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EXPERT COMMITTEE ON  
NUTRITION

Third Report

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## JOINT FAO/WHO EXPERT COMMITTEE ON NUTRITION

### Third Session

*Fajara, The Gambia, 28 November - 3 December 1952*

#### Members :

##### FAO :

- Dr. E. J. Bigwood, Professeur de Biochimie et de Nutrition à la Faculté de Médecine de l'Université libre de Bruxelles, Belgium  
Dr. P. Gyorgy, Professor of Nutrition in Pediatrics, University of Pennsylvania, Philadelphia, Pa., USA  
Professeur R. Jacquot, Directeur du Laboratoire de Biochimie de la Nutrition, Centre national de la Recherche scientifique, Bellevue (Seine-et-Oise), France  
Professor G. J. Janz, Chief, Nutrition Section, Institute of Tropical Medicine, Lisbon, Portugal  
Dr. L. A. Maynard, Professor of Biochemistry and Nutrition, Cornell University, Ithaca, N.Y., USA  
Dr. V. N. Patwardhan, Director, Nutrition Research Laboratories, Indian Council of Medical Research, Coonoor, India  
Mr. A. J. Wakefield, Resident Representative of the Technical Assistance Board, Port-au-Prince, Haiti

##### WHO :

- Dr. J. F. Brock, Professor of the Practice of Medicine, University of Cape Town, Union of South Africa  
Dr. F. W. Clements, Section of Social Pediatrics, Institute of Child Health, University of Sydney, New South Wales, Australia (*Chairman*)  
Professor G. Frontali, Director, Paediatric Clinic, University of Rome, Italy  
Professor B. S. Platt, Head, Department of Nutrition, London School of Hygiene and Tropical Medicine; Director, Human Nutrition Research Unit, Medical Research Council, London, United Kingdom of Great Britain and Northern Ireland  
Dr. M. V. Radhakrishna Rao, Chief, Department of Nutrition, Government of Bombay, Haffkine Institute, Bombay, India  
Dr. H. C. Trowell, Uganda Medical Service, Mulago Hospital, Kampala, Uganda  
Dr. J. C. Waterlow, Member of Scientific Staff, Medical Research Council, Great Britain; Senior Research Fellow, University College of the West Indies, Mona, St. Andrew, Jamaica

#### Observer :

- Dr. G. Péquignot, Chef adjoint de la Section de Nutrition, Institut national d'Hygiène; Representative of the International Children's Centre, Paris, France

#### FAO and WHO Secretariats :

- Dr. W. R. Aykroyd, Director, Nutrition Division, FAO (*Co-Secretary*)  
Mr. M. Autret, Senior Nutrition Officer, FAO  
Dr. R. C. Burgess, Chief, Nutrition Section, WHO (*Co-Secretary*)  
Dr. L. Verhoestraete, Chief, Maternal and Child Health Section, WHO

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## JOINT FAO/WHO EXPERT COMMITTEE ON NUTRITION

### Third Report<sup>1</sup>

#### 1. Introduction

The Joint FAO/WHO Expert Committee on Nutrition met in the Gambia in association with a conference organized by the Commission for Technical Co-operation in Africa South of the Sahara (CCTA). The CCTA conference was in session from 19 to 27 November, and the session of the committee immediately followed. Both sessions were concerned with malnutrition in mothers, infants, and children, the former in Africa and the latter on a world basis.

The convening of this session of the committee was in conformity with a recommendation made by the committee at its second session (April 1951) "that FAO and WHO should, if requested by the governments concerned, assist in organizing a meeting of agencies and individuals in Africa to consider problems of infant and child nutrition".<sup>2</sup>

There was considerable prior consultation between FAO and WHO, the CCTA authorities, and those responsible for the technical aspects of the CCTA conference, particularly Professor B. S. Platt, with regard to the arrangements for the two meetings. The majority of the members of the committee came to the Gambia at the invitation and expense of FAO and WHO. These attended the CCTA conference as observers. Other members of the committee took part in the CCTA conference as representatives of their respective governments and were asked to serve

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<sup>1</sup> The Executive Board, at its twelfth session, adopted the following resolution:  
The Executive Board

1. NOTES the third report of the Joint FAO/WHO Expert Committee on Nutrition;
2. THANKS the members of the committee for their work;
3. THANKS the Food and Agriculture Organization for its excellent collaboration;
4. DRAWS the attention of governments to relevant recommendations contained in the report, and
5. AUTHORIZES its publication.

(Resolution EB12.R10, *Off. Rec. Wld Hlth Org.* 49, 4)

<sup>2</sup> *Wld Hlth Org. techn. Rep. Ser.* 1951, 44, 29; *Joint FAO/WHO Expert Committee on Nutrition: report on the second session, 1951*, Rome, p. 29 (*FAO Nutrition Meetings Report*)

on the committee in addition to those specially invited by FAO and WHO. Their inclusion strengthened the committee and widened its range of experience.

All the members of the committee took an active part in the CCTA conference. Those coming from countries outside Africa were able to contribute to the conference the results of observation and research in other parts of the world and thus add to the total mass of knowledge available. Conversely, the committee had at its disposal, before beginning its work, the considerable body of scientific knowledge and practical experience provided by the scientific papers read at the conference and by the discussions and demonstrations. The WHO Regional Office for Africa provided for interpreters, translators, précis-writers, and facilities for simultaneous interpretation at the meetings of both the conference and the committee.

The committee considers that its close association with the CCTA conference, as described above, was an excellent arrangement and a happy example of fruitful co-operation between a regional, intergovernmental, technical organization and two specialized agencies of the United Nations.

This report is related to section 3.4 in the report on the second session,<sup>3</sup> which is largely concerned with ill-health and disease in children associated with deficiency of protein in the diet. The present committee, while not neglecting the broader aspects of the problem of under- and malnutrition in mothers and children, concentrated its attention on protein deficiency and its effect on child health. The term "protein malnutrition" has been used to designate the central subject under discussion. Malnutrition in mothers has been considered rather as a factor contributing to malnutrition in children than as a particular problem in itself.

Many of the findings and recommendations presented here are in line with those of the earlier report. The committee has, however, considered the problem on a wider basis than at the previous session, with special reference to underdeveloped areas and in the light of additional knowledge accumulated during the last two years. Step by step, the whole problem is being clarified and some progress is being made towards the development of practical measures for improving the nutrition of mothers and children. The prevention of protein malnutrition through appropriate developments in food production and the use of effective extension methods is among the matters considered in this report.

The committee hopes that its report will contribute to the study of and attack on a problem of fundamental importance throughout the world.

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<sup>3</sup> *Wld Hlth Org. techn. Rep. Ser.* 1951, **44**, 28; *Joint FAO/WHO Expert Committee on Nutrition: report on the second session*, 1951, Rome, p. 28 (*FAO Nutrition Meetings Report*)

## 2. Malnutrition in Mothers, Infants, and Children

### 2.1 *Mother-child relationship*

When the diet of a mother is inadequate, not only will her own health be affected, but her infant will be underweight at birth and may even show specific signs of deficiency, e.g., iron-deficiency anaemia. The infant born of a malnourished mother may be immature, i.e., it may not show at birth the development of a normal healthy child. If the mother is malnourished it is probable that the quantity and the duration of lactation will be reduced. As a result, the infant makes a poor start in life and will be stunted in its growth and retarded in its development. Moreover, in the environment in which maternal malnutrition occurs, there is likely to be deficiency of the supplementary foods needed for the healthy progress of weaning. There is therefore a close interrelationship between the nutrition of the mother, foetus, suckling, and weanling.

At all stages of the mother-child relationship, infection and parasitic infestation may lead to greater than normal requirements of nutrients. In the tropics the vicious circle of malnutrition and parasitism is very evident.

### 2.2 *Undernutrition and protein malnutrition in infants and children*

In the fields of medicine, public health, and medical research, attention has recently shifted from disease due to deficiency of vitamins and minerals to what can provisionally be called protein malnutrition. This term cannot at present be defined within narrow limits. It is used here to indicate in general a state of ill-health occurring where diets are habitually poor in protein, while they are more nearly adequate in calories. Clinically, protein malnutrition is most easily recognized when there is a relatively high intake of calories from starchy foods together with an insufficient intake of protein. The concept includes the effects of deficiency in the quantity of protein consumed, of imbalance of amino-acids, and deficiency of factors, such as vitamin B<sub>12</sub>, commonly found in foods in association with animal protein and concerned with protein metabolism.

**2.2.1 *Kwashiorkor.*** A full description of severe kwashiorkor, a form of protein malnutrition, is given in Annex 1. Kwashiorkor commonly occurs in infants and young children who have been fed on a diet low in protein and composed mainly of foods rich in carbohydrate. The main clinical features are failure of growth, retarded development, wasting of muscles, loss of appetite, mental apathy, oedema, dyspigmentation of hair and skin, diarrhoea, and the presence of undigested food in the stools. Subcutaneous fat is often well retained. There may be signs of associated

vitamin deficiency. In the blood there is a reduction in the concentration of albumen and of certain enzymes. The characteristic pathological features are fatty infiltration of the liver and atrophy of the pancreas and of other glands concerned with exocrine secretion, together with a diminution in the amount of pancreatic enzymes in the duodenal juice. The disease responds well to treatment with skim milk. A similar syndrome was described in Europe early in this century under the name "Mehlnährschaden"; conditions with all the essential features of kwashiorkor have been reported from many parts of the world under different names, a list of which is given in Annex 2. Of these names, kwashiorkor is the one that is now most widely accepted.

*2.2.2 Severe undernutrition in infants.* Severe undernutrition is often referred to as marasmus. It leads to failure of growth and development, with gross loss of muscular tissue and subcutaneous fat. The hair usually shows little change, and signs of vitamin deficiency are uncommon. Oedema is seldom seen except as a terminal event. Bouts of diarrhoea of uncertain origin may occur. The changes in blood proteins and in the structure of the liver and pancreas are inconstant.

In children suffering from severe undernutrition, as in those with kwashiorkor, intake of protein has been insufficient, but that of carbohydrates and fat has been correspondingly reduced, so that the dominating feature of the clinical picture is inanition (starvation)—that is, the effect of calorie deficiency.

*2.2.3 Intermediate states of undernutrition.* Intermediate states between those two clinical conditions are found in which some but not all of the manifestations of kwashiorkor and undernutrition are present. Examples are infants with wasting and oedema but with a normal liver, and infants in whom there is failure of growth and dyspigmentation of the hair but no oedema. One of the ways by which kwashiorkor can be distinguished from inanition may be the level of calorie intake in the initial stages. In the former there may be little or no reduction in calorie intake. This difference is, however, one of degree, so that a wide range of variation is to be expected. Moreover, the effects of reduced calorie intake may be superimposed on those resulting from the consumption of an unbalanced diet. In the underdeveloped countries generally, this combination is a common one, while undernutrition resulting from the consumption of a diet which is insufficient in quantity but properly balanced is rare. The signs which are usually found in protein malnutrition may therefore be associated with those usually found in calorie deficiency, and many different combinations may occur. Again, the manifestations of malnutrition and undernutrition may be present in severe or mild degree.

The problem of definition therefore presents difficulties. If the etiological significance of the term kwashiorkor is left aside, i.e., if it is regarded as being without descriptive significance, it is not easy to decide on the essential clinical manifestations to be covered by the term. The advance of knowledge will, however, inevitably solve the difficulty with regard to terminology and there is nothing to be gained at this stage by attempting to formulate too rigid definitions.

A point of practical and administrative importance must be emphasized. While undernutrition or hunger becomes clamorous and is easily recognized, there are varieties of malnutrition which are not necessarily associated with hunger and are not easily recognized as evidence of dietary deficiency. Kwashiorkor illustrates this point well. Patients suffering from its mildest forms often appear, at a superficial glance, to be well-nourished because oedema and a thick layer of subcutaneous fat conceal a poor state of the muscles.

*2.2.4 Influence of factors other than diet.* Protein malnutrition is particularly common in tropical countries, and the contributions to its causation made respectively by diet deficiency and tropical parasitism are difficult to evaluate. Infections and infestations may lead to interference with the digestion, absorption, and metabolism of food. There may be increased need for nutrients, especially protein, in order to make good the loss and destruction of blood and to meet increased metabolic demands during fever. Infections and infestations therefore accentuate the problem of malnutrition, and steps to reduce or eliminate them should be an integral part of efforts to eradicate malnutrition, particularly in tropical countries.

A word should also be said on the subject of hepatotoxins other than those produced by micro-organisms. The role of such hepatotoxins in the production of liver necrosis, and the relationship of their action in this respect to undernutrition and malnutrition, have been well demonstrated in experimental animals. From the clinical side, comparatively little evidence of similar manifestations has been obtained, but it is suspected that hepatotoxins of this nature may play a part in producing some varieties of liver disease of uncertain causation.<sup>4</sup>

*2.2.5 Collection of further information.* In order both to determine the extent of protein malnutrition as a public-health problem and to disentangle the part played by the various factors alluded to above, the collection of data on as wide a scale as possible is essential. More information

<sup>4</sup> Poisoning by alkaloids from the *Sesecio* plant, which is found throughout the world and has many varieties, may be mentioned as an example. These alkaloids act as hepatotoxins when administered to animals, and in some parts of the world a similar effect in man has been clearly demonstrated. Relevant references will be found in Selzer, G., Parker, R. G. F., & Sapeika, A. (1951) *Brit. J. exp. Path.* **32**, 14.

about the clinical, biochemical, and pathological changes found in infants and children suffering from undernutrition and malnutrition is necessary for more complete classification and analysis. Doctors in the field can make a useful contribution to the ultimate solution of the problem by placing on record detailed descriptions of patients who present one or more of the signs and symptoms falling under the terms kwashiorkor and undernutrition as defined in this report.

### **3. Causes of Undernutrition and Protein Malnutrition**

#### **3.1 *Food supply***

In many underdeveloped countries, existing food supplies available for consumption are not adequate to meet the nutritional requirements of the people. Estimates of calories and proteins available per caput, made by the "food balance-sheet" method, indicate that in these countries average diets are insufficient in quantity and defective in quality. Total per caput protein supplies may be below 60 grams daily and those of animal proteins less than 10 grams. This usually reflects a low production of such foods as milk, meat, fish, and eggs. While food balance-sheet estimates relate only to average supplies and have a high margin of error, they give a broad picture of the food situation in the country concerned. Further, it can be assumed that when per caput food supplies are inadequate in quantity and quality, the diets of sections of the population which have special nutritional needs, e.g., mothers and children, are particularly likely to fall short of requirements.

Another fact of importance is that in many parts of the world there are periodic fluctuations in food supplies which may affect both the total calories available and the consumption of certain kinds of food. Seasonal shortages of foods of high nutritional value, associated with greater reliance on starchy foods, may precipitate deficiency states. Fluctuations in the diet in respect of quantity and quality may also have other physiological results which are as yet imperfectly understood and call for further research.

The first and most essential step is to ensure that sufficient amounts of the right kinds of food are available at all times. Some of the measures which may be taken to achieve this end are considered in later sections of this report.

#### **3.2 *Population growth***

In certain regions of the world, the rapid increase in population, largely resulting from public-health policies, has created the problem of how to produce enough food to meet increasing requirements. In many regions,



a solution has been sought by increasing the production of foods which give a high calorie yield per hectare, such as starchy tubers and root crops. Paucity of draught animals, and adverse soil and climatic conditions, often give an added impetus to their production. Once introduced, these crops, because of the ease of their cultivation, tend to encroach on areas previously producing foods of both animal and vegetable origin which are richer in protein.

The starchy foods satisfy hunger but, unless appropriately supplemented, lead to protein malnutrition, which in turn reduces the efficiency of the manpower available and shortens working life. This chain of events can be broken by deliberate concentration on the quality rather than on the quantity of food produced, but this remedy is unlikely to be applied as long as hunger is prevalent, since, as has been said earlier, undernutrition is more vociferous than malnutrition.

If population growth leads to the greater production of starchy foods, in order to maintain calorie levels and avoid undernutrition, the result will be an increase in the prevalence of protein malnutrition. The effect of this trend will show itself in recognizable form first in the post-weaning period of life. It can be counteracted in underdeveloped countries by encouraging the practice of prolonged breast-feeding. Moreover, where this practice exists, it is associated with social customs which tend to reduce the rate of population growth.

### *3.3 Economic factors*

The influence of economic factors on diet has often been discussed, and the committee does not consider it necessary to consider this aspect of the problem in detail. The association of poor nutrition with low economic status, often closer in urban and semi-urban than in rural areas, is fully recognized. Of special significance in rural areas may be excessive reliance on cash crops and the tendency on the part of poor cultivators to sell certain kinds of nutritious foods, in order to obtain ready money, rather than to use them at home. The general conclusion is that measures to improve nutrition and to raise living standards are interdependent and must take place simultaneously.

### *3.4 Social and cultural customs*

Social and cultural customs exert, directly or indirectly, a profound influence on the diet of most people throughout the world. While their influence, considered from the nutritional standpoint, is often good, they may in certain circumstances be important causes of malnutrition. A few illustrations may be given.

The diet may be directly affected by beliefs relating to special foods. For example, in some rice-eating countries there is almost a reverence for rice and its consumption is believed to be necessary for the attainment of full health and strength. Because of this, it is the practice to introduce rice in unsuitable forms into the diet of the infant within a few days of birth, thereby producing digestive upset and dietary imbalance. In other countries fresh cow's milk and fish are regarded as unsuitable for young children. Beliefs of this nature, which are widespread in many communities in which only a narrow range of foods is available, result in bad dietary practices.

Diet may be indirectly affected in numerous ways by social conditions. An important example of this relationship is the position of women in many agricultural communities. The woman is required to perform much of the work in the fields and as a result the feeding of her infant is adversely affected, both because the supply of breast milk may be reduced and because she has no time to attend to the infant's needs. Again, beliefs and practices in relation to livestock may lead to failure to utilize sources of valuable foods which would improve the nutrition of the people. For example, in some African areas cattle are mainly a sign of wealth and little attention is given to them as producers of milk and meat.

#### **4. Extent of the Problem of Protein Malnutrition**

##### **4.1 *Incidence of protein malnutrition***

While much is known about the clinical manifestations of protein malnutrition in children, precise information about its extent as a public-health problem is still meagre. However, in many parts of the world, particularly in the tropics, large numbers of infants and children showing signs and symptoms known to be associated with protein malnutrition come under clinical observation. This can reasonably be taken as an indication that protein deficiency is widespread in the general population.

In most of the countries where these conditions are found, there are insufficient supplies of foods rich in protein which can be satisfactorily used in the feeding of infants and young children during and after weaning. Where combined dietary and nutritional surveys have been made, they have confirmed this association. It is, however, only by the medical examination of urban and village populations that the extent of protein malnutrition in a given area can be accurately determined.

##### **4.2 *Long-term effects of protein malnutrition on community health***

The medical histories in later life of infants and children who have suffered from ill-health due to protein malnutrition have not yet been

adequately studied. Little direct information on the long-term effects is, therefore, available. There is, however, some evidence which may have a bearing on the problem. For example, in some countries in which this form of malnutrition is found in the lower age-groups, postmortem examinations of adolescents and young adults frequently reveal fibrosis of the liver. In addition, primary carcinoma of the liver is relatively common.

A close relation appears to exist between the incidence and severity of tropical ulcers and malnutrition. In many parts of the tropics these ulcers are a serious cause of disability and constitute an important economic problem.

With regard to more general long-term effects, there is some indication that in areas in which protein malnutrition is prevalent the ability of both men and women to engage in sustained work is reduced. It has been found that improvement in the diet leads to a significant increase in productive capacity, including capacity to produce food. Again, in some of these areas, death-rates in adult life are high, and it is possible that this is due in part to the effect of protein malnutrition. Such mortality must considerably handicap the economic development of the communities concerned, through causing a relative lack of more elderly experienced adults and a loss of productivity from adults at the most active period of life.

Mental apathy is among the characteristics of young children suffering from protein deficiency. This may manifest itself at a somewhat later stage in life in the form of inability on the part of the schoolchild to benefit fully from the educational facilities available.

### **5. Treatment of Protein Malnutrition in Children**

The treatment of patients suffering from protein malnutrition is essentially dietetic. It calls for the administration of a diet rich in protein. The diet must supply sufficient calories and also provide nutrients other than protein to infants who show intolerance to fat and to many carbohydrates. It may consist of a mixture of powdered skim-milk and suitable forms of carbohydrate, such as ripe bananas. While, at the present time, skim milk is undoubtedly the most satisfactory therapeutic agent, there is some evidence that diets rich in protein of vegetable origin have been effective in all but the most severe cases.

The diet may have to be administered to infants who refuse almost all that is offered, or to infants who are vomiting. Small amounts may have to be given to these patients by nasal tube, after which the oral route can be used. All increases in the diet must be made cautiously since they are apt to provoke relapses of the diarrhoea. A quick return should, however,

be made to a well-balanced normal diet suitable for the child's age as soon as the digestive functions will permit, since milk alone will not satisfy calorie and other requirements.

If patients who are seriously ill do not make satisfactory progress on diets based on skim-milk powder, a change may be made to a diet in which most of the protein is in the form of calcium caseinate. When improvement occurs, a return can be made to a diet based on skim-milk powder.

Sometimes blood or plasma transfusions are administered to the most seriously ill patients, but with modern forms of tube feeding the percentage of patients requiring transfusion is small. All transfusions, unless given slowly and in small amounts, are dangerous and may cause heart failure. Blood transfusion may, however, be required if anaemia is severe.

An active infection should be treated as soon as it is detected, but helminthic infestation should be left untreated until convalescence. Severe cases may also show signs of vitamin deficiencies, many of which disappear rapidly if correct dietetic treatment, along the lines indicated above, is instituted. Deficiencies due to vitamin A require, however, the early administration of this vitamin to avoid the possible complication of keratomalacia. Some doctors prefer to treat signs indicative of deficiency of members of the vitamin-B complex by therapy with specific vitamins in pure or concentrated form, but unless these are administered in moderate dosage, accompanied by the correct dietetic treatment, they are of no benefit and may even be dangerous.

Patients suffering from the disease in mild form may be treated by dietetic means and do not require admission to a hospital. It is usually sufficient to increase the protein in the diet by the addition of foods rich in protein. Eventually, any intercurrent infection must be treated.

## 6. Prevention of Protein Malnutrition

### 6.1 *Changes in diet needed to prevent protein malnutrition*

Studies of diets consumed in areas in which protein malnutrition is and is not present have revealed that it tends to occur when the diet contains a large proportion of the following foods: sugar, manioc (cassava), maize, bananas, taros, yams, sweet potatoes, and milled rice. On the other hand, there is evidence that milk, meat (including glandular tissues), eggs, and fish have a preventive effect. The inclusion of pulses—including beans of various kinds, soya bean, and ground-nut—adds to the protective value of the diet, though to a lesser degree than foods of animal origin.

Within these various groups there are considerable differences. Among staple foods, for example, manioc, bananas, sugar, and maize seem to be more closely associated with the occurrence of protein malnutrition than wheat, millet, or rice.

Observations of this nature need confirmation and amplification, but sufficient information is already available to enable nutrition workers to provide guidance to agriculture, animal husbandry, and fisheries services. The main objective is the greater production of foods rich in protein. Among animal foods, special attention should be given to milk. To increase supplies of sea and freshwater fish by appropriate means is also of great importance. The production and consumption of pulses of various kinds should be increased. With regard to staple foods of vegetable origin, more encouragement should be given to the production of millet, wheat, and rice than to that of maize, and to the production of sweet potatoes than to that of manioc. It is, of course, obvious that food-production policies to prevent protein malnutrition must be related to ecological conditions and existing agricultural patterns and potentialities for change and development in food production in the area concerned.

#### 6.2 *The feeding of pregnant and lactating women*

The greater consumption of protein-rich foods by pregnant and lactating women contributes to the prevention of protein malnutrition in infants and children.

In some places in which protein malnutrition occurs, it is the custom to give pregnant and lactating women special, locally available foodstuffs, some of which help to improve their nutrition. Where these customs are found, they should be studied carefully and, if satisfactory from the nutritional standpoint, actively encouraged. Where this attitude towards the special needs of pregnant women exists, it should be used as a basis in extending the concept that pregnant women require foods rich in protein in sufficient amounts.

Where, on the other hand, these practices are not found and more particularly where the reverse—namely, the withholding of protein-rich and other nutritious foods during pregnancy—prevails, careful and prolonged education will be necessary. The social scientist can often give invaluable aid in developing appropriate educational techniques.

It should be added that in many places specific measures to supplement the diet of pregnant and lactating women present serious difficulties, and this objective can be achieved only through general improvement of the diet of the whole community.

### 6.3 *Supplementary feeding and weaning practices*

The most appropriate methods to be followed in weaning and supplementary feeding depend on the supplies of foods suitable for the feeding of young children. Where animal milk and other foods suitable for infants of about a year in age are in limited supply or not available, the traditional practice of weaning at a much later age has great advantages and should be encouraged. In some parts of the world, young children receive from breast milk a substantial contribution towards their daily food requirements until they are well into the third year. It should, however, be appreciated that the breast milk obtained by the infant from about 6 months of age is not sufficient to provide its calorie and nutrient requirements, and, from this period of life onwards, it should be given suitable supplementary foods in increasing amounts. These may not be available in some areas in which protein malnutrition occurs, and in such circumstances steps must be taken to ensure their production in sufficient quantities (see section 7). Moreover, mothers must be taught how to use appropriate foods in infant feeding; this can most effectively be done through infant-welfare services.

Where adequate supplies of animal milk and other suitable foods are available, as in northern Europe, North America, and parts of Oceania, the practice of weaning the infant towards the end of the first year is obviously the most satisfactory procedure for ensuring the good health and state of nutrition of both mother and child.

### 6.4 *Special food products for infants and children*

In seeking to meet the nutritional needs of infants and young children in places in which supplies of animal milk are insufficient, it has often been customary to think in terms of producing "milk substitutes", i.e., preparations, made from foods of vegetable origin, which resemble milk in appearance and nutritive value. This is probably an appropriate procedure where there is a strong traditional demand for a product resembling milk. Elsewhere, especially where this demand does not exist, it may be more satisfactory and easier to rely on food preparations and combinations which can fulfil nutritional requirements, without attempting to make available a product which looks like milk. These preparations and combinations should, in general, be based on foods which are locally available and which can be processed by methods applicable by individual families or "at the village level" (i.e., the foods needed in a particular village could be processed at one centre in that village).

Available experience in the use of preparations of soya bean, ground-nut, fermented millet, rice, etc., in infant and child feeding may suggest lines of

advance. It is essential that any preparation used for this purpose should be hygienic and easily assimilated. The most appropriate approach to the whole problem of satisfactory supplementary feeding will depend largely on local conditions.

The committee does not possess sufficient evidence to recommend the large-scale commercial production of food preparations suitable for child feeding in underdeveloped areas. It considers, however, that this subject calls for extensive research and technological development which merit the support of governments and international organizations.

## **7. Practical Application of Programmes to Improve Nutrition**

### *7.1 Food production*

The changes in food production needed to prevent the occurrence of protein malnutrition in mother and child are outlined in section 6.1. There is an important need for increasing the production of foods rich in protein and of foods which in suitable combination would form a diet which is protective against protein malnutrition. The committee is not in a position to review the food-production potentialities of the world in relation to protein malnutrition, or to consider the numerous measures by which scientific knowledge can be applied for achieving the end in view. Moreover, the appropriate practical measures will differ according to local circumstances. It wishes, however, to emphasize that there is often adequate practical experience in one country which can be used in other countries where conditions are approximately analogous, and urges that governments and technical officials should take account of the facts about protein malnutrition and its relation to food supply presented in this report in initiating and developing food-production programmes.

In this connexion, a note entitled "Food production and extension methods" by one of the members of the committee, Mr. A. J. Wakefield, is appended to the report (Annex 3).

### *7.2 Extension methods*

In many underdeveloped regions the main problem in initiating programmes for increasing food production is not lack of natural resources or the insufficiency of technical information and skills; it is to bridge the gap which exists between the knowledge of the administrative authorities and members of the technical and social services, on the one hand, and the

contribution in wisdom, experience, and effort which can be made by rural folk, on the other.

The committee is of the opinion that there is no better way of initiating a programme of community development (which includes greater food production) than by making a survey, the object of which is to determine the nature and magnitude of the problems to be solved, and also to discover what the villagers themselves know, and to establish good working relations between them and those who are seeking to help.

The need for knowledge of existing cultural practices and beliefs can scarcely be overemphasized. In many societies, great value is attached to these, but it may be difficult for the outsider to interpret them and even more difficult to gauge the strength of their influence on the mode of life and behaviour of the people. Failure to take account of them may militate against success in bringing about the desired change and development. Of great importance are the incentives which compel people to improve their lot. Often these are a matter of personal reward and satisfaction, but another important incentive is the desire of parents that their children should be healthy and survive. This desire, which is closely related to the objectives of the committee, is one that should be fostered.

Understanding of and a sympathetic approach to local beliefs, customs, and incentives are essential in developing satisfactory community programmes. If these can be, so to speak, incorporated in the plans for introducing improvements in village societies, this will go a long way towards ensuring success. In other words, the programme should be so designed that it is in tune with local attitudes and so that these operate in the direction of progress rather than against it. The social scientist and the cultural anthropologist have an important part to play in the study of this aspect of community development.

The assistance of technicians in many fields will be required. The doctor, the nutritionist, the agronomist, the economist, the sociologist, the home economist, and the public-health nurse may all be needed, but the need will differ in different communities. The contribution that can be made by the natural village leader who has received some training can be great and even decisive.

At every stage of an operation of this nature, it is of the utmost importance that the attitude of the technical staff should be one of unselfishness and helpfulness and not one of authoritarianism and superiority. Another point which may be mentioned is that technical experts trained in one particular culture and undertaking work in an area unfamiliar to them must adjust themselves to the culture prevailing in that area if the advice they give is to be realistic and their efforts are to meet with success.



### 7.3 *Training of workers and education in nutrition*

The subject of training in nutrition in underdeveloped areas was considered in detail in the report on the second session (section 7)<sup>5</sup> and is therefore not dealt with specifically in this report. The education of the people in nutrition has also been considered in earlier FAO and WHO reports and publications. Some ideas and principles regarding training and education emerge from other parts of the present report.

## 8. Further Investigations

The kinds of research needed cover a wide range. In general, they are concerned with the nutrition of pregnant and nursing women and of infants and young children, and with the mother-child relationship. With regard to this relationship, the effects of poor maternal nutrition on the development of the foetus, and on the supply and quality of breast milk, and those of prolonged lactation on the health of the mother and child are among the problems of special interest and importance. A combination of field, clinical, pathological, and biochemical research and animal experimentation is likely to be particularly effective in clarifying the whole subject of protein malnutrition. The outstanding need is for scientific knowledge of protein requirements at various ages, and here both the quantity and the quality of the protein which should be present in the diet are of paramount importance.

It is suggested that the following lines of research are among those likely to yield important information.

#### (1) *Field research*

(a) Surveys to determine the incidence of protein malnutrition and the causes underlying it.

(b) Quantitative study of the diets associated with states of protein malnutrition. A comparison between these and diets which prevent the occurrence of such states should be made.

(c) Study of the relationship of the diets actually consumed by children and the symptoms and signs of protein malnutrition.

(d) Study of seasonal variations in the incidence of protein malnutrition.

(e) Experimental field-trials concerned with the preparation and use of suitable foods of local origin in the prevention of protein malnutrition.

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<sup>5</sup> *Wld Hlth Org. techn. Rep. Ser.* 1951, **44**, 35; *Joint FAO/WHO Expert Committee on Nutrition: report on the second session*, 1951, Rome, p. 35 (*FAO Nutrition Meetings Report*)

(f) Study of patterns of the growth and development of infants and children in regions where protein malnutrition occurs, combined wherever possible with a study of dietary and other factors, especially infections, which affect these patterns.

(g) Study of the effect of the eradication of endemic parasitic diseases on the nutritional status of communities.

(2) *Clinical and laboratory research*

(a) (i) Detection of the early stages of protein malnutrition.

(ii) The elucidation and delineation of the picture which can be attributed to protein malnutrition by eliminating manifestations associated with avitaminoses, infections, and infestations.

(iii) Study of the effect of different forms of treatment in severe and mild cases.

(iv) Study of suitable foods or combinations of foods for treatment, their effect in mild cases being observed in the first instance.

(b) (i) Biochemical and pathological studies of changes in cells and tissues, e.g., in the liver, the pancreas, the endocrine organs, and the skin.

(ii) Studies of body proteins, enzymes, hormones, and electrolyte- and water-balance.

(iii) Metabolic studies in states associated with protein malnutrition.

(3) *Investigations of the nutritive value of foods*

(a) Chemical, biological, and microbiological evaluation of the nutritive value of proteins and other food factors, such as vitamin B<sub>12</sub>.

(b) Nutritive value of human milk at different stages of lactation, and the study of the effect of protein malnutrition in women on the quantity and quality of breast milk and on the duration of lactation.

(c) The effect of feeding suitable experimental animals on diets resembling those consumed by children in areas in which protein malnutrition is prevalent. In such experiments, foods may be given both in fermented and in unfermented form.

(d) Study of the effect of various foods and other physiologically important substances, such as amino-acids, vitamins, enzymes, hormones, and antibiotics, in treating protein deficiency states induced in animals.

(e) The influence of diets poor in protein on intestinal microflora.

(f) Investigations in animals on experimental diets of alterations in the structure and function of organs such as the liver, the gastro-intestinal tract and associated glands, and the endocrine glands.

## 9. Contribution of FAO, WHO, and Other Organizations

### 9.1 The committee recommends :

(1) That FAO and WHO should make further surveys of protein malnutrition along the lines indicated in the report on the second session. In that report (section 3.4),<sup>6</sup> reference was made to the need for surveys in Latin America, South-East Asia, and the Western Pacific region. In planning this work, special attention should be paid to the following :

(a) the assessment of the importance of protein malnutrition as a public-health problem by study of its incidence in sample groups within communities ;

(b) differences in the manifestations of protein malnutrition as observed in different areas and their dependence on variations in diet ; and

(c) the advantage of conducting investigations in places where good facilities for clinical, biochemical, and pathological observations and research are available.

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

(3) That FAO and WHO should prepare a bi-annual review giving a summarized account of current work and developments relating to protein malnutrition. This review, which should cover, inter alia, the aspects of the subject considered by the joint committee at its present session, should be made available to interested workers throughout the world.

(4) That periodic, small, joint FAO/WHO nutrition committees concerned with protein malnutrition should be convened in different regions. These should review progress and recommend lines of research which might be supported by research foundations and other appropriate bodies. The FAO and WHO staffs should continue to exercise co-ordinating functions through direct contacts with workers concerned with protein malnutrition in different parts of the world and make the information so obtained available to the periodic committees referred to above. These committees should, in an advisory and co-ordinating capacity, have the effect of a continuing working party. In making these and other arrangements for following up the work of the committee at its present session, full account

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<sup>6</sup> *Wld Hlth Org. techn. Rep. Ser.* 1951, **44**, 28 ; *Joint FAO/WHO Expert Committee on Nutrition : report on the second session*, 1951. Rome, p. 28 (*FAO Nutrition Meetings Report*)

should be taken of the need for co-ordination and continuity, the importance of which was stressed by the committee at its second session (section 2.10).<sup>7</sup>

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

9.2 The committee emphasizes the importance of developing extension work by methods such as those indicated in its report and hopes that increasing attention will be given to this activity in the regular and technical assistance programmes of the United Nations and the specialized agencies.

### Annex 1

#### A DESCRIPTION OF SEVERE KWASHIORKOR \*

Severe kwashiorkor may be diagnosed in a child which presents a certain combination of the signs referred to below. The diagnosis should be made only after attention has been paid to the history of the disorder and the preceding diet, and after a full clinical examination, together with observation of the biochemical and pathological changes and the response of the signs and changes to treatment. Characteristics of severe kwashiorkor are the following :

(1) The weight is always markedly subnormal, especially when allowance is made for the presence of oedema.

(2) Mental apathy is always present, and many patients often display peevishness if they are disturbed.

(3) Oedema is usually present, but it may be variable in amount and it may be lost during dehydration. A few cases, typical in all other respects, display no clinically demonstrable oedema, although they are seriously ill.

(4) The pancreatic enzymes are always severely reduced ; this is manifested by the passage of undigested food in the stools during life, and by an atrophy of the zymogen granules of the acinar cells of the pancreas established at autopsy in untreated fatal cases. In life, the stools are usually,

<sup>7</sup> *Wld Hlth Org. techn. Rep. Ser.* 1951, **44**, 20; *Joint FAO/WHO Expert Committee on Nutrition: report on the second session*, 1951, Rome, p. 20 (*FAO Nutrition Meetings Report*)

\* Based on a paper prepared by Dr. H. C. Trowell for the second inter-African conference on food and nutrition organized by the Commission for Technical Co-operation in Africa South of the Sahara.

but not always, loose ; they tend to be bulky in comparison with the amount of food eaten.

(5) The muscles are always wasted.

(6) The appetite is variable at the beginning of the illness, but in many cases there is an early decrease in desire to eat food in normal amounts. This is usually a prominent feature in advanced cases.

(7) The hair always shows some change in texture, and there is usually some loss of pigment if the hair has previously been dark in colour. Patients with a dark skin often show some loss of skin pigmentation, especially around the mouth.

(8) The serum albumen is always seriously reduced.

(9) At a certain stage in the illness, fat accumulates in the periphery of the lobules of the liver. The whole organ may enlarge, but this enlargement is an inconstant sign.

(10) Moderate anaemia usually occurs. It is usually normocytic, but may be macrocytic in terms of mean corpuscular volume.

(11) The disease is common among weanlings and does not occur during the first few months of life if breast milk has been adequate in amount. Most cases occur from the ninth to the thirty-sixth month, and the disease is rare during childhood after four years of age.

(12) If it is possible to obtain information about the diet consumed before the illness developed, it will always be found that it contained a low proportion of protein in proportion to its calorie content, and that breast milk and cow's milk were taken, if at all, in very small amounts.

(13) The child is always seriously ill, and there is a high mortality rate in untreated cases.

(14) As an inconstant feature, and depending partly on the nature of the principal foods in the diet, cases may display as a terminal condition certain variable features which appear to be due to associated vitamin deficiencies, especially those of the vitamin-B complex and of vitamin A.

(15) Clinical observations show that there are variations from place to place in the picture presented by the disease. The diets associated with it also vary from place to place. It seems unwise to recognize sub-varieties of what appears to be the same basic condition until a firm distinction can be made in terms of the preceding dietary history, the signs, the biochemical and pathological changes of the alleged variants, and the effect of treatment.

(16) Severe kwashiorkor and all alleged varieties eventually respond fully to treatment with a suitable high-protein diet.

(17) The above description should not be taken to exclude many other aspects of the disorder which have already been reported but whose association with the disorder awaits full confirmation.

## Annex 2

## NAMES FOR PROTEIN MALNUTRITION IN CHILDREN \*

The names given below have been applied by different authors to syndromes which have the same basic characteristics as kwashiorkor. In some instances, the descriptions of the syndrome observed is incomplete, but it can be inferred that it belongs to the same general type or category. The date given is generally that at which the name was published for the first time; some terms, however, were in use and had been published some time before the first date of publication which it was possible to verify.

Though today Europe retains the expression "dystrophie des farineux", Africa prefers "kwashiorkor", India "nutritional dystrophy", and Latin America "síndrome policarencial en la infancia".

<i>Name</i>	<i>Place</i>	<i>Approximate date of first use</i>	<i>Author</i>
Kwashiorkor	Gold Coast	1933	Williams <sup>35</sup>
Infantile pellagra	South Africa	1937	Trowell <sup>31</sup>
Malignant malnutrition	South Africa and Uganda	1944	Trowell <sup>32</sup>
Sugar baby	Jamaica	1947	Platt <sup>27</sup>
Fatty liver disease	Jamaica	1948	Waterlow <sup>34</sup>
Nutritional oedema	Europe	1920	Maver <sup>20</sup>
Endemic nutritional oedema	USA	1933	Youmans & Bell <sup>36</sup>
Hypoproteinosi	Mexico	1948	Miranda <sup>22</sup>
Bouffissure d'Annam	French Indochina	1926	Normet <sup>23</sup>
Dystrophie des farineux	France	1910-20	Marfan <sup>19</sup>
Enfants rouges	French Cameroons	1932	Lieurade <sup>16</sup>
Dégénérescence graisseuse du foie	French West Africa	1948	Bergeret <sup>3</sup>
Syndrome de dénutrition maligne	French West Africa	1948	Bergeret <sup>2</sup>
Maladie œdémateuse du sevrage	Morocco	1949	Delon <sup>9</sup>
M' Buaki	Belgian Congo	1938	van Daele <sup>8</sup>
Syndrome dépigmen- tation-œdème	Belgian Congo	1942	Pieraerts <sup>26</sup>
Diboba	Belgian Congo	1942	Pieraerts <sup>26</sup>
Imbeho	Urundi	1952	Vincent (personal communication)
Irungu	Ruanda	1952	Vincent (personal communication)

\* Based on a paper prepared by Mr. M. Autret for the second inter-African conference on food and nutrition organized by the Commission for Technical Co-operation in Africa South of the Sahara.

Name	Place	Approximate date of first use	Author
Distrofia da farine	Italy	1927	Frontali <sup>10</sup>
Mehlnährschaden	Germany	1906	Czerny & Keller <sup>7</sup>
Nutritional oedema	China	1942	Chen <sup>5</sup>
Malnutrition in infants	Egypt	1947	Hanafy <sup>14</sup>
Nutritional dystrophy	India	1950	Achar <sup>1</sup>
Nutritional oedema syndrome	India	1950	Gopalan & Patwardhan <sup>12</sup>
Culebrilla	Yucatan, Mexico	1908	Patrón Correa <sup>24</sup>
Síndrome pelagroide beribérico	Cuba	1935	Castellanos <sup>4</sup>
Edema avitaminósico de la infancia	Costa Rica	1937	Peña Chavarría & Rotter <sup>25</sup>
Caquexias hídricas tropicales infantiles	El Salvador	1937	Goens Rosales <sup>11</sup>
Avitaminosis compleja infantil	El Salvador	1938	Vidal <sup>33</sup>
Edemas de la infancia	Guatemala	1938	Cofiño <sup>6</sup>
Malnutrición	Spain	1942	Jiménez Díaz et al. <sup>15</sup>
Síndrome hipoproteínico avitaminósico	Mexico	1942	Torroella <sup>30</sup>
Distrofia farinácea	Uruguay	1942	Guerra et al. <sup>13</sup>
Síndromes policarenciales en la infancia	Chile	1941	Scroggie <sup>29</sup>
Desnutrición por carencia protéica	Mexico	1946	Prado Vertiz <sup>28</sup>
Distrofia pluricarencial hidropigénica	Brazil	1945	Magalhaes Car- valho et al. <sup>18</sup>
Desnutrición en el lac- tante mayor (distrofia policarencial)	Chile	1949	Meneghello <sup>21</sup>

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### Annex 3

#### FOOD PRODUCTION AND EXTENSION METHODS \*

It is, of course, quite impossible for any one individual to attempt to advise regarding the practical application of a programme of food production on a global or even continental basis. It is only possible to draw attention to certain immediately available opportunities for better utilization of existing and potential sources of protein within a relatively restricted sphere, and to put forward a few practical suggestions in the hope that they may lead to action being taken in some underdeveloped areas where the full potentialities for food production have yet to be utilized.

#### Food Production

Systems of crop and animal husbandry are largely determined by ecological conditions, modified, as may be practicable, by the provision of water for irrigation. It follows that the food-production plans most likely to be acceptable to administrations and most popular with the people are those which, while giving a quick return to the producer and consumer, do not entail either radical changes in farming methods and cultural patterns or appreciable capital expenditure. In other words, it is necessary to start from what exists and to avoid imposing what may be a foreign pattern on rural peoples, who are likely to be largely illiterate.

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\* Submitted by Mr. A. J. Wakefield, Resident Representative of the Technical Assistance Board, Haiti.

The average national income of the rural populations of tropical countries is often not more than one US dollar a week, so that families, after providing for clothes, taxes, and maybe for some local staple foods (for their consumption) to supplement those which they themselves produce, have nothing to spare for the purchase of imported foods. Furthermore, the great majority of the population belongs to the peasant producing class, and it is from the surplus of their subsistence farming that the local urban areas obtain much of their food supply.

Plans for the better utilization of the available resources of protein by the peasant farmer need not be complex or costly. For example, the natural grass which covers many tropical areas can provide abundance of food for livestock. Moreover, there are often numerous domestic animals, both cattle and goats, in these areas. Yet in many semi-arid regions, except in respect of rotational grazing in some areas, little or nothing is done to harvest and conserve this potentially valuable cattle-food for use throughout the year. Much of it is lost by burning.

Again, cattle are often regarded as family possessions and not as part of an economic farming system. Under such circumstances, it is only reluctantly, and often under administrative pressure, that the owner will sell his own stock. Nevertheless, in some areas in which this attitude has prevailed, cattle are being given an economic value through the manufacture of clarified butter which can be sold and exported without detriment to a normal tropical diet. The skim milk is then available for consumption by children in schools and its use in the home can be encouraged by social workers. Another outlet is through its manufacture into skim-milk cheese for transport elsewhere.

The greatest potentiality for milk production in the tropics lies, however, in the moister regions (not those of very heavy rainfall), which have two growing seasons in the year. Under such conditions, grass can be cut every eight weeks or so and used to feed cattle for milk production. A high annual yield of crude protein is obtained from grass cut in this way.

In some densely populated countries with adequate rainfall, an intensive system of stall-feeding by freshly-cut grass is followed. It should be more widely known that where milch-cows are sheltered from the tropical sun the milk yield increases considerably. One of the most important features of this system is the part which grass plays both in preventing erosion and in rehabilitating impoverished or worn-out land. While a farmer may be reluctant to place land under grass when cereals are urgently required, he more readily does so when it is shown how the hay can be used for milk production. Furthermore, the farmyard manure can be used to increase the yields of food crops.

Whereas the goat is an important supplier of milk throughout the Mediterranean area and in many temperate countries in the Caribbean, it is often not so elsewhere, even when its numbers are legion. If goats were kept as backyard stock and stall-fed on the clippings of garden hedges and bushes, families would obtain milk at practically no cost, and the contribution of the goat to soil erosion could be reduced.

In the Caribbean, the African goat has been crossed with such temperate breeds as the Alpine or Toggenburg. The progeny are hardy, some yielding over one gallon of milk daily. Departments of agriculture and animal husbandry of tropical countries could with advantage devote more attention to the breeding and management of milch-goats.

While the above suggestions for utilizing existing resources for milk production could be followed at little cost, considerable capital expenditure and carefully organized community effort will be required for such works as increasing supplies of water, essential to the keeping of livestock, and for making and repairing roads, necessary for the movement of foodstuffs from farming to urban and industrialized areas. Both these prerequisites to increased food production and better nutrition are inadequate in many underdeveloped countries.

For increasing supplies of cereals and pulses, the most obvious need is for the improvement of methods of storage in farms and in villages. Vast wastage of food occurs after harvest through faulty storage or, as is too often the case, because there are no storage facilities at all. Loss due to rats, insects, and fungi may amount to as much as one third of the amounts harvested. The utmost attention should be given to the trial, demonstration, and wide-scale construction of food-storage facilities, particularly those constructed with local materials for use in farms and villages.

A relatively quick and sure means of increasing supplies of animal protein in underdeveloped regions is the development of inland fisheries. Fish-pond culture on farms, or the use of irrigation waters for fish production as a secondary crop in rice-growing, may produce annual yields of fish as high as 500-2,000 kg per hectare of pond. The problems of transport, preservation, and distribution tend to be more simple than is the case with marine fisheries. Fish-pond culture has been widely developed in China, and its feasibility in many other parts of the world has now been proved. Wherever there are rivers, lakes, swamps, or brackish waters, rice fields and irrigation projects, attention should be given to the practicability of introducing fish culture. It is, of course, advisable to obtain expert advice and to have local personnel trained before embarking on the introduction of new fish or the construction of ponds.

### Extension Methods

As the committee points out, the real problem confronting most administrators is not one of lack of natural resources or inadequate technical knowledge, but rather one of bridging the gap which exists between science and practice. Nowhere is this more acute than with rural people in the tropics, where the barriers of superstitions and taboo are only slowly removed.

The extension services of agricultural and veterinary departments in most countries have been considerably increased in recent years. Indeed, the demand for suitably trained and qualified personnel seriously exceeds the supply. Extension work in underdeveloped countries has hitherto been limited largely to direct instruction to producers or, frequently, to ensuring that instruction is passed down to the community through administrative authorities also responsible for tax collection and the maintenance of law and order. As a result, it has failed to evoke a whole-hearted response from the people. The principal defect is still in the method and can be remedied only by a change in the attitude of those concerned.

In the preparation of extension programmes, full account must, of course, be taken of existing agricultural practices and of local cultures and traditions; the idea of drastic changes in ways of life and farming methods being "imposed" by people with superior knowledge and authority is no longer acceptable. The wisdom and inherent knowledge of rural people should not continue to be underestimated. It is of first importance to secure the willing participation of village communities in the preparation and operation of programmes aimed at improving their health and welfare, and this cannot be achieved by "superior people" dealing with "poor ignorant inferiors".

The extension services of many countries have turned from an attitude of tutelage to one which calls for approach at the farmers' level and assumes that producers are likely to know something about the problems which beset them, even if they may not be able to explain them; and, further, that they will take more interest in the results of research and will more actively support agricultural policies and contribute to the achievement of production targets if they are consulted in their own villages and account is taken of their own plans for food production.

If campaigns for the improvement of nutrition or other projects for rural betterment are to be effective, they must start at the family level within the village. It follows that, in addition to changes in individual attitudes, new kinds of techniques are required for the integration of local community effort and the necessary development of local leadership. In

the early stages of such campaigns the help of social scientists may be needed.

Attention may therefore be drawn to a few examples of communal activities which have proved useful in promoting economic and social development in a number of underdeveloped countries. These were designed not only as channels for technical instruction, but also as a means whereby leadership can develop and rural communities may have the satisfaction of creating for themselves within their own communities means for recreation, and so to solve in some degree the social problem of the dullness of rural life.

A well-known method is the establishment of agricultural societies, with village branches ultimately organized under provincial and national councils. Where local authorities exist on a "tribal" basis, the effectiveness of the newly established village activities can be secured, and the prestige of the "chief" enhanced, by making him patron. Simple social functions, such as a dance or feast, to wind up the meetings of the village branches, with an annual show as the big event, can mean much to rural communities. Such societies should be used by the technical and social departments of government for debate of the farmers' problems and to determine the producers' views of an extension programme. The extension agents should inject technical ideas into the discussions in such a way that the society itself takes the initiative for action. By this means, a much greater influence can be exerted by the technician than when the producer has to be contacted either individually or through the congested channels of administrative authority. The producers feel that the extension programme is theirs and so are likely to accept it with more enthusiasm than when instructions and guidance are imposed upon them from above.

In a large part of the underdeveloped regions of the tropics the women-folk do a good deal of the work on the land, yet they are rarely included in extension programmes. They can be encouraged to become active members of the agricultural society by being made directly responsible for its social functions. It may be added that groups of women forming or belonging to village societies can be a principal factor in combating apathy in a rural community, and bringing about rural betterment. However unfavourable the conditions may appear to be, a good social worker will usually find someone capable of taking the lead in this important side of extension.

Youth clubs should also be developed. Experience suggests that these are likely to be most popular when organized on the pattern of the 4-H Club movement originating in the USA, whose pledge "Hands to better service, Heart to greater loyalty, Head to clearer thinking and Health to better living *for club, community and country*" contains an

emotional appeal for good citizenship. As the boys and girls grow out of the youth clubs, they often continue to give service to their community in pioneer clubs.

In one country which has benefited greatly from the activities of organizations such as those mentioned above, village-development councils have been formed with the dual aim of (*a*) planning and carrying out by voluntary effort projects and works for the common good, and (*b*) submitting for the consideration of the local authorities and the central government the community's own ideas regarding its problems and development plans.

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