

*This report contains the collective views of an international group of experts and does not necessarily represent the decisions or the stated policy of the World Health Organization.*

WORLD HEALTH ORGANIZATION  
TECHNICAL REPORT SERIES

No. 97

JOINT FAO/WHO  
EXPERT COMMITTEE ON  
NUTRITION

Fourth Report

	Page
1. Introduction . . . . .	3
2. Programmes of FAO and WHO . . . . .	5
3. Requirements for calories . . . . .	21
4. Requirements for protein . . . . .	25
5. Protein-rich foods for feeding infants and children . . . . .	26
6. Enrichment of dried skimmed milk with vitamins A and D. . . . .	27
7. Additives to food . . . . .	29
8. Education and training in nutrition . . . . .	33
9. Pellagra . . . . .	36
10. Endemic goitre . . . . .	39
11. Nutrition and degenerative diseases . . . . .	41
12. Anthropometry applied to nutrition . . . . .	44
13. Assessment of nutritional status . . . . .	46
14. Nutritional aspects of the welfare of the aged . . . . .	46
Annex 1. Methods and content of education in nutrition . . . . .	47
Annex 2. FAO Technical Assistance programme in nutrition, food technology, and home economics . . . . .	55

WORLD HEALTH ORGANIZATION

PALAIS DES NATIONS

GENEVA

JULY 1955

## JOINT FAO/WHO EXPERT COMMITTEE ON NUTRITION

### Fourth Session

Geneva, 26 October – 2 November 1954

#### Members :

##### FAO :

- Professor M. J. L. Dols, General Adviser, Ministry of Agriculture, Fisheries and Food, The Hague, Netherlands  
Professor A. Keys, Director, Laboratory of Physiological Hygiene, University of Minnesota, Minneapolis, Minn., USA  
Dr. Hazel K. Stiebeling, Director, Human Nutrition and Home Economics Research, Agricultural Research Service, US Department of Agriculture, Washington, D.C., USA  
Professeur E. F. Terroine, Directeur du Centre national de Coordination des Etudes et Recherches sur la Nutrition et l'Alimentation, Centre national de la Recherche scientifique, Paris, France  
Dr. N. C. Wright, Chief Scientific Adviser, Ministry of Food, London, England

##### WHO :

- Dr. J. M. Bengoa, Jefe de la Sección Técnica, Instituto Nacional de Nutrición, Caracas, Venezuela  
Professor W. J. Darby, Director, Division of Nutrition, Vanderbilt University School of Medicine, Nashville, Tenn., USA  
Professor B. S. Platt, Professor of Human Nutrition, University of London ; Director, Medical Research Council's Human Nutrition Research Unit ; Director, Applied Nutrition Unit, London School of Hygiene and Tropical Medicine, London, England (*Chairman*)  
Dr. M. V. Radhakrishna Rao, Chief, Department of Nutrition, Government of Bombay ; Haffkine Institute, Bombay, India  
Professor Juan Salcedo, jr, Head, Department of Chemical Hygiene and Nutrition, Institute of Hygiene, University of the Philippines ; Chairman, Institute of Nutrition, Manila, Philippines

#### Representatives of the United Nations and other specialized agencies :

- Mr. M. Milhaud, Technical Assistance Administration, European Office of the United Nations, Geneva  
Mr. M. Bidard, Agricultural Division, ILO  
Dr. W. N. Taylor, Occupational Safety and Health Division, ILO  
Mr. P. Rossello, Department of Education, UNESCO  
Mr. E. J. R. Heyward, Deputy Director, UNICEF, New York  
Mr. F. W. Tooby, Chief, Programs Division, Regional Office for Africa, Eastern Mediterranean and Europe, UNICEF, Paris

#### Secretariat :

- Dr. W. R. Aykroyd, Director, Nutrition Division, FAO (*Joint Secretary*)  
Dr. A. G. van Veen, Senior Supervisory Officer, Nutrition Division, FAO  
Dr. M. Autret, Senior Nutrition Officer, Nutrition Division, FAO  
Mr. M. Kondrup, Food Technologist, Nutrition Division, FAO  
Dr. R. C. Burgess, Chief, Nutrition Section, WHO (*Joint Secretary*)  
Mr. H. E. Magee, D.Sc., Senior Medical Officer (Nutrition), Ministry of Health, London, England ; WHO Consultant  
Dr. Nevin S. Scrimshaw, Regional Adviser in Nutrition, Pan American Sanitary Bureau (WHO Regional Office for the Americas) ; Director, Institute of Nutrition of Central America and Panama, Guatemala

This report was originally issued in mimeographed form as document WHO/NUT/53, 15 November 1954.

PRINTED IN SWITZERLAND

## JOINT FAO/WHO EXPERT COMMITTEE ON NUTRITION

### Fourth Report \*

The fourth session of the Joint FAO/WHO Expert Committee on Nutrition was held in Geneva from 26 October to 2 November 1954. The session was opened by the Director-General of the World Health Organization, Dr M. G. Candau. Professor B. S. Platt was unanimously elected Chairman of the Committee, which consisted, as at previous sessions, of ten members, five of whom were invited by FAO and five by WHO. Observers from the United Nations, the United Nations Children's Fund, the International Labour Office, and the United Nations Educational, Scientific and Cultural Organization also attended the Committee.

### 1. INTRODUCTION

The terms of reference of the Committee were as follows :

(1) to advise the Directors-General of FAO and WHO on 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, and

(2) to advise either Director-General or both on any technical problems concerned with nutrition which they may submit to it.

---

\* The Executive Board, at its fifteenth session, adopted the following resolution :  
The Executive Board

1. NOTES the fourth report of the Joint FAO/WHO Expert Committee on Nutrition ;
2. THANKS the members of the Committee for their work ;
3. EXPRESSES ITS APPRECIATION to the Food and Agriculture Organization for its excellent collaboration ;
4. DRAWS THE ATTENTION of governments and of the Director-General to relevant recommendations contained in the report ;
5. REQUESTS that a record of the discussions on this subject be transmitted to the members of the Joint Expert Committee ; and further
6. REQUESTS the Director-General, in collaboration with the Director-General of the Food and Agriculture Organization, to convene, subject to availability of funds, a conference of representatives of national committees or similar groups now working on food additives, together with representatives of inter-governmental or non-governmental groups concerned with the subject ; and
7. AUTHORIZES publication of the report.

(Resolution EB15.R12, *Off. Rec. Wld Hlth Org.* 1955, 60, 4)

These terms of reference were accepted by the Executive Board of WHO at its tenth session in May 1952<sup>1</sup> and by the Council of FAO in November 1952.<sup>2</sup>

The first two sessions of the Committee, held in 1949 and 1951 respectively,<sup>3, 4</sup> were concerned with the nutrition programmes of FAO and WHO, and also gave specific consideration to a number of subjects on which the two organizations were already working or planning to work, and which were of general importance in the field of nutrition. The third session, held in the Gambia in 1952,<sup>5</sup> concentrated its attention on malnutrition in mothers, infants, and children. The fourth session followed the approach adopted at the first two sessions.

After a general review of the programmes of the two organizations, in which special consideration was given to their co-ordination, the Committee turned its attention to the other subjects included in the agenda. Throughout its discussions it was aware of the need of ensuring continuity between the various sessions and took cognizance of the findings and recommendations of earlier reports.

With regard to its attitude to its task, the Committee felt that it could appropriately repeat the substance of a passage contained in the introduction to the report on the second session.<sup>6</sup> The Committee was impressed with the need for making suggestions of immediate practical importance in the fight against malnutrition. Nevertheless, it was of the opinion that in attempting to solve nutrition problems consideration must be given not only to the necessity of obtaining practical results within a short period of time, but also to maintaining a balance between immediate measures which can produce temporary improvement in nutrition and long-range measures intended to secure permanent and lasting effects. The Committee has tried to secure such a balance in its deliberations and in making recommendations on the various subjects on its agenda.

---

<sup>1</sup> Resolution EB10.R3, *Off. Rec. Wld Hlth Org.* 1952, 43, 2

<sup>2</sup> Food and Agriculture Organization of the United Nations (1952) *Report of the Council of FAO, sixteenth session, 17-28 November 1952*, Rome, p. 65

<sup>3</sup> See Joint FAO/WHO Expert Committee on Nutrition (1950) *Report on the first session*, Geneva (*Wld Hlth Org. techn. Rep. Ser.* No. 16).

<sup>4</sup> See Joint FAO/WHO Expert Committee on Nutrition (1951) *Report on the second session* (*Wld Hlth Org. techn. Rep. Ser.* No. 44, Geneva; and *FAO Nutrition Meetings Report Series*, No. 5, Rome).

<sup>5</sup> See Joint FAO/WHO Expert Committee on Nutrition (1953) *Third report* (*Wld Hlth Org. techn. Rep. Ser.* No. 72, Geneva; and *FAO Nutrition Meetings Report Series*, No. 7, Rome).

<sup>6</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1951, 44, 4; and *FAO Nutrition Meetings Report Series*, 1951, No. 5, p. 4.

## 2. PROGRAMMES OF FAO AND WHO

The Committee received an outline of the nutrition work of FAO and WHO during the last two to three years, and plans for future work as approved by the governing bodies of both organizations. Activities and projects were not set out in detail, the aim being to inform the Committee of the nature and scope of the programmes and to provide a background against which the subjects included under other items on the agenda could be considered. Joint activities figuring in the programmes of both organizations are presented below without a label; those belonging to one only are indicated.

### *Joint conferences and committees*

1. At its third session, in October 1952,<sup>1</sup> the Committee concentrated its attention on "malnutrition in mothers, infants, and children", following a conference organized in the same place (Gambia) by the Commission for Technical Co-operation in Africa South of the Sahara and concerned with the same theme in relation to Africa. Members of the Committee were observers at the CCTA conference. At both these meetings attention was concentrated on protein malnutrition.

2. The same subject figured prominently on the agenda of two regional nutrition meetings held in 1953: the third meeting of the Nutrition Commission for South and East Asia (Bandung, June 1953)<sup>2</sup> and the Third Conference on Nutrition Problems in Latin America (Caracas, October 1953).<sup>3</sup> The Bandung Committee dealt with the features and etiology of protein malnutrition; its treatment; its long-term effects on community health; the further investigations needed; prevention through food production, distribution, and processing programmes, public-health measures, and education. The Caracas Conference also reviewed the subject at length and recommended appropriate measures for prevention and treatment. It stressed the importance of improving the nutrition of mothers and children through increasing supplies of food rich in protein, through supplementary feeding, and through education.

---

<sup>1</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1953, 72, 3; and *FAO Nutrition Meetings Report Series*, 1953, No. 7, p. 3.

<sup>2</sup> See Food and Agriculture Organization of the United Nations, Nutrition Committee for South and East Asia (1953) *Report . . . , third meeting, Bandung, Indonesia, 23-30 June 1953*, Rome, p. 7 (*FAO Nutrition Meetings Report Series*, No. 6).

<sup>3</sup> See Food and Agriculture Organization of the United Nations (1954) *Report of the Third Conference on Nutrition Problems in Latin America, Caracas, Venezuela, 19-28 October 1953*, Rome, p. 19 (*FAO Nutrition Meetings Report Series*, No. 8).

3. The Bandung Committee also reviewed the progress achieved since 1950 in attacking practical problems of nutrition in the South-East Asia region. It noted that most countries in the region now have national nutrition organizations and committees which advise governments on nutrition problems and co-ordinate work being done in the general field of nutrition. Although these organizations are not always as influential and powerful as might be desired, they are evidence of progress. Note was taken of the efforts made in certain countries to improve the rice-eater's diet by such measures as under-milling, the introduction of parboiling in areas in which milled raw rice is the staple food, the organization of rice enrichment programmes, as in the Philippines, and encouraging the production and increased use of supplementary foods which will increase the nutritive value of rice diets as a whole.

4. The Bandung Committee emphasized the need for programmes of education in nutrition to improve the nutrition of the populations of the countries in the region. It pointed out that, although education in nutrition and the training of suitable workers to carry out educational programmes had been receiving increasing attention, the development of satisfactory programmes had been hampered by the lack of trained personnel.

5. The Caracas Conference also considered the progress achieved in the field of nutrition during recent years, with special reference to the recommendations made by the First and Second Latin American Nutrition Conferences, held in Montevideo (1948)<sup>1</sup> and Rio de Janeiro (1950)<sup>2</sup> respectively. It found that much had been done to carry out these recommendations. Dietary surveys have been carried out in a number of countries, and their results applied in nutrition programmes. Local foods have been analysed in many countries and several comprehensive food composition tables have been prepared. Supplementary feeding programmes and programmes of education in nutrition have been developed in various countries. The Conference commended these activities, but urged that efforts to improve nutrition throughout Latin America should be intensified, and made a number of recommendations for further action.

6. A technical conference on protein malnutrition was convened in November 1953 by FAO and WHO in Jamaica, with valuable help from the Josiah Macy, Jr. Foundation, New York. This conference helped to clarify a number of points relating to the clinical, biochemical, and pathological aspects of the subject. Practical preventive measures were

---

<sup>1</sup> See Food and Agriculture Organization of the United Nations (1950) *Conferencia de Nutrición, Montevideo, julio de 1948*, Montevideo, p. 175 (FAO Nutrition Meetings Report Series, No. 1).

<sup>2</sup> See Food and Agriculture Organization of the United Nations (1950) *Report of the Second Conference on Nutrition Problems in Latin America, Rio de Janeiro, Brazil, 5-13 June 1950*, Washington (FAO Nutrition Meetings Report Series, No. 4).

also considered. Its report will be published at the end of 1954. The participants in this conference were mainly workers actively engaged on research in the subject, and its main purpose was to stimulate and co-ordinate the work being done in this field.

#### *Protein malnutrition*

7. At its second session, in 1951, the Committee emphasized the importance of the problem of kwashiorkor<sup>1</sup> or protein malnutrition (the latter term was introduced at the third session of the Committee in 1952<sup>2</sup>). During recent years FAO and WHO have given much attention to this problem in its various aspects.

8. The need for surveys of the incidence and epidemiology of protein malnutrition in various parts of the world was stressed at the second session. The first FAO/WHO survey of this nature has been published in 1952.<sup>3</sup> Two further joint surveys have been made, one in Central America in 1951 (Autret and Behar) and another in Brazil in 1953 (Waterlow and Vergara). The report of the Central American survey has been published in English<sup>4</sup> and French<sup>5</sup> and is to appear shortly in Spanish.<sup>6</sup> The report of the survey in Brazil is now being prepared for publication.

9. Partly as a result of the survey of kwashiorkor in Africa, supplementary-feeding projects were introduced into the Belgian Congo and Ruanda-Urundi in 1952. UNICEF, FAO, and WHO were associated with the Government of the Belgian Congo in undertaking these projects. A team consisting of members of the FAO and WHO headquarters' staffs and the regional UNICEF representative visited the areas concerned in 1952 to investigate the incidence of protein malnutrition and to advise on supplementary-feeding measures. Subsequently, supplies of dried skimmed milk were made available by UNICEF. During 1953 more than 31 000 beneficiaries in the Belgian Congo and 32 500 in Ruanda-Urundi received UNICEF milk rations under a programme administered by the Territorial Direction of Medical Services. An FAO nutrition officer visited the Belgian

---

<sup>1</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1951, **44**, 22; and *FAO Nutrition Meetings Report Series*, 1951, No. 5, p. 22.

<sup>2</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1953, **72**, 4; and *FAO Nutrition Meetings Report Series*, 1953, No. 7, p. 4.

<sup>3</sup> Brock, J. F. & Autret, M. (1952) *Kwashiorkor in Africa (World Health Organization: Monograph Series, No. 8, Geneva; and FAO Nutritional Studies, No. 8, Rome)*

<sup>4</sup> Autret, M. & Behar, M. (1954) *Síndrome policarencial infantil (kwashiorkor) and its prevention in Central America, Rome (FAO Nutritional Studies, No. 13)*

<sup>5</sup> Autret, M. & Behar, M. (1954) *Bull. Org. mond. Santé*, **11**, 891

<sup>6</sup> Autret, M. & Behar, M. (1955) *Síndrome policarencial infantil y su prevención en la América Central, Roma (FAO — Estudios sobre Nutrición, N° 13)*

Congo in 1954 to assess, on behalf of the interested agencies, the results obtained. He found that the supplementary-feeding programmes had had a beneficial effect on the state of nutrition of children and that considerable progress has been made both in research and in developing preventive programmes. There are good prospects, at least in certain districts, that the protein needs of the people will be met by the extension of fish farming after supplies of UNICEF milk have been withdrawn.

10. A WHO consultant has been working in Indonesia on nutrition diseases among children during the past two years. He has carried out numerous surveys and has demonstrated the public-health importance of protein malnutrition in that country.

11. At its third session the Committee drew attention to the part played by sociological factors in the causation of protein malnutrition.<sup>1</sup> An investigation of these factors is now being made in Indonesia by a trained sociologist, acting as a WHO consultant. Information is also being collected from other sources on this aspect of the problem.

*Encouraging the use of foods rich in protein*

12. Much of the work of the FAO Nutrition Division in the field of food technology has been concerned with the preservation and processing of protein-rich foods suitable for child feeding. Experiments on the acceptability of fish flour have been carried out in collaboration with the Instituto di Nutrición in Chile, and it has been found that the fish flour can be incorporated in local foods and dishes. As a result, the Government of Chile has asked UNICEF and FAO for help in manufacturing fish flour for human consumption, and a number of other countries — Belgian Congo, Camerouns (French Administration), Colombia, Ecuador, French West Africa, Indonesia, Peru — have become interested in the suggestion. In Indonesia, the Government, in association with FAO and UNICEF, has developed a project for the preparation of soya milk and soya milk powder. FAO is also collecting information on the nutritive value and utilization of pulses, groundnut and cottonseed presscakes, coconut preparations, and leaf-protein concentrates.

13. In furthering work in this field, grants have been made by WHO to the British Medical Research Council's Group for Research in Infantile Malnutrition in Kampala, Uganda. The Director of this group, who has worked for a number of years on the use of plant proteins in child feeding, visited the Institute of Nutrition for Central America and Panama (INCAP) in Guatemala City, and it has been agreed that similar investigations in the two centres into different sources of plant proteins should be

<sup>1</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1953, 72, 9; and *FAO Nutrition Meetings Report Series*, 1953, No. 7, p. 9.



carried out along similar lines so that the results can be compared. It is hoped it will be possible this year to give assistance to the nutrition laboratories at Coonoor (under the Indian Council of Medical Research) to enable the work now being done on plant proteins to be extended, and that this work can be co-ordinated both with that of the Uganda group and with that of INCAP.

*Nutrition and maternal and child health services*

14. WHO is especially interested in the treatment and prevention of malnutrition through maternal and child health services. In 1953 a WHO consultant made a study of the nutrition programmes of WHO maternal and child health centres in the Eastern Mediterranean, South-East Asia, and Western Pacific Regions. The survey was concerned with malnutrition in general among mothers and children, including protein malnutrition, and special attention was given to two aspects of maternal and child health work, namely, education in nutrition given to mothers either when they are attending the centres or in the course of visits paid by nurses to the homes of the people, and the use and value of dried milk (with special reference to UNICEF supplies) distributed through maternal and child health centres. The report of the consultant was discussed by the UNICEF/WHO Joint Committee on Health Policy which met in Geneva in April-May 1954. In the course of the survey, the consultant collected considerable information on the incidence of nutritional diseases in general.

*The supplementary feeding of schoolchildren*

15. FAO continues to give technical guidance to governments in initiating and developing school feeding programmes which help to correct deficiencies in the diet provided in the home. In this field co-operation with UNICEF is of importance. The FAO monograph on school feeding was published in English in 1953<sup>1</sup> and in Spanish and French in 1954. A seminar on school feeding was organized in 1953 in Costa Rica, for countries in Central America and for Panama, by FAO and UNICEF in collaboration with INCAP.

16. In 1954 a FAO nutrition officer and a WHO paediatrician made a survey of the nutritional status and needs of children in Libya and of the possibilities of organizing an effective school feeding programme. The survey was made at the suggestion of UNICEF, which is ready to provide assistance in the form of supplies, especially of skimmed milk. It revealed

---

<sup>1</sup> Scott, M. L. (1953) *School feeding: its contribution to child nutrition*, Rome (FAO *Nutritional Studies*, No. 10)

much under-nutrition. A provisional scheme for a school feeding programme was drawn up for consideration by the UNICEF Executive Board and accepted at the Board's meeting in September 1954.

*Participation in United Nations surveys of the needs of children*

17. The Economic and Social Council of the United Nations recommended in 1950 (Resolution 310 (XI)) that the United Nations and the various specialized agencies should develop an integrated programme of child welfare.<sup>1</sup> A working group on "long-range activities for children", including representatives of the United Nations and the specialized agencies, was subsequently set up. Surveys of the needs of children have been made in three countries by United Nations experts; these were concerned with existing child welfare services and with projects for training auxiliary and community workers to help in developing such services. FAO and WHO have co-operated in these surveys, with special reference to the nutritional needs of children and practical measures to meet these needs.

*Nutrition of the Palestine Arab refugees*

18. FAO and WHO have continued to advise the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) on problems relating to the food supply and state of nutrition of the refugees, the organization of supplementary feeding, and the development and use of local food resources. Periodic joint visits to the refugee area to study the situation and provide technical advice have been made by nutrition officers of the two organizations, the last having taken place in June 1954. In accordance with a recommendation made during an earlier visit of this nature, a nutrition worker who is a specialist in food management has been employed by UNRWA since June 1953.

*Endemic goitre (WHO)*

19. The problem of endemic goitre was considered at the first<sup>2</sup> and second<sup>3</sup> sessions of the Committee and also by the regional nutrition meetings held in South-East Asia and Latin America. The Caracas

---

<sup>1</sup> United Nations, Economic and Social Council (1950) *Economic and Social Council. Official Records: fifth year, eleventh session, 3 July-16 August 1950. Supplement No. 1. Resolutions*, Geneva, p. 42 (Document E/1849)

<sup>2</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1950, **16**, 13.

<sup>3</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1951, **44**, 10; and *FAO Nutrition Meetings Report Series*, 1951, No. 5, p. 10.

Conference devoted a large section of its report to this subject.<sup>1</sup> A good deal has been done to implement the recommendations of these expert groups. Special attention has been given by WHO to the development of satisfactory means of preventing goitre in countries where refined salt is not used. A WHO consultant has visited Yugoslavia on three occasions and helped the Government to initiate a comprehensive iodization programme. During the present year a consultant will visit fifteen countries in Latin America to assist in developing the iodization of salt supplies. Endemic goitre was considered as a separate item on the agenda (see section 10, page 39).

*Pellagra (WHO)*

20. This subject was also dealt with as a separate item on the agenda (see section 9, page 36). WHO consultants have paid a number of visits to Yugoslavia and Egypt since 1954 to advise on pellagra and it has been arranged that during the present year a consultant will go to Basutoland and Southern Rhodesia.

*The appraisal of food consumption and the establishment of targets (FAO)*

21. The FAO Nutrition Division, in collaboration with the Economics Division, continues to help countries to improve and refine food balance sheets, so as to show the quantities of different food groups and the calories, protein and other nutrients available per head of population. Country food balance sheets are the basis of a broader assessment of the world food situation, in which supplies are set against needs and current trends analysed and interpreted. Such a review is given in the *Second World Food Survey* which was published in 1952.<sup>2</sup>

22. The period of acute food shortage which persisted for some years after the end of the Second World War has passed, and the disposal of agricultural surpluses has become a problem in a number of countries. With the easing of the food situation, FAO's attempts to help member governments to relate agricultural production and policies to nutritional needs are likely to be more fruitful. FAO provides assistance by direct consultation with governments on appropriate national food-supply targets, and by discussing the subject at regional conferences on "agricultural programmes and outlooks". The Nutrition Division participates

---

<sup>1</sup> Food and Agriculture Organization of the United Nations (1954) *Report of the Third Conference on Nutrition Problems in Latin America, Caracas, Venezuela, 19-28 October 1953*, Rome, p. 33 (*FAO Nutrition Meetings Report series*, No. 8)

<sup>2</sup> Food and Agriculture Organization of the United Nations (1952) *Second world food survey*, Rome

with the other technical divisions of FAO in these activities, and staff members of the Division have been included in teams which have visited countries in the Near East, the Far East, and Latin America in 1954.

#### *Food composition (FAO)*

23. New food composition tables, which include figures for five vitamins and two minerals, as well as for calories, proteins, and fats, were issued by FAO in English in March 1954,<sup>1</sup> and French and Spanish editions will be issued shortly. The work on food composition at present consists of collecting and analysing new data as they appear, in order to keep the records up to date.

#### *Dietary requirements*

24. The action taken and contemplated by FAO and WHO with respect to dietary requirements was discussed as a separate item (see sections 3, page 21, and 4, page 25).

#### *Training in nutrition*

25. Training courses in nutrition were organized by FAO and WHO in Calcutta (1951) and Marseilles (1952). The first course was for the benefit of workers in nutrition and allied fields in the South-East Asia Region, and the second for workers in French-speaking territories in Africa. Many of the participants in the Marseilles course are now directly employed in developing practical nutrition programmes in Africa.

26. A WHO lecturer in nutrition has worked for eighteen months in Singapore (1952/53), teaching nutrition to post-graduate public-health students, medical students, sanitarians, and others.

#### *Education in nutrition*

27. This subject, which occupies an important position in the programmes of both organizations, was considered separately on the agenda (see section 8, page 33). *Teaching Better Nutrition*, published by FAO in English in 1950,<sup>2</sup> and also in French and Spanish, has reached a wide audience. A number of projects concerned with education in nutrition have been included in the Technical Assistance programme during recent

---

<sup>1</sup> Chatfield, C. (1954) *Food composition tables—minerals and vitamins—for international use*, Rome (FAO Nutritional Studies, No. 11)

<sup>2</sup> Ritchie, J. A. S. (1950) *Teaching better nutrition: a study of approaches and techniques*, Washington (FAO Nutritional Studies, No. 6)

years. A conference on home economics and nutrition education was held in Trinidad in 1952, under the joint sponsorship of FAO and the Caribbean Commission.<sup>1</sup>

*Advice to countries on nutrition policies and programmes*

28. A number of joint advisory missions, consisting of members of the regular staffs of FAO and WHO (or WHO consultants) have been concerned with national nutrition policies and programmes, including the establishment of nutrition services and, in some instances, national nutrition committees. Similar advisory work has also been done through technical assistance projects. The countries assisted have included: Egypt (1950 and 1954), Haiti (1951), Indonesia (1951), Iran (1952), Yugoslavia (1951-54). A preliminary survey of the nutritional situation in Somalia (Italian Administration) was made in 1953 by a worker employed under the FAO Technical Assistance programme.

*Home economics (FAO)*

29. The home-economics activities of FAO have been centred in the Nutrition Division since 1951 and have expanded rapidly in the intervening period. Work in this field is concerned with improving conditions in the home and helping families to make the best use of available resources. Home-economics programmes can make a substantial contribution to the improvement of nutrition. Primary importance has been attached to assisting governments in initiating and developing home-economics training programmes in colleges and institutions, as in many countries lack of trained staff is the limiting factor to the successful development of education and extension work in this field. Regional technical meetings, and training courses concerned with home-economics education and extension in selected areas, have been arranged, and the Nutrition and Agriculture Divisions have co-operated in planning meetings and training courses covering extension both in home economics and in agriculture. The technical meeting on home economics and nutrition which took place in 1952 in the Caribbean resulted in the establishment of an Advisory Council on Home Economics for the British West Indies, the provision of a three-month training course on home economics in the University of Puerto Rico, and the evaluation and further development of home economics in the public schools in the area. FAO has recently appointed a home economist as technical adviser to the Caribbean Commission to develop home-economics programmes in the region.

---

<sup>1</sup> See Caribbean Commission (195-) *West Indian Conference, fifth session, 1952*, Port-of-Spain, p. 14.

30. A Home Economics Information Exchange was established in 1952; it acts as a clearing house for information on teaching material available in many countries. A bibliography of available material was issued in 1953<sup>1</sup> and a supplement is to be issued at the end of 1954.

31. In May 1954, FAO participated in a conference—The Home Economist in Expanding Programmes of International Service—organized jointly by the Foreign Operations Administration of the United States of America and the American Home Economics Association, in New York. At the conference, emphasis was placed on the importance of co-operation between the various specialized agencies and other organizations giving technical assistance to under-developed countries in the field of home economics, in order to see that the best use is made of all available resources.

32. Assistance to countries in the field of home economics included the following: home economists for the UNESCO Fundamental Education Centres in Egypt and at Patzcuaro, Mexico; home economists to develop teaching programmes in Ethiopia, Iraq, Israel, and Yugoslavia; a home-economist dietitian for Ceylon; and a home economist concerned with improving catering methods in India.

#### *Food technology (FAO)*

33. The Nutrition Division of FAO is concerned with food technology apart from the aspect of the subject referred to earlier (see paragraphs 7 and 8, page 7). Projects concerned with the following have been undertaken: milling and baking (Chile, Israel); preservation of fruit and vegetables (India, Yugoslavia); food preservation and processing (Ceylon, Ecuador); food legislation and control (Israel); soya milk processing (Indonesia). Studies on the stability of vitamin A in dried skimmed milk under tropical conditions have been made with the co-operation of Messrs. F. Hoffmann-La Roche & Co., Basle, Switzerland. These have shown that it is possible to store dried skimmed milk to which vitamin A has been added in a warm place for two months without serious loss of the vitamin.

#### *Rice enrichment*

34. A survey of rice enrichment in the Philippines was carried out in 1952 by a team under the joint sponsorship of FAO and WHO, with

---

<sup>1</sup> Food and Agriculture Organization of the United Nations, Nutrition Division, Home Economics Information Exchange (1953) *Material on home economics and its teaching*, Rome (Mimeographed)

financial help from the Williams-Waterman Fund for the Combat of Dietary Diseases. The report of this enquiry has recently been published.<sup>1</sup>

*Regional organization (FAO)*

35. (a) *Near East.* A nutrition and home-economics officer is stationed in Cairo and makes periodic visits to Ethiopia, Iran, Iraq, Jordan, Lebanon, and Syria to advise the governments. In 1954 this officer was sent to Iraq to help the Government to organize emergency feeding for "flood" refugees. In Iraq, FAO nutrition officers have assisted the Government in organizing a school feeding programme for which UNICEF is providing dried skimmed milk for two years.

(b) *Asia and the Far East.* There were two nutrition officers working in this region until the end of 1953, when one was temporarily transferred to Rome. Their duties are to help the governments in the region to initiate practical nutrition programmes. One is specially concerned with home-economics and nutrition services, education in nutrition, and child feeding, and the other with food technology. The latter was active in developing the soya milk project in Indonesia.

(c) *Latin America.* One nutrition officer is stationed in Chile and a second was stationed in Central America until the end of 1953. The former was a member of the joint FAO/WHO team which made a survey of protein malnutrition in Brazil in 1953, and he was associated with experiments on the acceptability of fish flour made in Santiago in collaboration with the Institute of Nutrition in Chile. In 1954 he was a member of an FAO team which visited countries in the region to discuss "the selective expansion of agricultural production". The officer stationed in Central America has collaborated with INCAP and UNICEF. She has helped to train local nutrition workers in dietary survey techniques and has organized dietary surveys in Costa Rica, Cuba, Guatemala, and Honduras.

(d) *North America.* A nutrition officer is stationed in Washington. This officer maintains contact with UNICEF headquarters and with technical workers in Canada and the United States of America. She has been particularly concerned with the recruitment of specialists for the Technical Assistance programme.

(e) *Africa South of the Sahara.* No nutrition officer is at present stationed in this region. Visits have, however, been made by members of the headquarters staff and there have been numerous contacts both with governments and with persons working in the various territories on nutrition and allied subjects.

---

<sup>1</sup> Aalsmeer, W. C. et al. (1954) *Rice enrichment in the Philippines*, Rome (FAO *Nutritional Studies*, No. 12)

*Publications (FAO)*

36. The following publications have appeared since 1951 in the *FAO Nutritional Studies* series :

- No. 7 *Nutrition Work in Greece*
- No. 8 \**Kwashiorkor in Africa*
- No. 9 *Maize and Maize Diets : A Nutritional Survey*
- No. 10 *School Feeding : Its Contribution to Child Nutrition*
- No. 11 *Food Composition Tables—Minerals and Vitamins—for International Use*
- No. 12 \**Rice Enrichment in the Philippines*
- No. 13 \**Síndrome Policárencial Infantil (Kwashiorkor) and Its Prevention in Central America*

*Technical Assistance projects*

37. Projects carried out to date by FAO under the Technical Assistance programme are shown in Annex 2 (see page 55).

**Future Programme***WHO*

38. The WHO programme in nutrition for 1955 was approved by the Seventh World Health Assembly in 1954. Except for plans to provide short-term consultants for work at Headquarters, or in the field under the direction of Headquarters, the programme was prepared in the regional offices. Special provision has been made at Headquarters for work on the problem of food additives.

39. Fifteen "consultant months" are available in 1955, to be used under the direction of headquarters. It is proposed to use ten months for furthering work on the prevention of protein malnutrition; of these, five will probably be devoted to the development of protein-rich foods and five to providing assistance in programmes of education in nutrition. The remaining five months will, it is intended, be devoted to the study of anaemia due to nutritional causes.

40. Further assistance will, if funds permit, be given to the nutrition research laboratories of the Indian Council of Medical Research, and to the British Medical Research Council's Group for Research in Infantile Malnutrition in Kampala, Uganda.

---

\* Based on joint FAO/WHO studies



41. It is probable that an inter-regional adviser will be appointed to the WHO headquarters staff in 1955. He will advise regional directors on nutrition programmes. There is a great need for a more detailed review of the nutrition work being done through maternal and child health centres, and this will probably be one of his first tasks.

42. Regional projects planned for 1955 are listed below :

- Basutoland : A nutrition survey throughout the country and assistance in the development of preventive services
- Burma : The continuation of a programme for the development of nutrition services (joint FAO/WHO project)
- Indonesia : The continuation of a general programme in nutrition
- Tanganyika : Assistance in carrying out nutrition surveys among certain population groups which have had little contact with Western civilization
- Uganda : Assistance in making clinical and dietary surveys throughout the country and the provision of advice on preventive measures.

43. Fellowships in nutrition will be made available to the following countries and territories : Burma, former French Settlements in India, Indonesia, and Uganda.

#### *FAO*

44. The FAO programme for 1955, as approved by the Council of FAO at its twentieth session in September-October 1954,<sup>1</sup> will be essentially a further development of existing lines of work, guided by experience of the activities which produce the best results and are of the greatest assistance to member governments. The principal activities will, as in previous years, fall under the following heads : food consumption and management ; dietary requirements ; food technology with emphasis on protein-rich foods ; education in nutrition ; home economics ; supplementary feeding ; problems affecting maternal and child nutrition. The provision of advice and help to governments in developing nutrition advisory services will continue. An important activity of the regular FAO staff will be the development of suitable techniques and teaching aids for countries anxious to initiate or improve programmes of education in nutrition. Special attention will be given to food additives. Collaboration with UNICEF will continue to be of importance, with special reference to supplementary feeding and food processing.

<sup>1</sup> See Food and Agriculture Organization of the United Nations (1954) *Report of the Council of FAO, twentieth session, 27 September-8 October 1954*, Rome, p. 29.

45. A provisional list of FAO Technical Assistance projects in 1955 in nutrition, food technology and home economics is given in Annex 2 (see page 55).

*Joint projects*

46. Among joint projects will be the following: a proposed conference on "Protein requirements and their fulfilment in practice"; a seminar in health education and nutrition education in South-East Asia; a nutrition course in Marseilles for French-speaking territories in Africa south of the Sahara.

**Comments on the Programmes of FAO and WHO in 1951-54**

The Committee expressed its approval of the work accomplished, and noted with satisfaction the expansion of activities which has occurred since 1951 and the increasing extent to which the activities of the two organizations in the field of nutrition have been integrated. The following comments arose out of the Committee's discussion of both past and future programmes.

A. *FAO programme*

The Committee gave special attention to (1) the importance of relating national food-supply policies to the nutritional requirements of populations, and (2) the need, recognized by the Council of FAO at its twentieth session in September-October 1954, for devoting greater resources to the development of nutrition projects in member countries through the Expanded Programme of Technical Assistance.<sup>1</sup>

(1) A number of activities and projects included in both the regular and the Technical Assistance programmes of FAO have been concerned with the objective stated above, and some progress has been made towards its achievement. The attention now being given by FAO to the "selective expansion of agricultural production", in accordance with resolution No. 6 of the seventh session of the FAO Conference in November 1953,<sup>2</sup> offers opportunity for extending this important kind of work. With regard to the "selective expansion of agricultural production", the Committee

<sup>1</sup> See Food and Agriculture Organization of the United Nations (1954) *Report of the Council of FAO, twentieth session, 27 September - 8 October 1954*, Rome, p. 41.

<sup>2</sup> Food and Agriculture Organization of the United Nations (1954) *Report of the Seventh Session of the Conference, 23 November - 11 December 1953*, Roma, p. 26

recognized that factors other than nutritional needs must play a prominent part in determining the direction in which the agricultural production of individual countries could most appropriately and profitably be expanded. Among these factors are the countries' own economic requirements, particularly in relation to international trade and credit, the balance between production of food crops and cash crops of industrial importance, and the suitability of the environment for the production of various crops and livestock. Nevertheless, the Committee felt that, within each country's economic framework, full consideration should be given to the food requirements of its own population and that the assessment of such requirements and the establishing of targets related to nutritional principles should be an important function of nutrition experts and services. It noted with satisfaction that the Nutrition Division has been associated with consultations on the "selective expansion of agricultural production", and recommended that work of this nature, carried out in association with other divisions of FAO, should continue to occupy an important part in the future programme.

(2) As regards the allocation of funds under the FAO Technical Assistance programme, the Committee was concerned to learn that only a small proportion of currently available resources is devoted to projects in nutrition and allied fields, and that this is due to the limited number of applications for such projects received from member governments. The Committee was informed that this may be partly attributable to the difficulty of meeting certain requests for assistance in 1953 and the consequent hesitation of member governments to renew such requests. It felt, however, that the small number of requests is in large measure due to lack of appreciation on the part of many governments of the contribution which assistance of this kind can make towards assessing nutritional needs, improving the utilization of available food resources, educating the people in better habits of diet, and integrating the increased production and improved utilization of foods with social and other aspects of community life. Such appreciation is likely to be of increasing importance as the improvement in the world situation offers opportunity for expanding the consumption of foods capable of furnishing a better-balanced diet. An increase in the number of nutritional projects would enable governments to take advantage of this situation and promote energetic measures to improve the diets of their own peoples.

The Committee urges that continuing and increasing attention should be given by the Nutrition Division to the nutritional implications of Technical Assistance projects in fields other than nutrition, particularly those concerned with expanding the production of agricultural commodities.

### B. WHO programme

The Committee welcomed the progress made in the study of protein malnutrition, which had been given the high priority recommended by it at previous meetings, and recommends that WHO continue to stimulate interest in, and research on, this problem by sponsoring conferences, by assisting centres and institutions to pursue appropriate investigations, and by helping to determine the incidence of protein malnutrition in regions not included in previous surveys, especially the South-East Asia Region. Work in this field should continue to be done in collaboration with FAO.

The Committee noted that work had been done in improving nutrition through maternal and child health centres and stressed the importance of what can be achieved if these opportunities are fully utilized. It recommends, therefore, that continued attention should be paid to this work. The Nutrition Section should provide additional guidance and training for the personnel of these centres and should plan programmes and teaching to meet local conditions. The Committee is also of the opinion that, with proper planning, some maternal and child health centres could be a valuable source of data on infant and maternal nutrition, and recommends that this should receive attention.

The Committee also noted that it is proposed next year to commence a study of anaemias. It considered that this study should include a compilation and critical analysis of existing information on anaemias, especially those of nutritional types, with appropriate attention to the relative roles of dietary insufficiency and of parasitism in their pathogenesis, and a consideration of the anaemias of pregnancy, their characteristics and their etiology. Studies of the anaemias along these lines may lead to the establishment of effective preventive measures and to the publication of widely useful reports similar to the FAO/WHO reports on protein malnutrition.

The Committee noted that it had not been feasible for WHO to include in its programme certain lines of work which were referred to in the report on the second session.<sup>1</sup> After reviewing these earlier suggestions in the light of recent knowledge, it recommended that studies of the following problems should be taken up as and when opportunity offers :

(1) *Nutritional disorders of the eye.* At its second session the Committee drew attention to the public-health significance of nutritional disorders of the eye. This continues to be of importance in many areas and work is required in this field.

---

<sup>1</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1951, 44, 19; and *FAO Nutrition Meetings Report Series*, 1951, No. 5, p. 19.

(2) *Nutrition and parasitism.* At the second session the importance of the relationship between the nutritional state and parasitic disease was discussed and it was considered that this should receive the attention of WHO. This is again recommended as a suitable field of study for WHO.

C. *Comments applying to both FAO and WHO*

*Need for trained workers.* Rapid advance towards a solution of problems of nutrition, and a fuller appreciation on the part of governments of the value of projects in nutrition and allied fields, can be achieved only through a substantial increase in the number of qualified nutrition workers within member countries themselves. The Committee therefore urges that special efforts should be made to promote the training of such qualified workers. Reference is made in section 8 (see page 33) to the value of fellowships for training suitable workers and to the need for expanding present facilities for training in nutrition.

### 3. REQUIREMENTS FOR CALORIES

1. In September 1949, FAO convened an expert committee to study human calorie requirements and to recommend methods for estimating the requirements of different countries and population groups. The report of the Committee on Calorie Requirements was published in June 1950.<sup>1</sup> That Committee emphasized that its recommendations were "highly tentative and open to testing and further research" (page 32). In a special section of the report it set out what it considered the most desirable lines of research (page 28).

2. The Committee on Calorie Requirements assumed that its recommendations would be reviewed, in the light of subsequent application and new information, after a suitable interval. The second session of the Joint Committee (April 1951) took place too soon after the publication of the report on calorie requirements to allow for such a review to be made, and the third session (November-December 1952) concentrated on other questions. At this fourth session of the Joint Committee, therefore, it was considered desirable to examine the situation four years after the publication of the report on calories.

3. Consideration was given to the following: (1) the reception and use of the report on calories; (2) the soundness of its recommendations;

---

<sup>1</sup> Food and Agriculture Organization of the United Nations, Committee on Calorie Requirements (1950) *Calorie requirements. Report of the Committee . . .*, Washington (FAO Nutritional Studies, No. 5)

(3) the desirability of convening another session of the Committee on Calorie Requirements to review the problem in detail ; and (4) suggestions which might help to guide the Committee on Calorie Requirements at its next session.

*Use of the report on calorie requirements since 1950*

4. The methods recommended for assessing the calorie requirements of populations have been used since 1950 by FAO in estimating the adequacy of food supplies and establishing food supply targets. They were, for example, one of the bases for the part of the Second World Food Survey concerned with the appraisal of existing food consumption and with food-supply targets for 1960. They were also used in assessing the requirements of restricted populations in various countries, including Formosa, Italy, Korea, and Japan. The calories report has, in fact, provided FAO with a useful instrument for dealing with problems of nutrition in their quantitative aspects. The practical experience gained by FAO has indicated that on the whole the principles on which the report is based are sound and workable.

5. The Joint Committee noted with satisfaction that the calories report has been critically examined in a number of countries and that progress has been made in the evaluation of the recommendations contained in it.

6. In the United States of America, the Food and Nutrition Board of the National Research Council adopted, for the 1953 revision of its Recommended Dietary Allowances, the recommendations of the Committee on Calorie Requirements with two specific alterations : (1) for adults a 5% instead of a 7.5% decrease in calorie requirements per decade of age beyond 25, and (2) the differentiation between the calorie needs of boys and girls at age 10 instead of at age 12. The Food and Nutrition Board further suggested that the standard level of physical activity adopted in the calories report is probably above that corresponding to "average" or "moderate" physical activity in the United States of America at present and that a clearer definition of physical activity, to allow for more precise application of the calories report in that country, would be desirable.

7. The Committee considers that a more sharply defined differentiation between different levels of physical activity would be desirable but recognizes the difficulties involved.

8. In the United Kingdom, careful attention was given to the appropriateness of the recommendations of the Committee on Calorie Requirements to the situation in that country. It was concluded that the FAO recommendations underestimated actual needs by some 250 calories per head per day. More detailed analysis, undertaken partly in consultation

with FAO representatives, indicated that the discrepancy arose from the excessive decrement for increasing age beyond 25 years and that a decrement of about 3% for each decade would be more suitable, as far as the United Kingdom is concerned, than the recommended figure of 7.5%.

9. A similar conclusion in regard to the age decrement emerged from recent detailed studies of the Bureau of Home Economics and Nutrition of the United States Department of Agriculture. From these it has also been concluded that the basic ("standard man" and "standard woman") allowances are somewhat too high for the United States of America, because of the mode of life in that country.

10. In Venezuela, requirements calculated according to the FAO system corresponded closely with the observed caloric consumption. The observed caloric consumption of the middle classes was slightly below the estimated needs, while an intake in excess of these was observed among the prosperous classes. A more elaborate analysis in the Netherlands, in which caloric consumption was estimated according to income class and size of family, gave much the same result. An interesting observation in that country was an exceptionally high caloric consumption on the part of elderly people.

11. In studies made in Central America and in Panama, under the sponsorship of the INCAP and FAO, the correspondence between estimated requirements and actual food consumption in 19 localities was found to be reasonably good, but in some areas the caloric intakes of men were substantially above the value estimated by the FAO system. Those responsible for these surveys believed that these occasional discrepancies would be explained mainly by the higher physical activity of the groups concerned, and possibly by a lower digestibility of the vegetarian diets consumed by them. It was concluded that, while the calories report is a useful instrument, the adjustments for different factors as recommended in the report must be carefully applied to populations living in varying conditions.

#### *Revision of the report on caloric requirements*

12. The Committee feels that on the whole the report has stood up well to the test of application. It considers, however, from the information available to it, summarized in part above, that some revision is needed in the following directions:

(1) Some numerical adjustments in the estimated values for caloric needs may be desirable, and an attempt should be made to provide more specific guidance on the methods to be followed in translating physiological needs into terms of food supplies and vice versa.

(2) More careful study of the requirements of pregnant and nursing women and of aged people seems to be needed. In a study of pregnant women it appeared that the recommended increments in calorie allowances for pregnancy and lactation were unduly large for women in the United States of America, and that the increased calorie consumption did not correspond in time to that recommended in the report. Again, there is much to suggest that more attention should be given to the prevalent mode of life and energy expenditure in different countries, including activity during pregnancy and lactation.

(3) The use of the report in different countries has brought out the need for giving guidance on the provision to be made for food waste and other kinds of food losses. The problem of assessing the food supplies needed to meet physiological requirements was not dealt with in the calories report. This problem differs from country to country and in different segments of the population. Though no simple solution is possible, its practical importance is great and it cannot be ignored solely on the score of its complexity.

(4) Another problem that has emerged in the past four years is the need for taking into account the actual temperature of the human environment, particularly in highly developed countries where an increasingly large proportion of the population spends the greater part of its time in well-heated homes and buildings.

13. The Joint Committee recommends that as soon as is feasible a further committee on calorie requirements should be convened to review accumulated facts and experience and to prepare a revised report. It is suggested that this committee should give consideration to :

- (1) the use of anthropometric data in the computation of energy expenditure and needs ;
- (2) the decrement for age in adult calorie levels ;
- (3) the difference in the energy needs of boys and girls at different ages ;
- (4) the definition of activity levels for the "reference" man and woman ;
- (5) the special allowances for women during pregnancy and lactation ;
- (6) the use of actual human environmental temperatures ;
- (7) the value of various body measurements, including that of subcutaneous fat, in the assessment of nutritional state with regard to calories ;



- (8) the proportion between protein, fat, and carbohydrate in the diet in relation to their physiological destination and to their contribution to energy expenditure ;
- (9) the need for expressing in food supply and consumption data the amounts of energy provided by proteins, fats, and carbohydrates respectively ;
- (10) the relation between actual calorie intake and available calories calculated from supply data obtained at various stages from production to consumption ;
- (11) the contribution of alcohol to calorie requirements for various purposes.<sup>1</sup>

#### 4. REQUIREMENTS FOR PROTEIN

1. At its second session the Committee referred to the assessment of nutrient requirements, especially requirements for protein, and recommended that work on this subject should be continued.<sup>2</sup> During recent years, material with a bearing on this problem has been collected and specialists have been consulted. Protein malnutrition has been one of the prominent items in the nutrition programmes of both FAO and WHO, and the study of, and attack on, protein malnutrition throws light on the protein requirements of children and mothers.
2. The conference on protein malnutrition in Jamaica in 1953 was sponsored jointly by FAO, WHO, and the Josiah Macy, Jr. Foundation, the Macy Foundation contributing substantially to the cost. The Macy Foundation has kindly offered to help in financing a further conference in the United States of America in June 1955 to consider "protein requirements and their fulfilment in practice". The problem of protein requirements is of special importance to FAO for food supply and production policies. Provisional plans have also been made for the convening by FAO, some months after the conference, of a small expert group to prepare a statement on protein requirements, making use of the discussions which will have taken place at the conference.
3. The Committee endorsed these plans. It suggests that, if it proves difficult to convene in 1955 both a further meeting of the Committee on Calorie Requirements and the meeting of the expert group on protein requirements, the latter should have priority, since a statement on protein requirements is urgently needed.

---

<sup>1</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1954, **84**.

<sup>2</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1951, **44**, 17 (section 2.7, paragraph (c) ); and *FAO Nutrition Meetings Report Series*, 1951, No. 5, p. 17 (section 2.7, paragraph (c) ).

## 5. PROTEIN-RICH FOODS FOR FEEDING INFANTS AND CHILDREN

1. The problem of protein malnutrition was the main theme of the third session of the Committee<sup>1</sup> and has been considered by other conferences and committees under FAO/WHO auspices. Its solution lies mainly in the provision of greater supplies of suitable foods rich in protein for mothers, infants, and children. When the mother receives an adequate diet she is usually able to produce, through breast feeding, ample food for a sufficiently long period to provide an excellent basis for the nutritional needs of the young infant. In so doing she is able to make use of protein-rich foods which are not suitable for direct feeding to the infant. It is planned to give further attention to these aspects of the problem at an FAO/WHO conference next year (see section 4, page 25). In view, however, of the importance of the subject, and its prominent position in the programmes of FAO and WHO, a further review was undertaken by the Committee, leading to the statement or re-statement of the following points :

(1) In many countries measures are being taken to increase food production ; these should take account of the groups with special needs. In the long run this policy will tend to put at the mother's disposal protein-rich foods, suitable for child feeding, which she can prepare herself. Programmes of education in nutrition should accompany developments in this field, so as to ensure the proper utilization of the additional foods. Progress along these lines is, however, necessarily slow.

(2) Meanwhile it should be emphasized that in many parts of the world supplementary foods for the breast-fed infant and foods for weaned infants and young children are seriously lacking. Although milk is the usual infant food in most developed and many under-developed countries, there is need for the introduction of foods which utilize other good sources of protein for the mixed feeding of infants and for improving the diets of children. Some of these will also be of value for bettering the nutrition of pregnant and nursing women. These measures usually need to be developed on a regional basis, and will depend on the availability of local products and the nature of local food habits.

(3) Certain steps and investigations are needed in the development of any food preparation for these purposes. Knowledge of its nutritive value through chemical analysis and biological assays is essential, and the product must be acceptable and low in cost. The possibilities for its large-scale production and for its storage, preservation, and distribution must

---

<sup>1</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1953, 72 and *FAO Nutrition Meetings Report Series*, 1953, No. 7.

be evaluated. It is of the utmost importance that a new preparation should be proved to be harmless by suitable tests on animals, and that controlled studies of its value when given to children should be made, before it is recommended for widespread use. After the product is introduced into general use, continuing observations should be made on its suitability and its value for the nutrition of the child.

(4) The technical and other resources required for these studies frequently do not exist in the countries in which there is the greatest need for satisfactory foods for infant and child feeding and for increased supplies of protein-rich foods for pregnant and nursing women.

2. The Joint Committee recommends that FAO and WHO should do whatever possible to encourage and assist the development of studies of protein-containing foods of good quality in suitable centres along the lines indicated.

## **6. ENRICHMENT OF DRIED SKIMMED MILK WITH VITAMINS A AND D**

1. The production of dried skimmed milk in the main dairying countries of the world is at present at about three times the pre-war level. Dried skimmed milk is now not only a product of increasing importance in international trade but is a "surplus" food product, the disposal of which has been discussed by the FAO Committee on Commodity Problems and other bodies. This fact, and the convenience and value of dried skimmed milk as a basis for supplementary and emergency feeding programmes, has led to its extensive use in economically under-developed countries either by purchase through normal commercial channels, or under special concession terms in the form of "aid", or through its supply to governments by organizations such as UNICEF.

2. Dried skimmed milk is a valuable source of easily assimilated animal protein. The removal of the fat in the process of separation or "skimming" does, however, simultaneously remove vitamin A, of which milk fat is a good source. The vitamin D originally present in the milk fat is also removed, though milk is not normally rich in this vitamin.

3. In many under-developed countries the intake of vitamin A is low and vitamin A deficiency conditions are common; rickets, which is primarily associated with deficiency of vitamin D, is also prevalent in the sub-tropics. The question therefore arises whether the enrichment with vitamins A and D of the dried skimmed milk supplied through supplementary feeding programmes can contribute efficiently to the correction of these deficiencies.

4. The technical problems involved, which are at present being investigated by FAO, do not appear to be insuperable. Vitamin A can be added before drying, or directly during the reconstitution of milk immediately before use. There is some loss on storage and after reconstitution if the milk is kept for some time (the extent is still under investigation), but this is a problem which could no doubt be solved if it were considered desirable in principle to adopt an enrichment policy. Vitamin D is more stable than vitamin A and any loss during manufacture and storage is unlikely to be appreciable.

5. The adoption of an enrichment policy would, however, raise other problems to which the Committee felt it necessary to give special consideration.

6. Probably some 90% of the dried skimmed milk at present used in supplementary feeding programmes in under-developed countries is manufactured in producing countries whose own populations already secure adequate amounts of vitamins A and D from other sources. For these countries enrichment would not only be unnecessary but might well be considered undesirable in principle. Supplies for supplementary feeding usually come from the surpluses remaining after the consumption needs of the producing countries and of their normal export trade have been met. Once these surplus products have been processed and packaged, it is costly to enrich them in the country where they were produced, and enrichment cannot be satisfactorily done in the receiving countries during reconstitution into liquid form on a small scale in individual schools and centres. The Committee considers that the procuring and distributing agencies should explore whether some producing and exporting countries might be willing to enrich some batches of skimmed milk destined for use in specific supplementary feeding projects in some under-developed countries.

7. Another important point is that the needs of the populations of different under-developed countries for vitamins A and D may vary widely and that in consequence a level of enrichment suited to one country might not be appropriate to another. Thus it would seem that, should enrichment be used as a means of combating vitamin deficiency conditions, the enriched dried skimmed milk used in supplementary feeding programmes would need to be specially produced to meet the local conditions. There would be no serious problem in making provision for the domestic production of enriched milk in those under-developed countries in which it is intended that milk-drying plants should be installed to meet their own needs. But where dried skimmed milk for supplementary feeding programmes is procured from an external source, it would be necessary either to arrange with manufacturers to produce special supplies enriched at the required

levels or to take steps to ensure the addition of the vitamins during reconstitution.

8. The Committee reached the following conclusions :

- (1) Provided the technical difficulties can be solved, it should be recognized that the feeding of suitably enriched dried skimmed milk can form a valuable means of raising the vitamin A content of the diet in countries where there is evidence of a deficiency of this vitamin. The level of vitamin A enrichment should be decided after consideration of the age of the recipients, the quantity of dried skimmed milk to be fed, and the vitamin A content of the remainder of the diet.
- (2) In countries where rickets is prevalent, enrichment of dried skimmed milk can also be a valuable means of raising the vitamin D content of the diet. In deciding on the level of vitamin D enrichment, consideration should likewise be given to the age of the recipients, the quantity of dried skimmed milk to be fed, and both the vitamin D and calcium contents of the remainder of the diet.
- (3) The purpose of enrichment with vitamin A or vitamin D is the prevention of symptoms of deficiency. The levels of enrichment adopted in any country can be determined by the appropriate authorities in that country.
- (4) The investigations already sponsored by FAO on the development of satisfactory methods of enriching dried skimmed milk with vitamin A should be continued.

## 7. ADDITIVES TO FOOD

1. In 1953 the World Health Assembly adopted a resolution pointing out that the increasing use of various chemical substances in the food industry had in the last few decades created a new public-health problem which might usefully be investigated, and asking the WHO Executive Board to study the subject at its thirteenth session in January 1954.<sup>1</sup> The Executive Board, realizing that the subject is of great complexity and range, recommended that the proposed study be limited for the time being to the intentional incorporation of such additives in food, and suggested that the Joint FAO/WHO Expert Committee on Nutrition might consider the matter at a future session.<sup>2</sup>

2. The same subject was considered by the Council of FAO at its twentieth session, in September-October 1954. The Council, "recognizing

<sup>1</sup> Resolution WHA6.16, *Off. Rec. Wld Hlth Org.* 1953, **48**, 22

<sup>2</sup> Resolution EB13.R47, *Off. Rec. Wld Hlth Org.* 1954, **52**, 22

that the problem of food additives is of growing importance, with respect both to nutrition and food production and distribution", requested the Director-General "to consider the kind of work which FAO can appropriately undertake in the field of additives to food, in association with WHO, taking into account any recommendations made by the Joint FAO/WHO Expert Committee on Nutrition".<sup>1</sup>

3. Accordingly the Committee included the item "Additives to food" in its agenda.

4. The term "food additives" is used here to denote non-nutritive substances which are added intentionally to food, generally in small quantities, to improve its appearance, flavour, texture, or storage properties. Broadly speaking, the term should include substances added to foods to enhance their nutritive value; in their discussion of this subject, however, the Committee omitted consideration of this type of additive, as well as residues of toxic chemicals used in agriculture and unintentionally introduced into foods.

5. A wide variety of additives is now intentionally introduced into foods. Examples are colouring matters, flavouring and sweetening agents, preservatives, antioxidants, improvers, and emulsifying and anti-staling agents. Many of the substances used are innocuous and, in so far as they increase the attractiveness or the keeping quality of the food, their use may benefit the consumer. The increasing, and sometimes insufficiently controlled, use of food additives has, however, become a matter of public and administrative concern, particularly in view of the fact that long-term animal-feeding studies have, in certain instances, revealed the existence of chronic or cumulative toxic effects.

6. In countries that are highly developed technically and economically, the consumer demands highly attractive foods, standardized uniformity of quality, and a wide choice at all seasons. Moreover, many of the foods may have to be imported from distant producing areas and will have required processing. In such countries the variety of food additives tends to be large. Provided, however, that reliable information exists regarding the health hazards involved, machinery for the enforcement of control measures is likely to be relatively easily organized, particularly in view of the high proportion of products which are processed and packaged.

7. In countries which are less developed technically and economically, on the other hand, the purchasing power of the consumer is generally low and a wide choice of processed products is seldom possible: indeed,

---

<sup>1</sup> Food and Agriculture Organization of the United Nations (1954) *Report of the Council of FAO, twentieth session, 27 September-8 October 1954*, Rome, p. 36 (Resolution No. 4/20)

most of the food is locally grown and prepared in the home. Nevertheless, even in such countries the increased use of food additives is causing growing concern, the more so because control measures are less easy to enforce. Moreover, many of these countries are situated in tropical or sub-tropical regions, where food preservation entails special difficulties.

8. The problems involved in the use of food additives are therefore widespread, though the means of solving them may differ from country to country. This latter fact, however, must itself occasion concern, since the existence of widely differing control measures may well form an undesirable deterrent to international trade.

9. The desirability of securing a uniform approach to these problems, which are of concern to human health, has led various international bodies and groups to consider possible lines of joint action. Among these are the Brussels Treaty Organization, the International Union of Pure and Applied Chemistry, the Permanent International Committee on Canned Foods, the Deutsche Forschungsgemeinschaft, and various specialized bodies concerned with individual food commodities. The discussions which have taken place under the auspices of these bodies and groups have revealed (a) wide divergences between the legislative measures adopted or proposed in different countries, (b) conflicting evidence relating to individual food additives and differences in its interpretation, and (c) a serious lack of data regarding many additives, in regard both to their purity and to the health hazards involved in their use. Thus, to take a single instance, while 22 countries permit certain specified colours in foods, out of a total of 82 such colours only one is permitted in all the 22 countries concerned. Moreover, in some instances the regulations specify lists of permitted additives, while in others reliance is placed on lists of prohibited additives.

10. Throughout its discussions on this subject, the Committee was impressed not only with its importance, from both the nutritional and the health aspects, but also with the very complex considerations involved. The Committee felt, on the one hand, that undue restrictions on the use of food additives might tend to discourage new developments which could be of benefit to the consumer by conserving food resources and adding to the variety and attractiveness of the diet, and on the other hand, that the uncontrolled use of additives might well constitute a health hazard which could not be viewed with equanimity. Moreover, while it appeared clear that the ultimate goal of any international discussions on food additives could well be some measure of agreement in international trade, the Committee considered that the immediate objectives of such discussions could appropriately be limited to (a) the formulation of certain general principles which could be accepted as an agreed basis for future action by participating countries, and (b) the collection and collation of information

and evidence which would provide a basis for future technical discussions, agreement on the technical issues involved being, in the Committee's view, a prerequisite to any subsequent international action.

*Suggested action by FAO and WHO*

11. The Committee felt that existing arrangements for handling the problem in its various aspects were deficient in two respects. Firstly, it appeared that the groups which have been independently concerned with the subject were not only limited in membership, but that their activities in substantially identical fields have already led to undesirable duplication of effort, and might without adequate co-ordination result in conflicting recommendations. Secondly, it seemed clear that existing bodies did not possess satisfactory means for collecting information and evidence within this whole broad field and for continuity in following up any conclusions reached.

12. To meet the first point, the Committee suggests that the Directors-General of FAO and WHO consider the desirability of calling a conference of representatives of the existing groups working on this subject, together with appropriate representatives of such member nations as might be interested and would be prepared to send delegates. The main purpose of the meeting would be to consider whether future international consultations could be co-ordinated within the framework of the two organizations, and if so to what extent. The conference might also consider, as a step towards international agreement in this general field, the desirability of convening an expert committee which would attempt to lay down acceptable broad general principles governing the use of food additives. Such principles might be concerned with criteria which justify the use of food additives and the factors to be taken into account in assessing their safety from the standpoint of the consumer's health. Among the questions to be considered would be the desirability of limiting the number of additives and the amounts used; the need for controlling their purity; and any possible adverse effects on the nutritive value of the foodstuffs in which they are included. Other problems for review by the expert committee might be the relative advantages and disadvantages of basing legislation on lists of permitted or prohibited substances, and the desirability of the compulsory declaration of their presence in foodstuffs. The expert committee might thereafter advise on the criteria to be used in assessing toxicity and, at a later stage, on the adequacy of the available information regarding the toxicity of individual food additives and on the best means of filling gaps in knowledge without avoidable duplication of effort in different countries. The Joint Committee considers that the concept of toxicity should include the possible occurrence of insidious and long-delayed effects.



13. To meet the second point, relating to the collection of information and continuity of action, the Committee felt that the two organizations might usefully serve, within the limits of their resources, as a "clearing house" for the collection and collation of information in this field, derived from official and non-official bodies and from individuals in member countries. The Committee suggests that, in conformity with the recommendations of the Executive Board of WHO, such information might cover broadly (a) the chemical, pharmacological, and biological properties of individual food additives, including any adverse effects which they may have on the nutritive value of the diet and the health of the consumer; (b) their significance in relation to advances in food technology; and (c) existing legislation in member countries. Because the field is a wide one, the Committee suggests that the collection and analysis of information might, in the first place, be limited to two kinds of additives, namely colouring matters and preservatives. The latter are of special significance in the conservation of food in economically under-developed countries, particularly those in tropical and sub-tropical areas.

14. The Joint Committee recommends that the Directors-General of FAO and WHO should consider the desirability of convening a conference of representatives of groups already working on food additives, together with representatives of interested Member States, to consider:

- (1) whether and to what extent future international consultations could be co-ordinated by the two organizations, and
- (2) the desirability of setting up an expert committee for the purpose of laying down broad general principles governing the use of food additives.

## 8. EDUCATION AND TRAINING IN NUTRITION

1. The report on the second session of the Committee included a section on training in nutrition in under-developed areas, with a recommendation "that active steps should be taken by governments to further 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".<sup>1</sup> The Nutrition Committee in South and East Asia (third meeting, June 1953) commented that extension programmes of education in nutrition should play an essential part in the plans of countries in this region to improve the nutrition of their populations" and recommended that a course of the seminar or

---

<sup>1</sup> *Wld Hlth Org. techn. Rep. Ser.* 1951, **44**, 42 (section 7.7); and *FAO Nutrition Meetings Report Series*, 1951, No. 5, p. 42 (section 7.7)

workshop type on education in nutrition and training methods should be organized in the region as soon as possible.<sup>1</sup> The Third Conference on Nutrition Problems in Latin America (Caracas, October 1953) also stressed the importance of public education in nutrition.<sup>2</sup>

2. Earlier in this report (see page 21) reference is made to the crucial need for more trained workers in many countries. Without such trained workers, the development of educational programmes and the training of auxiliary workers to participate in them is impossible.

3. The Committee, after discussing various aspects of the subject of education in nutrition, made a number of recommendations relating both to progress in this field generally and to the programmes of FAO and WHO. These recommendations should be read in the light of Annex 1 (see page 47), which is a broad review of the subject prepared for the Committee and which the Committee in general endorsed.

4. The various kinds of workers needed in developing education in nutrition, and the specialized training required in medical schools and schools for teachers, nurses, and social workers, were considered in the report on the second session of the Committee.<sup>3</sup> It is important that personnel selected for training should have the qualifications and personality which will ensure their later usefulness in developing national and community programmes of education in nutrition. In the case of fellowships for advanced students it should be noted that periods of a year or more may be needed to prepare well qualified workers. It is important that students should be provided with adequate opportunities for doing effective work after their training is completed. The Committee wishes to draw the attention of governments to this point.

5. The Committee emphasizes again the importance of according to nutrition its proper place in the medical curriculum and endorses the recommendation made in the report on the second session advocating that adequate instruction in the subject be given to medical students and public-health officers.<sup>4</sup> From the information available to the Committee it appeared that many medical schools do not yet allocate a sufficiently important place to the subject in the curriculum. The Committee accor-

---

<sup>1</sup> Food and Agriculture Organization of the United Nations, Nutrition Committee for South and East Asia (1954) *Report . . . , third meeting, Bandung, Indonesia, 23-30 June 1953*, Rome, pp. 20, 26 (*FAO Nutrition Meetings Report Series*, No. 6)

<sup>2</sup> Food and Agriculture Organization of the United Nations (1954) *Report of the Third Conference on Nutrition Problems in Latin America, Caracas, Venezuela, 19-28 October 1953*, Rome, p. 14 (*FAO Nutrition Meetings Report Series*, No. 8)

<sup>3</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1951, **44**, 36; and *FAO Nutrition Meetings Report Series*, 1951, No. 5, p. 36.

<sup>4</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1951, **44**, 35; and *FAO Nutrition Meetings Report Series*, 1951, No. 5, p. 35.

dingly suggests that WHO, where deemed necessary and appropriate, should explore other means of drawing the attention of those who control medical education in different countries to the importance for the public well-being of adequate instruction of medical students in nutrition.

6. FAO and WHO should continue to co-operate in the field of education in nutrition with the United Nations Division of Social Affairs, the United Nations Technical Assistance Administration, UNICEF, UNESCO, and ILO. Educational, social, and supplementary feeding projects sponsored by these agencies can appropriately include the education of people in better feeding practices. Because of the importance of developing education in nutrition by methods such as those outlined in this report, the Committee hopes that increasing attention will be given to this activity in the regular and Technical Assistance programmes of the United Nations and its specialized agencies, and that work in this field will be co-ordinated with mutual benefit.

7. The Joint Committee recommends that, in undertaking further work concerned with education and training in nutrition, FAO and WHO should :

- (1) (a) continue to provide assistance for the training in nutrition of specialists who can in turn undertake the training of auxiliary personnel. Individuals intended for such training should be very carefully selected ;  
(b) provide assistance to governments in developing methods and materials, including visual aids, suited to the teaching of nutrition, especially in schools and community centres. The introduction of nutrition teaching into school curricula and into training courses for school teachers is of special importance. In all countries teaching should take fully into account local conditions, foods, and customs ;
- (2) assist the personnel of maternal and child health and community centres to develop teaching programmes adapted to local conditions and through which people can be taught how to obtain a more satisfactory diet based on local foods ;
- (3) convene, at appropriate times and places, conferences to consider ways and means of organizing programmes for nutritional improvement at the village or community level, which are in line with modern concepts of developmental work among rural communities, and which call for the participation of workers belonging to a variety of disciplines.<sup>1</sup>

---

<sup>1</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1953, 72, 20 (section 9.1, paragraph (5)) ; and *FAO Nutrition Meetings Report Series*, 1953, No. 7, p. 20 (section 9.1, paragraph (5)).

## 9. PELLAGRA

1. Pellagra is a nutritional disease which responds to therapy with nicotinic acid. The clinical signs vary, but the disease is usually characterized by symmetrical, sharply demarcated cutaneous lesions of exposed surfaces. In endemic areas these cutaneous lesions may constitute the principal clinical sign. Glossitis is commonly present. Cheilosis with or without angular fissures may occur. In the more severe cases, diarrhoea and/or mental changes are often seen. The disease has similar clinical features in adults and children. It is characteristically seasonal, with the maximum incidence usually in the spring. A lesser incidence may occur in the autumn.

2. Solar irradiation and other physical factors may influence the appearance of the cutaneous lesions, and associated conditions may be reflected by variable clinical findings, such as anaemia, hypoproteinaemia, lesions of the eyes, and hepatic disorders.

3. Epidemiologically, pellagra is most frequently associated with a grossly restricted variety in food intake and with a predominance of maize in the diet. Indeed, when certain other cereals, such as wheat or rice, constitute an appreciable percentage of the calorie intake, pellagra is rarely encountered despite the regular ingestion of maize. Sporadic cases of the disease may be associated with alcoholism.

4. Although, as has been said, pellagra is cured by nicotinic acid, the etiology of the disease is not simple. It occurs in individuals on a limited intake of nicotinic acid in association with a restricted intake of tryptophane. Whether a specific pellagragenetic factor exists in maize, and the possible significance of "bound nicotinic acid" or of "bound tryptophane" in this cereal, remain open questions. The occurrence of pellagra in endemic form is evidence of malnutrition due to a monotonous diet deficient in niacin and in good quality protein and usually composed preponderantly of maize.

5. Uncertainty exists as to the incidence of pellagra in many regions. In the past, reports of the occurrence of the disease have appeared from most regions of the world. It was once prevalent in the southern portion of the United States of America and in Italy, but in these regions the disease has now diminished to vanishing point. However, it has become evident that pellagra is still a problem in many regions in which maize may supply 60% or more of the calories of the diet.

6. Studies of pellagra in Yugoslavia, Egypt, and Basutoland reveal the prevalence of the disease in parts of these countries. Recent studies

available from other regions are less definitive, but the disease has been reported since 1940 from the majority of the countries of Latin America, Puerto Rico, Portugal, India, and Southern Rhodesia. A serious outbreak occurred in Spain during the Civil War (1936-39).

7. Pellagra is intimately associated with the major problems of poor sanitation and poverty. In some areas it may cause relatively little fatal illness, but nevertheless it contributes significantly to chronic ill-health and leads to decreased productiveness on the part of the population, especially among agricultural workers.

8. In some regions, such as Mexico, where maize is prepared as *tortillas*, the incidence of pellagra is reportedly low despite the high consumption of the maize. It is not clear whether this is a result of the method of preparation of the cereal or the presence in the diet of other foods such as beans, or whether it reflects problems in diagnosis and the incomplete reporting of incidence.

9. One difficulty in defining the incidence of the disease is in fact the inexactness of diagnosis. In many areas, any chronic malnutrition, particularly hypochromic anaemia, may be misdiagnosed as pellagra. In other regions, confusion remains over the differentiation between pellagra and kwashiorkor or *síndrome pluricarencial infantil*.

10. Comparison of the syndrome in Yugoslavia and in Egypt with that formerly present in the United States of America clearly demonstrates that the details of the clinical picture vary, depending upon the nature of associated diseases. Thus, in the United States many pellagrins exhibited macrocytic anaemia, while among pellagrins in Yugoslavia and in Egypt the WHO consultants have failed to find cases of macrocytic anaemia. Instead, they have noted a high incidence of microcytic hypochromic iron-deficiency anaemia, attributable, in part at least, to the effect of parasitic infestation. An accurate understanding of the clinical picture of pellagra, coupled with properly designed therapeutic and biochemical tests, can readily clarify a poorly understood situation.

11. At the first session of the Committee, it was noted that the unreliability of figures for the incidence of pellagra might indicate a need for an enquiry to obtain more detailed reports on the disease.<sup>1</sup> The point was made that in reaching a decision on this question consideration must be given to the possible lines of action which WHO or FAO could take when the added information had been obtained. Surveys without subsequent action are not desirable. Fundamentally, the eradication of pellagra is dependent upon alteration of diet pattern and in many areas this means a change in

---

<sup>1</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1950, **16**, 14.

agricultural policy which must be considered in the light of climate, soil, and other factors.

12. The occurrence of pellagra in a region is obviously an indication of dietary inadequacy. The possession of accurate information upon pellagra would therefore provide an additional incentive to develop food production and to broaden nutritional programmes in regions where the disease is endemic.

13. The Committee was informed that a demonstration programme in Yugoslavia has indicated that the technique of enriching maize with niacin<sup>1</sup> in small mills is an effective, acceptable control measure. Furthermore, the programme has proved a useful method of stimulating widespread interest in pellagra control work in the region. It is reasonable to expect that this approach would have a similar effect elsewhere.

14. The Committee noted that FAO issued in 1953 a publication entitled *Maize and Maize Diets*<sup>2</sup> in which the data available on the relation between maize and pellagra were reviewed and analysed. Research at present in progress may throw further light on this aspect of the pellagra problem, which has interested numerous investigators during the last two hundred years, and may perhaps soon lead to a satisfactory solution.

15. The Joint Committee recommends :

(1) that WHO prepare and publish a summary of the information available on pellagra, designed (i) to call attention to the disease as a public-health problem, (ii) to aid in the wider adoption of adequate diagnostic criteria, (iii) to stimulate research on the interplay of the several influences upon the etiology of the disease, and (iv) to aid in the planning of control programmes ;

(2) that in countries where pellagra exists in association with a high consumption of maize, agricultural production and educational programmes should be developed which take account of the need for increasing the consumption of cereals other than maize and of pulses and other appropriate foods ;

(3) that the governments of these countries should be encouraged to undertake and evaluate pilot programmes for the control of the disease. These should be concerned with (i) replacing some of the maize in the diet by other cereals or staple foods, (ii) increasing the production of pellagra-preventive foods, and (iii) the enrichment of maize products.

---

<sup>1</sup> In this demonstration the mixture contained thiamine, riboflavin, niacin, and iron.

<sup>2</sup> Food and Agriculture Organization of the United Nations (1953) *Maize and maize diets : a nutritional survey*, Rome (FAO Nutritional Studies, No. 9)

## 10. ENDEMIC GOITRE

1. The Committee at its first session (October 1949) concluded that endemic goitre occurred in many regions of the world and that in some the incidence of the disease was alarmingly high. The report included recommendations that WHO promote the use of iodized salt where practicable and needed, and collect information on methods of providing dietary iodine in regions using crude salt, the iodization of which was not then feasible.<sup>1</sup> The efforts of WHO have contributed greatly to new knowledge of the world-wide prevalence of goitre and new developments whereby crude salt can be iodized.

2. The WHO Study Group on Endemic Goitre, which met in London in December 1952, reviewed and summarized the progress and data available regarding the etiology and public-health importance of endemic goitre.<sup>2</sup> It called special attention to an important new advance in the prevention of endemic goitre, namely, the use of potassium iodate for the iodization of crude salt. Potassium iodide is not stable except when the salt is relatively pure and alkaline, can be packed in special containers and maintained dry, and is not subjected to high temperatures.

3. Information was available to the study group from laboratory and pilot scale tests of the stability of iodate in moist crude salt and its effectiveness in the treatment and prophylaxis of endemic goitre in field trials. This led to the recommendation that iodate should be employed when the conditions necessary for the use of iodide could not be met. Studies have since demonstrated that there is no measurable loss of potassium iodate for at least a ten-month period when added to crude salt on a commercial scale. Other investigations have demonstrated a large margin of safety between toxic doses of this compound and the maximum quantity which could be obtained from the diet by the consumption of salt at any of the levels recommended.

4. The First and Second Conferences on Nutrition Problems in Latin America recognized endemic goitre as a serious public-health problem in most of the Latin American countries and made strong recommendations for the use of iodized salt in its prevention.<sup>3, 4</sup> The third conference in

---

<sup>1</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1950, 16, 14.

<sup>2</sup> See *Bull. Wld Hlth Org.* 1953, 9, 293.

<sup>3</sup> Food and Agriculture Organization of the United Nations (1950) *Conferencia de Nutrición, Montevideo, julio de 1948*, Montevideo, p. 189 (*FAO Nutrition Meetings Report Series*, No. 1)

<sup>4</sup> Food and Agriculture Organization of the United Nations (1950) *Report of the Second Conference on Nutrition Problems in Latin America, Rio de Janeiro, Brazil, 5-13 June 1950*, Washington, p. 14 (*FAO Nutrition Meetings Report Series*, No. 4)

these series made a detailed report on the problem.<sup>1</sup> It took into consideration the available information on physiological requirements for iodine, the existence of goitrogenic factors in some areas, the variation in the consumption of salt in different regions, and the benefits from the use of one part of potassium iodide (equivalent to 0.77 part of iodine) in 10 000 parts of salt for many years in Canada and the United States of America. The Conference recommended that one part of iodine in 20 000 parts of salt should be considered a minimum level for the iodization of salt in Latin America, and that one part in 10 000 be regarded as a maximum.

5. The WHO Study Group on Endemic Goitre had previously recommended that food salt be iodized at a level of one part of iodine in 100 000 parts of salt, with a suitable adjustment where daily salt consumption differed materially from the figure of 10 g daily.<sup>2</sup> The Committee, after discussion, concluded that in selecting the level of iodization to be employed governments should take into consideration the average per caput salt consumption, the possible prevalence of goitrogenic factors, and the experience of similar areas.

6. In the planning and introduction of iodization programmes, objections are often presented based on a supposed possibility of harmful effects. The Committee noted the comment of the WHO Study Group that "In no country in which iodine prophylaxis has been used on a community scale, has this measure had any adverse effects on the health of the population".<sup>2</sup> The report of the Third Conference on Nutrition Problems in Latin America also stated that "Salt iodized with *potassium iodide* has been distributed in a number of countries and on a large scale for more than 20 years without producing unfavorable or adverse effects on the health of the population. In these countries . . . all reports of unfavorable effects which have been investigated have proved to be false or explainable on the basis of coincidence."<sup>3</sup> The Committee agreed that there was no reason to expect any undesirable effects from the introduction of salt iodized at any of the levels referred to above.

7. The Committee felt that WHO should continue to call the attention of governments to the problem of endemic goitre and the methods for its prevention. It was suggested that it would be useful to have a monograph on endemic goitre which would include the information at present

---

<sup>1</sup> Food and Agriculture Organization of the United Nations (1954) *Report of the Third Conference on Nutrition Problems in Latin America, Caracas, Venezuela, 19-28 October 1953*, Rome, p. 33 (*FAO Nutrition Meetings Report Series*, No. 8)

<sup>2</sup> *Bull. Org. mond. Santé*; *Bull. Wld Hlth Org.* 1953, 9, 295, 296

<sup>3</sup> Food and Agriculture Organization of the United Nations (1954) *Report of the Third Conference on Nutrition Problems in Latin America, Caracas, Venezuela, 19-28 October 1953*, Rome, p. 43 (*FAO Nutrition Meetings Report Series*, No. 8)



available regarding its incidence and public-health significance, as well as the details of practical control measures. In such a monograph, special attention should be given to the use of potassium iodate for the iodization of salt, and the epidemiological and clinical studies of endemic goitre which are especially needed should be indicated.

8. The Joint Committee recommends :

- (1) that WHO should prepare a monograph on the public-health importance and socio-economic aspects of endemic goitre, to include practical information on control measures. This should include full details on the iodization of crude salt with potassium iodate ;
- (2) that WHO should continue to call the attention of governments to the problem of endemic goitre and to the recent advances in its prevention through new methods of iodization of salt ;
- (3) that in doing this WHO should indicate that special consideration be given to :
  - (a) the appropriate level of addition of iodine compounds to salt, taking into account the local consumption of salt, the possible existence of goitrogenic factors, and the results of experience in other similar areas ;
  - (b) surveys of the incidence of goitre in representative population groups to determine the extent of the problem and to provide a basis for evaluating prophylactic measures and resulting economic and social changes ;
  - (c) the collection of data from endemic areas on the prevalence of cretinism, mental deficiency, deaf-mutism, hyper-thyroidism, and still-births, as well as on salt consumption and the existence of possible goitrogenic factors. Studies on the growth of children in these areas would also be valuable.

## 11. NUTRITION AND DEGENERATIVE DISEASES

1. At its second session the Committee noted that malnutrition may result from excessive consumption of food as well as from nutritional deficiencies. It concluded that attention should be drawn to the importance of this question, particularly in regions in which food supplies are abundant, and that systematic study was merited.<sup>1</sup>

2. Until now, the activities of FAO and WHO in the field of nutrition have been concentrated on problems of under-nutrition and dietary

---

<sup>1</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1951, **44**, 43 ; and *FAO Nutrition Meetings Report Series*, 1951, No. 5, p. 43.

deficiency diseases. This has been proper in view of the dominance of food shortages in the war and post-war periods in which these agencies were born. While efforts in this direction must continue unremittingly, it is now appropriate to consider other relationships between diet and health, especially in the more highly developed countries and in certain segments of the population in many other countries. During the last four years research developments in the epidemiology of non-infectious diseases have been rapid and significant, and there are increasing indications of the importance of the habitual diet in the development of some of these diseases.

3. In most of the more highly developed countries, all data on morbidity and mortality indicate that the classical nutritional deficiencies are of minor public-health importance as compared with metabolic disorders affecting the adult population, including the neoplasms, mental and cardiovascular diseases, and the arthritides. There is increasingly convincing evidence that the habitual diet plays an important role in the development of degenerative heart diseases, including coronary heart disease, angina pectoris, and myocardial degeneration.

4. Degenerative heart disease is the most frequent cause of death in North America, in most of Europe, and among the more prosperous segments of the population in many other parts of the world, and this is true not only of the aged but also of all ages beyond the third decade of life. The increasing dominance of degenerative heart diseases in these countries and areas is not explicable as a result solely of the reduction of other causes of mortality, or of the changing age structure of the population. In any case, it is clear that the mode of life is involved and that better sanitation, medical services, and the correction of specific and already recognized dietary deficiencies have not, and probably will not, improve the situation.

5. The fact that the habitual diet is important in the development of degenerative heart disease is indicated from evidence in many areas. Such evidence, which is fully in line with recent experimental work on animals and man, and which is based on the relation of the diet to the incidence of degenerative heart disease, on post-mortem statistics, and on chemical changes in the blood, suggests that high-fat diets are conducive to the production of atherosclerosis and subsequent degenerative heart disease. Obesity often goes hand in hand with high-fat diets and it may well be that consumption of excess fat is causally related to some of the degenerative accompaniments of obesity.

6. Further clarification of these problems urgently requires much more research, particularly the collection of data on the proportions and kinds of fats in the habitual diets of countries and of population groups, on the

frequency of obesity, and on the incidence of, and mortality from, degenerative heart disease in those countries and groups. Since much of the progress in understanding of the etiology and possible prevention of these conditions must come from systematic comparisons between countries, it is appropriate that FAO and WHO assume leadership and give guidance in this work.

7. There is a critical need for reliable data on morbidity and mortality, specific for cause, age, and sex; on the habitual diets of countries and regions, with special reference to their fat content; and on the relevant characteristics of the populations. In order to achieve proper comparability, methods of study and of reporting the findings must be standardized. It should be observed that in many countries there has been a marked and progressive trend towards the use of diets with higher and higher fat contents. This trend results from changes in food economics and food technology, as well as from alterations in preference and methods of preparation, but its effects have not been foreseen, nor has the possible danger of its further continuance been evaluated. Such knowledge of the relation between nutrition and cardiovascular diseases as is available indicates that there is need for considering the educational and other measures required for its application to preventive medicine and public health.

8. Co-ordinated international investigations of the relationship between the diet and the development of degenerative heart disease have been made recently, without the advantages of official connexion with United Nations agencies, in England, Spain, Italy, Sweden, South Africa, Central America, and the United States of America. Responsible experts and authorities in these countries, and also in Chile, Japan, the Netherlands, and other countries, are interested in collaborating in further studies and in participating in systematic co-operative work on the relationship between the diet and the burden of diseases previously not suspected of being nutritional in origin. There is every reason to believe that nutrition must occupy a most important place in a new type of epidemiology in which international co-operation is vital. The responsibility of WHO here is obvious. The Committee noted with satisfaction that WHO is, in fact, considering these questions and in the near future may assemble a study group to advise it on the present state of knowledge and on the possible role of WHO in this field.

9. Information on the availability and use of different foods, and on trends in dietary habits, is also indispensable. The collection of reliable data on these questions demands special experience and professional training. Moreover, it should be pointed out that guidance in the preparation of reports of dietary surveys and studies on food consumption

is needed to ensure the availability of specific information which may be of great importance in regard to the epidemiology of degenerative cardiovascular disease. FAO can make an essential contribution to these aspects of the problem.

10. The Joint Committee recommends :

- (1) that WHO should give consideration to the important questions of the possible relationship between the character and the amount of the habitual diet, and the development of atherosclerosis and related degenerative heart disease, and of other degenerative diseases of uncertain etiology ;
- (2) that WHO should assemble, in the near future if possible, a study group or committee of experts to examine these questions ;
- (3) that FAO should co-operate in this field by assembling and providing appropriate data on food consumption.

## 12. ANTHROPOMETRY APPLIED TO NUTRITION

1. Anthropometry provides important, though limited, tools for the assessment of nutritional status. This was clearly recognized in the report on the second session.<sup>1</sup> It was noted that the physical dimensions of the body depend, in part, on the individual's nutritional history and that anthropometric data, including measurements of the thickness of skin-folds, provide criteria of relative fatness and of nutritional state.

2. Since the publication of the report of the second session, interest in anthropometry as related to nutrition has increased considerably. For example, important methodological explorations have been carried out under the stimulation and guidance of the Committee on Nutritional Anthropometry (Food and Nutrition Board, National Research Council) in the United States of America and the Committee on Growth and Form (Medical Research Council) in England, and attention is being paid to the subject in other countries.

3. Measurements of physique during the period of growth provide a valuable indication of the nutritional state, and during infancy a particularly reliable one, but they are also of value in appraising the nutritional state of adults. Height and weight measurements can readily be made and they have been used extensively. Satisfactory information in terms of heights, weights, and other anthropometric measurements of adults does not exist

---

<sup>1</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1951, **44**, 63 ; and *FAO Nutrition Meetings Report Series*, 1951, No. 5, p. 63.

for any country. It is very desirable, therefore, that reliable values for height and weight averages and their distribution be obtained from healthy people of both sexes and of different ages and occupational groups within countries. The example of Canada, where a systematic anthropometric survey of a statistically representative sample of the entire country has been completed recently, could well be emulated in other countries. Reliable standards of this sort could be put to profitable use, both for national and for international purposes, especially during periods of economic, industrial, or other stress likely to affect the quality or quantity of diets.

4. It is commonly acknowledged by clinicians experienced in this field that objective measurements of physique of proven nutritional import are very desirable and research in anthropometry should aim at providing methods for such measurements. In recent years intensive studies of bodily physique coupled with clinical observations have shown other anthropometric measurements to be useful in throwing light on the nutritional state. Chief among these is skinfold thickness, which is readily measurable even under difficult conditions in the field. The thickness of the subcutaneous fat layer, measured by the skinfold caliper or on suitable roentgenograms, provides a more satisfactory index than the weight of the amount of fat in the body. In conjunction with gross body weight and measurements of the circumferences of the extremities, the subcutaneous fat thickness provides a means of estimating the muscular mass.

5. The Committee was convinced that the planning and specification of techniques for carrying out anthropometric surveys is a specialized task, and that sufficient studies have already been made and experience gained to warrant examination of the present position by an expert group with a view to giving specific and detailed advice on the planning of surveys, the measurements to be made and how to make them, the statistical analysis of the findings, and the significance to be attached to the results. The Committee suggested that attention should, in the first instance, be drawn to the need for a basic series of standard items of measurement.

6. The problem of the objective specification of body or skeletal type continues to demand attention. The provision of different height-weight tables for different skeletal types (e.g., "light", "medium", and "heavy frames") is useless, or worse, in the absence of an agreed and reliable system of classifying body types. The recent rather wide use of Sheldon's system of somatotyping raises questions of interpretation that are not yet answered satisfactorily. These are examples of problems that deserve the early attention of a group of experts.

7. The Joint Committee recommends :

- (1) that FAO and WHO continue to take cognizance of the developments in anthropometry as applied to the appraisal of nutritional status, and to give encouragement to more extensive use of objective and quantitative anthropometric devices ;
- (2) that attention be called to the need for standardization of methods and for reliable anthropometric norms, including height and weight, subcutaneous fat thickness, and other norms needed for such appraisal ;
- (3) that efforts be made in the near future to assemble a study group or expert committee to consider and to report on these questions of methods, standardization of procedures and reporting, the planning of surveys, and the provision of norms, and on the whole problem of the application of anthropometry to nutritional evaluation.

### 13. ASSESSMENT OF NUTRITIONAL STATUS

The Committee was informed that the " Guide to nutrition workers on the assessment of nutritional status " <sup>1</sup> had had a wide circulation and that opinions had been sought from a large group of specialists on this subject. There was evidence that the report had been well received and used extensively for teaching purposes. The Committee concurred with the conclusion reached unanimously at the second session that it was undesirable to recommend the use of a standard schedule. It considered that it was not necessary to review this document at the present time, but recommended that workers who had used it in nutrition surveys should continue to be consulted with a view to obtaining their opinions on its value and suggestions for alterations and additions. It recommended that arrangements should be made for an exchange of views on the value of the procedures described in this guide. The Committee envisaged that at some future date the guide would be revised in the light of information obtained.

### 14. NUTRITIONAL ASPECTS OF THE WELFARE OF THE AGED

A reference to this subject was made in the report on the second session.<sup>2</sup> The increasing proportion of elderly persons in the population of certain countries, and the current interest in geriatrics, underline its importance.

---

<sup>1</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1951, **44**, 45 ; and *FAO Nutrition Meetings Report Series*, 1951, No. 5, p. 45.

<sup>2</sup> See *Wld Hlth Org. techn. Rep. Ser.* 1951, **44**, 42 ; and *FAO Nutrition Meetings Report Series*, 1951, No. 5, p. 42.

The Committee hopes that FAO and WHO will continue to collect and analyse data with a bearing on the nutrition of elderly people, including available information on the food consumption of this group obtained through dietary surveys.

---

### Annex 1

#### METHODS AND CONTENT OF EDUCATION IN NUTRITION

##### *Introduction*

1. Education is recognized as an important means of changing food habits and ways of living to improve the nutrition of population groups. Its success is dependent, however, in every country upon the approaches adopted to influence people in the home, the school and the community.
2. Workers who are planning or developing programmes of education in nutrition require knowledge of local conditions, including information on food consumption, food habits, food supply, and economic and health conditions, and of the administrative structure of the country concerned and the various services which are available to participate in the programme.

##### *Cultural factors*

3. Before attempting to modify the food patterns of a group it is not only necessary to know what people eat; an understanding of *why* they eat what they do and in the way they do is also required. The "prestige value" of individual foods, based on a complex of cultural and social factors, varies from place to place. Attitudes towards food divorced from reason or scientific knowledge are by no means confined to the under-developed countries. Numerous examples are found in more sophisticated communities. There is need, therefore, for a realization and understanding of ideas about health and the causation of disease, and, especially in under-developed countries, of beliefs about the supernatural and about religion or magic. People may believe that certain foods protect them from disease or other misfortune, or that they have special "strengthening" properties, while other foods or combinations of foods are regarded as likely to produce epilepsy or impotence or other undesirable results, or are prohibited entirely by long tradition. Beliefs of this kind are commonly associated with childbirth and affect the diet of the mother and child.

4. Numerous other cultural factors also influence dietary habits. In some regions, for example, cattle and other domestic animals are not fully used as a source of food because they are regarded as symbols of wealth.

5. Everywhere those who wish to educate people in better habits of diet must, therefore, take account of the ideas on which existing dietary practices are based and of the values attached to particular foods or habits. The adoption of a new dietary practice will depend on whether or not it can be fitted into the existing cultural system of beliefs and values. The cultural anthropologist can assist the nutritionist, the health expert, the agriculturalist, and the social worker in this aspect of educational programmes.

#### *Motivation*

6. People of all ages, in all societies, are capable of learning how to change their ways. But they will only learn, and change their ways, if the new action seems to them to help them to achieve something they want—to serve their own interests. These interests are usually concrete and specific, especially among the more primitive societies. Time and effort must be given to discovering what the people in a community are themselves interested in achieving. The programme of education in nutrition should be linked as far as possible with these interests, and the people given opportunities to participate in the planning to achieve these ends.

7. It was found in one area, for example, that classes in cooking, offered by a health centre, roused no response at all among the women of the more needy section of the community. These women were found, however, to be extremely anxious to learn to read and write, to “do addition” and to “read time by the clock”. Literary classes were then established which formed the first link between the nutrition educators of the health centre and the women in the community most in need of help, and through these classes education in nutrition was given to the community.

8. Once the interests of the people are discovered they can be used as means to the end desired by the educator, and better nutritional practices can be presented to the people as a means to the end which they themselves desire.

#### *Educational approaches*

9. In the past, nutrition and health education in general have usually been carried out by people who have employed the methods with which they were familiar from their own experience. The fact that the desire



to learn, which they as students possessed, was not necessarily present in the people they sought to teach was overlooked, and the all too frequent failure to convince was blamed on the stupidity or obstinacy of the learners. As knowledge of the learning process has grown, and the importance of the motivating forces, and of the learner's own background of knowledge, has been more fully realized, considerable changes have taken place in the approach to education as a whole. The didactic methods of the past have fallen into disrepute, as ineffective and self-defeating, and are now generally regarded as satisfying more the "felt needs" of the educator than those of the learner.

10. Unfortunately, education in nutrition rarely shows quick results, so that it has been difficult to evaluate the different approaches used. Some useful guidance is, however, available from the reports of controlled nutrition-education experiments in the United States of America, and from the allied field of agricultural improvement through "extension" in both developed and under-developed areas.

11. It has been found that people will change their habits more readily if they can measure the benefits of an innovation for themselves, if the connexion between the action to be taken and the desired result is obvious, and if the result does not depend on too many extraneous factors.

12. It has also been found that (1) people will follow a fellow member's success more readily than a demonstration, however impressive, made by someone who does not belong to the community; (2) the younger members of the community are usually more ready than their elders to replace tradition by the prestige of the expert; and (3) decisions taken by a group of people after full discussion of the matter are more likely to be persistently carried out than those reached after individual instruction, or after talks and lectures to groups.

13. Until such time as reliable evaluations of different educational approaches are more widely available, it can be suggested that reliance should not be placed on didactic methods unless the demand for knowledge and the interest are shown to be high, and that it is better to concentrate the educational effort on the receptive few—leaving the rest to follow their example—than to spend much time and energy on persuading the reluctant to learn.

The teaching methods selected may well be based on the Chinese aphorism :

“ If I hear it I forget ;  
If I see it I remember ;  
If I do it I know.”

*Content of nutrition education*

14. Before anyone can adopt a new dietary practice he must clearly understand what he is to do. What the new practice should be can be decided only after the preliminary studies of local conditions and agricultural and economic resources have been completed. In general, every effort should be made to base the content of the education on modifications of present dietary practices rather than on the introduction of radical changes. Only those changes which are within the long-term economic and agricultural resources of the people should be advocated.

15. The content of the educational programme should, therefore, be completely agreed upon by all of the groups in the area with inter-related responsibilities—the nutritionists, health authorities, agricultural workers, and social welfare workers—in order to ensure an integrated programme and avoid contradictions and confusion. This is particularly important when the persons providing leadership in the programme have had varying backgrounds of experience in different parts of the world.

*Teaching methods*

16. The various methods and media of nutrition education are designed to facilitate understanding of what changes in practices are desirable and why. The best methods are those which encourage the learner to take an active part in the learning process, by creating situations such as discussions, interviews, councils, committees, projects, drama, and live demonstrations, where people learn by experience, with the educator at hand to supply the expert knowledge when necessary. Lectures, films, leaflets, posters, radio advertisements, and newspaper articles assume that the learner will understand what is intended, and be stimulated to act on the information at some later date—an assumption not always justified by experience.

17. Sometimes, however, a combination of both methods, the active and the passive, can be used to advantage. For example, a recent type of "visual unit" has been prepared in certain countries which consists of a series of films, film strips, wall charts, pamphlets, teacher's guide, and other educational material, all focused on one particular subject and its ramifications, designed especially to allow audience participation. This kind of "visual unit" can be used in schools or in local training, or in a programme to arouse interest and community activity. Such an elaborate unit is not obtainable in nutritional subjects at present, and some careful evaluation of its general usefulness and educational effectiveness, relative to cost of production, would have to be made before it could be widely

recommended. Such a unit might be equally effective if film strips were substituted for films, and would be much cheaper.

18. The need for clear specific language, and for the opportunity to check what has actually been understood and to correct any misunderstandings, cannot be overstressed.

19. Educational or visual aids such as posters and models, should be simple and accurate, in keeping with local knowledge, ideas, and values, and, where used as demonstration models, capable of being reproduced with the resources of the people concerned.

20. The extensive experience of FAO and WHO workers, particularly in under-developed countries, should enable these organizations to give assistance to programmes by providing visual and other aids better adapted to local conditions than those now in use in more technically advanced countries. The best educational aids are those that grow out of the experience of skilled educators in the community. The second best are those from other places that can be suitably adapted to local conditions.

#### *Education in nutrition for mothers*

21. In some countries opportunities for the education of mothers in nutrition are provided by mothers' clubs, parent-teacher associations, and rural institutes, as well as by maternal and child health centres. In the less developed countries, supplementary feeding programmes are often organized in maternal and child health centres. It is imperative, for this and other reasons, that education in nutrition should be one of the main functions of such centres. A recent survey suggests, however, that the amount of attention paid to the teaching of nutrition in these centres is, on the whole, inadequate in many parts of the world. This seems to be due to several factors, such as :

- (1) inadequate preliminary training of personnel in :
  - (a) the nutritional problems of the under-developed countries ;
  - (b) the problems of infant feeding and weaning where milk is not available, or is not a habitual weaning food ;
  - (c) the principles and methods of education ;
- (2) a pressing demand for curative services for minor illnesses ;
- (3) shortage of locally-born trained personnel.

22. One aspect of education in nutrition which is peculiar to maternal child health and other community centres the staff of which have come from different training schools is the need to ensure that there is agreement about the content of the education among all members of the staff,

including the humbler servants who are often consulted by the mothers and other people who visit the centres. In developing their programmes of education in nutrition, FAO and WHO should give careful attention to this important point.

23. Once agreement has been reached on the content, the techniques of education follow the general principles already outlined. It should always be borne in mind, however, that a demonstration in the home by public-health nurses, social-welfare workers, and others who are in direct contact with the people and use their habitual utensils and limited cooking facilities is of far greater value than a demonstration in a centre. Where the maternal and child health centre is the only source of education in nutrition in the area, thought must be given to whether education of the mothers alone can be effective in producing the necessary changes in dietary practice.

24. In communities in which women have little say in domestic spending, or where their position is insecure, or rigidly defined, it may be necessary to extend the educational efforts to reach the fathers, the old people, or the local leaders before any change can be effected. Where other potential educators exist—for example, personnel in school health or agricultural extension services—the maternal and child health team can help to co-ordinate and co-operate in the total educational effort.

#### *Education in nutrition in schools*

25. The teaching of nutrition should be a basic part of the educational system in all primary and secondary schools. It is unlikely that classes in this subject can be given by specialists in most countries, but the teaching can be integrated with the work on many subjects in the curriculum, and this method should also be adopted in the formal training of teachers. In-service training to enable school staffs to develop nutrition education is also urgently required and should be made available regularly. Manuals on nutrition adapted to different educational levels are needed.

26. Actual practical projects with a bearing on nutrition, such as gardening, the keeping of small animals, the feeding of animals for demonstration purposes, or the planning, budgeting, and preparation of well-balanced meals, are effective ways of teaching. Such teaching should reach boys as well as girls.

27. In many countries, supplementary feeding programmes are organized in schools and either school meals or snacks, based on skimmed milk, are supplied to the children. A large part of the value of such programmes is lost if they are not used as a basis for teaching better food habits. Such educational programmes should be carefully planned and supervised.

The benefits of education programmes associated with supplementary feeding projects should wherever possible be evaluated by suitable studies, e.g., of the growth and health of children receiving school meals.

#### *Community education*

28. As the promotion of good nutritional practices involves many fields of activity—agriculture, marketing, public and domestic hygiene, and the storage and preparation of food—progress can be best achieved by the education of the whole community. This can be done only if the people are prepared to do something to help themselves, and nothing should be attempted until they have reached this stage, which may call for long preliminary discussions between the initiators and the people.

29. The educational programme which can be initiated (with expert guidance from nutrition workers) through health, agricultural, or home-economics education, or by social-welfare personnel, or through mass education or other social or cultural movements, must be based on the particular conditions and needs of the area. The feeding of industrial and farm workers provides a good opportunity for education in nutrition. The people should be guided to aim at immediate as well as long-range targets, which they themselves feel to be fully appropriate, so that the encouragement of success may not be delayed too long. The preliminary goals should not be very ambitious; failure makes a second attempt more difficult. The co-operation of all the local leaders, official and unofficial, should be sought from the beginning, in the planning as well as the action stage.

30. It is essential that all workers taking part in an educational project should study the problems and develop a plan together, and that each should understand his own particular part in furthering the work. If possible they should receive initial training in the content and methods of the education to be carried out. FAO and WHO could help by providing experts for the furtherance of such programmes.

31. Community programmes can include the development of community and school gardens, the growing of new foods, and the testing of new ways of cooking and preserving foods, the last on a domestic or community scale. It is obviously advisable to test the acceptability of a finished product, e.g., a flour for *tortillas*, or a new vegetable or staple, before advocating the cultivation of new crops on a large scale.

32. In the past, community education has been attempted by the use of travelling film units, radio broadcasts, articles in newspapers, or the posting of leaflets or posters in headmen's houses and in school classrooms.

This approach is extremely uncertain in its effect, and should be used only to reinforce the educational efforts of the "ground staff". Unfortunately large sums expended by governments on travelling film units give a feeling that "something is being done about it", though no one really knows quite what.

*Organization of programmes of education in nutrition*

33. Work in nutrition education has been growing, but only a beginning has been made in developing effective methods. More trained specialists are needed to initiate, organize and superintend programmes. These may be employed by the ministries or departments most directly concerned with nutrition, e.g., health, agriculture, education, and social welfare. In most countries, however, the number of available nutrition specialists is too limited to enable them to reach the population directly. At the community level in both urban and rural areas, the greater part of the teaching must be done through school teachers, health workers, social-welfare workers, extension agents, and others who are working in the community. The specialists have the responsibility for providing reliable technical advice and illustrative material adapted for local use, which are essential to a successful programme.

34. All such programmes must in fact be fitted into the existing pattern of social services. All available channels should be used to reach the people and new ones developed when necessary. The co-operation of government departments and private organizations whose activities have a bearing on health, food supply, food technology, and other fields related to nutrition should be sought. The aim should be a unified and co-ordinated programme, in which many different agents and agencies co-operate, each contributing towards the achievement of a common goal. For greater success, increasing attention should be given to methods of teaching. The plan to organize an FAO/WHO seminar on health education and education in nutrition in South-East Asia in the latter part of 1955 may well result in significant progress in teaching methods.

## Annex 2

**FAO TECHNICAL ASSISTANCE PROGRAMME IN NUTRITION,  
FOOD TECHNOLOGY, AND HOME ECONOMICS**

**A. Completed Projects**

The following projects have been completed or will be terminated at the end of 1954. Projects now in progress which will be continued in 1955 are shown under "B" marked with an asterisk.

**I. Nutrition**

Costa Rica	1953/54	Organization of supplementary-feeding programmes—1 fellowship
Ecuador	1953/54	Organization of dietary surveys—4 fellowships
INCAP	1951/52	Teaching dietary-survey techniques—10 fellowships
India	1952/53	Organization of courses in nutrition and catering for cafeteria workers—3 fellowships
Indonesia	1952/53	Organization of training courses for dietitians—2 fellowships
Nicaragua	1953/54	Organization of nutrition-education programme—1 fellowship
Peru	1951	Help in making dietary surveys—2 fellowships
Portugal	1951	Organization of supplementary-feeding programmes—1 fellowship
Somalia	1953	Preliminary survey of nutritional situation
Thailand	1951	Organization of nutrition services—4 fellowships

**II. Food technology**

Ceylon	1953	Advice on the establishment of a food research institute and on food technology generally
Ecuador	1951	Preservation and storage of perishable foods
India	1954	Organization of a laboratory for food packaging and testing
Indonesia	1953	Production of soy bean milk for supplementary feeding purposes—3 fellowships
Israel	1954	Improving baking and milling techniques—1 fellowship
	1954	Assistance in developing appropriate food legislation
Yugoslavia	1954	Canning of fruit and vegetables—1 fellowship

III. *Home economics*

Barbados	1953	Organization of home-economics teaching
Ceylon	1953/54	Organization of services in home economics and dietetics
Israel	1953	Establishment of a college of home economics and nutrition—3 fellowships, \$15 000 equipment
Syria	1951	Organization of home-economics training programmes—1 fellowship

IV. *Training*

- Nutrition training course for French-speaking territories in Africa South of the Sahara (Marseilles, 1952)—A joint FAO/WHO project
- Nutrition training course for East and South-East Asian countries (Calcutta, 1951)—A joint FAO/WHO project
- Home-economics training centre for the Caribbean area (Puerto Rico, 1953)
- Seminar on milk production, distribution, and utilization for Central American countries (Costa Rica, 1953)—In collaboration with UNICEF and INCAP
- Nutrition and home-economics training course (Ecuador, 1954)—In collaboration with the Organization of American States
- Home-economics workshop (Syria, 1951)

**B. New Projects Planned for 1955  
and Projects Now in Progress Continuing in 1955<sup>1</sup>**

The list that follows indicates the general scope and direction of the Technical Assistance programme. It is, however, provisional, being dependent on the approval of the Technical Assistance Board, the availability of funds, and other factors.

I. *Nutrition*

*Burma	Organization of nutrition services, school feeding, and training of workers—A joint FAO/WHO project
Chile	Help in developing a nutrition laboratory
*Colombia	Advising on the national nutrition programme Development of supplementary-feeding programmes—In collaboration with UNICEF
Ecuador	Organization of nutrition services
Indonesia	Organization of courses in nutrition and dietetics
*Indonesia	Food chemistry and technology—Study of the nutritive value and processing of local foods

<sup>1</sup> Those now in progress and continuing in 1955 are marked with an asterisk.



*Iraq	Help in organizing a nutrition institute and nutrition services
Libya	Development of school feeding—In collaboration with UNICEF
Syria	Development of nutrition services; encouraging the appropriate use of local foods

Costa Rica has recently submitted a request for a nutritionist to advise on education in nutrition; a request has also been received from Honduras for help in developing a supplementary-feeding programme. These will be met if funds permit.

## II. *Food technology*

*Chile	Improving baking techniques
Colombia	Food preservation and storage
Ecuador	Grain and flour technology
India	(a) Fruit preservation; (b) assistance in manufacturing malted foods; (c) development of manufactured cereal products
*Indonesia	Help in establishing a soya milk plant
Libya	Possibilities for developing food technology—preliminary survey
Mexico	Food preservation
Southern Rhodesia	Utilization of wheat substitutes in baking
Thailand	Development of food processing
Yugoslavia	Improvement of canning practices

## III. *Home economics*

Home economists will continue working in, or be assigned to, the following countries:

*Caribbean area	Home-economics teaching and extension work
*Egypt	Home-economics and nutrition programmes in villages
*Ethiopia	Home-economics teaching
India (Uttar Pradesh)	Home-economics development through women's organizations
*Iraq	Home-economics teaching

Home economists will continue to be assigned to the UNESCO fundamental education centres in Egypt, Mexico, and Thailand.

## IV. *Training*

Two FAO/WHO joint projects, already mentioned, are planned under this head: a seminar in health education and nutrition education in a country in South-East Asia; a nutrition course in Marseilles for French-speaking territories in Africa South of the Sahara. In addition, a home economist will be provided to act as director at a home-economics training centre in Jamaica for the benefit of British territories in the Caribbean. A specialist will also be provided, on a short-term basis, to organize a nutrition and home-economics training course in Ecuador.

**V. Fellowships**

Fellowships, associated with projects listed above, will be granted as follows :

Nutrition : Burma, Colombia, Ecuador, Paraguay

Food technology : Chile, Colombia, Israel, Yugoslavia

Home economics : Caribbean Commission, Egypt, El Salvador, Ethiopia, Iraq

**WORLD HEALTH ORGANIZATION**  
**TECHNICAL REPORT SERIES**

**Selected Titles**

	Number	Price		
		s. d.	§	Sw. fr.
<b>Adoption, Joint UN/WHO Meeting of Experts on the Mental-Health Aspects of</b> Final report . . . . .	70	1/3	0.15	0.60
<b>Alcohol, Expert Committee on</b> First report. . . . .	84	1/9	0.25	1.—
<b>Alcohol and Alcoholism</b> Report of an expert committee . . . . .	94	1/9	0.30	1.—
<b>Alcoholism</b> Subcommittee See under <b>Mental Health</b> .				
<b>Antibiotics, Expert Committee on</b> Report on the first session. . . . .	26	9d.	0.10	0.40
<b>Bilharzia Snail Vector Identification and Classification (Equatorial and South Africa)</b> Report of a study-group . . . . .	90	1/9	0.25	1.—
<b>Bilharziasis, Expert Committee on</b> First report. . . . .	65	2/3	0.30	1.20
<b>Biological Standardization, Expert Committee on</b> Report on the third session . . . . .	2	1/6	0.20	0.80
Report on the fourth session . . . . .	36	9d.	0.10	0.40
Fifth report . . . . .	56	1/3	0.15	0.60
Sixth report . . . . .	68	1/6	0.20	0.80
Seventh report . . . . .	86	1/9	0.25	1.—
Eighth report . . . . .	96	1/9	0.30	1.—
Report of the Subcommittee on Fat-Soluble Vitamins . . . . .	3	9d.	0.10	0.40
<b>Brucellosis, Joint FAO/WHO Expert Committee on</b> Report on the first session. . . . .	37	2/-	0.25	1.—
Second report. . . . .	67	2/-	0.25	1.—
<b>Cholera, Expert Committee on</b> First report. . . . .	52	1/3	0.15	0.60
<b>Cholera, Joint OIHP/WHO Study-Group on</b> Report on the third session . . . . .	18	1/3	0.15	0.60
<b>Diphtheria and Pertussis Vaccination</b> Report of a conference of heads of laboratories producing diphtheria and pertussis vaccines . . . . .	61	4/3	0.55	2.20
<b>Drugs Liable to Produce Addiction, Expert Committee on</b> Report on the second session . . . . .	21	9d.	0.10	0.40
Third report . . . . .	57	9d.	0.10	0.40
Fourth report. . . . .	76	1/9	0.25	1.—
Fifth report . . . . .	95	1/9	0.30	1.—

	Number	Price		
		s.d.	\$	Sw. fr.
<b>Health Statistics, Expert Committee on</b>				
Report on the first session . . . . .	5	9d.	0.10	0.40
Report on the second session (including reports on the first sessions of the Subcommittees on the Definition of Stillbirth and Abortion, on the Registration of Cases of Cancer as well as their Statistical Presentation, and on Hospital Statistics) . . . . .	25	<i>Out of print</i>		
Third report (including second report of the Subcommittee on the Registration of Cases of Cancer as well as their Statistical Presentation) . . . . .	53	2/9	0.35	1.40
<b>Health and Vital Statistics, First International Conference of National Committees on</b>				
Report . . . . .	85	1/9	0.25	1.—
<b>Hepatitis, Expert Committee on</b>				
First report . . . . .	62	1/6	0.20	0.80
<b>Influenza, Expert Committee on</b>				
First report . . . . .	64	1/6	0.20	0.80
<b>Insecticides, Expert Committee on</b>				
Report on the first session . . . . .	4	2/3	0.30	1.20
Report on the second session . . . . .	34	<i>Out of print</i>		
Third report . . . . .	46	2/-	0.25	1.—
Fourth report . . . . .	54	5/-	0.65	2.60
<b>International Pharmacopoeia, Expert Committee on the (formerly Expert Committee on the Unification of Pharmacopoeias)</b>				
Report on the fourth session . . . . .	1	9d.	0.10	0.40
Report on the fifth session . . . . .	12	9d.	0.10	0.40
Report on the sixth session . . . . .	29	1/3	0.15	0.60
Report on the seventh session (including report on the first session of the Subcommittee on Non-Proprietary Names)	35	1/6	0.20	0.80
Report on the eighth session (including report on the second session of the Subcommittee on Non-Proprietary Names)	43	2/-	0.25	1.—
Ninth report (including third report of the Subcommittee on Non-Proprietary Names) . . . . .	50	2/-	0.25	1.—
<b>Leprosy, Expert Committee on</b>				
First report . . . . .	71	1/6	0.20	0.80
<b>Malaria, Expert Committee on</b>				
Report on the third session . . . . .	8	2/3	0.30	1.20
Report on the fourth session . . . . .	39	1/6	0.20	0.80
Fifth report . . . . .	80	1/9	0.25	1.—
<b>Malaria Conference in Equatorial Africa</b>				
Report . . . . .	38	3/6	0.45	1.80
<b>Mental Health, Expert Committee on</b>				
Report on the first session . . . . .	9	2/3	0.30	1.20
Report on the second session . . . . .	31	2/9	0.35	1.40
Third report ("The Community Mental Hospital") . . . . .	73	2/-	0.25	1.—
Fourth report ("Legislation affecting Psychiatric Treatment") . . . . .	98	1/9	0.30	1.—
<b>Alcoholism Subcommittee</b>				
Report on the first session . . . . .	42	1/3	0.15	0.60
Second report . . . . .	48	2/-	0.25	1.—