considered by the Joint Expert Committee on Nutrition to be convened in 1963.

- G. Vitamin D deficiency
 - (a) rickets, active
 - (b) rickets, late effects
 - (c) osteomalacia
 - H. Sprue
 - I. Vitamin K deficiency
 - J. Vitamin E deficiency
 - 4. Other nutritional deficiencies
 - A. Essential-fatty-acid deficiency
 - B. Individual-amino-acid deficiency
 - C. Other states and unspecified
- II. *Hyperalimentation*
- 1. Obesity
 - 2. Hypervitaminosis A
 - 3. Carotenaemia
 - 4. Hypervitaminosis D
 - 5. Fluorosis
 - 6. Other

III. *Food toxicants*¹

- 1. Lathyrism
- 2. Epidemic dropsy

Diseases of the Blood and Blood-forming Organs

I. *Pernicious anaemia*

- 1. Subacute combined degeneration

II. *Nutritional-deficiency anaemias*

- 1. Iron-deficiency anaemias (microcytic, hypochromic)
- 2. Other deficiency anaemias
 - A. Folic-acid-deficiency anaemia
 - B. Vitamin-B₁₂-deficiency anaemia
 - C. Vitamin-B₆-deficiency anaemia
 - D. Protein-deficiency anaemia
 - E. Other

¹ These and a variety of similar food intoxications are listed together in the current edition of the Classification. The Committee recommended the separation of these two conditions as individual items because of the consideration which they have received at previous meetings of the Joint Expert Committees.

11. FOOD AND NUTRITION POLICY AND PLANNING

The role of nutrition in agricultural planning is basic to the philosophy of FAO and is explicitly stated in its Constitution. The FAO Conference and Regional Conferences have repeatedly recommended the intensification of efforts to bring the importance of the problem to the attention of Member Governments. FAO has been called upon to participate in regional as well as national food-policy planning. For instance, the governments of Central America and Panama asked FAO to advise in planning joint food policies. FAO has also provided assistance to Member Governments for the nutritional assessment of levels and patterns of food consumption.

The need to plan agricultural production and food distribution, taking into consideration the nutritional requirements of the population as well as relevant agricultural, social and economic conditions, has received wide recognition in the last few years. Close co-operation between specialists, particularly those in nutrition, agriculture and economics, is essential in formulating food and agricultural policies reflecting nutritional needs. However, a mechanism to bring about such co-ordination is not always available. One effective way of focusing attention on this problem is to organize regional meetings of leading nutritionists and government officials concerned with economic and agricultural planning. If such meetings are not feasible, proper liaison should be established between separate meetings convened for nutritionists and for planning authorities.

As an example of the latter arrangement, an FAO meeting held in Bangkok in June 1960 and attended by leading nutrition workers of India, Thailand, the Philippines, Ceylon, Indonesia and China (Taiwan) as well as by representatives from WHO, ECAFE and UNICEF transmitted recommendations to the FAO/ECAFE Working Party on Selected Aspects of Agricultural Planning (which met in Bangkok in November 1960). The economic planners in the region could thus take into account the nutritional aspects of agricultural planning in these Asian countries. Similar meetings are planned for Africa and Latin America. Technical assistance in policy planning on a regional basis does not, however, exclude vigorous assistance to individual countries in this regard. Such assistance continues in Asia, Latin America, the Eastern Mediterranean area and Africa.

FAO, often in co-operation with WHO, has assisted in the establishment of food and nutrition boards and other policy, co-ordinating or executive bodies. Examples of such activities may be found in the setting up of a Food and Nutrition Council in Ghana, advice to the Government of Poland on a Food Science and Nutrition Institute, the development of a nutrition service in Haiti, and the reorganization of the National Nutrition Committee of Thailand. There is an increasing number of requests for assistance of this nature under the FAO/ETAP programme, particularly in Africa.

However, much still remains to be done in this field, and the need for national nutrition services and organizations becomes more acute with the growth of field programmes. In view of the importance of the subject the Joint Committee gave special attention to the organization, function and activities of national food and nutrition organizations. Its views are outlined in the following section.

National food and nutrition policies and activities

National programmes for improved nutrition have many facets :

1. A programme to relate medical activities and public health legislation and services to the nutritional needs of the human population. This programme will include the following :

- (a) epidemiological studies, including clinical surveys, to determine the magnitude and nature of the nutritional problems ;
- (b) establishment of nutrient requirements for vulnerable and diseased groups ;
- (c) implementation of measures by medical, public health and auxiliary personnel for the prevention of malnutrition ;
- (d) development of adequate dietetic services in hospitals and welfare institutions ;
- (e) evaluation of the interaction between improper feeding and other causes of diseases ; and
- (f) advising of other governmental agencies on the public health aspects of nutrition problems with which they may be concerned.

2. A food and agricultural programme to relate the production, processing, handling and consumption of food to nutritional needs. This programme will include the following :

- (a) assessment of national food supplies and consumption levels in relation to the nutritional needs of the population ;
- (b) establishment of short-term and long-term targets for food production and supply, taking into account the nutritional needs of the population and the agricultural, economic and social factors affecting food production and consumption ;
- (c) provision of technical advice, on methods of storage, preservation, transport and marketing of food that will maintain maximum nutritive values, to all organizations and industries connected with these activities ;
- (d) collection and dissemination of information on the nutritive value of processed and unprocessed foods and the effects on nutritive value of common commercial or household processing practices.

3. Action in respect to food standards, food control and legislation so as to ensure the quality of food, including its maximum nutritional value and wholesomeness.

4. Steps to be taken to meet the needs of special groups through supplementary and general group-feeding programmes for hospitals and other institutions, schools, workers and others.

5. The periodic assessment of levels of food consumption and of nutritional status.

6. Nutrition education and training programmes at several levels (see Section 15).

7. Research and investigations in food and nutrition problems. Programmes in applied nutrition and their planning and implementation obviously depend on adequate research-based knowledge of nutritional problems within the country. Such knowledge can accumulate only by means of continuous and consistent investigations into various aspects of the field of nutrition. Research programmes include studies of nutritional status and dietary diseases in relation to food and nutrient intake; determination of nutrient requirements; and studies of the nutritive value of foods and of the food-consumption practices of different segments of the population. The training of medical and scientific personnel in research should be linked with courses in the theory of nutrition and its practical application.

Basic steps to achieve objectives

The implementation of the programme outlined above will require the co-operation of many groups and individuals and action by governments.

Training and recruitment of technical personnel. The formulation and implementation of programmes designed to improve the nutritional status of populations calls for adequately trained technical personnel. In many of the developing countries such personnel may not be available at present. The training of technical personnel to take charge of nutrition programmes, for example in ministries of health and of agriculture, and to promote nutrition education must be regarded as a first priority.

Development or strengthening of centres for nutrition teaching and research. In many countries the most effective way of promoting education and research programmes will be to make the fullest use of existing institutions, including universities and colleges of medicine, public health, science and agriculture. New institutes or departments concerned with nutrition and related programmes (e.g., food science, home economics, health education) may develop best when closely associated with existing institutions.

Encouragement of co-operation between individuals and groups. Experience has shown the important results that can be achieved by promoting voluntary co-operation between professional workers in different fields of nutrition and related fields (including the economic and social sciences).

Action within ministries (or government departments)

Certain ministries (or their equivalent), in particular health and agriculture (food and fisheries), often have special responsibilities in nutrition

programmes. Each of these ministries should ideally have fully staffed nutrition sections; as a minimum, there should be a qualified nutrition officer with suitable technical and administrative personnel.

It should be the task of the nutrition officers (a) to stimulate interest in nutritional problems within their own ministry and to promote the nutritional programme undertaken by the ministry and (b) to co-operate in all possible ways with their colleagues in other ministries, both directly and through any co-ordinating machinery (e.g., National Nutrition Council) which may be established. The precise composition of the nutrition sections in each ministry will depend on the administrative set-up in different countries. In countries with a federal set-up, it may be necessary to have nutrition units in the different states constituting the federation.

The importance of co-ordination of national policy; the role of national nutrition councils

By their very nature, many problems in nutrition are the concern of two or more ministries or government departments. Thus while much may be achieved by personal and technical co-operation between officers of ministries of, for example, health and agriculture, experience has shown that, in many countries, special machinery for co-ordination of national efforts may be both necessary and desirable.

This co-ordination should embrace not only ministries directly concerned with nutrition, but others such as those concerned with economic development, which may require advice on nutritional matters because they may be responsible for major policy decisions (e.g., in respect to food imports and exports or the establishment of new industries).

The plan of co-operation and co-ordination may also involve ministries (or departments) responsible for education, social welfare, economic affairs and community development, and not least, governmental or public bodies concerned with university and/or medical and agricultural education and research.

Because of the above considerations, it has been considered wise in several countries to establish a national body, under a title such as National Food and Nutrition Council, charged with the tasks of:

- (a) advising the government as a whole in food and nutrition problems and on the desirable action to be taken; and
- (b) securing agreement on the ways and means through which the national programmes can be implemented, whether through the secretariat of the council, through the different individual ministries or through other bodies (e.g., teaching or research centres).

In many countries the formulation of integrated nutrition programmes will not be possible unless such interministerial and interdepartmental co-ordination is effected by a statutory body with access to, and with powers

to advise, the highest authorities of government. This statutory body or council would therefore require, as its chairman, someone who himself occupies a senior position in the government (perhaps even the minister responsible for economic development) or alternatively some other individual whose personal prestige enables him to have access to the government.

The council, for effectiveness, will have to include senior representatives of all ministries of the government which are in one way or another responsible for the problems of food and nutrition. The membership should also include technical experts in the field of nutrition, food technology, home economics, agronomy and animal husbandry, education, social welfare and statistics, and should have as its secretaries leading nutrition workers in the country, such as the heads of nutrition departments in the ministries of health and of food and agriculture. It is also likely that in some situations a full-time secretary may be necessary.

The Joint Committee realized that the precise composition of the council will differ from country to country, depending upon local circumstances.

The council would require, for the discharge of its various functions, several expert committees or working groups, which may be arranged from time to time to advise on specific questions. The recommendations of the council would be based on the advice of these technical working groups and would be forwarded to the relevant ministries for implementation.

These technical groups are essential for success; hence the stress laid in this document on education and training. In some countries the first step to be taken may well be to establish a technical advisory group from those people currently available with a knowledge of the technical aspects of research and education programmes in the field of nutrition. Once such a basic technical structure has been established, the foundation will have been laid for achieving the main objective, the proper organization of a national council.

The Joint Committee was of the opinion that interested international agencies should arrange, with the consent of the governments concerned, to establish contact with and to work through the national councils in countries where they exist.

Food shortages and famine

The Nutrition Division of FAO has played an important role in the over-all FAO efforts to ease the serious food shortages and famines which have occurred in a number of countries during the period under review. Following a drought in Morocco in 1957 and an earthquake in Chile in 1960, FAO provided assistance to these countries. Since the end of 1960 FAO has been given major responsibility for ensuring that sufficient supplies be made available to South Kasai, Congo, for effective relief. An epidemic of protein-calorie malnutrition broke out in South Kasai, as a

result of food shortage and the influx of a large number of refugee tribesmen. WHO assisted in the organization of medical services for the treatment of acute cases of malnutrition in hospitals and rural dispensaries. FAO and WHO also took steps to ensure the availability of supplies of appropriate foods at these centres and to instruct the local medical and health staff in their proper use for treatment and prevention.

The Joint Committee was conscious of the fact that similar emergencies might recur and urged the two Organizations to continue to be at all times ready for necessary action. In particular, it suggested that a very simple handbook, based on World Health Organization Technical Report Series No. 45 (*Prevention and Treatment of Severe Malnutrition in Times of Disaster*), be prepared and made available in each region in case of need. Such a handbook should emphasize the practical aspects of food management in case of disaster (such as appraisal of existing stores and possibilities, rationing, methods of distribution, price control and first-aid nutritional relief).

The Joint Committee was informed that, in pursuance of a United Nations General Assembly resolution, FAO will be concerned in the utilization of considerable amounts of food surpluses as aid to developing countries. The Joint Committee felt that this was a unique opportunity, the significance of which as a possible contribution to the improvement of nutrition in developing countries should not be under-estimated. It adopted the following resolution in order to place on record how best this objective could be achieved :

“ The Joint Committee is encouraged to note that large amounts of agricultural surpluses may shortly be made available to a number of developing countries. It notes with satisfaction the fact that, in the past, international organizations, FAO in particular, have been concerned in such distribution and that nutritional priorities have received due consideration. The Joint Committee, conscious of the dangers which may arise if the distribution of such surpluses is guided primarily by economic rather than nutritional considerations, hopes that international organizations, FAO in particular, will continue to ensure that nutritionists as well as economists are involved from the beginning in the planning of the proposed distributions. ”

Freedom from Hunger Campaign

The Freedom from Hunger Campaign (FFHC), launched by FAO on 1 July 1960, aims at improving food production and consumption, particularly in those areas which have chronic shortages of food. An important aspect is to promote widespread understanding of the complex nature and extent of the problem of providing adequate food for the present and ever-increasing world population. As part of this preparatory phase, a number of basic documents are being prepared by FAO in co-operation with other interested United Nations agencies. The Nutrition Division has responsibility for some of these documents, and WHO is co-operating in this work.

Plans for some 20 projects have been prepared by FAO in great detail for possible implementation under the campaign when funds are available; governments and private organizations are now studying them. FAO is launching the two first national programmes under the FFHC in the Northern Region and Eastern Region of Nigeria; they aim at increasing production and consumption of grain legumes (pulses).

The Joint Committee hoped that, as more funds become available, increasing support would be given to effective developments in the field of nutrition.

12. DEFINITION AND MEASUREMENT OF FOOD CONSUMPTION AND NUTRITION AS A COMPONENT OF LEVELS OF LIVING

The question of how to define and measure standards and levels of living has received increasing attention following the establishment of the United Nations and its specialized agencies. The United Nations Economic and Social Council is concerned with the improvement of levels of living in general, while FAO and WHO have particular responsibility for the so-called component of "food consumption and nutrition", i.e., the kind, quantity and nutritive value of foods consumed by people. In spite of the considerable progress achieved in defining and measuring this component, fully satisfactory measures have not yet been devised.

The United Nations Committee of Experts which prepared the Report on International Definition and Measurement of Standards and Levels of Living (1954) suggested the following three "priority" indicators to reflect different aspects of the nutritive value of diets:

- "(1) National average food supplies in terms of calories at the retail level compared with estimated calorie requirements.
- "(2) National average food supplies in terms of total proteins at the retail level.
- "(3) National average food supplies in terms of animal proteins at the retail level."

While the approach of the United Nations Committee was appropriate under the circumstances in which the subject had to be considered, subsequent consideration and developments have emphasized the need for certain improvements in the indicators. First, national averages have very limited value, especially when the available food supplies are unevenly distributed among different socio-economic sections of the population. It is necessary, therefore, to take into account the socio-economic distributions in addition to national averages, but for many countries such data are at present very difficult to obtain. Second, it is desirable, as far as possible, to choose a single priority indicator instead of a multiplicity of separate indicators. The United Nations Economic and Social Council expressed

the strong opinion that this should be attempted at least in relation to the nutritional quality of the diet.

Although the nutritional value of diets cannot be fully expressed in terms of a single indicator, and although certain indicators might be quite adequate for one pattern of diet but inadequate for another, consideration should be given to the development of simple, approximate and probably empirical indicators. At the same time, the need for an improved method of expressing the biological value of the protein of diets in relation to total protein requirements and adequate food energy should be taken into account.

A simplified indicator now being considered is the proportion of total calories derived from cereals, starchy tubers and sugars. This indicator of the nutritional quality of diets has been found to be of potential usefulness in some preliminary studies carried out by FAO. Since most foods in these categories are relatively poor in protein and many other essential nutrients, this indicator should reflect nutritional quality indirectly or negatively—that is, a higher proportion would indicate lower quality. However, the negative correlation of the indicator with nutritional quality cannot be relied on in all cases, since nutrition quality is influenced also by the relative quantities and specific kinds of foods included in these categories in different regions of the world. This indicator could be improved further by suitable modifications to suit different types of diets. Nevertheless it seems to have the merit of simplicity, gives a fair impression of nutritional quality and is applicable to widely different conditions. These considerations led the Working Party on Statistics for Social Programmes, which was established in 1951 by the United Nations Administrative Committee on Co-ordination (ACC), to add the following indicator to the list proposed by the United Nations Committee in 1954:

“(4) Per cent. of total calories derived from cereals, roots, tubers and sugars.”

A recent study of Indian diets has shown a high positive correlation between total calories on the one hand and protein, calcium and iron on the other. Similar relationships, probably at different levels, can be found in other regions. Since knowledge of such relationships in different types of diets might simplify the task of measuring the nutritive value of diets, studies on this and other relative aspects should be carried out in different regions.

The ACC Working Party recognized the need for better indicators than those currently available and requested FAO and WHO to give further attention to this subject. At its last session, the Joint Committee expressed the view that the broad subject of “criteria for assessing the state of nutrition and food consumption of population groups” merited further investigation and recommended that in due course it might be studied, on behalf of FAO and WHO, by an appropriate group of experts. Some indicators for assessing health of populations have been developed by WHO, which

will be useful in this connexion (*Wld Hlth Org. techn. Rep. Ser. 137, 1957, Section 3*).

The Joint Committee noted with appreciation that continued attention is being given to this subject by both FAO and WHO, and in the light of the above considerations recommends that :

1. Appropriate studies of existing data on diets and health status should be encouraged by FAO and WHO in different countries to test the usefulness of various possible indicators.

2. A small group of nutritionists, statisticians and economists with experience in the subject should be convened by FAO and WHO to review the problem in detail and to suggest appropriate measures.

13. FOOD SCIENCE AND TECHNOLOGY

Food science and technology are concerned with the improved handling, processing, storage and utilization of foods. To be effective, progress in food technology must be closely linked with progress in agricultural production (including animal production) and with the efficient marketing, distribution and use of foods.

Since the last session of the Expert Committee, FAO's work on food science and technology has followed much the same lines as in previous years, though more emphasis has been placed on protein-rich foods. A recent development that may be of considerable importance in the future has been the expressed desire of several countries to have United Nations Special Fund projects in which food science and nutrition are the major aspects.

The application of food technology may make a direct contribution to the nutrition of the people in terms of both total food supplies and improvements in food quality. Improved storage methods lead to an increase in the total foods available, while improved preservation and processing methods will result in the retention of nutritive values and can even lead to higher quality, for example, in terms of proteins and certain vitamins. Moreover, newer techniques can transform crops or parts of crops not at present utilized by man into human foodstuffs. Changes in the method of processing oilseeds (noted on page 58) may, in the future, exercise as profound a change on protein supplies for man as that produced in edible-fat supplies through the development of the margarine and shortening industries in the early part of this century.

Application of food technology may have indirect effects on nutrition in several ways. In many developing countries agriculture is the main and primary industry ; the more efficient use of agricultural products can contribute to the economy of a country by reducing the necessity for certain

food imports and by making possible the export of surpluses. At the same time the new local industries can provide employment, and money that may be used for the purchase of foods. Improvements in present methods (for example, through the introduction of simple types of machinery) may rapidly affect household and community practices, liberating the housewife and others from some time-consuming tasks and making labour available for other, more productive purposes.

Food-processing industries may be essential to meet the requirements of the new urban populations in developing countries; they can also make an important contribution to plans for group feeding.

The FAO programme also is concerned with the study and improvement of indigenous or traditional food-processing methods. An examination of traditional processes suggests that some of these, especially those based on fermentation, influence nutritional value. An essential part of FAO programmes in food technology must therefore be the encouragement of basic and applied research into the composition of foods at different stages of processing (including cooking), so that the nutritional changes are known before major technical changes are advocated. There must also be educational programmes at both the professional and the subprofessional levels to train men and women in laboratory and production techniques.

In some parts of Africa, as well as in other continents, there is increased interest on the part of governments in food science and technology, as evidenced by requests from the Ivory Coast, Ghana, Pakistan and Poland for assistance in setting up teaching and research institutes.

Modern food science and technology stress the unity of the food industries. Common scientific principles (such as those of biochemistry and microbiology) apply to all foods whether of plant or animal origin; many of the physical and engineering techniques used in processing are common to a wide range of foodstuffs; moreover, neither the nutritionist nor the food technologist is concerned with any one food component or any one food but with all components of the diet. It is worth stressing that the principles of physical science may be adequate for the treatment of agricultural produce for non-food purposes, but their application in food industry must always be governed by the consideration that foods are biological entities and that their nutritive quality may undergo undesirable changes unless due regard is paid to this aspect during processing.

Food composition

A knowledge of food composition is necessary for assessing the nutritive value of food supplies and food consumption and for translating nutritional requirements into food needs. The fifth session of the Joint FAO/WHO Expert Committee on Nutrition recommended the continuation of the work on food composition and indicated some specific lines to be followed.

Two aspects in particular, viz., compilation of data on fatty acids and on amino acids in foods, were emphasized and have since received attention :

1. A draft table of the fatty-acid content of foods has been prepared (with the assistance of a consultant provided by the United States Government), for evaluation of diets in relation to epidemiological studies and research planning pertaining to coronary heart disease.

2. Work has continued on the compilation of data on the amino-acid content of dietary proteins.

The Joint Committee considered food-composition studies to be also an element of dynamic processes in food technology. It is essential to know the composition of foods as consumed and to know the effect of various types of food processing on the nutrient content of foods. Indeed, inasmuch as food technology is concerned with the preservation of the nutrients in food, it may be said that without studying food composition, no rational food technology is possible. FAO should therefore continue to pay great attention to this general problem. In its future programme, and as far as the available means allow, FAO should also collect information on the composition and calorie value of alcoholic beverages consumed in different parts of the world.

A Regional Food Composition Table assembling all available data on Latin American foods and food names, prepared by INCAP and ICNND with FAO participation, is to be printed in both Spanish and English. The Joint Committee anticipated that this would be widely useful and hoped that it would stimulate the preparation of similar tables for other regions.

Food processing

Industrial

During the past two years assistance has been given to Pakistan, India, Burma, Mexico, Israel, Turkey and Ghana in food technology. The development of modern systems of food processing has had an important part in these assignments. In most cases the specialists sent out by FAO have worked either directly in existing institutes concerned with food science and technology or in close association with such institutes.

Family and community (traditional).

Traditional methods of food processing (drying, smoking, salting, fermentation) received detailed attention at the FAO Regional Seminar on Food Technology for Asia and the Far East (Mysore, India, 1959), and the Tenth FAO Conference (November 1959) showed much interest in the subject. FAO is collecting further information on the methods practised

in different regions and the characteristics of the products thus preserved. It is hoped to intensify these efforts in 1962/63.

Protein-rich foods

The Protein Advisory Group,¹ established by the Director-General of WHO in 1955, became in 1960 a tripartite WHO/FAO/UNICEF group.

The progress achieved in the study and development of various protein-rich foods is summarized below.

Various mixtures and formulations of the basic protein-rich materials from soya, groundnut and cottonseed have been subjected to successful biological, clinical and acceptability trials.

Satisfactory commercial production of flours from soya, groundnut and cottonseed has been achieved, and good progress has been made towards the economic production of a refined fish flour. There is also interest in partially defatted fish meals which are stable and acceptable to the local population.

Acceptability tests were conducted in some 20 countries on fish flour, groundnut flour, cottonseed flour, and mixtures of these products with local staple foods. Assistance has been given to a number of these countries for the production and commercialization of the products.

A fish flour produced in Morocco has, so far, proved acceptable to the population, but there is still room for its wider use. A campaign to promote consumption of fresh fish, fish flour and other types of processed fish has been launched in that country.

Groundnut flour is being produced industrially in Senegal, Nigeria and India; it is being used in mixtures with millet or with dry skim milk, thus extending supplies of the latter.

Two FAO surveys on wholesale and retail marketing were made in Senegal, and these were followed by mass acceptability tests of various mixtures and recipes. A campaign to promote the wider use of groundnut flour is being launched with FAO assistance. Private firms in Nigeria and Brazil are also interested in the production of groundnut flour mixtures and biscuits. A product called Incaparina, developed in the Institute of Nutrition for Central America and Panama (INCAP), has successfully passed all stages of processing and acceptability and is now being produced commercially.

FAO and the Instituto Centro Americano de Investigaciones Técnicas e Industriales (ICAITI) have developed a sausage of the frankfurter type, containing cottonseed flour as an extender instead of wheat flour, for commercial production in Central America.

¹ See *Joint FAO/WHO Expert Committee on Nutrition, Fifth Report*, p. 21.

The production and sale of *saridélé* is keeping the Indonesian plant operating to full capacity, in spite of some difficulties affecting the biological value of the product.

The future work of WHO, FAO and UNICEF on protein-rich foods will continue to be guided by the Protein Advisory Group, which, at its last session in August 1960, made important recommendations regarding priorities, as follows :

1. Promotion of consumption, and commercialization of those products already available either at pilot-plant or industrial level.
2. Industrial production of those products which have successfully passed the mass acceptability tests.
3. Studies of available and potential raw materials, methods and cost of processing, economic aspects of production and commercialization.
4. Further research on fish flour, groundnut and cottonseed flour in preference to sesame, coconut, protein isolates and leaf proteins.

(The promotion of foods of high protein value is considered in detail in Section 16.)

The Joint Committee commended the vigour and the variety of the approaches to this crucial problem.

Food additives

In December 1958, the third session of the Joint FAO/WHO Expert Committee on Food Additives considered provisional specifications for identity and purity of some of the more commonly used antimicrobial preservatives and antioxidants. Similar specifications for a number of inorganic natural and synthetic colouring matters for use in food were defined by the Expert Committee at its fourth session, in December 1959.

The reports of both these Committees were circulated for comments to firms manufacturing these substances and to institutes or individuals working with them. After further consideration by the members of the Expert Committee, the revised reports will be published as monographs.

The fifth session of the Committee, which was held in Geneva in December 1960, dealt with the evaluation of the carcinogenic hazards of food additives. The sixth session of the Committee will discuss in June 1961 safe levels of use and associated problems of a number of antimicrobial preservatives and antioxidants. Data sheets on these substances have been compiled in advance for the Committee. These sheets not only contain specifications as given in the monographs mentioned above but also provide information on use, legislation and toxicology. Following this meeting they will be brought up to date, mimeographed, and distributed.

FAO has continued to publish approximately 10 issues per year of the periodical *Current Food Additives Legislation*, which now also includes pesticide residues. In addition, a new series on *Food Additive Control* has been initiated and has so far covered Canada, the United Kingdom, Australia, the Netherlands and Denmark.

FAO and WHO have also maintained an active interest in problems connected with the use of pesticides and with pesticide residues.

In accordance with the programme of work outlined by the first FAO/WHO Conference on Food Additives (1955), a beginning has been made with the collection of data on emulsifiers.

The Joint Committee commended the two Organizations for the excellent programme in this area of such importance to Member Governments of both technically developed and less developed areas. It appreciated that many considerations arising from both intentional and incidental additives will continue to be a problem for governments. Newer uses of agricultural chemicals and biologicals in food production and preservation, new additives in processing and new packaging materials will continue to be invented. The increasing technologic development of a nation's food supply will demand effective regulatory and educational measures regarding the use of these substances. Uniformity of control from country to country is desirable in order to expedite the movement of food in international trade. Until such uniformity occurs, it is essential that food-exporting countries be aware of the regulations concerning products, in order to avoid disastrous losses through condemnation of shipments.

FAO and WHO should continue to serve in this field through the elaboration of principles of use and methodology, the promotion of sound and uniform regulatory measures, the codification of international standards, and the provision of media of exchange of information on all subjects relating to intentional and incidental additives.

Food irradiation

Following the recommendation of the fifth meeting of the Joint Expert Committee, FAO organized in November 1958 a widely representative European Meeting on the Use of Ionizing Radiations for Food Preservation, at Harwell, England at which major aspects of food irradiation were considered. Subsequently, a European Meeting on the Microbiology of Irradiated Foods was held in Paris (April 1960).

Food standards, legislation and inspection

Several countries are seeking guidance from FAO for revising their food legislation. Furthermore, in certain regions such as Southeastern Asia, the need for modernizing and streamlining food legislation has been

expressed, and FAO, in close co-operation with WHO, plans to convene a regional meeting on food standards and legislation in the near future.

The First FAO Conference for Europe, held in Rome in October 1960, recognized the desirability of international agreement on minimum food standards and associated requirements as an important means of protecting consumers' health, of assuring quality and of reducing trade barriers. Already some international governmental and non-governmental organizations are active in this field, but without a co-ordinated approach. In view of (1) the responsibility of FAO and WHO in the field of food standards and legislation and (2) the desire to avoid the creation of new international bodies, the Conference felt it would be valuable if the Directors-General of FAO and WHO, after consultation with interested international governmental and non-governmental organizations, could submit to the Eleventh Session of the FAO Conference proposals for a joint FAO/WHO programme on food standards. Preliminary consultations have already been initiated between FAO and the Council of the Codex Alimentarius Europae.

In Morocco in 1959, severe intoxication by oil used for human consumption occurred. WHO assisted the Government with personnel for diagnosis and treatment of numerous cases of poisoning, and FAO provided the services of an expert to study food legislation and to advise the Government on appropriate control measures.

14. GROUP FEEDING PROGRAMMES

In 1958 two regional school feeding seminars, one for South America and one for Asia, were sponsored jointly by FAO and UNICEF. WHO participated in both seminars, which brought together key personnel associated with various aspects of school feeding in different countries. The problems encountered in developing school feeding programmes and related nutrition activities and the measures needed for their expansion on a sound nutritional and financial basis were considered.

FAO has helped to arrange and conduct national seminars on school feeding in Finland, the Ivory Coast and the Upper Volta.

At the request of UNICEF, FAO and WHO carried out a survey with the help of consultants to :

(a) determine whether the distribution of dry skim milk is the optimum way of using local and international resources or whether support should be given to other ways of improving maternal and child nutrition, and

(b) indicate, in the light of experience, future lines of action of the international agencies with respect to the distribution of skim milk.

This survey resulted in a number of important suggestions on ways of combining current activities with additional measures to provide effective

feeding programmes, taking into account such local factors as economic possibilities and the availability of suitable personnel.

Towards the end of 1959, the curtailment of dry-skim-milk supplies hitherto obtained primarily from the Government of the United States created an urgent problem. Many supplementary feeding programmes in schools and maternal and child health centres throughout the world had come to rely on this food. The FAO Conference, at its session in November 1959, regarded the situation as most serious. As a result, FAO, in co-operation with WHO, made an analysis of the skim-milk situation and its repercussions on FAO/WHO/UNICEF programmes. This report included, *inter alia*, information on the magnitude and nature of dry-skim-milk distribution programmes; the impact of the situation on UNICEF-assisted programmes, with particular reference to priorities; and supply prospects for dry skim milk in exporting countries.

The curtailment in dry-milk supplies has, however, not been an unmitigated evil. It has helped to stimulate interest in more permanent methods of preventing malnutrition in young children based on the production and use of local foods and extending the limited supplies of dry skim milk by appropriate mixtures with other, locally available protein-rich foods. Dry-skim-milk supplies have now increased again and the situation has eased.

The practicability of enrichment of dry skim milk with vitamins A and D and preliminary testing of the stability of the resulting product under conditions of normal use have been under study in the FAO/WHO/UNICEF protein-rich-food programme. The WHO Protein Advisory Group recommended in 1958 fortification of dry skim milk at the levels of 10 000 I.U. vitamin A and 800 I.U. vitamin D per 100 g dry skim milk. These levels allowed for a 50% loss of the vitamins before consumption of the milk. It is felt that all UNICEF milk should be thus enriched for countries requesting it, that the enriched milk should be given first to areas of greatest need, and that the provision of vitamins A and D (now being distributed by UNICEF in capsules) should cease when enriched dry skim milk is introduced, except for health centres needing supplies for therapeutic purposes.

Supplementary child feeding programmes are an integral part of most of the "expanded aid" programmes (Section 17). It is anticipated that FAO's role in the promotion of supplementary feeding will be increased as a result of the United Nations General Assembly resolution (October 1960) on the disposal of surplus foods.

The problem of group feeding in institutions such as educational establishments, hospitals and prisons deserves to be carefully examined from the nutrition standpoint. The Joint Committee hoped that FAO and WHO would pay increasing attention to it in the coming years, for they may be called upon for assistance, particularly to advise governments on the organization of feeding programmes and training of personnel.

Group feeding of manual and non-manual workers

ILO has emphasized on several occasions (Textiles Committee 1948, Asian Regional Conference 1950, Petroleum Committee 1952, Inland Transport Committee 1954) that attention should be given to the special nutritional needs of workers and to the development and promotion of appropriate feeding facilities. A recommendation concerning welfare facilities for workers, adopted by the General Conference of ILO in 1956, contains detailed provisions regarding canteens and other feeding facilities for manual and non-manual workers other than those in agriculture and sea transport.

The need for international action in this field was recognized by the Food and Nutrition Board of the United States National Research Council in 1951. It expressed the hope that a joint study could be made by FAO and ILO of feeding programmes for workers in Europe and Latin America. It recognized the need for a central source of information and guidance and the stimulation of interest in planning programmes.

FAO has also done some work in this field, providing, for instance, assistance to Poland and India. In the latter case, the establishment of a school of catering and nutritional management for the training of personnel to run the mass feeding centres, including industrial canteens, may be mentioned. The subject of feeding workers has also been discussed in FAO in relation to the Freedom from Hunger Campaign. The fifth FAO Regional Conference for the Near East, held in Teheran in 1960, recommended that a survey be undertaken of facilities now available in that region for feeding industrial workers.

Proper feeding of workers can help to maintain good health and thus reduce absenteeism and increase working efficiency; it is therefore valuable from an economic point of view. There are indications that efficiency can be raised by the provision of good, adequate meals. Further experimental work is going on in some countries to test this thesis.

The Joint Committee considered that feeding programmes for workers should not be restricted to manual workers in industry. Attention should also be paid to workers in agriculture (e.g., plantation workers) and employees in governmental and community services and private enterprises. The Joint Committee was aware that the organization of group feeding for those employed in agriculture was much more difficult than the feeding of workers in factories or institutions. Special attention should therefore be paid to organization, particularly to facilities for transport and storage of foods. A pilot project should certainly be considered before a large-scale programme.

The Joint Committee recognized that the feeding of workers could introduce new and better food habits, such as milk consumption, particularly where adolescents and women are beneficiaries. But the mere provision

of food in canteens should not be seen as the only goal, however important that may be. Such a service may also help to promote better nutritional habits affecting the welfare of the whole family. Group feeding in canteens is a unique opportunity to reach both men and women and would be a waste of effort if it were not accompanied by nutrition education. The Joint Committee believed that it was a great mistake to consider the feeding of workers as being separate from that of their families; where possible, canteens should make good food available to families at low prices, and such canteens should be used as centres for education in nutrition. Canteens should offer not only food, including milk, but also nutritious non-alcoholic beverages. Good water must be available at all times in working areas, and under some working conditions it may be necessary to supply salt.

In the newly developing urban centres in countries becoming industrialized, a suitably organized feeding programme for workers, adapted to the local working schedule of the various commercial and industrial establishments, has a particularly useful role to play. Where necessary such a programme should aim at providing more than one meal a day, depending on local needs, practice and transport facilities. Provision of meals at work or payment in kind should not be considered as a part of wages and should be on an absolutely voluntary basis as far as the worker is concerned. Meals should be at a reasonable price, without profit for the factories or institutions concerned.

The Joint Committee recognized that successful feeding programmes for workers required well-trained personnel in management, menu planning, catering, preparing and distributing meals. It recommended that a responsible agency in each country formulate and propose necessary legislation and give guidance on standards for group feeding, taking into account nutritional and hygienic aspects. Facilities should be available to train the personnel required, to advise the management of the respective canteens on the desirable composition of meals for workers in different occupations, to watch the quality and quantity of the food supplied and otherwise help to ensure satisfying meals.

The Joint Committee considered that new developments and advances anticipated in food science and technology in both developed and developing countries should be carefully studied in relation to :

- (a) the type of catering arrangements, including kitchen equipment;
- (b) the training of cooks to work in the kitchen or of food technologists for factory-scale production;
- (c) the development of village producer co-operatives where appropriate.

The Joint Committee therefore recommended :

1. that the secretariats of the international organizations concerned should collect and evaluate available information on the legislation concern-

ing feeding programmes for workers, on approaches and methods adopted in various countries and in the various types of industries and institutions—the type of feeding programmes, the quality of meals, the hygienic conditions, the management, financial aspects, etc.—and bring this information to the attention of governments; and

2. that an expert committee be convened at a suitable time to consider the results of the mentioned survey and report to the responsible organizations.

15. TRAINING AND EDUCATION IN NUTRITION

Previous sessions of the Joint Committee have dealt with various aspects of nutrition education and training. Recommendations made at some of these sessions may be mentioned here, for they are particularly relevant to the present stage of FAO/WHO activities in these fields.

The second report of the Joint Committee¹ recommended that:

“... active steps should be taken by governments to further the training of workers in nutrition and that FAO and WHO should continue to provide all the assistance they can to their Member Governments in initiating and conducting educational programmes.”

The third report of the Joint Committee² contains sections on the practical application of programmes to improve nutrition and on food production and extension methods. It recommended that:

“FAO and WHO should assist governments on request in organizing specific projects for the prevention of protein malnutrition. The Committee hopes that UNICEF will co-operate in these projects. In their planning and development, account should be taken of the principles and facts presented in the report.

“FAO and WHO should convene, at an appropriate time and place, a conference to consider ways and means of organizing programmes for nutritional improvement at the village level which are in line with modern concepts of development work among rural communities, and which call for the participation of workers belonging to a variety of disciplines.”

Methods and content of education in nutrition were dealt with at the fourth session. The fifth session considered education and training in nutrition and nutrition in maternal and child health programmes. The Joint Committee felt that the establishment of additional training centres for long-term education of specialists in applied nutrition was urgently needed, and that centres of this kind already providing such training for national and potential international personnel should be assisted to maintain and extend their facilities.

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1951, 44, 42; *FAO Nutr. Mtg. Rep. Ser.*, No. 5, 1951.

² *Wld Hlth Org. techn. Rep. Ser.*, 1953, 72, 19; *FAO Nutr. Mtg. Rep. Ser.*, No. 7, 1953.

The increased interest of governments in the development of national nutrition programmes and the rapid spread of applied nutrition programmes have made the problem of training nutrition workers of major importance to governments and therefore to FAO and WHO. In fact, it can be said that the availability of trained workers is the limiting factor in many of the activities carried out by these two international organizations. The solution of this problem is likely to be difficult; it is considered more fully later in this Section. It may be noted at this point that a number of attacks on this problem are under study. Regional training courses and seminars have been sponsored jointly by FAO and WHO, sometimes in association with UNICEF or other agencies. Training in nutrition principles and methods of education in nutrition form an essential part of programmes to which FAO field staff are assigned. Most of these are in connexion with UNICEF-assisted projects. Several fellowships for training have also been granted.

The Committee took note of the following regional activities :

(a) A Nutrition Training Course in the English language was held in Kampala, Uganda, in November 1957 for professional workers in fields related to nutrition in Africa south of the Sahara. This course, in which the Uganda Government helped, was the third of a series of training courses organized by FAO and WHO for workers from Africa. Following the course a Seminar was held on the orientation of nutrition programmes in the countries and territories concerned. This was attended by a number of senior representatives from these countries and territories as well as by participants in the training course.

(b) An FAO/WHO Symposium on Education and Training in Nutrition in Europe was held in Bad Homburg, Germany, in December 1959. The training of nutritionists and dietitians and other professional workers in nutrition is relatively advanced in most European countries. Discussion in the Symposium concentrated on the training at college and university levels in the following disciplines : nutrition and dietetics, medicine and public health, home economics, agronomy, and general education.

(c) A Seminar on Nutrition Education sponsored by FAO, WHO and UNICEF in 1960 in Rio de Janeiro, Brazil, included participants from ten countries of South America, with representation from public health, education, agricultural extension and home economics services and nutrition institutes. The Seminar provided an opportunity for joint examination of the channels, methods and techniques most effective in educational programmes to improve nutrition and of appropriate training in various disciplines.

Experience in the development of programmes of education in nutrition has emphasized the importance of linking them with supplementary-

feeding and food-production programmes and with school and community life, as well as of incorporating the methods and criteria of evaluation in the initial plan.

The need for texts and other teaching materials suited to the food and nutrition problems and the cultural conditions of the people concerned has been recognized. FAO and WHO, sometimes in collaboration with UNESCO and with the financial help of UNICEF, are therefore assisting with the national or regional production of such material. Examples are the Horticultural and Nutrition Manual for Central America; posters, leaflets and manuals on horticulture and nutrition for teacher-training and extension workers in Tunisia; posters, leaflets and a teacher-training manual for Libya; guides for nutrition teaching in primary schools in Ecuador; film strips and a nutrition manual for teachers in Italy.

With the increasing realization that sound programmes of education in nutrition cannot be developed without an adequate knowledge of the cultural, agricultural and socio-economic conditions of the area for which they are designed, FAO and WHO have employed in a few countries anthropologists with a knowledge of nutrition to carry out studies which will form a basis for understanding attitudes and devising effective corrective programmes. It is hoped that more work of this nature will be undertaken.

Nutrition in home economics

Home economics, which is concerned primarily with education for family living, offers an effective channel for promoting improved nutrition in the home and community. Recognition of this has led, in recent years, to greater emphasis on home economics subjects in the curricula of elementary and secondary schools, teacher-training institutions, colleges and universities and an increase in out-of-school programmes for women and girls. FAO has helped to stimulate these developments and has worked towards a clarification of the objectives and scope of home economics, its relation to other educational fields, and the nature of the training needed.

Countries have also been assisted to establish departments of home economics in colleges and universities, to strengthen the nutrition training in these institutions, and to approximate the teaching to the nutritional needs and resources. Special attention has been given to methods of teaching the principles of nutrition and food preparation to rural women and girls, using schools, community centres, extension services and other means.

Regional and national meetings have been organized by FAO in the Eastern Mediterranean area, Southeastern Asia and Latin America for the purpose of assessing present programmes in home economics and determining sound lines for future development, including the strengthening of

nutrition education and training. Seminars and training courses have been conducted in a number of countries, including Poland, Yugoslavia, Argentina, Malaya and Thailand, to prepare home economics teachers and rural workers for developing programmes more closely related to family conditions and needs. A European regional seminar on evaluation of home economics extension programmes gave particular attention to techniques and methods of evaluation and has led to the organization of a number of national training courses on this subject.

Studies are also being made of the relation of home economics to social welfare, especially family and child welfare, and of the nature of the training needed in these two fields. Such a study, jointly undertaken by FAO and the United Nations Bureau of Social Affairs, is now in progress in Africa, with a view to preparing a basis for training African women for their future responsibilities in administering and carrying out those aspects of community development which have a special bearing on child and family welfare. This study will also assist UNICEF in planning and preparing its future work in the community-development and mother and child welfare fields.

Reference is made elsewhere to the expanded nutrition programmes assisted by UNICEF, to which FAO and WHO supply technical aid. There has been an increase in the number of UNICEF-aided homecraft/mothercraft programmes since this Committee last met. Studies of these programmes as they are developing in Tunisia, Morocco and elsewhere have shown the need to strengthen and expand the training of the women responsible for directing these programmes and to include more nutrition and home economics in this training.

Expansion of nutrition education and training

In 1960, at the request of the UNICEF Executive Board, FAO and WHO collaborated in a survey of training in nutrition. The objectives were to assess the present scope of training schemes, the obstacles to faster progress, the areas of training where greater emphasis is needed, the use of trainees after completion of training, and the ways in which UNICEF, in co-operation with other international organizations, could provide greater help. Studies were carried out in India, Latin America (Guatemala, Ecuador, Brazil and Colombia) and East and West Africa, especially Senegal and Uganda. The reports of these studies, along with a score of other documents, formed the basis for a comprehensive report which was before the Committee.

Obstacles to faster progress

The failure on the part of governments to recognize the nature and magnitude of malnutrition is one of the reasons for the inadequacy of the training of personnel in nutrition. Health workers whose own training in

nutrition has been limited do not recognize the part played by an inadequate diet in causing, directly and indirectly, sickness and death; the training of essential personnel is therefore neglected. Similarly, lack of knowledge of nutritional needs on the part of agronomists has prevented proper orientation of food production.

Lack of co-operation between government departments may also result in insufficient and inadequately trained personnel. The failure of one government department to recognize its obligations will result in the absence of a cadre of personnel essential for an effective programme.

Even where there is a general recognition of the nature of the problem there must be a properly planned food and nutrition policy, because this will decide the type of training and the numbers to be trained. In few countries does such a policy exist.

Last and perhaps most important is the inadequacy of national resources in relation to the seriousness of the malnutrition problem. The inadequacy may be in the key personnel or in material aid to education.

Areas where greater emphasis is needed

A growing number of countries are undertaking practical pilot programmes for nutritional improvement of the type referred to in Section 17. However, such action programmes should be part of a broader plan to attack food and nutrition problems along the lines of an agreed food and nutrition policy. Such a plan can be built up only by highly qualified nutritionists in full co-operation with economists, agronomists and public health administrators. There is therefore a need for training of such highly qualified nutritionists, who are indispensable as directors and co-ordinators of practical nutrition programmes as well as international consultants. The Joint Committee considered that increased attention should be given to the training of this category of personnel.

Practical nutrition programmes which help to focus attention on local food and nutrition problems can provide a valuable demonstration of the efficacy of simple methods and techniques for improving the situation. Optimum use should be made of such projects for training.

The degree to which practical pilot nutrition programmes can be extended within individual countries and become part of broad national programmes to improve nutrition depends, in large measure, on the availability of trained personnel of various types and grades. The training associated with the current action programmes is largely of an *ad hoc* nature and is concerned mostly with the training of field personnel. It is, however, helping to stimulate interest in training needs and in the establishment of permanent facilities to meet them. There is thus an important interplay between action programmes and formal training activities which could eventually provide the nutrition leadership needed within countries. The

Joint Committee was of the opinion that action programmes should be supported by strengthening such formal training activities in nutrition as are already in operation in a country; where none exist, they should be started. International personnel assigned to countries should, wherever feasible, be centred in a university or college. They should regard advising on, and participating in, the teaching programme in nutrition as part of their duties.

In most countries human nutrition aspects are almost wholly neglected in institutes, colleges and universities concerned with the teaching of agriculture. Ignorance of human nutrition and human needs for food is glaringly obvious. This neglect of the teaching of nutrition is often the result of preoccupation with the production of crops (including food crops) for cash, without appreciation of the ultimate purpose of production. The FAO/WHO Symposium on Education and Training in Europe (1959) dealt with the training in nutrition of the agricultural student and drew attention to some good examples. The Joint Committee considered that urgent efforts should be made to introduce appropriate teaching in nutrition into the curricula of agricultural colleges and schools for extension workers.

There is likewise a need for developing teaching in nutrition in home economics schools and colleges.

Undergraduate teaching of nutrition in medical schools is often inadequate and theoretical. There are, however, examples of good training in some post-graduate public health schools. The Joint Committee emphasized that a nutrition course should be basic and obligatory for all candidates in schools of medicine and public health. For this purpose at least one member of the faculty should have a strong background in nutrition and be responsible for the recognition and teaching of nutrition as an important part of the curriculum.

There is increasing recognition of the contribution that nutritionally sound practices in food technology can make to the eradication of malnutrition and the maintenance of good nutrition, as by preventing gross losses of food, notably during storage, or more subtly, as by conserving nutrients in the milling of grains. Improved preservation and better use of existing food resources could make a substantial contribution to the improvement of nutrition. The Joint Committee was of the opinion that the establishment of departments of food science and technology in centres of higher education would provide a valuable training ground for students who later will become teachers and workers in a variety of disciplines and whose future co-operation will be essential.

The Joint Committee considered it important that *all* training should be closely associated with supervised field experience in nutrition demonstration or pilot areas.

There is a general lack of teaching materials in nutrition (including handbooks and manuals) for both formal training programmes and the

educational activities that form part of action programmes. In the view of the Joint Committee, FAO and WHO should devote more attention to the production of these materials.

The use of trained staff after completion of training

Appropriate posts and prospects for trained staff will depend ultimately on the attitudes of governments towards nutrition education and training, on the extent to which formal training is established and on the knowledge and experience gained in practical action programmes. Governments will need to be satisfied that the staff engaged in these activities will contribute to the solution of their national problems; the outlook will improve considerably when governments realize that they should not consider whether they can afford to pay trainees but whether they can afford *not* to employ them after they have completed their training. Trained staff should receive appropriate recognition; their pay and opportunities for promotion should compare favourably with those of people of similar professional levels in other fields. Professional societies of nutritionists and others engaged in food-science and nutrition activities should be established in countries with well-organized programmes. This will enhance the prestige of the subject and arouse the enthusiasm of workers in the field and the interest of the government.

It is important also that personnel, especially senior staff, should be trained before any attempt is made to implement a nutrition programme and that the staff to be employed in rural areas should generally be drawn from those areas.

Ways in which international organizations can provide greater help

In the light of the foregoing it is obvious that assistance from international organizations should be intensified and broadened in scope. While emphasis should be put on strengthening permanent training facilities, *ad hoc* training arrangements will continue to be needed. With respect to the latter, there is likely to be a sharp increase in need pending the development of more permanent training centres.

FAO and WHO should continue their responsibilities for technical guidance on nutrition training and education; the collaboration of other international organizations, such as UNESCO and ILO, should be sought to promote nutrition education and training in their programmes. The material assistance that may be provided by UNICEF will be of great value in extending these activities.

A survey of the nutritional needs of children, undertaken by FAO and WHO at the request of the UNICEF Executive Board, has emphasized the importance of education in nutrition.

As mentioned earlier, UNICEF has contributed to a number of regional nutrition seminars and training courses organized by FAO and WHO. In addition it has supported national training courses for personnel engaged in UNICEF-assisted nutrition programmes (see Section 17). UNICEF aid has been in the form of stipends and fellowships, training and demonstration equipment, supplies, transport and freight.

The Joint Committee considered that particular attention should be given to the following points :

1. There is a need for increased provision for fellowships for the training of key professional personnel in universities or in nutrition institutes with well-developed training programmes in nutrition. These should provide not only academic training but also supervised field experience in a nutrition demonstration or pilot area.

2. To meet the present need for the training referred to in (1), the collaboration of some training institutions in developed countries would have to be enlisted ; those institutions which can provide supervised field experience as part of the training could be especially helpful. However, these institutions are already overcrowded ; they would need an increase in staff as well as in equipment and supplies in order to cope with an increase in the number of trainees and to extend the scope of their training programmes to fill the need for senior personnel to develop programmes.

3. Existing national or regional training centres in developing countries require support to establish or strengthen training programmes in nutrition. This may be given in the form of a grant to be used as required for supplies, equipment for laboratories and libraries, stipends for trainees or additional staff.

4. Guidance is needed on the reorientation of curriculum in schools of medicine and public health, in training institutes for agriculturalists, home economists, school teachers, social workers and community-development workers. This may be provided through the medium of seminars or through the provision of consultants.

5. The establishment in centres of higher education of full-time teaching posts in nutrition and departments of nutrition and of food science and technology is desirable.

6. A specialist in nutrition with experience in training could be put at the temporary disposal of a country or group of countries to advise on long-term training activities and to participate in the planning and conduct of *ad hoc* training activities such as national or regional seminars and refresher courses on nutrition for personnel associated with practical nutrition programmes.

7. Regional training courses particularly for professional workers not specialized in nutrition (e.g., agriculturalists, pharmacists, health workers and home economists) should be organized.

8. It is essential that government personnel responsible for planning and developing programmes bearing on food and nutrition be aware of the importance of a co-ordinated approach to food and nutrition and the contribution which their respective departments can make. Orientation seminars for government personnel would be useful on both a national and regional basis.

9. Provision is made in plans of operation for "expanded aid" projects for the *ad hoc* training of nutrition personnel at the intermediate and particularly at the auxiliary level. Increased emphasis should be placed on the training of these categories, which will be needed to ensure the success of the pilot projects and to make it possible to extend them to broader areas within the country concerned.

10. The development and production of suitable teaching materials in nutrition for all levels of training and education is a broad area of need and one for which international assistance would be most valuable. While basic teaching materials, particularly for the training of professional personnel, may be developed on a world-wide or regional basis (e.g., the technical monographs of FAO and WHO), it is essential that materials for use in practical education programmes be developed in accordance with the particular food and nutrition problems, cultural conditions, educational standards and other factors in the particular country in which they will be used. More assistance in these fields is needed.

11. Increased dissemination of information on advances in food science and applied nutrition should be stressed.

16. PROMOTION OF PROTEIN-RICH FOODS

The Fifth Report of the Joint FAO/WHO Expert Committee on Nutrition and the present Report outline the programme in which FAO and WHO, in collaboration with UNICEF, are engaged. This programme aims to increase the production and use of foods rich in protein, e. g., fish, grain legumes, groundnuts and sesame, and of protein-rich products from sources not now widely used in human diets, such as oil seeds. Supplies of oil seeds required for animal feeding must be taken into account. Fish flour has received special attention because of the potentially large supplies of fish and the high quality of fish protein. To an increasing extent vegetable sources are providing high-protein mixtures for child feeding and the enrichment of staple diets.

As mentioned earlier, the programme has been greatly assisted by the work of the Protein Advisory Group. This Group has provided guide lines for the development of protein-rich foods and advice as to their nutritional suitability and has defined needed research.

The Committee on Protein Malnutrition of the National Research Council (USA) has worked in close liaison with the Protein Advisory Group and the United Nations agencies in administering grants from the Rockefeller Foundation totalling \$550 000 for research on protein-rich foods and protein malnutrition. So far, approximately three-quarters of these funds have been committed for the support of research groups in 14 countries. These activities have been complemented by allocations from the Executive Board of UNICEF of a total of \$310 000 for laboratory testing of protein-rich foods, provision of materials for field trials and technological assistance to development of production.

A Conference on Protein Needs, held in Washington, D.C., in August 1960, dealt mainly with the results of this grant programme. Its proceedings will be published by the National Academy of Sciences, National Research Council (USA). This publication should be of considerable aid to the protein-rich food programme.

The stage has now been reached when it can be said with some confidence that one of the major, most promising and most rapid methods of improving nutrition in many countries lies in an effective and speedy programme for the production, distribution and consumption of protein-rich foods. FAO, WHO and associated agencies must now work out in detail precisely what advice and help can be given to governments which desire aid in promoting the use of protein-rich foods.

Action by governments

It is clear that governments must be prepared not only to request the programmes but also to take active steps to aid a production and promotion campaign through the various channels at their disposal, such as the ministries and agencies concerned with the production of the raw materials, the processing and marketing of the products and their distribution to special groups (hospitals, schools, welfare clinics). The help of government agencies responsible for education and community development as well as the co-operation of the press, radio and cinema, trade unions, farmers' groups, and other voluntary bodies, including women's organizations, is also required. This means a co-ordinated effort on the part of the various governmental and non-governmental agencies and groups; it is reasonable to expect that the machinery now in existence in several countries for the promotion of good health through sound nutrition will be mobilized to support the promotion campaign. Ideally the project should not be carried out in isolation but as part of a broad national programme for better nutrition and should include emphasis on all sources of good protein available in the country.

Whatever the help that can be given by the international agencies, it should be stressed that the governments concerned must be prepared to assign personnel of several types to the project. In particular, it is necessary to have local people with a full knowledge of national food habits and food preparation who are able to demonstrate the uses of the products and to reach the catering staffs of institutions and, even more important, the housewife.

Co-operation of industry and of industrial groups

Special protein-rich foods, if they are to make a significant and permanent contribution to the nutrition of a country, must be produced on a commercial scale at an economic price and ultimately must be distributed mainly through commercial channels. The co-operation of industry is therefore essential, and this raises many considerations, including the following :

1. If the foods are to be used by those most in need, the price of the final product must be close to that of staple foods.
2. The profit margin on production may be narrow but it must be sufficient to encourage the change-over in processing methods or to establish an entirely new food-production facility.
3. Although the nutritionist and public health specialist may say with confidence that protein-rich foods are desirable, it is difficult to forecast with certainty the success of a newly introduced product.

Efforts can and must be made to create the conditions for success, but private industry may be reluctant to take the initial financial risk of development for an uncertain and limited margin of profit. Thus although large-scale food manufacturers have the experience in efficient production and marketing of speciality products, they may be reluctant to enter the field of protein-rich foods. It is therefore necessary to envisage a flexible plan of action which will vary from one country to another. Various suggestions have been made :

Large firms. Apart from the direct participation in production and marketing of a product, the directors of firms may be approached on the basis of the Freedom from Hunger Campaign to provide assistance in regard to technical, marketing and sales personnel. It can be pointed out that help in this way may be more effective than the equivalent cash contributions and that dividends in goodwill will certainly accrue.

Small firms. For many projects, small or medium-sized local firms may be most appropriate in that they may be able, using local materials, to keep production costs low. Such firms will often require some financial

and technical assistance. The financial aid may be direct or through contracted purchase of initial production for a limited introductory period.

Development corporations. Many governments have set up an Industrial Development Corporation (or a similar body with a different title) to sponsor industrial enterprises, to make grants to local groups desiring to establish new companies, or to co-operate with overseas firms interested in investment combined with production.

Producer co-operatives. Many governments are encouraging the formation of producer co-operatives as a means of stimulating groups (e.g., farmers, fishermen) to pool their resources and to secure an outlet for their products in either fresh or processed form.

Guaranteed sales to institutions. An agency or government may be able to contract for the purchase of supplies of a new product for distribution and use by schools, hospitals, welfare centres and the military services. Such distribution, however, should not be of a nature to prejudice subsequent acceptance of the product by different segments of the population.

Food-machinery firms. Firms manufacturing machinery and equipment have an important contribution to make to developing countries, more especially as the policy of many of these countries is to establish manufacturing industries for which machinery is essential. An educational approach to such firms through the general or technical press or by other means might produce desirable results.

Type of equipment. In order to keep prices down, advisers should be urged to be realistic regarding initial capital outlay and operating costs. There may be a case for a fully automatic factory, but under certain conditions there may be a far stronger case for a factory of simple design using, for example, simple types of power units and hand-packaging procedures.

Pattern of production. The production for human consumption of protein-rich concentrates from oilseed will involve a change in the traditional outlook of the industry. In the past, oil has been the primary product and protein-rich press cakes have been an important and valuable secondary product, although usually processed at temperatures which lower protein quality. New-type processes will involve :

- (a) the preservation of protein quality ;
- (b) removal of part of the crude fibre ;
- (c) conditions which will give a sanitary product for human consumption ;
- (d) changes in methods to assure the continued production of good-quality oil.

The dairy industry is facing a similar problem. As a result of advances in knowledge, the philosophy has changed from an emphasis on the fat content of milk ; the importance of the non-fat components is now recog-

nized by the industry and the consumer, with resulting changes in established dairy practices.

Associations with trade and industry. It seems important that information regarding protein-rich foods should be placed before appropriate trade and industrial associations. There is already evidence of both interest and goodwill. Two recent conferences illustrate this: the Fish Meal Conference (Rome, March 1961) sponsored by FAO, and the Cottonseed Processing Conference sponsored by the United States Department of Agriculture in co-operation with UNICEF (November 1960).

Type of product

The choice of protein-rich products to be recommended for a particular country requires careful consideration. Any or all of the products noted in the introduction may be useful. In some countries the availability of local raw materials (e.g., fish, groundnuts) may be a primary consideration, especially when the government (for reasons of currency or other limitations) wishes the protein foods to be locally produced. Even in these countries, however, it may be desirable to begin a promotional campaign with acceptability tests on imported products.

Strong efforts must be made to discourage any concept of "competition" among different protein-rich foods. Representatives and consultants from the different agencies (and officers of bilateral aid programmes also) should be well aware of the fact that there is no single road to nutritional salvation, and excessive advocacy of one product rather than another (e.g., milk, fish, legumes, vegetable mixtures) will undermine confidence and be against the public interest. Even cereals make a significant contribution to protein requirements.

Attention should be given to the use of the protein product as a food, or in food, and full information about local tastes and preferences is essential to successful development and introduction of new food products. A product may be new in one country although traditional in another. Experience in Guatemala has shown the advantages of having a product, such as Incaparina, which closely resembles an already familiar food.

In some cases a useful protein-rich product takes the form of a bland powder which can be added to other foods without a change of taste. On the other hand, a product such as fish meal may be most acceptable when it closely resembles in taste the foodstuff from which it is made.

Pattern of distribution

A method of distribution of a protein-rich food should be arranged which in no way lowers its prestige. Except for samples, free distribution

to the general public may be unwise. On the other hand, it is entirely appropriate to arrange for the free or subsidized use of the product by institutions of various types. The support of the medical profession, particularly paediatricians, is essential.

As noted earlier, institutional use may provide financial guarantees; it can also serve as a vehicle of promotion. Recipes should be tested in institutional kitchens and demonstrations given in health centres, out-patient clinics and schools. Demonstrations may also be arranged for youth organizations, parent-teacher associations, labour unions and military units.

Present status of the programme

The Joint Committee, having considered in detail the present status of the protein-rich-food programme, noted that :

1. The production of protein-rich foods is technically possible, and the experience gained in several countries can now be placed at the disposal of governments and industry.
2. The establishment of processing units in new countries must be accompanied by experimental work to find the most suitable uses of the products in food and/or beverages.
3. There must also be a campaign for the promotion of the new foods on a local, national and regional basis.
4. The total amount of money available to FAO, WHO and associated agencies for the protein-rich-food programme has been small compared with the potential importance of the projects. The funds available have, moreover, been earmarked almost entirely for the study of production methods and testing procedures ; funds are also required for promotional efforts.
5. The working paper on promotion submitted to the Committee provided valuable details of methods used in promotion campaigns in Morocco and Central America. It would appear that the promotion methods already used or suggested can be practical guides to governments and representatives of agencies, and details regarding them should be made available. A manual on promotion techniques being prepared by FAO will be useful for this purpose.
6. The Joint Committee was impressed by the high cost of promotion campaigns but believed that such campaigns were essential if nutritional aims were to be realized and hoped that money could be made available from different sources such as the Freedom from Hunger Campaign, UNICEF and international foundations.

Action by international organizations

The Joint Committee believed that co-operatively or individually WHO, FAO and other agencies could contribute to the promotion of protein-rich foods in one or more of the following ways :

(a) by placing before governments and private industry full information regarding the methods already used in programmes for the promotion of protein-rich foods ;

(b) by offering technical assistance in regard to problems of production, packaging, promotion and marketing ;

(c) by arranging for the training of national personnel, either locally or in other countries, in the production and promotion of protein-rich foods ;

(d) by making available technical information regarding processing procedures ;

(e) by making grants for acceptability trials, equipment for pilot-plant or industrial processing, and printed material and visual aids for assisting government promotion efforts ;

(f) by arranging for the purchase of supplies of low-cost protein-rich products for distribution in a welfare programme while commercial marketing is being developed.

**17. PLANNING, IMPLEMENTING AND EVALUATING
INTEGRATED PROGRAMMES TO IMPROVE MATERNAL
AND CHILD NUTRITION**

Programmes to improve maternal and child nutrition have long been the concern of FAO and WHO. Since UNICEF's inception in 1946, measures to improve the nutrition of mothers and children have figured prominently also in its programme of assistance. Initially, UNICEF programmes were of an emergency nature designed to bring relief to countries in which post-war hardships were acute. Gradually assistance was extended to developing countries in various regions of the world and attention focused on activities that would lead to more permanent improvement in child welfare. UNICEF assistance during the first decade of its operations took the form of support for (1) supplementary feeding programmes in schools and maternal and child health centres, (2) the development of milk-conservation programmes for the primary purpose of providing greater quantities of safe milk for children, and (3) the development of new sources of protein-rich foods suitable for children. Through this period there was close co-operation with FAO and WHO. Towards the

end of 1958 comprehensive evaluations were made, with the help of consultants, of results achieved in the field of milk conservation and in the distribution of dry skim milk.

In 1957 the UNICEF Executive Board concluded that efforts were needed to make a greater impact on the widespread and serious nutrition problems among children in the developing countries. Moreover, the Board recognized that while children have special nutritional needs requiring special measures, these measures should, wherever possible, be encouraged as an integral part of broader measures undertaken by governments to raise family and community levels of living. In consultation with FAO and WHO a document was prepared, *Expansion of UNICEF Aid to Maternal and Child Nutrition* (E/ICEF/L. 1123), and approved by the UNICEF Executive Board at its session in September 1957. The essential steps in implementing this policy may be stated briefly :

- (a) establishing the facts on which practical programmes must be based ;
- (b) arousing community interest in nutrition problems and practical ways of solving them ;
- (c) encouraging through school, home and community efforts an increase in the production and consumption of protective foods needed to improve local diets ;
- (d) developing effective programmes of education in nutrition through simple means and practical demonstrations, with particular emphasis on the education of mothers and children ;
- (e) training appropriate national personnel at various levels to supervise and implement the nutrition programme.

In approving this policy the UNICEF Executive Board enlarged the scope of assistance that could be provided by UNICEF to include supplies and equipment for demonstration of food-production and -preservation activities ; supplies and equipment for the preparation of teaching materials ; stipends and demonstration materials for training programmes ; supplies and equipment for food-consumption and nutrition surveys ; and transport. It further emphasized that projects should be planned and implemented with the technical co-operation of FAO and WHO.

The first projects were ready for submission to the UNICEF Executive Board in 1958. By January 1961, 26 projects had been approved, most of which are now in the initial or active stage of implementation. UNICEF allocations for this type of project in 1959 and 1960 averaged about \$1 000 000 per year, and this level of expenditure is expected to be maintained or increased.

Projects are generally undertaken in a relatively small area, the aim being to assist the government in gaining experience that can gradually be applied on a broad national basis. The Joint Committee considered that in selecting the project area, particular attention should be given to the following factors :

- (a) the size of the project area, based on the possibilities for adequate supervision ;
- (b) the co-existence of reasonably well-developed health and agricultural extension services consistent with the general pattern of these services in the country ;
- (c) the readiness of the community to co-operate in the project ;
- (d) the possibilities of extending the project to other parts of the country, taking into account financial resources and availability of personnel.

Projects under this policy are essentially educational in nature. Experience has shown that they are stimulating government interest in strengthening nutrition programmes, especially in the training of personnel.

Co-ordination is required among the various authorities, particularly agriculture, health, education and welfare at national, district and local levels. In many countries this concept of co-ordination is not fully appreciated and is difficult to achieve. Experience shows that it is often easier to obtain co-ordination at the local level than at the national level, but the interest and support of national authorities is essential. The setting up of appropriate machinery to ensure this co-ordination is indispensable.

The Joint Committee attached great importance to the adequate initial planning of projects and stressed that sufficient time must be given for this. FAO, WHO and UNICEF each have a role in this phase in collaboration with the government authorities concerned. From the outset there should be co-ordination within the country among the international agencies and government authorities.

The Joint Committee emphasized that projects should be based on a sound knowledge of conditions in the areas concerned, including present and potential food-production patterns ; nutritional status and related health factors influencing this (e.g., infection) ; family patterns of food consumption and preparation ; beliefs and values attached to various foods ; economic factors affecting food production and consumption ; the stage of development of agricultural, health and educational services ; the village hierarchy ; and the availability of suitably trained personnel both to supervise and to implement the project. Frequently such information is not readily available and some of it may indeed not exist. Where this is so, the Committee considered that provision should be made in project plans for surveys of food consumption, food habits and nutritional status. Information of this nature is essential not only to guide the development of the project but also to provide a basis for evaluating its impact on the food and nutrition problems. The necessity for such evaluation is discussed at the end of this section of the report.

The training of personnel, especially those concerned with agriculture, health and education, in the practical application of nutrition to the problems in the project area is essential and should be given high priority in the initial stage of these projects. The Joint Committee emphasized the need to schedule training activities, both formal and *ad hoc*, so that local

personnel may assume full responsibility for the project within a reasonable period of time. When circumstances permit, it would be advantageous to arrange also for periodic refresher courses for the professional people involved in the project.

The Joint Committee underlined the need to demonstrate how education activities can be carried out without undue financial expenditure on the part of the government and without overtaxing the basic functions of the services involved. With respect to the latter it stressed, for example, the need to study how teaching of nutrition can be integrated into existing school curricula.

In most countries there is a dearth of teaching materials in nutrition adapted to the food and nutrition problems of the country and available in the language of the country. Such materials are needed for the training of personnel and for subsequent educational activities in schools, health services and extension services. The Joint Committee was of the opinion that efforts should be intensified to develop appropriate teaching materials.

Supplementary feeding programmes in schools and in maternal and child health centres provide a practical demonstration of ways of improving nutrition and are part of the integrated programme. Although such feeding programmes should be based as far as possible on local foods, problems of supply often make this difficult, at least in the initial stages. Supplementary feeding programmes offer a useful means of popularizing new foods and the products of new methods of food processing.

School gardens, which may include the growing of vegetables and the raising of small animals, cannot be expected to yield sufficient produce for school feeding programmes; these must generally be supported by a combination of national and community effort. School gardens are essentially educational devices designed to teach basic practical methods of horticulture and small-animal raising. They can be linked with teaching good practices of preservation and use of food.

The Joint Committee considered the practical difficulties often encountered in promoting school gardening. It noted that in some cases their success is precarious because of traditional curricula, lack of skill and interest among busy teachers, difficulty of care during vacations, and divided responsibility between agriculture and education authorities. Community projects, which are usually directly assisted by more technically skilled advisers from agricultural extension services, do not suffer from these drawbacks and are more likely to be successful. They may be used as demonstration and teaching media for the schools as well as for the community.

The Joint Committee suggested that an evaluation of school and community projects which are under way should be made after a reasonable time. Other ways of increasing knowledge within the community of good methods of food production, preservation and use should be considered.

The Joint Committee noted that the general pattern emerging from these integrated projects seldom involves the adolescent group. It considered that greater attention should be given to associating this group, wherever possible, with project activities. This may be done, for example, through youth groups such as the 4-H Clubs common in some countries.

It was suggested that the impact of these projects might be considerably strengthened if measures could be taken simultaneously to provide supervised credit to rural families to facilitate the production and better use of food.

It is evident from the foregoing that the nature of these projects calls for technical leaders skilled not only in nutrition but also in methods of community organization and educational techniques. Experience has shown that this combination of skills is rare, with respect both to local personnel and to international experts who might be provided to assist with the implementation of the project. The Committee endorsed the recommendation made by an FAO/WHO consultant in Latin America, namely, that "assistance should be provided to technical experts and consultants in the principles of organization and administration of a programme; this may be offered in one of several ways, among them a period of training prior to assignment to a country".

The Joint Committee welcomed the steps taken by FAO, WHO and UNICEF to promote an integrated approach to programmes to improve maternal and child nutrition. At the same time it recognized that there are a number of difficulties inherent in this approach. After the programme has been in operation for a sufficient length of time an over-all evaluation should be made of the principles involved, the immediate objectives, and the methods being used. It considered that such an evaluation should be carried out by a team composed of a public health administrator, a nutritionist, an agronomist and, if possible, a social anthropologist. In order to obtain representative results, the countries to be visited should be selected at random in each region. Attention is drawn in the Introduction of this report to the need for greater emphasis on evaluation. The Joint Committee welcomed the proposals to convene an expert group on evaluation procedures for applied nutrition programmes.

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