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9. ABSTRACT
All the papers, discussions, committee reports, and recommendations of this conference. The conference's main recommendations are as follows: 1) An overall food and nutrition authority should be established in each country, which would have executive powers, multivalent competence in health, agriculture, education, industry and allied fields and, above all, its own budget. 2) Basic health services should be strengthened and expanded, with particular attention to maternal and child health and to the reinforcement of nutrition. 3) Supplemental feeding should be need-oriented rather than surplus-oriented. 4) Appropriate enrichment of staples and, if needed, the subsidization of nutritive supplements based on local resources for vulnerable groups should be undertaken by the governments. 5) Nutrition should be integrated into teaching at all levels of education. 6) Breast-feeding should be prolonged as long as possible. 7) Governments should adopt a more equitable distribution of emphasis between cash crops and food crops and be aware promoting a cash economy at the expense of good nutrition. 8) Marketing facilities should be improved to help the producer obtain cash for the surpluses he may be induced to produce. 9) Food storage should be improved. 10) A better balance should be achieved among production, import, export, and distribution of foods using tariffs or subsidies. 11) The role of industry in the fight against malnutrition should be facilitated by placing the products of the food industry within the reach of the low-income group.

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NUTRITION

AND

CHILD FEEDING

Nairobi, Kenya

May 19-23, 1969

Proceedings of the
EASTERN AFRICAN CONFERENCE ON NUTRITION AND CHILD FEEDING

Nairobi City Hall
Nairobi, Kenya

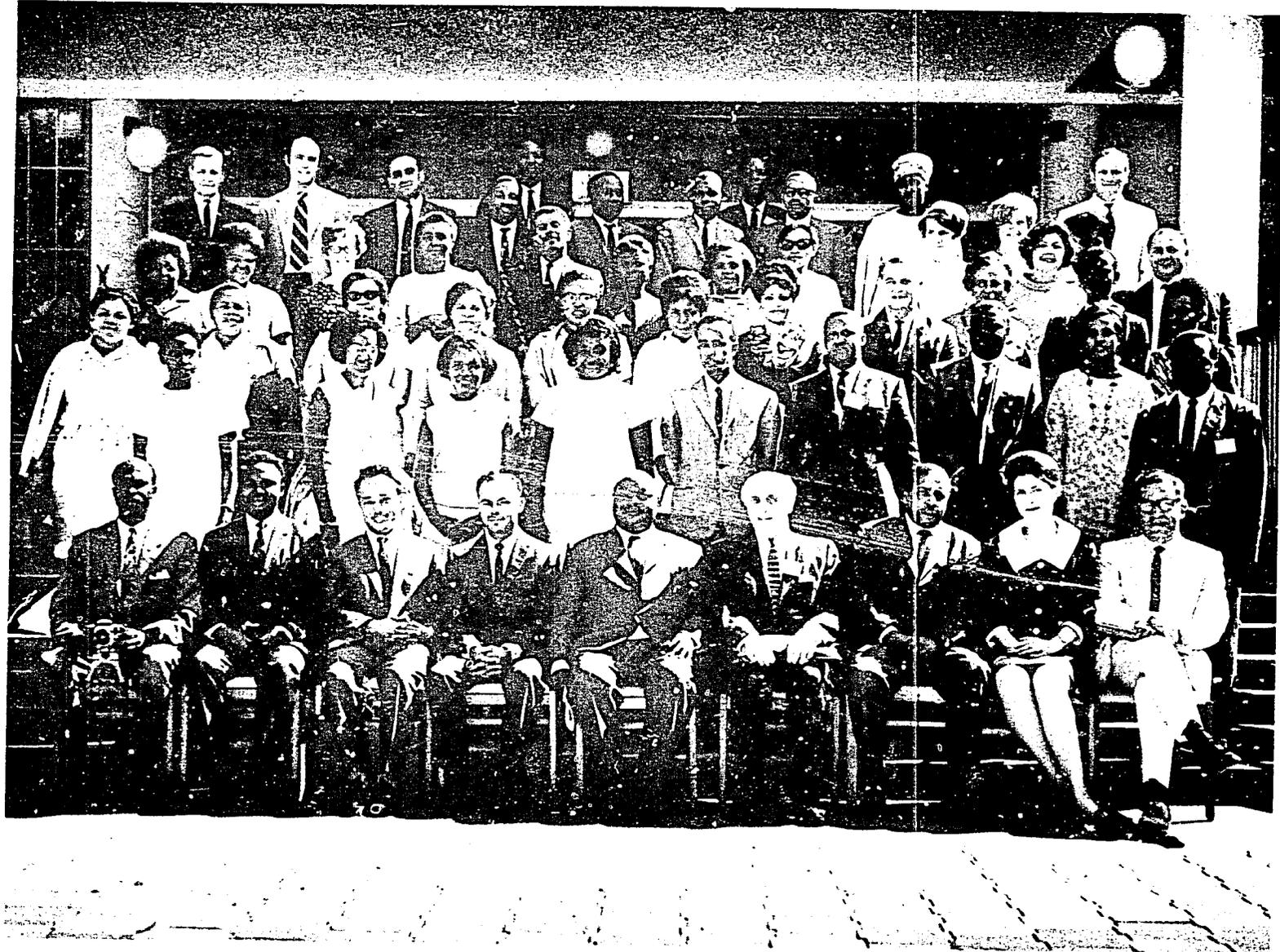
May 19-23, 1969

Sponsored by

The Republic of Kenya
and
The United States of America Agency for International Development

With the Participation of

The Food and Agriculture Organization of the United Nations
The United Nations Children's Fund
The World Health Organization



His Excellency, Mr. J.D. Otiende, Minister for Health of Kenya (first row, center) and delegates to the Eastern African Conference on Nutrition and Child Feeding.

This Conference was planned and organized and the proceedings were prepared by the Nutrition Program of the U.S. Public Health Service under A.I.D. Participating Agency Service Agreement No. AFR(HA) 15-69, with the assistance of the A.I.D. Mission in Nairobi.

TABLE OF CONTENTS

	<u>Page</u>
Introduction	vi
Conference Recommendations	vii
Program	xi
List of Delegates	xv
Conference Organizers	xx
Opening Ceremonies	
Welcoming Address -- The Honorable R.G. Ngala	1
Welcoming Address -- The Honorable Wendell B. Coote	3
Keynote Address -- The Honorable J.D. Otiende	6
Country Reports	
Nutrition in Botswana	12
Nutrition in Ethiopia	32
Nutrition in Kenya	41
Nutrition in Lesotho	56
Nutrition in Malawi	69
Nutrition in Somalia	80
Nutrition in Swaziland	96
Nutrition in Tanzania	107
Nutrition in Uganda	128
Nutrition in the United States of America	136
Nutrition in Zambia	152
General Discussion	174
Thematic Presentations	
Nutrition and Health -- Dr. Demissie Habte	182
General Discussion	194
Nutrition and Agriculture -- Dr. I.S. Dema	201
General Discussion	207
Nutrition and Child Feeding -- Miss Grace Wagemu	218
General Discussion	230
Nutrition and Education -- Mr. Louis Ocheru	238
General Discussion	249
Nutrition and Industry -- Mr. J.J. Kambona	256
General Discussion	265
Nutrition, Planning and Coordination -- Mr. A.P. Vamoer	274
General Discussion	283
Committee Reports	
Committee on Nutrition and Health	291
Committee on Nutrition and Agriculture	292

Committee on Nutrition and Child Feeding	295
Committee on Nutrition and Education	299
Committee on Nutrition and Industry	301
Committee on Nutrition, Planning and Coordination	305
Closing Ceremonies	
Closing Address -- The Honorable J.D. Otiende	307

INTRODUCTION

Convinced that orderly social and economic development is not possible without healthy and satisfied populations, and convinced of the paramount importance of nutrition in the promotion of good health, the United States Government has placed the fight against malnutrition high on its list of priorities, both at home and abroad. Recent scientific discoveries suggest that the ability of the child to learn, the ability of the adult to work and the ability of all people to resist disease is closely related to the individual's nutritional status.

While there is no difficulty in convincing scientists of these correlations, there is considerable difficulty in convincing planners, economists and politicians. Unfortunately, it is easier to get scientists together to discuss intriguing problems of biochemistry than it is to get planners and economists who can implement programs to meet with the scientists. Yet, without such meetings, communication remains in a closed circuit and, in fact, breaks down.

The United States Government, through its Agency for International Development, has addressed itself to this problem by convening a series of conferences aimed at providing an opportunity for scientists, policymakers and program implementors to exchange ideas and information on the problem of malnutrition. The first such meeting in Africa was held in Dakar, Senegal, in the spring of 1968 for the countries of West Africa. Encouraged by the success of this meeting, A.I.D. decided to convene a second such conference for the countries of Eastern Africa. This second conference was held in Nairobi in May 1969 under the joint auspices of the Government of Kenya and the Government of the United States.

The present volume includes all the papers, discussions, committee reports and recommendations of the Eastern African Conference on Nutrition and Child Feeding. It is hoped that the message of these proceedings will encourage all readers to join in the fight against malnutrition in Africa.

Jacques M. May, M.D.
Special Advisor to the Chief
Nutrition Program
July 1968

CONFERENCE RECOMMENDATIONS

PREAMBLE

- The purpose of good nutrition is to promote good health.
- Good health is essential to productivity.
- Productivity is the basis for orderly social and economic development.

DISCUSSION

On the basis of the philosophy outlined above it is the consensus of opinion of this Conference that malnutrition is a most important and ever increasing problem in every participant country. The causes of this state of affairs are multiple and include sociological, environmental, economic and demographic factors. An important background to these causes is the too hasty replacement of an original, well-rooted culture by an exotic culture ill-adapted to local conditions.

Sociological factors include the drive of women toward gainful employment, resulting in problems of bottle-feeding as opposed to breast-feeding and in increased consumption of highly advertised nonnutritious commodities, such as soft drinks.

Environmental factors include: poor distribution of water, either in excess or in short supply; depredation of crops by vermin, resulting in food wastage; and overcrowded and substandard housing.

Economic factors include: low per capita earnings, inadequate to procure satisfactory diets; and transfer of individuals from the subsistence economy to a cash economy, the demands of which cannot be met.

All these and many other factors are aggravated by the rapid population increase. Population pressures and the need for increased yields per acre have resulted in the adoption of new but less nutritious staples than heretofore.

The end-product of these converging factors is a high level of infant and child mortality and morbidity, high rates of prevalence of infectious and parasitic diseases, and in the adult an impairment of health and productivity.

RECOMMENDATIONS

Confronted with this state of affairs, the Conference has made a number of recommendations in the various fields of activity that have been discussed during its sessions. The details of these recommendations can be read in the individual reports of the Committees. The most important may be summarized as follows:

1. In view of the general inadequacy of existing systems of coordination in the field of nutrition and food supply which has been confirmed in all the country reports submitted to the Conference, it is strongly recommended that an overall food and nutrition authority be established in each country which would have executive powers, multivalent competence in health, agriculture, education, industry and allied fields and, above all, its own budget. This authority must be placed in the governmental structure at such a level as to be directly responsible to the Head of State in order to avoid the frustrations of overlapping interdepartmental responsibilities. Governments might consider requesting technical and financial assistance from bilateral and/or multilateral sources in setting up such authorities.
2. Basic health services should be strengthened and expanded, giving particular attention to maternal and child health and to the reinforcement of nutrition activities. Special consideration should be given to child feeding and to the feeding of pregnant and lactating mothers.
3. Supplemental feeding should be need-oriented rather than surplus-oriented and should be given after a careful survey of the child's routine diet has revealed the weak points of its nutrition.
4. It is also recommended that appropriate enrichment of staples and, if needed, the subsidization of nutritive supplements based on local resources for vul-

nerable groups be undertaken by the governments. The working woman should be assisted by the creation of supervised hygienic and subsidized canteen services as well as adequate nurseries for her children.

5. Nutrition should be integrated into teaching at all levels of education by the various departments covering this activity. This education should reach both ends of the economic structure: a) the consumer--the mother and family, the politician and administrator, the scientist and the middle-level worker; and b) the producer--the farmer, the fisherman, the extension worker, the herdsman and the industrialist.
6. Breast-feeding should be prolonged as long as possible; proper education in the use of artificial feedings and in the measures needed to avoid gastrointestinal infection should be strongly emphasized.
7. Governments should adopt a more equitable distribution of emphasis between cash crops and food crops and beware of promoting a cash economy at the expense of good nutrition. To this end, a Food and Nutrition Unit should be established within each country's Department or Ministry of Agriculture, as suggested by the FAO Conference of 1967, and human nutrition should be included in the curricula for agricultural personnel.
8. Marketing facilities should be improved to help the producer obtain cash for the surpluses he may be induced to produce.
9. More important still, food storage should be improved through simple processing at the family level, through more sophisticated techniques of storage and collecting points and through the enlargement of national strategic reserve warehouses.
10. A better balance should be achieved between production, import, export and distribution of foods using tariffs, and subsidies, as appropriate, to improve the food and nutrition situation.

11. The role of industry in the fight against malnutrition should be facilitated by placing the products of the food industry within the reach of the low income group. To this end, more effective management of cooperatives should be provided; incentives to increase productivity should receive government support; research into the development of simple weaning foods based on local raw materials should be encouraged; and wider consumption of protein-rich foods should be recommended. A greater and more effective expenditure in advertisement could be made for such commodities in preference to soft drinks, cosmetics and detergents.

PROGRAM

May 19, 1969 (Morning Session)

Opening Ceremonies

Welcoming Addresses

The Honorable R.C. Ngala, M.P.
Minister for Cooperatives and Social Services
Republic of Kenya

The Honorable W.B. Coote, Charge d'Affaires
American Embassy, Nairobi

Keynote Address

The Honorable J.D. Otiende, M.P.
Minister for Health, Republic of Kenya

Presentation of Country Reports

Chairman: Dr. I. Maboshe, Zambia

Report on Nutrition in Botswana
Report on Nutrition in Ethiopia
Report on Nutrition in Kenya
Report on Nutrition in Lesotho
Report on Nutrition in Malawi

May 19, 1969 (Afternoon Session)

Continuation of Country Presentations

Chairman: Dr. Demissie Habte, Ethiopia

Report on Nutrition in Somalia
Report on Nutrition in Swaziland
Report on Nutrition in Tanzania
Report on Nutrition in Uganda
Report on Nutrition in United States
Report on Nutrition in Zambia

General Discussion

May 19, 1969 (Evening)

Government of Kenya Reception for Delegates

Tuesday, May 20, 1969 (Morning Session)

Prasentation of Themes

Chairman: Dr. Y.H. Misomali, Malawi

"Nutrition and Health"

Dr. Demissie Habte, Deputy Director
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Ethiopia

General Discussion

"Nutrition and Agriculture"

Dr. I.S. Dema, FAO Secretary, Joint FAO/WHO/OAU
Food and Nutrition Commission for Africa

General Discussion

Tuesday, May 20, 1969 (Afternoon Session)

Chairman: Mrs. Anna Hlalele, Lesotho

"Nutrition and Supplementary Child Feeding"

Miss Grace Wagemu, Head
Home Economics Extension Section
Ministry of Agriculture, Kenya

General Discussion

"Nutrition and Education"

Mr. Louis Ocheru, Senior Health Education Officer
Ministry of Health, Uganda

General Discussion

Wednesday, May 21, 1969 (Morning Session)

Chairman: Mrs. Raqiya Haji Dualeh, Somalia

"Nutrition and Industry"

Mr. J.J. Kambona, Chief Fisheries Officer
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Tanzania

General Discussion

"Nutrition, Planning and Coordination"

Mr. A.P. Vamoer, Assistant Executive Secretary
National Food and Nutrition Commission, Zambia

General Discussion

Wednesday, May 21, 1969 (Afternoon Session)

Committee Meetings

Committee on Nutrition and Health
Committee on Nutrition and Agriculture
Committee on Nutrition and Child Feeding
Committee on Nutrition and Education
Committee on Nutrition and Industry
Committee on Nutrition and Coordination

Thursday, May 22, 1969 (Morning Session)

Committee Meetings

Thursday, May 22, 1969 (Afternoon Session)

Consolidation of Committee Reports and Preparation of
Conference Resolutions by Committee Chairmen and
Rapporteurs

Thursday, May 22, 1969 (Evening)

Government of the United States Reception for Delegates

Friday, May 23, 1969 (Morning Session)

Chairman:

Presentation of the Six Committee Reports

General Discussion and Adoption of Conference Recommendations

Friday, May 23, 1969 (Afternoon Session)

Chairman: Dr. J.C. Likimani, Kenya

Closing Address

The Honorable J.D. Otiende, M.P.
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OPENING CEREMONIES

WELCOMING ADDRESS

by the Honorable R.G. Ngala, M.P.
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I find it a great pleasure and honor to be given the opportunity to open this important Conference on Nutrition and Child Feeding. On behalf of the Government of Kenya I wish to thank all our distinguished guests from within and without East Africa who have kindly accepted our invitation to participate in this meeting. I wish also to express my special thanks to the United States Government which with us, has cosponsored this conference. On behalf of the people of Kenya I wish to welcome you all to Kenya and from them I bring you greetings and many happy returns.

A conference of the same nature was held last year in Dakar, Senegal, for participants from West African countries. I understand that it was a success. We, the people of Kenya, feel honored that this year a similar conference is being held here.

I was pleased to learn from the prospectus of the conference that the main theme is "to combat malnutrition in Africa," and that the conference is to be action-oriented to review recent findings in the field, report on progress by various countries, exchange ideas and information, and plan expanded action programs to combat malnutrition in Africa.

The Government of Kenya has long recognized the medico-socio-economic significance of poor nutrition status of the preschool age child, the school child and the working population. Malnutrition in infancy and childhood constitutes a major public health problem of which all our countries must be aware and against which we must undertake to fight continuously. Effects of malnutrition retard individual physical and mental development and therefore national, social and economic progress. I do realize that the problem of malnutrition is not caused by unavailability of, or inaccessibility to, foods only, but also by failure of our people to make proper use of foods which are available.

I am, therefore, pleased to know that your program for the week will deal with various subjects that are closely related to nutrition. I believe that matters of nutrition can neither be discussed nor tackled in isolation and that they must be seen against the background of such sciences as agriculture, health, education, industry and, above all, they must be related to coordinated planning. An interdisciplinary approach is therefore necessary and this should involve planners, administrators and technical personnel. I am glad to say that in this conference the right approach has been adopted since the participants here with us today come from different disciplines.

In November of this year, a seminar on epidemiology, prevention and treatment of protein-calorie malnutrition will be held here in Nairobi. This seminar is being organized conjointly by the Government of Kenya, the World Health Organization and the Danish Board of Technical Co-operation. The participants will come from various African countries. I hope that the present Conference on Nutrition and Child Feeding will generate the necessary stimulus and your governments will readily accept our invitation to participate in the seminar which we are organizing to take place towards the end of the year.

In conclusion, Ladies and Gentlemen, I wish to express my hope that this conference will stimulate in you those actions which are aimed at combating malnutrition. It is also my hope that the information obtained and the conclusions arrived at will lead to programs which can be implemented and that your participation in this conference will result in both regional and international cooperation in the field of nutrition.

Although you will be very busy during the week, I hope that when the conference is over you will manage to find time to visit some of our institutions and other places of interest in the country.

I wish you a happy stay in Kenya and I hope that you will find the conference stimulating and the results fruitful. Thank you.

WELCOMING ADDRESS

by the Honorable Wendell B. Coote, Charge D'Affairs
American Embassy, Nairobi

It is my great pleasure to welcome you, on behalf of the United States, to the Eastern African Conference on Nutrition and Child Feeding. My government is very happy to have been able, in association with the Government of Kenya, to extend to your various countries an invitation to send distinguished delegates to discuss the problems involved in feeding the populations of Eastern Africa. We are delighted to see such a good response.

As a result of recent scientific discoveries, we have become aware of the extreme importance of good nutrition to the intellectual development of the child, particularly of the preschool child from birth to 5 years of age. I understand that scientists all over the world have come to the conclusion that faulty nutrition during these formative years may, and very often does, result in irreversible damage to the central nervous system and more especially to the ability to learn. Hence, it is quite possible that the efforts we are all making to educate the next generation could be to no avail because of damage caused by poor nutrition. This explains our vital interest in these matters.

I am sure you will agree that programs to combat malnutrition are complex. The multidisciplinary character of the problem of nutrition has induced my government to sponsor several conferences throughout the world, of which this is one, to illustrate the importance of interdisciplinary coordination by governments. Too often we see crops being developed without regard to the health needs of the population; too often we see education programs failing to include health education; too often we see health programs failing to include the subject of nutrition; too often we see the discoveries of the scientist ignored by the politician; and too often most programs to combat malnutrition bypass the most important person in the world - the mother. The mother is, of course, important everywhere, but she is especially important in Africa, where she grows most of the food crops. She is, as everywhere else, the person who prepares the family's

food, the person who distributes it, often forgetting herself, although she needs good nutrition if she is to supervise that of her children and, in fact, for all her important tasks. Thus, I am sure that the distinguished scientists and specialists assembled here today will insist on the importance of giving her all the educational background necessary to carry out her responsibilities, notably to raise a new generation of active, intelligent people capable of promoting in their countries orderly, dignified and fruitful development.

The second point I would like to emphasize, although I am sure the scientists gathered in this room can do this more effectively than I, is that nutrition is not only a problem of quantity but is chiefly a problem of quality. I am told that in many countries of the world the amount of food measured in terms of calories is adequate but the nutrients needed for the development and efficient functioning of the body are not present. I am told, for example, that one may eat considerable quantities of cassava and have hidden starvation in the tissues. On the other hand, persons may feed on excellent proteins such as meat and milk, but if they do not have sufficient starch or fat this excellent food will be burned for energy and will be of little benefit to the body tissues. Hence, what we should be striving for is balanced diets. This means more attention to education and to the production of the right foods.

Let me emphasize, if I may, the need for these "right foods." They need not be imported. Although my government has been happy to place at the disposal of those who need it considerable amounts of our own food supply, we feel that it is far better to encourage developing countries to produce these foods themselves. Africa is replete with excellent foods, such as pulses like groundnuts, beans, peas and many others. The lakes, rivers and seas of Africa are full of nutritious fish. Hence, it is necessary only to produce more of these rich foods, which are well-known to and tastily prepared by the African mothers.

Food preparation is also important. Africa is rich in ancestrally developed techniques for preparing food, for smoking fish and for making beer out of millet and other plants. All that is needed is to improve the yield and efficiency of these methods. This can be accomplished in a very simple way, very often in the home, and in the village. Such an achievement will also allow more time for the development of sophisticated industries.

Much of the food produced at present is wasted because it is not properly stored or preserved. The industrious African farmer already has developed many simple ways to protect his food from the depredations of insects, weevils and rodents. All that is required now is an improvement of these techniques and a systematization of these crafts to allow the villager and the mother, each at his or her own level, to preserve and protect a larger quantity of food for use during the seasons of nonharvest.

Moreover, the development of "cottage" industries for the processing of food crops is probably the best way to introduce money into the subsistence economy, to valorize the produce of the soil, to reduce unemployment in rural areas and to reverse the cityward trend.

I began my remarks by stressing the need for a multidisciplinary approach to combating malnutrition. In closing, I would like to emphasize what I believe is the most important of the several disciplines involved. This is education. The education of farmers in improved production and storage techniques for food crops, the education of mothers in elementary nutrition and the training of community development workers, home economists and health workers in problems of nutrition may well be the single most important factor in combating malnutrition. Education, in fact, can be even more important than money, for money may not always be used to buy food and certainly not necessarily the right food. Recent nutrition surveys in the United States have revealed serious problems of malnutrition in affluent sectors of the population as well as among poverty groups.

Let me state once more that it is our wish to see the African people develop, within the framework of their own cultures, the best possible nutrition for their children to enable them to grow into useful, active and satisfied citizens. The ways and means to achieve these goals will be discussed by the distinguished delegates of this conference who come from various countries and from various disciplines. Let me wish you a happy and fruitful week in Nairobi, and express the hope that when you leave this beautiful city and country you will feel richer as a result of your own labors. Thank you.

KEYNOTE ADDRESS

by the Honorable J.D. Otiende, M.P.
Minister for Health, Republic of Kenya

I am not an expert in nutrition but I know that many nutrition experts have given much time and thought to the problem of nutrition and malnutrition throughout the world. Many technical papers and publications have been produced on the subject and many conferences and seminars have also been held. I would not be surprised if I were asked to plead guilty of repetition; but I would plead not guilty, because in spite of all the improvements brought about by science in the treatment of many diseases, and in spite of the many conferences, seminars, publications and the like, hunger and malnutrition still exist and their effects continue to grow greater and greater. The search for ways and means to relieve this enormous burden of ill health continues. Each time we become more and more aware of how little we know. The heart of the problem lies in its complexity. Human nutrition is closely tied to economy, agricultural production, productivity, educational level in the society, environmental conditions in which we live and lack of knowledge of the problems facing us.

I find it sad to say that a state of undernutrition is still regarded as the "normal" state for many people. In fact, some of the so-called national, racial or tribal characteristics could be nothing but mere characteristics resulting from want of proper foods.

Some of the physical effects of undernutrition are measurable and known. They usually vary with the victim: for example, the adult worker, the pregnant woman, the fetus, and the lactating mother.

In Kenya, our information is actually so limited that we cannot be absolutely certain whether the cases of malnutrition and related diseases are on the increase or decrease. We seem to believe that the cases are on the increase, but is the increase of cases real or is it just that our medical services are expanding, and our detection and reporting methods are improving? It is likely that the latter is correct. The same can be said about the mortality rate of malnourished children. We know the number of children who have died of nutritional diseases in

our hospitals, but the figures do not reflect the many who have died in their homes out of reach of the health services or who have died of other diseases because their resistance to disease was lowered by malnutrition. We estimate that malnutrition is the greatest killer of our children and, therefore, the major health problem in our country.

But is this the only impact of malnutrition? Every child who is born and is not well-nourished may survive kwashiorkor or marasmus or some milder form of deficiency disease, but we know that the mental development of such a child may be retarded. It has been shown by several research workers that the major part of the brain cells develop up to the age of 2-3 years and that in the later years the brain cells only increase by 5 percent of the total growth. The highest incidence of malnutrition in our country occurs in the age group from birth to 3 years. This means that during the most important period for the development of the brain, the body is not supplied sufficiently with the foods required as building materials. The child's learning efficiency is thus impaired in the later periods of life. Many elaborate tests have been carried out in Guatemala, and now in Uganda to prove this fact.

It has been estimated that in many African countries, 20-40 percent of the children in this age group suffer from some kind of moderate malnutrition, and a number suffer from severe kwashiorkor or marasmus.

As I have already pointed out, the age during which we see the highest morbidity and mortality rates is under 3 years. The infant in his first year of life and the young child are extremely vulnerable. They succumb easily where the environment is unsanitary and overcrowded and where infectious diseases and parasitic infestations are rampant. Other factors contributing to infant mortality include poor quality of mothercraft, lack of adequate and suitable foods and ignorance or existing misconceptions regarding the needs of the child. Recent investigations show that children succumb easily to infectious diseases because of lowered resistance caused by malnutrition.

Another point which I find interesting is the difference in incidence of diarrhea in children below and above 2 years of age. The mortality below 2 years is higher but in the first 6 months of life the mortality

and cases of diarrhea are lower. I think that during the first 6 months of life the child is, to some extent, protected by being breast-fed. Mother's milk is wholesome, rich and free from infectious agents, and, above all, it is free. This is why I believe that for our prevailing economic and environmental conditions the best form of food for an infant is mother's milk. I have my own doubts about other forms of milk such as cow's milk or tinned milk. Cow's milk is expensive and in our conditions it is difficult to keep free from infectious agents. Tinned milk is certainly too expensive for the ordinary person. Powdered milk is good for proteins but lacks other nutrients, such as fat.

The most dangerous period is the post-weaning stage, that is, the period between weaning and school age. Retardation of growth and development, lowered resistance to infection and manifestations of various types of nutritional deficiencies can all be taken as evidence of undernourishment in this age group and the result of high mortality rates. Retardation of mental development which may result from malnutrition in the early years of life must also be looked upon as a factor which will have serious consequences for the future of our countries.

I cannot overstress the fact that the nutritional state of any country is the key to its progress. Food and health have long been linked in the minds of men, though most of the early dicta have been in the form of provision for the avoidance of ill health rather than prescriptions for the promotion of health. Good nutrition must be regarded as part and parcel of good health, and for this reason I consider it one of the most important contributing factors to development. The level of productivity cannot be raised substantially on empty or half-empty stomachs, to put it rather crudely. I wish to add that our ultimate objective for improving the nutritional status of our countries should be to raise the level of the health of our people to its highest and to maintain or preserve it at that level.

Our whole rural environment is experiencing some important changes. The rapid rise in population produces pressure on the available land, for although there are opportunities for some young men to seek wage employment in towns or to set themselves up in business, the great majority must remain in the countryside to cultivate the

family farm. When there are several sons, the amount of land which each son can farm is less than his father had. In this way, the land has been divided in some areas into tiny subeconomic plots where the family just manages to exist, and in bad years struggles for survival. On a holding of 3 acres or less, the farmer is forced to grow food crops with the highest yields, such as maize, and must reduce the number of cattle he keeps and the acreage of other foods. As a result, his diet becomes poorer.

This is one example of the way in which the nutritional state of our people is connected with the state of agriculture and industry and factors in the wider economy. It suggests the complexity of the relationships between these factors, and the difficulty of finding simple solutions to our nutritional problems. The potential for solving these problems does exist in our countries, but as they are complex, so must our approach also be complex and adaptable to changing conditions.

As workers in the field of health, we accept the concept that every child born has the right to be kept alive and healthy. Our main effort must be to ensure the survival of those seeking treatment for malnutrition and related diseases, but hospitals and health centers must not be simply the places where wounds are treated and pain relieved. We must also direct a large part of our resources towards the prevention of disease, the spread of knowledge about nutrition, and education for a more healthy environment.

Training farmers in new methods of agriculture will certainly be of immense importance, especially when it is remembered that the majority of our people are farmers, and that they themselves consume the major part of what they produce. Here we should expect agricultural experts to advise the farmers on what should be grown on each small holding, to the greatest advantage of the family's nutrition and cash income. Account should be taken of the geographic and climatic conditions prevailing in different parts of the country to get the best return, both in nutritional value and money, from cash sales of new crops like hybrid maize and oilseeds. Attention should also be given to the exploitation of our fish resources. Ways of putting these new ideas into practice should be studied; they may include agricultural education and financial assistance to farmers.

We cannot expect all these activities to solve the nutritional problems in a short time. We must expect for some time to come that our hospitals and health centers will be crowded with children suffering from kwashiorkor and vitamin deficiency whose mothers will expect the doctor to effect a miraculous cure by means of some injection. We must educate mothers in the relationship between correct feeding and good health. We must show that an adequate wholesome milk supply is better than the whole range of drugs. Part of the justification of supplementary child feeding programs is that they have the demonstrable effect of giving definite proof to the mothers of the link between certain foodstuffs and good health. Discussing the supplementary child feeding program as part of your agenda, I would like to suggest that it should always be accompanied by nutrition education for the mothers. This education must be an integral part of the programs, otherwise the money and the food spent on them will be wasted and the return will be disappointing. The whole program could become degraded to a kind of charity.

There is a role for private industry in the solution of nutrition problems, especially if industry uses the most nutritious crops produced by our farmers. This will give the latter an incentive to produce more and will give the consumer the comfort of eating a product based on some familiar staple. I am aware of the fund of goodwill which is to be found among the industrialists and companies concerned, and they probably know better than I how much risk is attached to any undertaking aimed at producing protein-rich foods and weaning formulas using local resources and costing no more than the average family can afford. But I would like to welcome every initiative taken in this direction, and to assure manufacturers that the government will support such ventures and give technical advice where appropriate. The benefits from projects such as these will extend to farmers producing for the market, to consumers and to the companies concerned.

I think we must all feel that these manifold activities in nutrition require coordination in some overall plan, and I see that this point is on your agenda. I would like to commend to you the idea of establishing a Nutrition Advisory Board or Council. The Government of Kenya is in the process of establishing a National Nutrition Council which will bring together representatives of the various ministries and other bodies concerned.

The Council will be the body responsible for coordinating all nutrition activities in Kenya, and its implementation is confidently expected to be a big step toward improving the nutrition status of our people.

I should like to congratulate the organization committee responsible for this well-prepared conference for the carefully selected agenda, which will no doubt tackle the basic problems in this field. I wish you every success in your deliberations, and I believe that at the conclusion of this conference it will be found that an important contribution has been made to the solution of the problems of nutrition.

COUNTRY REPORTS

REPORT ON NUTRITION IN BOTSWANA

presented by Dr. George Lochrie

I. BACKGROUND INFORMATION

A. Geography and Climate

The Republic of Botswana comprises some 220,000 square miles lying between 18° and 27° south latitude and between 21° and 28° east longitude. It is thus approximately the same size as Kenya with about two-thirds of the country lying north of the Tropic of Capricorn.

It is bounded on the east and south by the Republic of South Africa, on the northeast by Rhodesia and on the west by South-West Africa. The whole country occupies part of a plateau with a mean altitude of 3,300 feet.

Because of its position, the climate is continental with great variations in temperature. Frost is experienced in the southern half of the country while in the summer, shade temperatures rise into the 100's.

The average rainfall is 18 inches, ranging from less than 10 inches in the southeast to 27 inches in parts of the northwest, most of the rain falling in the summer between October and April (see Table I). Evaporation rates are high, possibly reaching 9 feet in any one year, inflated by the late winter winds.

Average rainfall figures, however, are insignificant, for the real limitations to a successful agricultural economy are the great variations in annual totals, the absence of effective rain at critical periods in crop growth and the extreme localization of storms. For a small farmer this uneven distribution of rainfall can mean the difference between a successful and a disastrous season. Such conditions have been particularly evident this past year in the country and, in general, the rainfall is so unreliable that good harvests are reaped only once every 4 or 5 years.

It is a country of great physical contrasts, from the lush northwestern area fed prodigiously by the Okavango

River and truly tropical in the character of its vegetation and disease incidence, to the extreme southwest, where typical desert conditions prevail.

Despite the low and unreliable rainfall, the vegetation is not insignificant and the east of the country is rich in trees, shrubs and grasses which extend well into the Kalahari region. Thick brush in the south is usually Acacia in type, in the north, Mopane, and over the whole area, including the Kalahari (provided the rainfall has been reasonable) wild fruit and vegetables help to augment food supplies.

B. Population

The population is estimated at around 620,000, of whom almost half are under 15 years of age, and is increasing at present by 3.4 percent per annum (see Table II). The distribution is very uneven, the great majority of the people living in the eastern half of the country where the runoff is enough to replenish dams, or in the northwest where the only perennial river, the Okavango, and its tributaries provide more than adequate water resources locally before discharging into the vast salt pans of the Makarikari, Lake Ngami and Lake Dow.

The remainder of the people inhabit the wastelands of the central and southern Kalahari, where little surface water is evident, in communities of 1,000 or more around pans or wells of water potable for themselves and their livestock.

Perhaps it is relevant at this point to note that the people of Botswana tend to live in fairly large communities, the chief centers having a population of up to 30,000 or more. The reasons for this are not easily discernible, although when looking at history, defense and ease of administration may have been cogent factors. In any case, the custom has been long established and has led to certain sociological problems in the field of nutrition which will be illustrated shortly.

C. The Economy

Although there have been indications recently of promising mineral discoveries in Botswana, for the

foreseeable future the economy must be based on agriculture and animal husbandry (see Table III). The people of Botswana, in general, are cattle-rearing folk (see Tables IV and V), and there is no doubt that the number of head held signifies not only wealth, but also contributes to a person's prestige in society. This is evident even among the urbanized populations who still tend to invest any savings in livestock, about the rearing of which they have acquired considerable expertise over generations.

Despite the unpredictable rains, a considerable amount of agricultural activity takes place annually. The main crops grown are sorghum and maize, plus smaller amounts of groundnuts and occasionally millet wheat (see Table VI).

The staple diet consists of these, augmented where possible by meat, vegetables, wild fruit and milk. In some areas game is still quite plentiful and locally brewed beer plays its part in the nutritional picture throughout the country. The per capita income is estimated at Rands 50 (70 U.S. dollars) per annum. An influential factor in this respect is the emigrant labor force working in the mines of South Africa who send regular remittances home to the country for the general welfare of their families. In an average year this might amount to some 900,000 Rands (1,260,000 U.S. dollars).

II. NUTRITIONAL STATUS

Statistics relating to health in developing countries are notoriously unreliable, due partly to the poor medical coverage of the population and also to the caliber of the paramedical personnel relaying much of the information.

Nevertheless, taking this into account, and with the information available to us, Botswana is in an extremely fortunate position compared to many other African countries in the field of nutrition. It is probable that this is partly due to its longstanding dependence on an economy based on cattle and its attendant benefits from protein by-products. We are also fortunate to be, in the main, free from the problem of trypanosomiasis, for although this creates a problem in the north and west of the country, great strides have been made to overcome it with the help of the World Health Organization and a vigilant Tsetse Fly Control Service.

Little investigation has been carried out in the country in the field of nutrition. Squires, in the 1940's and early 1950's, carried out some field surveys among school children in the larger communities and found an incidence of malnutrition amounting to 20-30 percent. In the smaller communities, where it is easier to augment the basic cereal diet with wild fruit, vegetables and small game, the incidence dropped dramatically to about 3 percent.

In 1964 and 1965, Amaral reported on the food and nutrition situation in the country following several drought years. Although specific deficiencies were encountered, in the main, the problem was one of undernutrition due to repeated crop failures. Time and again he noted a "near lack of subcutaneous fat in children."

From hospital and health center returns it is clear that the major nutritional diseases encountered at present are scurvy and pellagra, with a few cases of protein deficiency malnutrition occurring in urban areas. Scurvy, as expected, is more common in late winter and early summer before the edible weeds make their appearance.

Nevertheless, during 1968 only 0.7 percent of all outpatient attendances were said to be related to nutritional deficiency and, in the under 14 age group, only 0.9 percent of attendances. During 1967 no deaths were attributed to malnutrition in inpatients.

These figures are greatly at variance with the few previous surveys and may be a reflection on the difficulties of transportation involved when providing medical services for a sparsely populated country. On the other hand, it may be that measures instituted by the Government since 1965, with the help of outside agencies, have made considerable impact on the nutritional status of the community. A further factor which requires investigation is the possibility that the incidence of malnutrition is being masked by returns giving a diagnosis of measles or gastroenteritis, both of which figure highly in the morbidity figures for the country.

III. SOCIOLOGICAL AND OTHER FACTORS

It was noted earlier that the people of Botswana tend to join together in fairly large communities. The scarcity of suitable pasture, arable land and water for each family

has resulted in a situation where most Botswana families have become seminomadic, supporting a home at the main center of population, often the Chief's official residence, but at other times of the year, depending on the rains, ploughing their allocation of arable land or tending their cattle at the cattle post. This latter home could be sited anywhere up to 100 miles from their "urban" home. Although young people, and particularly young boys, are involved in this work at the cattle post, the production of milk in large quantities away from the centers of population has an adverse effect on the nutritional status of the community in general.

Educational opportunities for all are increasing in the country but, naturally, schools must be situated in economic pockets of population and the poor communications, plus the intemperate climate for much of the year, lead to considerable wastage of high quality protein.

The widespread increase in educational facilities being offered now has two obvious effects on the nutritional status of the Botswana child. Previously, children not at the cattle post, where milk was freely available, accompanied their parents to the arable lands and some check was kept on their caloric intake. Nowadays, they may well remain in the vicinity of the village school in the care of an elderly relative no longer fit for manual labor, or band into communal groups to fend for themselves. Fortunately, the deleterious effects which could result from such a system can be obviated by intelligent teachers knowledgeable in the signs of malnutrition allied to a supplementary school feeding program.

With regard to food taboos, the Botswana are remarkably free compared to many other countries. They do have a totem system where one would never eat the animal of one's own totem, but this nowadays must affect few families other than some bushmen who are totally reliant on game meat for animal protein. It is unfortunate that fish, which is plentiful in the north and northwest, is as yet an unacceptable supplement to the diet of many families in the country.

IV. GOVERNMENT POLICY

Although malnutrition per se is difficult to recognize as a major problem in Botswana, the paradox is that

following another poor year for general rainfall, the country is once more having to approach the offices of the World Food Program to feed approximately 30 percent of the population.

Despite the encouraging mineral findings, the Government policy remains dedicated to developing the agricultural, pastoral and fishing industries of the country so that a full and varied diet is ensured for all sections of the community, that the natural resources of land, water, crops and livestock are used to the best advantage for the good of the people and that these same natural resources are preserved and developed to a state of self-sufficiency for present and future generations.

In order to implement this policy it is utilizing the following programs through various government departments and outside agencies.

A. Agriculture Department

1. The Pupil, Improved, Progressive and Master Farmers' Scheme

This is a system which has been running successfully for some years now. Individuals with certain accredited agricultural criteria are afforded assistance in the way of credit for seed, fertilizers and such matters as advice on marketing (see Table VIII).

2. Training

The intensive training of local candidates to become Agricultural Demonstrators and the encouragement of others suitably qualified to train outside the country is actively promoted.

3. The Artificial Insemination and Bull Subsidy Scheme

A system orientated to improving the standard of livestock in the country and offered to the public at a subeconomic rate.

4. Agricultural Credit

In May 1966, the credit previously available to farmers from the American Revolving Loan Fund was taken

over by the National Development Bank with the Director of Agriculture an ex-officio member of its Board. It has continued since then to supply increasing amounts of money to worthy applicants for assistance with implements, fertilizers and seeds (see Table VIII).

5. Inservice Training

Rural training centers have been established to provide inservice training, not only for departmental staff but also for farmers, teachers, health, community development and other personnel involved in the country's nutritional and economic status.

6. Education

The radio is used extensively as a medium to promote good agricultural practices and steps are being taken to include agriculture as a major subject in the final years of primary education.

7. Pests and Predators

American bollworms, stalk borer and aphids are all encountered and traders are being encouraged to stock pesticides to combat these locally. Their economic application is still a problem not yet solved.

8. Extension Work

Great emphasis is placed on this aspect of development and, with the help of international agencies, plans for irrigation schemes and dams are being developed gradually. There is a feeling in the Department that wider channels of communication with the general public are essential if worthwhile improvement in standards of production are to accrue. The principle of cooperatives is actively encouraged.

B. Veterinary Department

1. Foot and Mouth Disease

In the knowledge that livestock is so important to the economy of Botswana, the Government has always given strong support to this Department on such subjects as the prevention of foot and mouth disease.

2. Measles in Cattle

Recently, it became apparent that although the incidence of tapeworm in patients was less than 1 percent, the incidence of measles in cattle had reached crisis proportions as far as the economy was concerned. Accordingly, a national campaign has been mounted with the assistance of the Medical Department to improve the situation.

C. Education Department

1. School Curricula

The school curricula for both primary and secondary school pupils includes more than adequate instruction on nutrition and this is reinforced at the Teacher Training College level.

2. School Feeding

A Supplementary School Feeding Service is operated through the assistance of the World Food Program. It is felt that recent health returns on the nutritional state of the under 14-year-olds are an excellent reflection on the success of this scheme, which includes the encouragement of school gardens.

D. Community Development Department

1. Home Economics

This Department has expanded most effectively since its birth some years ago. It has been extremely active in the field of nutrition advice and, in cooperation with Women's Clubs, the Y.W.C.A., and the Red Cross, has contributed significantly to the nation's knowledge of such subjects as the prevention of malnutrition and home economics.

2. Population Pressures

The Government, while recognizing the low density population of the country, nevertheless, felt that a balance must be effected between population and economic expansion. Accordingly, they invited the International Planned Parenthood Federation, in conjunction with the Community Development and Medical Departments,

to produce a program geared to effect a general improvement in maternal and child health, with special emphasis on nutrition.

3. Food for Work

Because of the climatic vicissitudes of Botswana, the Community Development Department has found itself intimately involved with the World Food Program. In this field, it has affected the nutritional state of the country by identifying certain areas badly in need of support and organizing the subsequent administration of distribution of essential calories. In all cases, the distributed food is linked with essential works of rural development, be they roads, dams, schools or clinics.

D. Medical Department

1. Health Education

The low incidence of malnutrition reflected in returns has not led the Department into a sense of false security and at present two officers are on courses in health education, part of whose duties on return will be in the field of nutrition. Regular radio advice programs in this field are already in operation.

2. Health Educator

Here again, the Department is desirous of acquiring an officer interested in the active promotion of good nutritional policies in the light of local limitations of foods available.

3. Nutritionist

The Department would welcome the addition of a nutrition expert to its staff, but for some years this seems unlikely for economic reasons.

V. CONCLUSION

In conclusion, the Government recognizes the possibility of a malnutrition problem in Botswana, especially a "protein one," with the impact of increasing urbanization, engendered by independence and the prospect of mining wealth.

For these reasons, we are pleased to have been invited to this conference to listen to the problems of other African countries and learn what may lie ahead so that adequate preventive measures may be taken.

TABLE I

BOTSWANA - ANNUAL RAINFALL (IN INCHES) 1961-1967

Area	1961	1962	1963	1964	1965	1966	1967
Tsabong	18.57	8.48	12.96	6.97	6.15	6.83	18.41
Gaberones	18.80	15.89	13.75	15.83	9.93	22.27	36.36
Tshane	17.65	6.11	17.08	4.28	6.07	18.12	19.24
Mahalapye	16.46	12.46	14.40	9.33	7.02	13.61	22.84
Serowe	21.12	12.21	16.99	14.65	8.92	15.23	24.66
Ghanzi	15.00	9.84	30.86	6.75	11.77	13.35	24.77
Francistown	18.42	16.91	14.92	8.51	4.44	28.14	21.01
Maun	27.58	17.42	21.11	11.11	9.22	23.27	25.28
Shakawe	20.66	22.48	22.35	12.50	11.89	24.97	27.07
Kasane	33.48	23.63	23.82	13.58	14.20	31.02	29.54
Lobatsi						20.88	38.97
Palapye						10.61	13.66
Mochudi						10.31	32.68
Molepolole						25.89	28.24
Kanye						21.86	38.15

TABLE II

BOTSWANA - ESTIMATES OF MID-YEAR POPULATION 1968

Ages (years)	Both Sexes	Males	Females
All ages	611,000	297,605	313,395
Under 1	22,581	10,982	11,599
1 - 4	81,707	39,762	41,945
5 - 9	85,460	41,581	43,879
10 - 14	71,540	34,644	36,896
15 - 19	60,957	29,354	31,603
20 - 24	52,479	24,995	27,484
25 - 29	45,041	21,383	23,658
30 - 34	38,528	18,574	19,954
35 - 39	32,632	15,897	16,735
40 - 44	27,340	13,597	13,743
45 - 49	22,567	11,516	11,051
50 - 54	18,534	9,540	8,994
55 - 59	14,944	7,702	7,242
60 - 64	11,957	6,104	5,853
65 - 69	9,067	4,602	4,465
70 - 74	6,458	3,220	3,238
75 - 79	4,433	2,099	2,334
80 - 84	2,771	1,316	1,455
85 and over	2,014	737	1,277

TABLE III

BOTSWANA - EXPORTS BY COMMODITIES 1967

Commodity	Unit of Quantity	Quantity	Value (R)
Cattle (live)	head	7,645	413,830
Cattle (carcasses)	no.	45,612	3,856,152
Sheep and Goats (live and carcasses)			78,206
Hides and Skins (cattle, goats and sheep)	no.	117,621	1,675,820
Skins, Mats and Karosses (wild animals)	-	-	231,376
Canned meat	lb.	1,010,746	269,047
Meat extract	lb.	973,294	1,319,941
Offals and tallow	lb.	2,452,582	64,189
Bone meal	tons	1,917	81,438
Carcass meal	tons	1,266	88,584
Abattoir by product (other)	-	-	447,262
Butter, fat and cream	-	-	175,008
Other animal products	-	-	35,730
Beans and cowpeas	(200-lb. bag)	13,992	202,877
Sorghum	"	40,227	255,441
Talc	short tons	80	800
Manganese Ore	short tons	4,688	22,802
TOTAL:			9,218,503

Source: 1. Livestock products - Veterinary Department
2. Agricultural products - Department of Agriculture
3. Mineral products - Geological Department

TABLE IV

BOTSWANA - LABOR FORCE BY INDUSTRY AND SEX
(1964 CENSUS)

Industry	Males	Females	Total
Agriculture, Forestry, Hunting and Fishing	108,683	118,966	227,649
Mining and Quarrying	1,872	68	1,940
Manufacturing	1,596	824	2,420
Construction	2,678	26	2,704
Electricity, Water, Sanitation Services	120	-	120
Commerce	2,017	451	2,468
Transport, Communication	2,260	55	2,315
Services	5,107	4,691	9,798
Ill-defined or unknown	1,144	120	1,264
TOTAL:	125,477	125,201	250,678

TABLE V

BOTSWANA - CATTLE POPULATION

Year	Bulls	Cows & Heifers	Oxen & Tollies	Calves	Total Cattle
1944	22,688	448,536	237,386	188,292	896,902
1945	22,509	446,157	244,464	190,045	903,175
1946	22,715	463,101	274,327	198,646	958,789
1947	22,187	472,936	272,312	199,505	966,940
1948	24,000	478,875	283,625	192,000	978,500
1949	25,012	468,786	273,145	216,008	982,951
1950	25,543	515,698	282,556	266,169	1,089,966
1951	22,841	526,108	288,108	189,033	1,026,090
1952	26,891	532,057	287,886	207,462	1,054,296
1953	42,757	544,439	289,196	221,289	1,097,681
1954	44,772	583,968	276,823	198,840	1,104,403
1955	45,401	596,613	296,115	214,345	1,152,474
1956	49,996	640,121	316,331	229,256	1,235,704
1957	52,899	672,735	338,474	245,842	1,309,950
1958	51,535	674,036	362,655	226,012	1,314,238
1959	50,250	673,606	360,417	228,663	1,312,936
1960	44,074	643,513	372,346	206,931	1,266,864
1961	41,861	680,848	368,581	227,837	1,319,127
1962	41,041	692,271	357,821	256,693	1,347,826
1963	40,354	702,913	363,245	233,178	1,339,690
1964	38,157	703,366	361,553	236,026	1,339,102
1965	30,722	599,347	291,684	174,082	1,095,835
1966	28,596	503,453	232,502	151,678	916,229
1967	32,968	579,823	265,672	226,259	1,104,722

Source: Veterinary Department

TABLE VI

BOTSWANA - ACREAGE AND PRODUCTION OF MAJOR AGRICULTURAL COMMODITIES

Crop	Unit of Production	1964/65		1965/66		1966/67	
		Acre-age	Pro-duction	Acre-age	Pro-duction	Acre-age	Pro-duction
Maize	200-1b bag	20,943	20,900	7,594	9,643	6,204	14,742
Sorghum	200-1b bag	64,741	32,371	107,837	105,555	64,309	74,967
Cotton	500-1b bale	4,976	8,850	1,930	488	925	68
Groundnuts	200-1b bag	365	1,104	987	4,312	6,468	5,164
Beans	200-1b bag	3,386	847	4,019	8,251	-	-
Cowpeas	200-1b bag (included under beans)	-	-	2,837	2,465	1,291	2,082
Millet	200-1b bag	-	-	2,949	5,569	-	-
Citrus	Pocket	-	-	250	40,000	-	-
Sunflower Seed	200-1b bag	-	-	45	561	-	-
Others ¹		4,031	-	-	-	2,037	-
TOTAL:		98,442	-	128,448	-	81,234	-

¹"Others" include millet, citrus and sunflower seeds

Source: Department of Agriculture

TABLE VII

BOTSWANA - PUPIL, PROGRESSIVE AND MASTER FARMERS SCHEME

Criteria for admission to:

A. Pupil Farmer

1. Must own his own plough and at least two oxen. Other draught oxen must be readily available as and when required.
2. Must reside permanently on his lands throughout the crop season, or must have a permanent responsible farm manager.
3. Must have a minimum of one-half acre without stumps before joining.
4. Must be prepared to accept advice.

B. Improved Farmer

1. Must own at least a harrow in addition to plough and oxen.
2. Must be increasing his acreage of destumped land.
3. Must be applying kraal manure to an increased acreage.
4. Must have a reasonable knowledge of moisture conservation, seedbed preparation, weed control, plant espacement and some knowledge of basic principles of dryland crop production.
5. Must reside permanently at his lands throughout the crop season or have a permanent responsible manager.

C. Progressive Farmer

1. Must reside permanently on his lands throughout the crop season, or employ a permanent responsible manager.
2. All lands should be row-planted and a good seed-bed should be prepared.

TABLE VII (Cont'd)

3. Must follow at least a kraal manure rotation covering all his land.
4. Must own (or have a share in) a full set of implements.
5. Must be acquiring knowledge and working hard.
6. Must have a sound, practical, working knowledge of all implements, seedbed preparation, optimum planting conditions, plant espacement, weed control and a sound, basic knowledge of dryland crop production.
7. Must pass practical and oral test on above.
8. Must practice cross harrowing of cereal crops when 3-9 inches high for weed control.

D. Master Farmer:

1. All lands must be properly row-planted and cultivated.
2. Must plough well and deeply and use headland furrows.
3. Must winter plough and/or plough with first rains.
4. Must prepare a good seedbed.
5. Must have a high standard of timely cultivation and optimum crop espacement, and must cross harrow for weed control.
6. Kraal manure and/or fertilizer must be used and a crop rotation covering all the land must be followed and fully understood.
7. Must own a full set of implements and a scotch cart, wagon or trailer and have an implement shelter. Implements, cart, etc., must be well looked after and kept in good repair.
8. The land must be divided by grass strips or, if necessary, be contour banks.

TABLE VII (Cont'd)

9. Must practice improved animal husbandry and take good care of stock. Spraying or dipping against ticks must be carried out where this is considered necessary by the officer in charge of the district.
10. Must pass oral and practical test covering every aspect of improved methods of farming, fundamental principles of dryland crop production, and improved animal husbandry.
11. Must reside permanently on the lands throughout the crop season or employ a responsible permanent manager.
12. It is highly desirable that lands should be fenced.
13. It is desirable for the farmer's wife to be a progressive farmer, and the children young farmers.
14. The above standards must be maintained for two successive seasons before a farmer can become a Master Farmer.

TABLE VIII

BOTSWANA - AGRICULTURAL CREDIT

LOANS APPLIED FOR AND APPROVED BY DISTRICTS AND TYPE

	Barolong	Bangwaketse	Bamalete	Bakwena	Gaberones	South Ngwato	Central Ngwato	North Ngwato	Ngamiland	Total
No. Loans Applied for:	79	206	32	16	239	48	28	55	3	704
No. Loans Approved:	67	167	2	14	12	35	21	-	-	320
Value of Approved Loans	R	R	R	R	R	R	R	R	R	R
Tractors, etc.	3,755	-	600	1,895	132	2,280	-	-	-	8,662
Implements	6,465	6,672	-	960	747	2,250	2,832	-	-	19,926
Wire	534	200	110	-	105	460	1,479	-	-	2,888
Fuel	520	245	-	-	-	-	-	-	-	765
Fertilizers	-	155	-	-	-	-	-	-	-	155
Livestock	440	-	-	-	-	2,038	-	-	-	2,758
Total Approved	11,714	7,272	710	2,855	1,264	7,028	4,311	-	-	35,154
Total Applied for	18,875	22,708	10,656	3,031	21,707	9,456	24,821	28,525	3,624	143,403

REPORT ON NUTRITION IN ETHIOPIA

presented by Dr. Demissie Habte

The importance of malnutrition as a major public health problem of Ethiopia was realized only recently. In 1958, the U.S. Interdepartmental Committee on Nutrition for National Defense¹ (ICNND) carried out a national nutrition survey. This survey showed that the most acute nutritional problem involved preschool children, pregnant and lactating women.

Subsequent detailed studies by the Children's Nutrition Unit (now known as the Ethiopian Nutrition Institute), essentially confirmed the ICNND finding and further confirmed that the basic problem was the lack of a suitable weaning food.

Malnutrition in its various forms is manifested in Ethiopia. The immediate cause reflects the feeding pattern present in the area which in turn is determined, as in many other developing countries, by poverty, lack of suitable food, ignorance and superstition. Technological advancement has done little to help and, in many cases, may have worsened the position by destroying or making impossible old and well-tried beliefs and practices without supplying the means for newer methods.

Differences in feeding patterns exist from one area to another. This is to be expected in a country covering 400,000 square miles and exhibiting a great ecologic variety, including arid areas at elevations below sea level to alpine regions over 4,500 meters, with a fertile central highland, forbidding deserts and malarious lowlands.

"Difficulties of communication and other factors have discouraged the growth of towns and left most people living in isolated family groups close to their lands. This situation has helped to preserve the identity of tribal groups with different customs and languages."² Nevertheless, the feeding pattern by and large reflects the same general trend, namely, prolonged breast-feeding and late introduction of semisolid foods.

¹Now the Nutrition Program of the U.S. Public Health Service

²Prince, J.S., Spruyt, D.S., Elder, F.B., Messing, S.B., Wade, M.K., Ryder, B., Tseghe Y. "Demonstration and Evaluation Project. Ethiopian Health Center Program." Ethiopian Medical Journal, 1967, 5: 35.

The newborn infant is put to the breast right from birth. In addition, he frequently receives butter by mouth, either alone or mixed with water or Fenugreek (or rue, Ruta Graveolens) for up to 1-2 months. The amount of butter administered rarely exceeds 5 g. It is given for lubrication of the intestinal tract. (The medicinal value of butter is retained throughout adult age.)

Breast milk alone or with other additional infant foods is continued for 1-3 months and even to 4 years. The period of breast-feeding and the type of additional food given seem to be determined by the availability of cow's milk in the area.

Data on breast-feeding patterns of three different Ethiopian communities revealed that in Tigre (northern Ethiopia), where available milk is scarce, 92 percent of the children were breast-fed for over 1 year and 64 percent for 19 months or more. In Sidamo (southwest Ethiopia), on the other hand, where milk is available, 61 percent were breast-fed for over 1 year and 32 percent for 19 months or over. In Arussi, where the population consists essentially of a cattle-rearing community, only 14 percent were breast-fed for over 1 year and only 6 percent for 19 months or more.

These differences reflect the cultural context of the area - namely, that the more traditional and conservative a society is, the more likely it is to prolong breast-feeding, and the more open it is, the earlier the tendency to introduce cow's milk. However, the early abandonment of the breast in the Arussi area may also be determined by the high infant mortality and subsequent parental attempt to offset this by repeated pregnancies.

A study of infant feeding conducted in Addis Ababa demonstrated the change of feeding practices with urbanization. The percentage of infants receiving breast milk alone or with additional cow's milk fell from 86 percent in the first month to 25 percent by the end of the second year. Breast milk as the sole food was given to only 71 percent of infants in the first month of life and fell to 11 percent by the sixth month. Expressed differently, breast milk was completely abandoned in 14 percent, 24 percent, 31 percent, 41 percent, 37 percent, 44 percent, 46 percent, 62 percent and 75 percent of the infants between the ages 0-1, 1-2, 2-3, 3-4, 4-5, 5-6, 6-12, 12-18 and 18-24 months respectively.

In those areas where it is available, cow's milk is introduced as an additional food as early as the first 2-3 months of life. Thereafter, with increasing age it assumes an increasing importance as the main infant food until about the age of 12-18 months, after which it is drastically reduced. In the Addis Ababa survey, 34 percent of children below the ages of 18-24 months received some cow's milk.

In a dietary survey conducted by the Children's Nutrition Unit, children between the ages of 1-3 years receiving cow's milk in four different parts of Ethiopia were: Addis Ababa 28.0 percent, Ijaji 39.2 percent, Sidamo 64.3 percent and Begemdir 22.2 percent. The interesting finding of this survey was the average volume of milk consumed a day:

Addis Ababa	-	360-430 ml	(17 children)
Ijaji	-	100-340 ml	(22 children)
Sidamo	-	100 ml	(9 children)
Begemdir		7 ml	(2 children)

It is quite clear that the milk consumed fails to meet the caloric and protein needs of the children between the ages of 1 to 3 years. Additional foods other than cow's milk are given usually when the latter is unavailable. While the protein content of Fenugreek approaches 27 percent, the liquid extract that the infant receives contains negligible amounts of protein. This practice of successive extractions is probably an attempt to remove the bitter taste of Fenugreek.

Emmer wheat (or aja) is widely used after the first 6 months and it is to Ethiopia what matoke is to Uganda. The preparation into the liquid form is laborious. First, the husks are removed, then the wheat is ground to flour and finally mixed with liberal amounts of water and boiled for 15-20 minutes. The liquid aja, with or without added sugar, can then be given through a feeding bottle.

Aja is cheap, 4 kg costing about ET \$1. ET \$2 to \$4 worth is sufficient to feed an infant for one month, contrasting with the equivalent in cow's milk which amounts to \$12 monthly (1 liter daily). Aja is well-liked by children, presumably because of its easy digestibility. This is important because of the high frequency of

gastroenteritis. In spite of its low price, aja has attained the position of a prestigious food, and even among rich adults it is the most frequently prescribed food for the sick, the convalescent, or the mother during the puerperium. Unfortunately, its protein content is low, and it is the diet which most of our kwashiorkor children have been on before the onset of classical symptoms. Recently, wheat flour has been used increasingly in place of aja in urbanized sophisticated areas. Other foods not used commonly are linseed (given in liquid form), tea with sugar, corn gruel and local beverages.

Solid or semisolid foods are rarely given before the age of 1 year. In fact, it can be safely assumed that they are not given until the infant is capable of being sufficiently mobile to invite himself to the family Messob (table). Then he partakes of bits and pieces of the adult diet, and it is not until several weeks or months have passed that any attempt is made to prepare suitable foods for the child. This at best means a diluted, liquefied (with sauce) form of the local bread, injera, or a dry piece of bread made of corn, barley or ensete. The classical adult diet of the central highlands consists of injera (pancake-like bread baked from ground Eragrostis abssinicum) and wott (a stew prepared essentially of onions and spices, mixed either with legumes or meat, plus oil or butter).

This is nutritionally adequate as long as the sauce is rich, this being directly proportional to the family income. In addition, the best food is usually given to the father, then guests, mother and finally the children - the older children getting a better share than the smaller children.

Under these circumstances, the child between the age of 18 months to 4 years faces the most dangerous period of his life. He is considered too old to receive breast or cow's milk, and is given the second- or third-rate adult diet. His diet is, therefore, grossly inadequate to meet his calorie or protein requirements. In addition, he is exposed to common childhood infections such as measles, gastroenteritis and respiratory infections, against which he has little natural and no acquired resistance. He is neglected by his parents who are busy

with his younger siblings. Thus, he is catapulted toward the whirlpool of protein-calorie malnutrition from which he is unlikely to come unscathed, if alive.

Frequency of Advanced Protein-Calorie Malnutrition

Advanced protein-calorie malnutrition (represented by kwashiorkor and marasmus) constitutes an important cause of hospital admissions. Together with respiratory disorders and gastroenteritis, colloquially referred to as the "The Big Three," malnutrition forms close to 60 percent of all admissions. In a retrospective analysis of inpatient material of a children's hospital, advanced malnutrition accounted for 9.4 percent of all admissions and 9.8 percent of all deaths. The mortality of advanced protein-calorie malnutrition (PCM) was high, 30.3 percent in 1961. In the same report, 5.3 percent of patients seen in the OPD were registered under protein-calorie malnutrition. In a survey of 3,000 Addis Ababa children attending the mobile child health clinic, 8 percent of the children were found to be clinically marasmic.

The pattern has changed only slightly throughout the subsequent years, and advanced PCM remains an important cause of admissions and death.

A community survey conducted at the village of Ijaji among 397 children under the age of 5-1/2 years revealed 14 cases of advanced PCM or a rate of 3.5 percent. In another survey recently completed in Mekki by ESPC, 6 cases out of 129, or 4.6 percent, were found to have advanced PCM. These figures are admittedly high, as it is often the sick that readily come to such community surveys, but they underline the magnitude of the problem.

A better means of assessing the extent of the problem of malnutrition in Ethiopia is to examine weight-for-age and height-for-age curves of children at all age groups and compare these with results of optimally-fed children. These analyses show that malnutrition is one of the major public health problems of the country. While the percentage of children that can be labelled as suffering from malnutrition cannot be accurately assessed because of differences in the criterion of diagnosis, there is reason to believe that as much as 50 percent or more are affected.

Frequency of Other Deficiency Diseases

Iron deficiency anemia appears to be widespread among infants below 3 years. The etiology is related to inadequate intake of foods containing iron and to the repeated diarrhea that results in loss of blood through the gastrointestinal tract.

The anemia corrects itself soon after the child partakes in liberal amounts of the adult diet which, fortunately, is very rich in iron.

Vitamin A deficiency, as represented by conjunctival xerosis and keratomalacia, is prevalent in Ethiopia and may well be an important cause of blindness. It is frequently associated with protein-calorie malnutrition, thus pointing to a common etiology.

Vitamin D deficiency (rickets) occurs and estimates of affliction as high as 30 percent of children under 3 years have been given. The reasons are related to the widespread practice of covering infants and children from the sun to keep the "evil eye" away. Only when the child forces his way out into the sun does the rickets correct itself, if the infant has survived repeated respiratory infections and severe chest deformities.

Endemic goiter is very common in some regions and contrary to previous beliefs, also affects preschool children.

A program of salt iodization is underway, and this disease will, hopefully, disappear from the medical scene.

Nutrition Programs

The main activity in the field of nutrition to date and possibly in the future, lies with the Ethiopian Nutrition Institute (ENI). The Institute began in 1961 as the Children's Nutrition Unit, and was a joint venture of the Ethiopian and Swedish Governments. The primary objectives were:

1. A survey of the incidence of malnutrition in selected groups of Ethiopian children.

2. A detailed analysis, chemical and biological, of the food consumed in the families under study.
3. An enrichment program with special emphasis on locally available indigenous foodstuffs.
4. An evaluation of the physical fitness in relation to nutritional status.
5. Participation in nutrition teaching at various levels.

The Institute has so far successfully carried out most of its planned objectives as much as possible under existing circumstances. The initial survey studies show that the main nutritional problems affect the preschool child, due to a lack of good traditional weaning foods. Accordingly, the Institute then formulated an acceptable weaning food, faffa, from locally available foodstuffs, and started introducing it to the mothers.

The Institute has realized from the beginning that the basic causes of malnutrition are very complex and touch deeply into traditional beliefs, education, socio-economic status, etc., of the population. Also, the appropriate solution is not simply the introduction of a supplementary weaning food.

Presently, along with the marketing of faffa, the following activities are going on:

1. An intensive campaign to inform the public of the dire importance of nutrition, particularly in the preschool child.
2. Integration of nutrition teaching at all levels of education. This involves preparation of nutrition manuals for all levels of education.
3. Integration of nutrition activities with the basic health services.
4. Training of health personnel in the field of nutrition.

5. Integration and coordination of nutrition activities operating in the various ministries.

The major problems in the implementation of nutrition programs are:

1. The lack of adequate infrastructure of the basic health services.
2. The lack of awareness of the importance of nutrition among the high government officials.
3. The lack of adequate funds to carry on planned nutritional activities.

Future plans for the improvement of nutrition on a national scale essentially consist of strengthening and expanding the existing planned activities of the Ethiopian Nutrition Institute. In addition, the present effort to expand the basic health services should be actively encouraged so that the number of infants exposed to modern medicine is increased.

At the same time, increased agricultural production of foodstuffs, particularly those containing proteins, e.g., fish production, will be undertaken.

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REPORT ON NUTRITION IN KENYA

presented by Dr. J.C. Likimani

I. BACKGROUND INFORMATION

Kenya covers a total area of 225,000 square miles, of which 5,170 square miles are water. Rainfall statistics indicate that there is considerable oscillation. An increasing number of inhabitants are exposed to famine during the dry years, and depend on emergency food supplies. The impact on health and mortality statistics is obvious.

The population is estimated to be 10 million, of which approximately 50 percent is under the age of 15 years. The population distribution is approximately 44 inhabitants per square mile; however, the density varies from place to place, being heavy in the central, western and coastal regions, but very sparse in the northern region. Approximately two-thirds of Kenya is either arid or semiarid.

Over 90 percent of Kenya's population is rural and 97 percent is of African origin. The African population consists of over 40 tribes and can be divided into four major ethnic, linguistic or geographical groups, namely the Bantu, Nilotic, Hamitic and Nilo-Hamitic groups.

The available information on vital statistics is limited and insufficient to give a reliable picture of the situation in the country. In the absence of complete birth and death registration, the birth and death rates can only be estimated. The birth rate is estimated to be 50 per thousand per annum and the crude death rate 20 per thousand. The infant mortality is probably not less than 100 per thousand. The high rate of population increase does indicate that at this rate (3 percent per annum) the population will double itself toward the end of the century.

Kenya is basically an agricultural country. Agriculture is responsible for 40 percent of the gross domestic product and nearly 90 percent of the exports.

Over 90 percent of the population is dependent upon agriculture which forms the basis of economy both at the traditional subsistence level and at the cash production level. I have already pointed out that approximately two-thirds of Kenya is arid or semiarid; the economy in these areas is dependent mainly upon livestock and livestock products. Since farming is the main source of food and income, and given the high rate of population growth, it appears that some areas are approaching overpopulation.

Kenya's economy is in transition where the subsistence and monetary economy exist side-by-side and influence each other. The nonmonetary sector forms one-quarter of the gross domestic production component, but the ratio is undergoing a fast change.

There are two types of farming in Kenya: there is the large farm sector which operates on a commercial basis using modern techniques; there is also the small farm sector which represents approximately 1 million holdings of about 18 million acres of land. The majority of farmers live in the subsistence sector of the economy. There is also the pastoral sector spread over about 110 million acres of land in areas where the average annual rainfall is below 20 inches.

The economy of the country is developing very quickly, particularly in the urban areas, but the rural people react slowly to change and cannot sufficiently keep up with the necessary scientific advances in methods of farming and life in general. On the whole, it is the peasant on the small farm who, with his family, suffers from disease and poverty.

II. LEVELS OF NUTRITION

Kenya had already shown interest in the field of research work during the colonial period and, in fact, one of the classical publications on the influence of nutrition on growth and health is based on the comparison of the Kikuyu and Masai diets (1). An outstanding amount of work has been done here by H. Foy and A. Kondi on anemias, their incidence, classification, therapy, etiopathogenesis, especially in connection with sickling, iron and vitamin

deficiencies, kwashiorkor, marasmus and hookworm infestation (2-12). After the drought and floods in 1961-62 two booklets were published (13, 14) describing the famine in different areas and actions undertaken. Very valuable material is included in the Economic Survey of the Central Province (15) and in the Kenya African Agricultural Sample Census (16). Consumption, medical and other data are in the reports produced by the WHO Nutrition Project (17-20).

This enumeration certainly does not include everything that has been published on nutrition and in the related fields. It represents only the basic literature, which should be read by every student who begins to study local problems.

A. Calories

According to surveys carried out on random samples of the rural population, approximately one-third to one-fourth of the families consumed less than 60 percent of the minimum daily caloric requirements in the preharvest periods. In the postharvest periods, at least one-fifth of the families were consuming less than 80 percent of the recommended allowances. These figures do not include the population working on the estates, the landless and the unemployed in the towns.

According to a study carried out in the Murange District (21) which calculated the recommended allowances for an average person and compared it with the calories and proteins available, the gap in calories is more serious (64.9 percent of the recommended allowance) than the gap in proteins (74.2 percent).

Taking into account the statistical data available in the Land Register or in the Kenya African Sample Census (16), we can estimate the number of holdings in different ranges of acres. We have to accept the presumption that it is necessary to own certain acreages to cover the food minimum of the family, to pay **taxes, school fees**, buy clothing and to make the necessary saving possible. Of course, the necessary size of land will depend on the quality of soil, rainfall, growing of cash crops, size of the family and productivity; but if we accept that on a holding below 2.5 acres it is hardly possible to produce enough for the family, we can find that in the

Central Province 32.4 percent of the holdings are of that size and in Nyanza Province 22.8 percent are less than 2.5 acres in size. The number of persons supported per holding on the farms below 2.5 acres is 6.23 in Central Province and 5.16 in Nyanza Province.

The Economic Survey of the Central Province (15)
has shown the same calorie problem:

District	Produced		Consumed ^{1/}		Expenditure for Food per Head (EA cents)
	Calories (grams)	Protein (grams)	Calories (grams)	Protein (grams)	
Kiambu	1,185	29	2,478	62	32
Muranga	1,465	41	2,058	57	15
Embu	1,612	55	2,046	66	11
Nyeri	2,375	69	3,126	89	19
Meru	1,775	54	2,091	62	8
Average	1,599	44	2,269	62	17
Recommended Allowance ^{2/}			2,536	69	

^{1/} It was assumed that the money available for the purchase of foods was used to buy maize only.

^{2/} Family with 5.5 members

The northern pastoral tribes, mainly Turkana, are always on the edge of famine, and their nutrition is safeguarded through government aid and through missions and voluntary organizations. In 1961-62, the Masais were dependent on emergency government food supplies.

B. Proteins

The above data has proved that the shortage of calories is a serious problem among a proportion of the population. It does not mean, however, that protein consumption is adequate. Kenya is a country which exports milk, cheese, meat and some cereals, and we appear to live on the surplus. The majority of the surpluses are produced within the large farm sector, working on an economic basis for sales of the products. Against this, the small farm sector is living on a subsistence

basis, and only a small part of the farmers are in the transitional stage to a monetary economy. The rural population consists of subsistence farmers who, together with the urban wage earners, business contractors and tradesmen, do not have sufficient purchasing power to buy the surplus proteins, and thus obtain a healthy, nutritious diet. The country must export protein foods as part of the Agricultural Export Plan, and it also must request protein aid. A person who cannot understand this fact, cannot comprehend the problems of the transition period to a monetary economy, or the whole paradox of development.

Figures from different surveys show that protein consumption per head is low, but the gap does not seem so big as in the case of calories. The explanation is simple: the typical diet of Kenya consists of large quantities of legumes often containing 20-24 percent protein. Given below are the figures on protein consumption estimated on a family basis in the Central Province.

Location	Percentage of Adequacy	Protein (grams)	Persons in Family
Ngamwa, June	79	48	24
Gitugi, July	166	109	23
Gitugi, September	109	66	19
Ihururu, October	96	56	24
Gitugi, January	125	78	21

From the point of view of child feeding, we must take into account once again the percentage of small farmers and landless families. Their children suffer from protein malnutrition. But to this figure we must add the families with reasonably-sized holdings, where the mothers are ignorant about feeding practices and hygiene and usually prefer to feed the child on soft, starchy, cheap foods. Not the least of the problems is that the child's feeding is badly influenced by the status of the men in the family.

The ratio of animal to vegetable protein has been calculated among families selected at random. In the

Central Province, the ratio was 1.7:98.3 percent in the worst cases, and 8:92 percent in the best cases. In Nyanza Province, where fish is an indispensable part of the diet, animal protein represented 1/4 to 1/3 of the total protein. Protein score, calculated according to the WHO/FAO suggested method, oscillated between 51 and 65 with the exception of the Nyanza Province, where in two different locations the score was 69 and 70. Considering the development of protein supplementary food, it is important to point out that the limiting amino acids were tryptophan and sulphur-containing, in the majority of households. The data collected on the random sample of households show that the subsistence farmer cannot produce enough animal protein, even if he does not sell the animal products. Below is an example of the average figures from one location in the Central Province:

Total number of households:	24	Number of families:	21
Cows per family	0.8	in 9 families	
Goats per family	1.0	in 8 families	
Sheep per family	1.9	in 11 families	
Chickens per family	4.6	in 13 families	
Without cattle or poultry	5	families	
Milk per family/day	1.06	pints	

There is a great potential for animal protein production in the areas belonging to the pastoral and semi-pastoral tribes. The potential has not yet been exploited due both to long distances for transportation and to traditional attitudes.

C. Fat

The typical rural diet, with the exception of the pastoral tribes, is low in fat content. The lacking fat calories are replaced by the calories from vegetable protein and carbohydrates.

D. Iodine

The incidence of endemic goiter among 28,520 school children surveyed in 1962-64 was as follows:

Goiter, 1st degree	-	21.95 percent
Goiter, 2nd degree	-	7.13 percent
Goiter, 3rd degree	-	1.14 percent
Total		30.22 percent

As a result of these findings, the Ministry of Health decided to iodize the salt produced locally (33.7 mg of potassium iodate per 1 kg of salt, or 1 part of iodine in 50,000 parts of salt) and the ministerial instructions will eliminate the import of noniodized salt. The first supplemented salt will be on the market this year.

D. Other Nutrients

It has been recorded that insufficient intake of vitamin A occurs in all areas. The dietary deficiency of riboflavin, niacin and vitamin C is very common. On the other hand, the intake of thiamine was above the recommended allowance in all areas surveyed.

III. MAJOR NUTRITIONAL DISEASES

According to our hospital and health center returns, malnutrition is the fourth leading cause of death. The age group worst hit is the under 5-year-olds. Many of the deaths of malnourished children are reported as being caused by gastroenteritis, tuberculosis, or pneumonia, which are terminal stages of malnutrition. In addition, there exist many cases of retarded growth, but usually these are not reported as malnutrition because they do not easily fit into any formula of disease reporting which the medical personnel were taught during their training.

IV. MAJOR CAUSES OF MALNUTRITION

Our major nutrition problems are found in the population classified, according to their economic importance, as the small farm sector. Here, due to the previous divisions of family holdings, there is not enough land to produce the minimum food requirement every year. The smallholders are not able to produce sufficient reserves of money or foods, and their nutrition level thus fluctuates from season to season with the rainfall.

The transition period from the subsistence to the monetary economy has not yet established an intensive exchange of goods and trade. The production for the market is small, the farmer is lacking cash and has little incentive to produce more than his family needs. The production of food crops has in some areas the character of monoculture (maize, beans, cassava, sweet potatoes, bananas) which restricts the exchange of products and their conversion into money, and contributes to the monotony and unhealthy composition of the diet.

Small production and consumption of vegetables and fruits contribute to the monotony of the rural diet and are responsible for the incidence of hypovitaminosis. There is a large field for applied activities and enlightenment utilizing the initiative of education. However, slow acceptance of the effective agricultural methods is aggravated by illiteracy, mainly in the older generation.

The mothers are ignorant as to the needs of a child in the weaning and later periods. Soft foods are not necessarily starchy foods. A considerable part of malnutrition in children from families with a reasonable-sized holding could be prevented by providing a simple guideline in the mother's language.

Basic rules of hygiene are not respected due to ignorance and, in some areas, due to the lack of water. The poor hygiene existing in the child's environment is responsible for the high incidence of diarrhea in the age group below two years and of parasites. Early infections and parasitic infestation are the second most important causes of malnutrition.

There is small production of animal protein among the cultivators, although there do exist unused reserves of well-bred cattle, fish and small domestic animals.

Promotion of oilseed production would assist in increasing the intake of calories and could be the source of cash and of valuable protein.

V. PROGRAMS INSTITUTED TO COMBAT MALNUTRITION

A. Training and Education

Two years ago, the Ministry of Health decided to organize a 6-month training course on nutrition for selected paramedical nursing and midwifery staff. The course is designed to produce nutrition fieldworkers. The type of training is adapted to local conditions in which these officers are to live and work. On completion of their training, these officers are employed as full-time nutrition workers. We now have 40 of them, each assigned to a district. Their main work consists of health education in general and nutrition education in particular. Emphasis is placed on principles of food hygiene and food requirements, infant and child feeding, instructions on weaning, use of locally available food-stuffs, demonstrations of food preparation, personal and home hygiene, and prevention of malnutrition, infectious diseases and parasitic diseases. The workers are also expected to give information on family planning. Emphasis is placed on food costs and family budgeting. In some areas, the workers participate in organizing the Preschool Age Nutrition Program. They wear uniforms and each is equipped with a set of audiovisual aids, a set of cooking utensils and is provided with a little money to purchase foods for demonstration. They are also provided with transportation for their work in the rural areas.

This program is new and the workers are still too few to cover all areas. The effectiveness of this program remains to be assessed. However, we intend to assign a second and a third nutrition fieldworker, at least in some districts. All this and other problems we face in the program can be met only after consolidation and evaluation of the value of this type of service. We do recommend to our fieldworkers that in the course of their activities they should involve women's clubs and their aim should be to select from these clubs literate women who can assist them on a voluntary basis.

In addition to the nutrition fieldworkers employed by the Ministry of Health, other nutrition workers are employed by the local authorities, Kenya Cooperative Creameries, and by other voluntary and private agencies.

Their main job is to teach mothers about correct feeding of their families and their children, and about the foods available to them, about personal and family health and hygiene, about prevention of disease and immunization, and about family planning and other subjects of interest. These can include the home cultivation of vegetables and fruit and poultry-keeping.

They try to stimulate health education at women's clubs and assist in the education and extension activities arranged by other ministries and organizations. The responsibilities of the nutrition fieldworkers are increasing even more in the districts where the Preschool Health Program has been introduced.

The training syllabus for all nursing and health personnel includes a substantial element of teaching in nutrition.

The Schools Broadcasting Service of the Voice of Kenya gives regular lessons on nutrition, which are heard on radio by schoolchildren and teachers in over 2,500 schools throughout the Republic.

Nutrition teaching is included in the curriculum of the homecraft courses held at Farmers' Training Centers by the Ministry of Agriculture, and at the Homecraft Training Centers run by the Community Development Department of the Ministry of Cooperatives and Social Services.

Other nutrition education activities are organized by voluntary agencies, such as the Freedom from Hunger Committee, Oxfam, Kenya Red Cross, and the Catholic Relief Services, at nutrition rehabilitation centers, mission hospitals, etc.

B. Supplementary Feeding Programs

We have a number of programs aimed at supplementing local diets and nutrition education of the mothers. In these programs emphasis is placed on the expectant mother and the mother and baby. Most of them are new, and are carried out only on a small scale because of the shortage of field staff and lack of transportation facilities and other requirements. I shall mention only three.

1. Applied Nutrition and Preschool Age Nutrition Program

This program is aimed at the prevention of malnutrition among preschool children and the provision of practical nutrition and health education to parents of preschool children. The program was started in 1967 by the Catholic Relief Services (CRS) with the assistance of the Government and the World Health Organization (WHO). The foodstuff used in the program is supplied free by the CRS from the United States. Each child in the program receives a mixture of 2.7 pounds of dry skim milk, 5 pounds of cereals and 1.0 pounds of vegetable oil per month and pays 1.00 shillings per month towards the cost of transport and supplies.

The scheme involves the mothers paying a monthly visit with their children to hospitals or health centers. At each visit, a simple clinical assessment is made on the nutritional and health status of the child. The details are recorded on a standard record card with the weight plotted in graph form. During each visit, the mothers also attend demonstrations on the preparation and cooking of meals and on personal health hygiene. Talks are also given on nutrition. Finally, they collect their monthly ration of food.

At present, the scheme is working in two districts and covers 6,000 children. Another 70,000 children are covered by various church establishments. The aim is to extend the program as widely as resources will permit.

2. School Feeding Program

This program is based on the concept of providing nationwide school lunches aimed at supplementing the protein and vitamin intake of school children and providing a basis for elementary nutrition education among parent-school committees. The program was initiated in 1967 with a grant from Oxfam and is now under the control of the National School Feeding Council with a national organizer and a staff of fieldworkers. The meal is made up of milk, yeast and barley (known as supro) to which beans are added and served as thick

soup. Each recipient pays 9 shillings per term towards the cost of supplies, equipment, food preparation, etc. The scheme now covers over 20,000 children and has the target of eventually covering all schools where it is required.

3. Dried Skim Milk Production

There are two milk processing plants which have been equipped with the assistance of a grant from the United Nations Children's Fund (UNICEF). The objective is to stimulate local production of milk and to set up production of protein concentrates. According to the agreement, the loan from UNICEF is repaid in the form of skim milk powder which UNICEF supplies free to the Ministry of Health and is distributed free to health centers, schools and other institutions for supplementary feeding programs.

C. Control Measures Against Endemic Goiter

According to surveys conducted by the Ministry of Health with the assistance of the World Health Organization (1962-64), endemic goiter in different clinical stages was found in 30.2 percent of 29,000 school children examined in 14 districts. Other surveys have also shown that the disease is common in some parts of Kenya. In some districts, between 60 percent and 70 percent of the people are affected. As mentioned earlier, the Government has now decided to take preventive measures against this nutrition deficiency disease and a committee of experts has decided that all the common salt locally produced for human consumption is to be iodized. If all goes well, this program will start before the end of this year, at which time iodized salt will be on the market. We are also thinking of allowing only iodized common salt to be imported into the country. In the meantime, further studies on the prevalence, epidemiology, clinical aspects, and the related problems of endemic goiter are being carried out in order to provide baseline data for future evaluation of the iodized salt scheme.

D. Other Activities

Among the other activities in the field of nutrition a mention must be made of the highly specialized

research work being carried out in our hospitals and institutions by our government staff, the staff of the University College, Nairobi, and the research workers of the Royal Dutch Institute of Tropical Diseases. The work being carried out includes epidemiology, prevention and treatment of malnutrition and social and cultural aspects of the disease.

VI. COORDINATION

Consideration is being given to the formation of a National Nutrition Council of Kenya whose main function would be to stimulate and coordinate the efforts of different government ministries, voluntary agencies and private organizations in improving the level of nutrition and in the fight against malnutrition. Such a council would be invested with the necessary status to make effective impact and recognition both at national and international levels and would deal with policy matters on nutrition.

In conclusion, I would like also to place on record the appreciation of the Government and people of Kenya of the important part played by organizations, such as WHO, UNICEF, FAO, Freedom from Hunger Campaign, Oxfam, Catholic Relief Services, United States Agency for International Development, International Red Cross, World Bank and many others in assisting us to solve some of our health problems. Special appreciation on our part must also be placed on record with regard to the Danish Government who has assisted us in establishing a school at Karen where our nutrition fieldworkers are trained.

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REPORT ON NUTRITION IN LESOTHO

presented by Mrs. Anna M. Hlalele

I. BACKGROUND INFORMATION

A. Geography and Climate

The Kingdom of Lesotho, which until recently was known as Basutoland, is an enclave within the Republic of South Africa. It covers an area of 11,716 square miles, of which about one-fifth, to the west, is lowland and the remaining four-fifths to the east, is mountainous, rising to over 11,000 feet in the Drakensberg Range.

The mountainous regions of the country are almost completely devoid of proper roads, but abound with bridle paths and tracks, which are traversable only by pack mules and horses. However, since the attainment of independence in October, 1966, the Government has given priority to road construction works and the mountain areas are also receiving attention. Lesotho is mainly agricultural and much attention is also paid to soil conservation programs with soil erosion as a major problem.

Temperatures range from 27°C (90°F) in the summer, to as low as 16°C (62°F) during the winter months. The four seasons of the year are experienced with the changes which characterize them.

Rainfall varies to a great extent; on the average 28 inches is recorded annually. Showers occur mostly in the summer and autumn months.

B. Population Profile

The population of Lesotho is 1 million, growing at the rate of 2.0 percent compound for the de jure population, or 2.88 percent per annum compound for the de facto population.

According to reports of the Bureau of Statistics, international alien migration into Lesotho is negligible, and population increases may be attributed to the natural growth rate, which means that there is an excess of births over deaths.

The European population is about 1,593, and of these, about half reside in Maseru, the capital of Lesotho. Maseru alone has about 15,000 residents. Asiatics also form a small percentage of the population, numbering up to about 799. Approximately 250,000 inhabitants are settled in the mountainous parts of the country, whereas the remainder occupy the foothills and the lowlands to the west, where climatic and geographical conditions are less trying.

There is only one language spoken in Lesotho, which is understood by the majority of the people - Sesotho.

Distribution of the population according to race, sex and ages is given in Table I.

II. NUTRITION SURVEYS

The Nutrition Education Scheme, sometimes referred to as the Applied Nutrition Program, was conceived and launched jointly by the Lesotho Government, the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Children's Fund (UNICEF).

A. History of the Nutrition Education Scheme

The implementation of the Nutrition Education Scheme came as a result of findings, a report, and recommendations made by a team of two World Health Organization (WHO) consultants, Dr. J.A. Munoz (Medical Nutritionist) and Miss Anderson (Non-medical Nutritionist), who were assigned to Lesotho for a period of four years, from 1956-1960.

Previously, malnutrition had been a source of misery and unhappiness to many people in Lesotho; this was revealed in the annual reports of the Department of Health. Feeling greatly concerned about this problem, the Government of Lesotho appealed to WHO to give "technical assistance toward a nutrition survey within the territory, in order to assess the problem, and to devise the best means of combating it." Thus, two consultants were sent to Lesotho by WHO. Upon arrival in Lesotho, the consultants were assigned the task of carrying out a nutrition survey, which they did with the assistance of local staff.

Upon completion of their assignment, the WHO consultants submitted a report, which was published by their organization. This report revealed, among other things, that the diet of the Basotho is deficient in foods supplying animal proteins, calories, fats, calcium, riboflavin, nicotinic acid and vitamin A.

In order to alleviate the situation, the experts recommended that agricultural production should be increased. This, they advised, "could be accomplished by the implementation of an expanded nutrition program with the assistance of WHO, FAO and UNICEF."

In June, 1961, the UNICEF Executive Board approved this recommendation and a plan of operations was drawn up by the Government. The program was then launched in February, 1962, in selected pilot areas where the people had become aware of their needs and had requested the scheme.

Initially, three nutrition pilot areas were established in three lowland districts. As a result of the motivation induced by the activities of the scheme at all levels, an additional four pilot areas were opened in the remaining four lowland districts, thus raising the total number of pilot areas to seven. To date, the program has been expanded in the seven initial areas, and now serves a bigger section of the population, approximately 122,000 people of which 26,000 are school children attending 120 schools. The population of the seven demonstration areas which are affected constitutes about 13.5 percent of the total population.

B. Objectives of the Nutrition Education Scheme

In general, the objectives of the Nutrition Education Scheme are to raise levels of nutrition in Lesotho through:

1. A program of nutrition education,
2. Increased local production and consumption of bodybuilding and protective foods,
3. Conducting a school feeding program carried out through schools and the community.

All of these are to be effected in cooperation with the Ministries of Agriculture, Cooperatives and Marketing, Education and Culture, Health and Social Welfare, and Interior.

C. Phases of the Program

For effective operation, the scheme is divided into five phases:

1. Poultry production, evolved as the best and quickest method of increasing the production of first class protein foods. At present, there are about 510 poultry producers.
2. The establishment of productive communal and home vegetable gardens. School gardens are used largely as demonstration areas, to educate boys and girls so that they can appreciate gardening.
3. School feeding intended to combat hunger due to underfeeding and malnutrition, and to educate the children about nutrition.
4. Organization of Young Farmers Clubs to teach boys and girls in and out of school better methods of farming, homemaking, nutrition, cooperation and leadership. Regular meetings are held once a week. Eighty clubs have been established with a membership of 2,500, approximately 70 percent of whom are girls.
5. Adult education meetings held regularly in the villages, where adults receive training in nutrition/home economics subjects, through talks and demonstrations given by the field staff. Village level courses of 3-4 days' duration are organized and also longer courses are conducted, at which the average attendance is 60 adults per course, mainly women. Courses are also arranged for local leaders, youths and adults.

III. MAJOR NUTRITIONAL DISEASES AND THEIR PREVALENCE

The incidence and geographical distribution of major deficiency diseases are summarized in Table II.

IV. MAJOR CAUSES OF MALNUTRITION

A. Sociological

Until the launching of the Applied Nutrition Program in 1962, the major causes of malnutrition could be attributed to ignorance of the nutritional requirements of the body by the majority of people in the rural areas. Various means have now been employed, in an attempt to cover a larger section of the population and in this way to spread nutrition education.

For a long time, girls were not permitted to eat eggs. This taboo still remains in parts of the country. However, it is pleasing to realize that in the pilot areas and in some areas outside, particularly in the urban areas, this taboo is being broken off gradually, through education.

B. Environmental

Excessive drought and lack of sufficient irrigation facilities is a great handicap, even in areas where the people have taken to improved agricultural methods, and are doing their utmost to produce vegetables and other crops.

As a large percentage of the country is mountainous, frosts are experienced much too early and, therefore, the growth of any vegetation is often retarded. Even in the lowlands, frosts sometimes come too early.

The inaccessibility of the mountain areas through lack of roads, and inadequate transportation facilities, tends to keep these areas completely secluded, and even products, such as vegetables, which thrive better because of the rich basalt soils, are not well distributed.

C. Economic

About 80 percent of the population of Lesotho is engaged in farming. As only a small percentage of farmers have adopted progressive farming methods, the rest use primitive methods of farming for subsistence living. Insufficient production of the cash crops, therefore, lead

to inadequate food for consumption in the home and practically nothing for sale in order to get cash to buy additional nutritious foods. The per capita income per annum is, therefore, very low, being approximately R46 and ranks as one of the three lowest in Africa.

V. PROGRAMS TO COMBAT MALNUTRITION

A. Nutrition Education and Applied Nutrition

As far as the introduction of applied nutrition programs in the general education of children as well as the professional education of teachers, health workers and agricultural personnel goes, the applied nutrition program covers the entire country. This is accomplished through nutrition lessons given to school children in schools within the pilot and expansion areas and among youth out of school.

Periodically, courses of 3-4 days' duration are held for women within and without the nutrition pilot and expansion areas. A 1-month course is held for about 30 women from parts of the country once a year. These would be mainly leaders in the villages and members of voluntary organizations. Radio broadcasts have also provided one of the best media for reaching the population. Nutrition centers have been constructed in the seven lowland districts and four are already in use. Village level courses are held at these centers.

Three Farmer Training Centers have been constructed, and as they offer better teaching and accommodation facilities, they are in constant use throughout the year for the running of courses for farmers and their wives. A 6-month course is run concurrently for youth in agriculture, nutrition and home economics subjects. Much emphasis is laid on the production of food and proper utilization for consumption in the family. In all these activities the focal point is the family unit. Every citizen of Lesotho has access to the Farmer Training Centers, as and when they find it convenient.

The Save the Children Fund started work in Lesotho in August 1961. School feeding was started in 11 schools and the number has risen to 820 schools feeding 100,000 children daily. In order to receive assistance from the

Save the Children Fund, each school is expected to own a vegetable garden covering an acre of land. This is fenced in, and the school children learn agricultural methods and produce vegetables for use in the school feeding program.

During the last 5 years, supplementary foods have been received from the World Food Program through the Government of Lesotho and this has increased the quality of the school meal tremendously.

An educational program is carried out in cooperation with the Nutrition Education Scheme staff.

B. Child Feeding

Child feeding programs, particularly those geared to preschool children, are run entirely by voluntary organizations, such as the Lesotho Red Cross and the Catholic Relief Services.

1. Lesotho Red Cross

Apart from its many activities, the Lesotho Red Cross runs full-time and weekly child welfare clinics in 25 centers--9 full-time, 16 weekly. At these clinics, advice is given to expectant and nursing mothers on nutrition and proper child feeding methods. Supplementary foods in the form of powdered milk are also made available to mothers.

2. Catholic Relief Services

The Catholic Relief Services offers assistance to already existing health and child welfare centers. In September 1966, the first mission clinic was approached; later a government and a Red Cross Clinic were incorporated and with the constant increase in numbers of clinics which accepted the scheme, the end of 1966 saw the expansion of the scheme to approximately 8,000 children. To date, the scheme has been extended to 16 clinics which serve approximately 25,000 children once a month. The aim, this financial year, is to see the program extended into the mountainous region of Lesotho and the target is to reach 35,000 children. The program enjoys the support of the Government and receives material assistance in the form of vaccines from the Ministry of Health and advice in nutrition

from the Nutrition Home Economics section of the Ministry of Agriculture, Co-ops and Marketing and transportation of U.S.- donated foods to the clinics. A qualified nurse has been employed as a Preschool Clinic Supervisor. She is responsible for the overall supervision of staff in all the clinics and also attempts to advertise and to expand the scheme by contacting potentially interested health centers in the country. The nurses are responsible for giving talks and cookery demonstrations to mothers on the use of CRS supplementary foods and also locally produced foods.

VI. GOVERNMENT POLICIES ADOPTED TO COMBAT MALNUTRITION

A. National Nutrition Policy

The Ministry of Agriculture's policies regarding food are as follows:

1. To promote the production of greatly increased quantities of food from both plant and animal sources. Lesotho does not yet produce enough food to meet its needs, being dependent upon imports of up to 400,000 bags of maize each year.
2. To encourage the production of more nutritious food, particularly those items rich in proteins, vitamins and minerals, which will prevent further suffering from malnutrition.
3. To develop agricultural cash commodity production, such as export crops of wheat, peas and beans and livestock products such as wool, mohair, hides and skins.

B. National Food and Nutrition Board

The Government of Lesotho is solely responsible for the administration of the Nutrition Education Scheme and this is done through the Permanent Bureau of Nutrition, which is a government appointed board. The Bureau is an interministerial body with representatives from the following ministries and voluntary organizations:

Agriculture
Health
Education
Interior

King's Representative
World Food Program
Lesotho Red Cross
Save the Children Fund
Catholic Relief Services

The following personnel attend the Permanent Bureau of Nutrition meetings ex-officio in an advisory capacity:

FAO Advisor in Nutrition Education
FAO Agricultural and Extension Expert
FAO Associate Expert in Agricultural Extension

The Permanent Bureau of Nutrition is also responsible for coordinating the work of the ministries and voluntary organizations concerned with the running and management of the Nutrition Education Scheme.

VII. MAJOR PROBLEMS INHIBITING PROGRAMS TO COMBAT MALNUTRITION

A. Transportation

The Nutrition Education Scheme is staffed by 31 women, of whom 26 are field workers. The supervisory staff comprising three at the district level and two at national headquarters, need transportation in order to be able to carry out constant supervision. There is such an acute shortage of transportation that the work of the supervisors is almost completely hindered.

B. Shortage of Staff

The present areas are already too large for the staff to cover adequately in their numbers.

C. Lack of Demonstration Materials

Most of the work is done as long as the villagers can produce demonstration materials. This is a good move as far as the encouragement of self-help goes, but can be trying in some of the newly established areas.

D. Lack of Adequate Facilities for Running Courses

E. Lack of Proper and Sufficient Water Supplies for Irrigation Purposes and for Consumption

F. Lack of Natural Resources and Openings for Employment

G. Inaccessibility of Parts of the Country and the Difficulties of Communication

VIII. FUTURE PLANS

It is intended to expand the program gradually at intervals of about a year. This means moving the staff from area to area until they can cover the entire district and, in turn, the whole country.

Preliminary preparations for an evaluation are almost completed. In this way, an assessment of the impact of the scheme on nutrition education and school feeding since its launching will be made through the analysis of a questionnaire which will be answered by women in selected areas and also by heights and weights of school children in schools within the selected villages. In the event the results of the survey are positive, expansion of the scheme will be considered on broader and less gradual grounds. The staff will continue to receive training.

A 5-year plan is being considered by the Government of Lesotho. Should a positive attitude be adopted, the plan would solve a lot of our problems.

IX. CONCLUSION

In order to derive benefit from the scheme, it has been found necessary to exploit extension methods fully. The field staff of the Ministries of Agriculture, Health and Interior are receiving continuous training in extension methods, so as to equip them with knowledge that they, in turn, can disseminate to the rural population.

In addition, seminars are held for teachers from the Ministry of Education, where the aims and objectives of the scheme are discussed at length. It is hoped that through improved practices in nutrition education better understanding will bring about changes in farming and home economics, within the communities.

The Nutrition Education Scheme is simple in conception, comprehensive in scope and is within the reach and understanding of all villages, as its popularity within and outside the pilot areas has revealed.

The enterprises started inside the pilot areas, poultry in particular, are now well recognized and are demonstrated to other farmers. The reaction of the farmers has indicated success and many requests seeking advice on how to start similar enterprises have been received and attended to.

This is sufficient proof that farmers have gained confidence in the scheme.

TABLE I
LESOTHO - DISTRIBUTION OF THE DE FACTO POPULATION BY RACE, BY SEX, BY 5 YEAR AGE GROUP

Age Groups	Mosotho			Other African			European			Asian			D.K. ^{1/}	Total Population		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total		Male	Female	Total
0 - 4	59,798	60,902	120,700	634	675	1,309	70	66	136	51	61	112	3	60,553	61,704	122,260
5 - 9	62,636	62,009	124,645	591	626	1,217	60	62	122	63	82	145	2	63,350	62,779	126,131
10 - 14	60,567	60,378	120,945	561	583	1,144	33	36	69	41	43	84	6	61,202	61,040	122,248
15 - 19	39,356	48,003	87,359	435	467	902	14	26	40	30	33	63	5	39,835	48,529	88,369
20 - 24	16,186	36,851	53,037	261	381	642	53	35	88	23	29	52	6	16,523	37,296	53,825
25 - 29	13,997	31,020	45,017	236	362	598	54	54	118	19	34	53	4	14,316	31,470	45,790
30 - 34	14,943	30,756	45,699	246	386	632	72	67	139	31	32	63	-	15,292	31,241	46,533
35 - 39	13,825	23,457	37,282	210	251	461	84	71	155	24	27	51	3	14,143	23,806	37,952
40 - 44	12,881	20,127	33,008	159	207	366	77	74	151	17	11	28	6	13,134	20,419	33,559
45 - 49	17,047	23,143	40,190	225	268	493	100	70	170	14	12	26	6	17,386	23,493	40,885
50 - 54	13,248	19,207	32,455	161	200	361	57	75	132	11	16	27	1	13,477	19,498	32,976
55 - 59	10,223	13,323	23,546	117	156	273	50	67	117	9	10	19	3	10,399	13,556	32,958
60 - 64	8,088	11,949	20,037	74	108	182	32	50	82	7	6	13	3	8,201	12,113	20,317
65 - 69	9,483	15,717	25,200	102	150	252	16	18	34	17	9	26	-	9,618	15,894	25,512
70 - 74	2,913	8,004	11,917	47	69	116	12	10	22	5	3	8	1	3,977	8,086	12,064
75 - 79	2,143	3,852	5,995	25	30	55	6	4	10	2	1	3	1	2,176	3,887	6,064
80 - 84	1,162	2,412	3,574	17	23	40	1	-	1	4	-	4	-	1,184	2,435	3,619
85 - 89	1,609	3,748	5,357	19	33	52	2	1	3	-	3	3	-	1,630	3,785	5,415
90 - 94	267	767	1,034	6	9	15	-	1	1	-	10	10	-	273	787	1,060
95 & over	232	628	860	-	5	5	-	-	-	2	1	3	-	234	634	868
Not stated	1,358	1,620	2,978	16	20	36	1	2	3	3	1	6	31	1,378	1,645	3,054
TOTAL	362,962	477,873	840,835	4,142	5,009	9,151	804	789	1,593	373	426	799	81	368,281	484,097	852,459

^{1/} D.K. = Race and/or sex not stated

Source: Bureau of Statistics - Interim Report: Release No. 1, August 18, 1967

TABLE II

LESOTHO - INCIDENCE AND GEOGRAPHICAL DISTRIBUTION OF DEFICIENCY DISEASES

District	Hospital	Avitaminosis and Other Deficiency States						Total	Anemias
		Avita.	Pella.	Aribo.	Kwash.	Malnu.	Scurvy		
Maseru	Q. E. II	225	731	-	84	347	-	1,387	396
Maseru	Mohlomi	-	-	-	-	-	-	-	1
Maseru	St. Josephs	162	148	46	10	209	-	575	4
Maseru	Scott	762	911	-	207	678	-	2,558	32
Maseru	St. James	-	18	-	19	271	-	308	7
Maseru		1,179	1,809	46	320	1,505	-	4,859	440
Berea	T. Y.	68	706	-	196	201	39	1,210	27
Berea	Maluti	-	16	-	276	173	-	465	163
Berea		68	722	-	472	39	39	1,340	190
Leribe	Leribe	130	1,031	-	71	170	-	1,402	200
Leribe	Mamohau	3	10	-	-	72	-	85	1
Leribe		133	1,041	-	71	242	-	1,487	201
B. Buthe	B. Buthe	37	899	-	14	165	1	1,116	51
B. Buthe	Seboche	10	71	-	65	123	-	269	12
B. Buthe		47	970	-	79	288	1	1,385	63
Mafeteng	Mafeteng	11	668	1	135	102	-	917	-
Mafeteng		11	668	1	135	102	-	917	-
M. Hoek	M. Hoek	9	991	70	302	103	1	1,476	112
M. Hoek		9	991	70	302	103	1	1,476	112
Quthing	Quthing	17	269	10	22	49	-	367	9
Quthing		17	269	10	22	49	-	367	9
Q. Nek	Q. Nek	30	175	-	7	68	1	281	72
Q. Nek	Paray	128	101	-	274	-	-	503	-
Q. Nek	Tebellong	22	110	-	66	66	-	264	-
Q. Nek		180	386	-	347	134	1	1,048	72
Mokhotlong	Mokhotlong	5	187	75	27	177	65	536	219
Mokhotlong		5	187	75	27	177	65	536	219
Lesotho	18 Hosp.	1,649	7,102	132	1,543	3,173	107	13,646	1,306

REPORT ON NUTRITION IN MALAWI

presented by Dr. Y.H. Misomali

I. BACKGROUND INFORMATION

A. Population (Malawi Population Census Report, 1966)

Males	1,914,224
Females	<u>2,128,188</u>
Total	4,042,412

Area: 36,325 square miles.
Persons per square mile: 111.

The population of Malawi is mainly rural and over 80 percent of the people live in villages. Although there is a substantial movement of the population towards the towns, the majority still live in the villages and those who live in the towns are there only temporarily. In many cases, the villagers commute to and from town each day, a factor which influences their living and diets accordingly, and a factor which also affects their adherence to their traditions.

The principal occupation of the people is food production, most of which is consumed locally. Until recently, there has been, and in many areas there still is, evidence of general apathy towards intensive cultivation of crops, though this apathy seems to be waning due to the direct impact of the Department of Agriculture's demonstration of improved methods of agriculture and the increasing use of fertilizers. A small proportion of the population are wage earners; mostly government employees in various grades, employees at mission stations and others employed in skilled and semiskilled jobs in industry in the towns, at trading centers and farm settlements.

The source of foodstuffs would, therefore, vary and food habits would vary in relation to the occupational and sometimes, educational status of the individual. The state and degree of food supplements in the normal diets of the children and their feeding habits will also depend on these factors. The fact that many of the children seen in hospitals with gross undernourishment are often,

though not always, from the villages, helps to point to the customs and food habits rather than food availability as the cause of malnutrition.

II. NUTRITIONAL STATUS

Figures for the nutritional state of Malawi's children are not available, but the high child mortality rate, estimated at about 52 percent in the Lower Shire, as mentioned in a recent Survey of Preventative Health Services in Malawi, is an indication that the nutritional state of the community is poor. A survey is being held as a preliminary measure at Namitambo Rural Health Center, a few miles from Blantyre, and although the data collected is being processed, there is an indication that of the 600 children seen about 30 percent showed overt signs of malnutrition.

Various deficiency diseases occur in all the districts of Malawi. Few, if any, Malawians fail to show some signs of malnutrition at some time in life. Although full-fledged kwashiorkor is not seen very commonly, protein-calorie malnutrition, presenting itself in the form of severe marasmus, is very widespread.

Anemia is common, and contrary to the belief that it is mostly rampant in connection with ankylostomiasis, it is mostly found in association with malaria and schistosomiasis. Mixed cases where symptoms are traceable to multiple vitamin and mineral (Fe) deficiency do occur frequently.

A high rate of prematurity associated with severe anemia and sometimes obstruction of labor are some points physicians note and could be due to gross malnutrition.

Following gross protein deficiency in childhood and stunted growth, there is a high rate of underdeveloped pelvises superimposed on generally android pelvises, resulting in obstructed labor despite the small sizes of the babies.

Tropical ulcers, expressing a wide range of protein and other deficiencies, are very common, especially among women and children.

Until now in the tropics, more was told about the disease of a person than the nutritional status of the person, and it is hard for physicians to assess the nutrition of all their patients. In fact, a physician in the tropics has no time for an assessment of the patient's nutritional status and, moreover, quite a large proportion of diagnosis is left in the hands of auxiliary staff. As a result, the cause and the effect are often difficult to determine because disease and malnutrition commonly, if not always, occur in the same individual.

Even without concerted observation, one can and does come to a conclusion that there is a definite correlation in Malawi between the incidence of infection and the weaning of a child. The high incidence of measles, infective diarrhea, pertussis, chicken pox and tuberculosis during the second half of the first year is apparently due to the insufficiency of breast milk. In Malawi, the child tends to be left on the breast until completely weaned, which takes about one and a half to two years, and therefore tends to be seriously malnourished. In this progressively nutritionally depleted state, the child is brought to the hospital where more often than not treatment is difficult. Acute systemic infection or a diarrhea of infectious origin may bring on any of the diseases mentioned above, kwashiorkor included. Although always present, this nutritional state has a tendency to rise seasonally and is worse during the harvest season or the period immediately before harvest when there is not enough food for the mother and thus not enough milk produced in the breasts. Ultimately, the load falls on the child who depends on the breast for all his nutrition.

III. MAJOR CAUSES OF MALNUTRITION

No demographic assessment has as yet been made to correlate the relatively high population density with Malawi's nutritional status, which itself has not been fully established.

A. Food Habits and Food Availability

Food patterns are generally similar all over Malawi with little difference between rural and urban

areas and peoples. A new categorization may, however, be in the offing due to the fast rate of urbanization and industrialization taking place. The average per capita income is low at about 20 pounds annually (1966). I am inclined to think that this figure may in reality be a little lower than actual income. All the produce from villages cannot be effectively evaluated since subsistence based on the family garden which produces enough for the family for a year is still the order of things. The actual purchasing power through cash and mutual exchange or barter would therefore be considerably more than 20 pounds per annum.

At best, diets are unbalanced. Even when food is available, chronic malnutrition is common as a result of improper mixing of foodstuffs. On the whole, the diet has a predominance of carbohydrates and its function seems to be that of filling the stomach rather than meeting nutritional needs. The process of partially pounding maize, the commonest staple, and soaking it before eventually grinding it into flour removes all the proteins and vitamins and leaves a pure white corn flour. In the nutrition education programs to be mentioned later, mothers are being instructed about the value of full grain flour and the advantage of having maize ground together with beans or maize flour mixed with groundnut flour. The reaction, as expected, is not very encouraging since such treatment gives an unfamiliar flavor and color to the end product.

Large amounts of beans and peas are used and these, together with a variety of pulses and groundnuts, form the main source of vegetable protein in the rural areas. A number of tropical leaves are prepared to supplement the staple food and they are another good source of plant protein. Cassava leaves, which are used in some districts, are believed to have a high yield of protein, about 20-30 percent crude protein on dry weight, according to D.J. Rogers writing in Economic Botany in 1959 (no.13).

Fish is available in most parts of the country but it does not easily reach the rural persons living away from the lake shore due to lack of adequate preservation facilities. Smoked or sun-dried fish is rarely consumed. Poultry forms part of most households but it

is a delicacy consumed only on special occasions or when a favorite guest calls. In fact, in certain cases women are not supposed or allowed to eat chicken or fish for fear of sterility or disease.

B. Urbanization

The problems of urbanization are no less acute in the towns of Malawi than in any other city in eastern Africa today. The problems arise as laborers move to the towns from the dullness of the village and the meager resources of the rural areas. The able-bodied menfolk flock to the towns in search of work while the women and older folks stay in the villages. As a rule, during the week following payday the diet is unbalanced but filling, while towards the second half of the month the diet is neither balanced nor filling. Three major factors influence the diets of these people and are responsible for their malnutrition: different food, cost of the new foods and irregularity.

The changing diet, of course, is not so great in Malawi towns, for it should be noted that the staple remains the same but there are additional "prestige" foods which tend to replace staple foods in many cases, depending upon cost. When settling in a town, a man finds that he must depend on markets and stores for almost all his food supplies as opposed to the food obtained from the family garden while he was still at home. He soon finds his salary inadequate for his new diet and his family, which may include parents and a number of other dependents, and therefore he is forced to eat only sparingly. Moreover, as a villager he never had to buy his food at all, and when transplanted to a town, he is reluctant to take the cost of his daily diet from his salary, which may not be very sufficient.

Even the food supply at the town market and the stores is subject to the ability of the surrounding populations in the farming villages which grow around each town to supply the town with food. For all these reasons, collectively or acting in succession, it is easy to see that a serious degree of malnutrition occurs in most of the town populations, regardless of age.

C. The Diets of Susceptible Populations

Since the recognition of kwashiorkor as a protein deficiency disease associated with high mortality and morbidity rates in infants, and depressed physical and mental development, malnutrition has been one of the major public health problems of developing countries. As in many developing countries of the world, the principal evidence of underfeeding in infants and children in Malawi is stunted growth. The incidence rate has not been assessed, but judging from the numbers of marasmic children who gravitate to the hospitals, it is very high.

All infants in Malawi are breast-fed, except infants whose mothers cannot breast-feed them. In many cases, especially in rural areas, a wet nurse is often available among relatives to assist in the feeding of such an infant. The use of proprietary baby foods is prohibitive to many due to high cost and/or availability, and in many cases no other means of baby feeding has been heard of, except perhaps cow's milk which in itself is not easily obtainable. To some, a baby cannot be fed by any other means at all. The mother is there for the baby and the breast is there for him, and I could not agree more, that under village conditions, the safest milk a mother can give her baby would definitely be breast milk. There could never be a better way of ensuring minimum contamination.

The infants do very well the first two to three months, but poor nutrition on the part of mothers, coupled with overwork and often another early pregnancy, means that the infants do not get enough at any one feed. Therefore, infants are often put on light maize porridge, in some areas as early as the first week of life, and in others not until the end of the first year. In either case, the result is gross imbalance in nutrition. It is not surprising to find a mother bringing a 2-year old child to the hospital with gross malnutrition and a history revealing that his diet has only been maize porridge and mother's breast milk. In fact, some mothers do not wean their children until they are 2 years old or until the mother is expecting another baby.

D. Food Taboos

Food beliefs and taboos are very important causes of malnutrition among infants and children. It is believed by certain members of the population, especially grandmothers and mothers, that eggs will cause infertility in women and therefore female children should never eat eggs. Eggs are also believed to cause disease in all children, boys or girls, and therefore no child should eat eggs.

Women survive during pregnancy in spite of the wide range of taboos and hardships. In many cases they cannot eat an animal for fear of transferring the traits of the animal to the child. Eggs, milk or even chicken are out of the question and it is almost impossible to get a pregnant woman to take a prescribed diet in any society. The forms of protein mentioned above, i.e., eggs, fish, meat, milk, etc., are locally available in all villages but their consumption is limited by many factors, one of which is expense. The ordinary villager would rather spend money on food which will fill his stomach than food which some health educator may have told him is best for his health.

There is, however, a small growing stratum of the population composed of educated middle-aged and young persons who are employed in the various sections mentioned earlier, who can afford to supplement breast-feeding their babies with some proprietary preparations and who have discarded, or are in the process of overcoming, the ancient taboos and traditions regarding foods.

After infants, the second worst off as, I believe, elsewhere in Africa, are women - victims of taboos and male priorities. This situation is not necessarily an indication of contempt towards women. As a provider of food and as a cook, the woman is a valued symbol of life itself. Her association with food explains the male indifference about feeding her. It is believed that she can take care of herself and that there is no need to worry, but she always serves the choicest pieces to her husband. In many areas women and children eat after the father and all other males of productive age have satisfied their appetites. Nonetheless, even under these conditions, children are better off in rural areas than in the urban centers where there may not be even scraps from the barren environment of the city streets.

V. PROGRAMS TO COMBAT MALNUTRITION

A. Nutrition Education, Applied Nutrition and Child Feeding

From the foregoing, it would appear that more intensive maternal and child health services might help develop the nutrition of the children and pregnant women and possibly this would lead to a stronger and healthier population. Specific services of this nature had, until recently, been provided under voluntary auspices only, the main sponsors being the medical units of various mission denominations and the Malawi Red Cross Society. The Namitambo Maternal and Child Health Clinic mentioned earlier is financed by the Christian Service Committee but is run in the existing framework of the Ministry of Health and Community Development.

An in-service training program for medical assistants is carried on at Namitambo where already-trained medical personnel are reoriented in the field of nutrition education for one month and at present sent to many rural health centers in the Lower Shire area, one of Malawi's worst areas regarding malnutrition. The aim is to establish these units so that there will be a health center within a distance of 5 miles to each mother. Depending upon its success in the Lower Shire and finances permitting, the country should be covered. Thus, the program is expected to reach at least 80 percent of the population, i.e., all the village population of the country.

Homecraft and community development workers are used in the rural areas to give demonstrations and assist mothers in the proper utilization of locally available foodstuffs and on matters of personal hygiene. In the battle being waged to combat malnutrition, all is being tried that can work, and some District Medical Officers have embarked on establishing Nutritional Rehabilitation Centers where mothers are taught how to cook simple but nutritionally valuable foods instead of being fed or having their malnourished children fed for them. It is hoped that mothers from such centers will be of tremendous help when they return home and disseminate to their colleagues what they have learned.

The paucity of funds specifically earmarked for nutrition education alone limits the time and attention devoted to the subject, although an attempt is made to maintain regular sessions even if these are spaced at weekly or longer intervals. The United States Peace Corps has been in this field since November 1968. Thirty-six Peace Corps Volunteers are engaged in full-time Under Five's Clinics, each with the help of a health assistant and a medical assistant who may be able to run the program in the future.

A training program for the community nurses has recently been started. The first nine enrolled nurses started this month, May 1969, and at the end of one year they will be posted into the villages to run Rural Health Centers with specific interest in health, education and nutrition. This program is a WHO-assisted project.

Despite the elementary nature of the present Maternal and Child Health Services obtained in Malawi today, they are well supported by the United Nations Children's Fund (UNICEF) in the matter of basic equipment and drugs along with dried milk products and such special items as triple antigen and vaccines.

B. Education and Social Services in Nutrition

The part that education in nutrition can play in promoting the best use of food resources and improved methods of production cannot be overemphasized. Broadly speaking, educational programs should aim at the public acceptance of food and agricultural policies and show people how to make use of food resources through planned production, including production for home use and wise expenditure of money on foods.

In the face of other priorities and the prevailing paucity of staff and funds, the recently amalgamated Ministry of Health and Community Development envisages a more concerted approach on nutrition work and health and nutrition education. The network of curative services, comprising 96 dispensaries, 19 district hospitals, 13 rural hospitals, along with three general and two specialized hospitals, does handle the diagnosis and treatment of malnutrition cases as they present themselves and most of them run regular Under Five's Clinics.

As an integral part of the Nutritional Development Program, plans have been formulated and some of them are now well into the implementation stage in the agricultural development sector. They hold promise of influencing the overall nutritional situation of the country. Firstly, a rainfed agricultural development project is being carried out in the Lower Shire Valley, in Chikwawa district, with the assistance of the Food and Agriculture Organization, (FAO). While the primary intention is to produce cotton crops for export and local textile manufacture purposes, an important share of the activities is devoted to production of staple foods likely to maintain a satisfactory food crop balance in the country.

A second project being promoted by the Government in association with FAO is the opening of acres of unused land in the Central Region, in Lilongwe and Salima, so that it may be utilized for the production of cotton, maize and groundnuts. These crops are expected to be large enough to make Malawi self-sufficient in staple foodstuffs with a reasonable balance for export purposes.

Subsidiary bilateral programs developed in partnership with the Government of Taiwan have already propagated new ways of cultivating rice in the rice-growing areas of the Lakeshore, and around Karonga, Salima and Somba in the area around Lake Chirwa. These projects embrace individual farmers and members of the Malawi Young Pioneers movement. Their yields are greatly enhanced in quality and quantity, thus making this important foodstuff available to support the nation's nutrition in the years to come.

VI. GOVERNMENT POLICIES TO COMBAT MALNUTRITION

No specific Food and Nutrition Board has as yet been formed but a presentation is to be made to the cabinet for the formation of a national coordinating body in nutrition which would involve more ministries and enable the problem to be tackled on a national level rather than as a responsibility only of the Ministry of Health and Community Development. There is no law regarding food fortification.

Price supports are given by the Farmers' Marketing Board in the form of standardized prices for crops from

farmers and credit for purchase of insecticide spraying machines, etc. Land settlement is an important part of the agricultural program. Presently, youth belonging to the Malawi Young Pioneer movement are being resettled after a successful completion of their course, to act as satellites of improved agriculture among the community.

From the foregoing, it is apparent that the most important problem inhibiting programs to combat malnutrition is the lack of knowledge of proper utilization of foodstuffs, resulting in grossly unbalanced diets.

REPORT ON NUTRITION IN SOMALIA

presented by Mrs. Raqiya Haji Dualeh

I. BACKGROUND INFORMATION

A. Geography and Climate

The Somali Republic comprises the former British Somaliland and the former Italian Somalia. They formed a single state on July 1, 1960, under a democratic form of government. The Somali Republic occupies part of the geographical area of northeast Africa known as the Horn of Africa. It is bounded on the North by the Gulf of Aden, on the East by the Indian Ocean, on the West by Ethiopia, and on the Southwest by Kenya. It has an area of 638,000 square kilometers and its coastline extends over 2,800 kilometers.

The climate of the country is characterized by high temperatures and low rainfall. One of the biggest problems of the country's economy is the shortage of water. Rainfall varies considerably from one part of the country to another and from one year to the next. There are two rainy seasons during a year, the Gu period (April through June and July) which is considered to be more important than the Der period (September through November up to December). Along the lower reaches of Somalia's only two rivers, Shebeli and Juba, and the coastal strip of over 40 to 60 kilometers from the sea-shore, the Hagai rains fall intermittently during July to August up to September.

The two big rivers have their origin in Ethiopia. The Juba has a maximum flow of 1,200 cubic feet per second during the dry season and a maximum flow of 36,000 cubic feet per second during the flood season. The Shebeli River has a maximum flow of 6,000 cubic feet per second during the rainy season but it dries up for about two to four months during the year.

B. Resources

About half of the land surface of the country is suitable only for livestock raising and only 10 percent

is arable. The country has abundant land and water resources. What is greatly needed is that the rainfall be conserved and that the rivers be harnessed to irrigate the cultivable land, which should be cleared, leveled and plowed.

The area actually occupied is a little over 1 million hectares. Of this, about 650,000 hectares are under crops. The area under controlled irrigation by the water of the rivers is about 15,000 hectares. Bananas occupy 11,000 to 12,000 hectares, sugarcane 1,300 hectares and the rest is occupied by citrus fruits, papayas and vegetables. The area irrigated by the river floods is much larger and is estimated at 60,000 to 80,000 hectares. This is utilized for maize and sorghum. Small areas devoted to groundnuts, beans, sesame and cotton receive a small amount of watering during their growing period. The amount and frequency of watering depend upon the amount and distribution of rainfall during the year.

The country has also large forestry and fishery resources. Forests cover over 14 percent of the total land area and are not exhaustible if properly managed and conserved. Fishery resources extend over a coast of 2,800 kilometers along the Indian Ocean to the Gulf of Aden. These resources need to be surveyed and exploited.

C. Population

Although no statistics on the population are available, the official estimate of the country's population provided by the Ministry of Interior is 5 million. Of these, the estimate is that 70 percent are pastoralists, 14 percent agriculturalists, 15 percent urban dwellers, and only 1 percent fishermen. Table I shows the present population, birth and death rates of natural increase in six major towns.

II. NUTRITIONAL STATUS OF THE COUNTRY

Two important studies revealed how the nutritional status of the country presently stands. One of these studies was conducted under the auspices of the Food and Agriculture Organization of the United Nations (FAO) in 1953 and the other was jointly sponsored by FAO and the United Nations Children's Fund (UNICEF) in 1960.

The 1953 study revealed that, in general, the people receive a satisfactory supply of animal protein. The problem lies in the insufficiency of foodstuffs having a high caloric value. This is found to be acute during the dry season. Low income is another cause for the insufficiency of food of the urban dwellers.

The people's diet was found to be greatly influenced by the major types of occupation. Four types of diets were observed and were characterized as follows:

1. For the pastoralists who constitute 70 percent of the population, the diet was based on animal foodstuffs and was fairly satisfactory during eight months of the year. During the other four months of the dry season, the diet was insufficient in quantity.
2. For those engaged in agriculture, which constitutes 14 percent of the population, the diet was reasonably satisfactory during the year. But a certain scarcity of foodstuffs was also felt during the dry season.
3. For urban dwellers, who constitute 15 percent of the population, the food was generally insufficient throughout the year due to their low income. Their diet was generally characterized by: low protein content which is mostly of vegetable origin, little fat, and low caloric content.
4. For fishermen, who represent only 1 percent of the population, the diet was found to be poor in calories and vitamins.

According to this study, chemical signs of malnutrition were observed even during seasons favorable to food intake. Thirty-three percent of the school children showed signs of mediocre or poor general nutritional status; 6 percent showed signs of anemia; 24.7 percent had dryness of skin. These are all signs of vitamins A and B complex deficiency.

The 1960 study revealed that the total food production of the country is insufficient to feed the population per FAO standards and that the actual number of calories would not reach 1,350 per day per person.

A more recent survey conducted in 1965 through the instrumentality of FAO provided the following data:

1. Cereal production in the country covers only 40 percent of the requirement of the population for this food group.
2. The Somali diet is deficient in vitamins A and C.
3. Based on calculation of the total expenditure on food per day, 10 percent is spent on sugar and 20 on oil and ghee which supply only calories.
4. Meals provided for in organized institutions, i.e., army, boarding schools, hospitals, police and prisons were nutritionally unbalanced.
5. Food consumption surveys revealed that in some areas the average distribution of calories in the daily diet follows: cereals 50 percent, animal origin 16 percent, sugar 17 percent, fat 12 percent and other foods 5 percent.

During the dry season, food intakes of urban, agricultural and seminomadic populations who were surveyed were deficient in almost all essential nutrients. The nomads cannot afford to have even 50 percent of the required calories during the dry season.

Table II shows the percentage distribution of family expenditures in main food groups and commodities.

III. NUTRITION PROBLEMS

Identified by the studies conducted are such problems as:

1. Malnutrition
2. Customs and traditions
3. Religion
4. Food shortage
5. Inadequacy or lack of potable water.

A. Malnutrition

Malnutrition has been considered the most complex and greatest problem facing the Somali family, both urban and rural. This was found to be due to a multiplicity of causes. Among these are:

1. Ignorance. This prevents many people from eating certain nutritive foods. It is also a cause of not knowing how to utilize available resources. In some cases, it results in lack of knowledge of the right kinds of foods to eat.
2. Lack of information. This is akin to ignorance but this is mainly due to a shortage of qualified personnel to train the population along the fields of food production and proper utilization of available foods.
3. Poverty. In many cases, this prevents the people from buying the proper quantity and quality of foods essential for good nutrition.
4. Transportation facilities. Inadequate transportation facilities made 70 percent of the population live on subsistence economy.

B. Customs and Traditions

The uneven distribution of food within the family is a problem experienced in many families. Like other African countries, it is a custom in Somalia for grown males to eat ahead of other members of the family and thus receive the choice portions of the meal. Little food is generally left for other family members, especially for those who eat last and who get the last portion of what food was available.

Certain traditional beliefs and customs also prevent some people from eating certain valuable foods. Somalis are generally conservative in their food habits. Many do not eat eggs and fish not only because they have a distasteful smell but also because they are "snakelike."

C. Religion

Other practices which may or may not be detrimental to the nutritional state of health of the people are religious in nature. The Somalis are Moslems and this prevents them from eating pork.

D. Food Shortage

Limited food resources may also be one of the causes of malnutrition. The present uncontrolled marketing system provides no incentive for increased food production and consequently, the farmer is only interested in raising crops for his own family's consumption.

E. Inadequacy or Lack of Potable Water

The problem of drinking water is very serious for both the people and the herds.

IV. EFFORTS TO REMEDY PREVAILING CONDITIONS

The problem of nutrition has undoubtedly many facets which must be tackled jointly by several ministries, often with the assistance of international agencies. Information and/or improvement of nutrition and child feeding are disseminated through the following institutions:

1. Agricultural extension services
2. Regularly organized public schools
3. Women education centers
4. Child welfare centers
5. Press
6. Radio
7. Women associations and other clubs

The Ministry of Agriculture undertakes agricultural research for the improvement of farming practices and the provision of extension services whereby new ideas and production techniques are transmitted to the farmers. The Experimental Station at Baidoa and Afgoi were established with the assistance of USAID and they have shown encouraging results.

The Ministry of Education's existing programs in nutrition and home economics are carried out in schools, women's education centers, and women's associations. It covers adequately the educational aspect of the problem.

A more direct and realistic approach is through the organized women's education centers. More positive results will be achieved in the near future when the implementation of the World Food Program projects can be effectively carried out in the country. The women's education centers involve aspects of nutrition education in home economics, such as:

1. Practical application of nutrition theory
2. Cookery methods and recipes
3. Protein content
4. Preservation and storage of foods
5. Budgeting and wise use of food money
6. Child feeding.

In the Ministry of Health, doctors, nurses, midwives and public health nurses are of great help as nutrition and health educators. Demonstrations on child feeding are undertaken in child welfare centers. Home visitations by the public health nurses, provide an ideal setting for practical education through advice and demonstration.

The Ministry of Information also makes valuable contributions to health education, nutrition and child care through radio talks and informative articles in newspapers.

V. MAJOR PROBLEMS INHIBITING PROGRAMS TO COMBAT MALNUTRITION

Four of the major problems which are readily identifiable are: lack of education, food shortage, inadequacy of transport facilities, and lack of water for drinking and sanitation purposes.

A. Lack of Education

With adequate nutrition education mothers/housewives could improve the health of the Somali community since they

are the ones responsible for feeding their families. A well carried out nutrition education program will gradually persuade mothers/housewives to adopt new practices in the kitchen, to change or modify their habits of food intake and to introduce new ingredients into the general pattern of national cooking without a major change in the taste of the people.

B. Food Shortages

Food shortages have been mainly due to:

1. Seasonal rains
2. Uncontrolled marketing
3. Inadequacy of grains and vegetables
4. Trouble with insects
5. Primitive tools
6. Poor storage facilities
7. Ignorance

C. Inadequacy of Transport Facilities

This has hampered distribution of local produce and discouraged production due to poor marketing facilities. When there is a good crop, prices drop. But when prices are high due to crop failure, farmers still obtain little money due to the small amount of produce they have to sell.

D. Lack of Water for Drinking and Sanitation Purposes

Drinking water for humans and livestock and water for irrigation present a great problem to the country. The problem is not really one of scarcity but of nonavailability during certain periods.

VI. FUTURE PLANS (FOR THE MINISTRY OF EDUCATION)

With the availability of a home economics expert and an associate who is specialized in the field of nutrition,

the nutrition program of the Ministry of Education could be strengthened through the regular home economics classes in the intermediate schools and the women's centers. Plans are underway to operate school lunch feeding programs in some big intermediate schools. In addition, demonstrations on food preparation, especially of fish, which the people generally dislike eating and of fruits and vegetables to conserve their vitamins and minerals will be undertaken. The proper utilization of the World Food Program (WFP) rations will be demonstrated to the recipients. Depending upon available facilities, home gardening and to some extent, animal raising will be encouraged.

Nutrition education will be intensified through:

1. Testing and standardizing local recipes from locally produced foods and disseminating their usability to the women.
2. Preparing low and medium cost balanced menus based on the food consumption survey in Mogadiscio in 1966 and transmitting knowledge of these through the schools, the women's centers, and the public through press and radio. Remedial measures would take into consideration the heavy consumption of sugar and lack of vitamins A and C.
3. Preparing locally-produced foods in various ways, especially as regards the conservation of minerals and vitamins in fruits and vegetables. Results will be disseminated in schools through the lunch counter feeding program. The feeding program will also be utilized to provide supplementary foods children missed at home.
4. Giving more emphasis to the budgeting of food money and wise selection and preparation of foods in the food and nutrition classes.
5. Teaching the food value of fish, chicken and eggs and demonstrating various ways of preparing them so that they will be better utilized as food because they abound in the country.

Low income, which is one of the causes of malnutrition and poverty which characterizes many Somali families, will

be partly remedied by encouraging vegetable gardening and animal production at home. In addition, the teaching of salable handicrafts will be undertaken in the women's centers and intermediate home economics classes to provide the family with a little supplementary income.

Food shortages due to the prevalence of the long dry season will, to a certain extent, be remedied by teaching preservation of meat in various ways and especially of fruits and vegetables which, when in season, are cheap and readily available. Some examples are tomatoes and lemons.

It may be difficult to overcome immediately certain traditional practices where men, women and children's positions in society are highly differentiated, resulting in differentiation in food allocations on the family table. Food practices, as related to religion, may also be hard to overcome. In due time, as the general education of the masses ascends and the psychological effect of religion on food practices crumbles against the impact of modern science and technology, these may change.

The availability of potable water for drinking purposes has been and will perhaps be a problem in the country for years to come. For the present, educating the people to take available water, safe to drink will be the only remedy.

The provision of good roads to provide transportation facilities for the equitable distribution of foods throughout the country will depend upon how fast community development efforts can be greatly realized. The building of roads and the provision of transport conveyances need a great capital and generally depend upon government initiative.

Currently, a multipurpose project is being carried out among the Ministries of Agriculture, Health and Labor, Education and Public Works. This is closely tied to the World Food Program rations under the joint sponsorship of FAO and the United Nations. The implementation of this program will be a good opportunity for the Associate Expert in Nutrition to demonstrate the proper utilization of the foods provided for in the rations.

TABLE I

SOMALIA - PRESENT POPULATION, BIRTH AND DEATH RATES AND RATES OF
NATURAL INCREASE IN SELECTED TOWNS

Name of Town	Population	Birth rate per 1,000	Death rate per 1,000	Rate of natural increase per 1,000
Kismaio	17,872	71	27	44
Baidoa	14,962	70	30	40
Merca	17,708	63	17	46
Brava	6,158	34	23	11
Gelib	3,232	58	48	10
Giamama	5,408	55	25	30

TABLE II
 SOMALIA - PERCENTAGE DISTRIBUTION OF FAMILY EXPENDITURE ON MAIN GROUPS
 AND COMMODITIES IN SELECTED TOWNS¹

Items	Mogadiscio	Kisimaio	Brava	Gelib	Giamama	Corriolei	Average
	%	%	%	%	%	%	%
<u>Cereal and Cereal</u>							
<u>Substitutes</u>							
Rice	4	4	4	4	7	2	4
Maize	2	4	10	6	3	12	6
Sorghum	-	1	-	-	-	-	-
Pasta	3	3	2	4	4	1	3
Bread	4	6	3	1	2	2	3
Flour	1	1	2	2	2	-	1
<u>Sugar and Sugar</u>							
<u>Products</u>							
Sugar	8	11	10	9	14	8	10
<u>Pulses and Lentils</u>							
Beans	1	-	1	1	-	1	1

TABLE II (Cont'd)

Items	Mogadiscio	Kisimaio	Brava	Gelib	Giamama	Corriolei	Average
	%	%	%	%	%	%	%
<u>Vegetables</u>							
Onions	1	1	2	1	1	1	1
Tomatoes, fresh	1	1	1	1	1	1	1
Tomatoes, canned	1	1	1	-	1	-	1
Potatoes	1	-	-	-	-	-	-
<u>Fruits</u>							
Bananas	1	1	2	1	1	2	1
Papaya	2	1	-	1	1	1	1
Lemon	1	-	1	-	1	-	-
Grapefruit	1	-	-	-	-	-	-
<u>Meat, Fish and Eggs</u>							
Beef	3	3	8	6	8	6	6
Mutton	1	2	3	-	-	-	1
Goat's meat	3	-	-	2	2	3	2
Camel's meat	1	1	1	-	-	3	1
Eggs	1	-	2	1	-	-	1
Chicken	-	-	-	-	-	1	-

TABLE II (Cont'd)

Items	Mogadiscio	Kisimaio	Brava	Gelib	Giamama	Corriolei	Average
	%	%	%	%	%	%	%
<u>Milk and Milk Products</u>							
Milk	9	8	6	7	6	7	7
<u>Oil and Fats</u>							
Cooking oil	4	2	4	2	3	4	3
Ghee (local butter)	2	7	2	7	8	5	5
<u>Salt and Spices</u>							
Spices	1	-	-	1	1	1	1
Salt	-	-	-	-	1	-	-
<u>Coffee, Tea and Beverage</u>							
Tea	1	1	1	1	2	2	1
Coffee	1	1	2	-	1	1	1
<u>Tobacco</u>							
Tobacco	3	2	1	3	1	1	2
<u>Fuel and Light</u>							
Firewood	-	1	3	1	1	4	2
Charcoal	3	2	2	2	2	-	2
Kerosene	1	2	2	2	2	2	2
Electricity	1	-	-	-	-	-	-

TABLE II (Cont'd)

Items	Mogadiscio	Kisimaio	Brava	Gelib	Giamama	Corriolei	Average
<u>Housing and Water</u>	%	%	%	%	%	%	%
<u>Housing and Water</u>	15	10	4	6	1	11	6
<u>Clothing</u>	4	3	8	7	7	7	6
<u>Miscellaneous</u>							
Laundry Soap	3	2	2	2	2	3	2
Toilet Soap	1	1	1	1	1	1	2

1RESULTS OF FAMILY BUDGET PILOT SURVEY CONDUCTED
IN SOME SOUTHERN TOWNS OF SOMALIA

A family budget survey was conducted in Mogadiscio in 1966. This was necessitated by the obsolescence of the index, based on the consumption habits of 1950 and whose weights were later found to be inapplicable to the pattern of expenditure of the residents of Mogadiscio, the capital of Somalia. Similarly, it was felt wise to make an attempt to study the structure of expenditure of the people of the other towns of Somalia. Hence, a family budget pilot survey was launched in Kismaio, Brava, Gelib, Giamama and Corriolei in 1968, and a total of 117 households selected on the basis of a purposive sample were surveyed during April to November 1968. Each household was interviewed for a week.

Shortage of money forced us to be satisfied with the very small number of households from each town. The sample is no doubt too small and cannot lead us to reliable generalization; nevertheless, the results of this pilot survey do indicate that:

1. The consumption of sorghum and fish in all these places is very insignificant;
2. The proportion of expenditure on sugar shows only little variation from town to town;
3. The proportion of expenditures on housing and water are much higher in Mogadiscio than the weighted average of the other towns, as the percentage of persons living in rented houses and rooms is much higher in Mogadiscio than in small towns;
4. The percentage of expenditure for clothing is considerably lower in the harbor towns of Mogadiscio and Kismaio.

REPORT ON NUTRITION IN SWAZILAND

presented by Miss Valetta M. Dlamini

I. BACKGROUND INFORMATION

A. Geography and Climate

Swaziland lies to the east of the Transvaal Province of the Republic of South Africa. Most of the country is between the 26th and 27th parallels of south latitude and the 31st and 32nd east meridians. With an area of 6,705 square miles or 4,291,000 acres, Swaziland has a maximum distance of 120 miles from North to South and 90 miles from East to West.

There are four well-defined topographic regions in Swaziland: the Highveld - 2,000 square miles, 3,500 to 4,500 feet average altitude, 60°F mean annual temperature and 40 to 90 inches mean annual rainfall; the Middleveld - 1,900 square miles, 2,000 to 2,500 feet average altitude, 30 to 45-inch mean annual rainfall; the Lowveld - 2,000 square miles, 500 to 1,000 feet average altitude, 72°F mean annual temperature, 20 to 25-inch mean annual rainfall; the Lubombo Escarpment - 600 square miles, 2,500 to 2,700 feet average altitude, 30 to 35-inch mean annual rainfall.

B. Population

The population of Swaziland at the 1966 census was 375,000 persons including 8,000 Europeans and some 4,000 other non-Africans. Mbabane, the administrative capital, has a population of 14,000.

The pattern of land tenure is the principal factor in controlling the distribution of the population. The overall density is 59 persons per square mile. On freehold farms the density is 27.1 per square mile, 74.1 per square mile in urban areas and 76.7 per square mile in Swazi area.

The population is comparatively young as the distribution by age groups reveals.

<u>Component</u>	<u>Age Group</u>			
	<u>0-4</u>	<u>5-14</u>	<u>15-64</u>	<u>65+ years</u>
African	17.2	29.7	48.7	4.4
European	12.8	16.9	66.2	4.1
Other non-African	21.4	30.3	46.1	2.2
All components	17.1	29.4	49.1	4.4

The population growth appears to have been about 2.7 percent per annum when the last population census was held in 1966. With a declining mortality rate, population growth can be expected to reach or exceed 3 percent per annum in the near future.

C. Agriculture

The main production commodities, most of which are exported, are sugar, cotton, citrus, rice, forest products, livestock and livestock products.

D. Mineral Production

Minerals were valued at R17,466,000 in 1967. Iron ore accounted for R11,320,000, asbestos R5,858,000, and coal R184,000.

E. Exports and Imports

In 1967, exports were valued at R41,600,000 and imports at R33,189,000.

F. Education

Education is not yet compulsory in Swaziland. In 1967, 59,200 pupils were enrolled in the primary schools and 3,700 in the secondary schools, with a total of 1,700 teachers.

G. Employment

There are 60,000 persons in paid employment, including self-employed. This is 30 percent of the working age population (15-64 years) which at the 1966 census was 183,000.

II. LEVELS OF NUTRITION

A study of Swazi nutrition carried out by Sonya Jones in 1961-62, showed that in the rural areas two meals a day were eaten. The basic pattern of eating consisted of a cereal, either maize or sorghum, accompanied by a relish, unless the cereal was eaten in its soured form. Meat and beer were the superlative Swazi foods. The dietary patterns varied with the physiographic regions and with the seasons. Certain taboos on food favored the men and deprived the women and children.

An average Swazi had a daily intake of nutrients as follows: (These are compared with FAO Recommended Allowances for Swaziland)

TABLE I

Nutrient	Average Swazi intake per person per day ingested: 1961-62	FAO recommended allowance <u>or</u> average Swazi Requirements per person per day	Percentage of recommended allowances
Calories	1,672	2,276	74
Protein	55 g	59 g	93
Fat	27 g	45-55 g	60
Calcium	4 g	.9 g	42
Iron	18.6 mg	10.4 mg	179
Vitamin A	2,563 I.U.	3,740 I.U.	69
Vitamin B ₁ or Thiamine	1.5 mg	1.2 mg	120
Vitamin B ₂ or Riboflavin	1.09 mg	1.4 mg	78
Niacin	8.5 mg	12 mg	71
Vitamin C	59 mg	48 mg	117

The Swazi diet on a per capita basis was found to be deficient in calories, calcium, vitamin A, riboflavin and niacin. There were adequate quantities of iron, thiamine and ascorbic acid. Evidence suggested that the most poorly nourished population members were children from weaning to 5 years and the pregnant and lactating women.

III. MAJOR NUTRITIONAL DISEASES AND THEIR PREVALENCE

The chief nutritional disease problems of the territory are multiple deficiency conditions, pellagra and kwashiorkor. In 1967, it was reported that malnutrition was still a major cause of morbidity and mortality in children. This condition, together with gastroenteritis, is the principal cause of death in the young child.

In 1968, the hospitals treated nearly 3,000 people for various forms of malnutrition. Of these, 12 died of pellagra, 67 children from kwashiorkor and 35 from other types of malnutrition. The following is abstracted from the return of cases treated in government and mission hospitals.

	<u>1966</u>	<u>1967</u>	<u>1968</u>
Malnutrition, unqualified	1,711	876	1,077
Pellagra	893	842	836
Kwashiorkor	799	654	954
Anemia, unspecified	298	194	135
Non-toxic goiter	136	111	84

IV. MAJOR CAUSES OF MALNUTRITION

In Swaziland, as in many other countries, malnutrition is fundamentally caused by an insufficient production or supply of necessary foods, an uneven distribution of available food and a general lack of understanding of the function of food.

A. Sociological

Sociological causes of malnutrition in Swaziland relate mainly to food habits connected with the choice, preparation and distribution of food within the family. For many reasons food habits are rapidly changing and some good traditional habits are often discarded. For instance, protein-rich animal foods such as locusts, certain types of edible ants and cooked cow's blood are becoming less and less popular. Preference is given to foreign or prestige foods which may be poor from a nutritional point of view, such as refined cereals, carbonated beverages and sweets. Poor food preparation methods lead to loss of nutrients.

Many taboos, unfortunately, relate to protein-rich animal foods and work in favor of the adult males and against women and children. For instance, from puberty on a woman may not eat eggs. She may not drink milk from her in-laws herd until after a special ceremony. Women who do not receive this ceremony must necessarily restrain from drinking milk. Most of these restrictions, however, are gradually dying out.

The growing tendency to bottle feed babies, regarded by many as a sign of sophistication, and the weaning of babies at an early age (between 3-9 months) have had disastrous results.

B. Environmental

A number of interacting factors govern the success of crop production in Swaziland.

1. In the Highveld, poor fertility of arable land and occasional winter frost even with abundant rain, limit food production.
2. Uncertain rainfall, high rate of evaporation and scarcity of water in the Lowveld limit dry land farming almost exclusively to cotton.
3. Pests and plant diseases do exist but are not a serious threat, as they are controllable.
4. On the whole, transport facilities are satisfactory. A large part of the territory's passenger and goods traffic is carried by privately owned services.

C. Economic

The average Swazi has low purchasing power. The characteristics of the working population are a small proportion of skilled workers and a high percentage of semiskilled and unskilled laborers earning low wages. For instance, unskilled laborers, in the wholesale/retail trade and building industry are paid a basic monthly wage of R15.00-R20.00 and a driver (heavy duty) between R25.00 and R32.00. A pound of beef costs 45c in urban areas.

Unfortunately, statistics showing the percentage of wages spent on food are not available.

D. Demographic

The urban area has the widest variety of food-stuffs. Only a few legumes are used but the purchase of beef is high. White bread, flour, potatoes, sugar and tea indicate the sophistication of the diet.

In the peri-urban area, the purchasing power is much lower and the distance from the shops greater. These factors are reflected in the diminished variety of the diet and the absence of luxury purchases, e.g., flour, sugar. Both bread and beef consumption levels are lower than the urban area.

V. PROGRAMS TO COMBAT MALNUTRITION

A. Nutrition Education

Nutrition education programs are intended to reach the entire population but are at present particularly directed toward mothers, future mothers and school age children.

The Ministry of Agriculture, through the Home Economics Extension Section, teaches nutrition to rural women who are organized into associations or clubs for this purpose. By the end of 1967, there were 118 such clubs with a total membership of 2,380 persons. Due to shortage of staff, however, it has not been possible to reach many women in the 16-24 year age group or women in urban areas.

An agricultural broadcasting service was started in 1966 and provides vernacular broadcasts every week on agricultural and home economics topics.

The Home Economics Section of the Ministry of Education has been involved in nutrition education for more than 20 years. Many higher primary schools offer an elementary home economics course in which nutrition, child care, etc., are included. There are presently 96 high primary domestic centers reaching a total of about 1,660 girls.

The Mbuluzi Home Economics Center offers a three-year Domestic Science Teacher's Certificate while a home economics certificate course is offered by the Swaziland Agricultural College and University Center. Public health and clinic nurses of the Ministry of Health give nutrition and health education to expectant and lactating mothers who attend prenatal and mother and baby clinics. Mothers who attend the hospitals' out-patient departments are also reached.

B. Applied Nutrition

1. The FAO/UNICEF Project

This project was launched in collaboration with the United Nations Children's Fund, the Food and Agricultural Organization of the United Nations and the World Health Organization. The objectives of the projects are:

- a. To raise the level of nutrition and standard of living through education in nutrition.
- b. To increase production and consumption of protective foods by school feeding.
- c. To create an awareness of the need for better living conditions in rural areas.

2. Poultry Keeping and Vegetable Production

Included in this project is a program of egg and vegetable production in three rural development areas. In return for loans of poultry and gardening equipment, selected farmers undertake to send a small part of their produce to a school feeding scheme in their area. In 1967, a total of 45 poultry farmers and 36 vegetable farmers were using UNICEF equipment and many other Swazi farmers produced eggs and vegetables on their own.

By 1967, six schools in the rural development areas had begun school feeding under this project, feeding about 34 percent of the school children in these areas.

Because school feeding was taking a disproportionate amount of the time of home economics and agricultural extension staff, the Territorial Food and Nutrition Committee agreed that the Save the Children Fund should operate all school feeding in the territory.

C. Child Feeding

1. Pattern of Feeding in Early Childhood

For the first few weeks the baby is fed on breast milk and Inembe (maize gruel) or cow's milk. As a rule, feeding is on demand.

2. Age of Introduction of Mixed Feeding Expressed as a Percentage

<u>Baby's Age in Months</u>								
<u>Under 3</u>	<u>3-6</u>	<u>7-10</u>	<u>11-14</u>	<u>15-17</u>	<u>18-22</u>	<u>23-26</u>	<u>27-30</u>	<u>Over 30</u>
4.29	65.71	20.00	2.85	1.43	1.43	-	2.86	1.43

The first food introduced depends on whether the baby is in the rural or urban area. Rural intergradation of breast feeding is very dependent on the season of the year. In the urban area, soft maize porridge soured or with milk is usually given as a first food, followed by what is available.

3. Age of Weaning: Mothers' Replies Expressed as a Percentage

<u>Baby's Age in Months</u>								
<u>Under 3</u>	<u>3-6</u>	<u>7-10</u>	<u>11-14</u>	<u>15-17</u>	<u>18-22</u>	<u>23-26</u>	<u>27-30</u>	<u>Over 30</u>
-	1.10	4.49	10.99	5.49	15.38	43.97	-	17.58

The pattern of feeding is now rapidly changing with the advent of industries and urbanization. The tendency now seems to be early intergradation of breast feeding and early weaning which is as a rule sudden. This factor coupled with the absence of a weaning food in Swaziland and the use of herbal purgatives and anemata give the average child a poor start.

The child feeding program for infants and preschool children is supervised through government health centers and clinics, mission clinics, Red Cross child welfare sessions and sessions run by industrial concerns.

In 1968, 40,952 infants and preschool children were fed. School feeding started in 1965 when the Save the Children Fund, London and Oxfam allocated funds to the Save the Children Fund in Swaziland for a three-year project which is known throughout the country as Zondle.

For one cent a day, payable monthly in advance, the children receive either half a pint of fortified soup, two ounces of hard skinned beans, two ounces of samp or half a pint of skimmed milk (donated) and a slice of whole wheat bread with peanut butter. This menu provides school children with 295 calories and 11 g protein per child per day.

The whole basis of the feeding scheme is self-help, with the schools, parents and children all playing their parts in organizing the cooking and distribution of the food and the establishment of vegetable gardens so that soup can be supplemented with fresh vegetables.

By the end of 1968, 21 school kitchens had been built and 11 were under construction. There were 162 schools out of 360, with a total of 18,000 out of 60,000 school children, being fed at the end of 1968. Oxfam has given a grant to build and equip a central kitchen which will provide 4,000 school meals per day in the Mbabane area.

4. Supplements

Since 1961, UNICEF has supplied dried skimmed milk and full cream milk. A mixture of corn, defatted soya and milk was a welcome addition in 1967-68.

Oxfam sponsored a preschool children's center in Mbabane. Thirty-five to 55 children are kept at the center while their parents are at work. Two meals, consisting of breakfast and lunch, and midmorning and afternoon snacks are served.

The Red Cross sells milk and skimmed milk at cost price.

VI. GOVERNMENT POLICIES ADOPTED TO COMBAT MALNUTRITION

A. Land Settlement

As part of the Government policy to get the Swazi farmer onto a cash farming basis and consequently improve his standard of living, four settlement schemes have been started. Two schemes in the Lowveld, embracing 350 acres of unirrigated and 1,440 acres of irrigated land, concentrate on sugarcane production. In addition to sugarcane, the farmers grow maize, cotton and vegetables for sale. The other two schemes are in the Middleveld. The first one, based on pineapples for canning, involves 27 Swazi tenant farmers each on 22 acres of land. The second is a resettlement scheme which, with the assistance of Oxfam, resettled 23 Swazi families for intensive dairy production with vegetables under irrigation as a subsidiary enterprise.

B. Agricultural Credit

Agricultural credit is obtainable from the Swaziland Credit and Savings Bank which was established in 1965. Farmers may borrow from the bank to purchase fertilizer, seed, implements, such as cultivators, tractors, etc., and to pay laborers or to hire tractors. Farmers provide security to the bank for loans granted to them, usually in the form of cattle pledged to the bank, machinery or farm mortgages.

Seasonal loans are small loans of about R100 granted to farmers who wish to repay the loan from the proceeds of their farm produce within a period of 12 months. Larger sums are also advanced for the purchase of tractors, etc. These loans help farmers to develop and improve their farming along modern and most productive agricultural methods.

A loan is obtained after compliance with certain simple formalities. A loan application form drawn by the bank is filled in by the applicant and returned to the bank along with an application fee of R1.00.

VII. MAJOR PROBLEMS

- A. Inadequate food production is due to poor soil fertility, low rainfall, poor application of

fertilizer by farmers and migration of young people from rural to urban areas.

- B. Low per capita income.
- C. Lack of information concerning the nutritive value of certain local foodstuffs.
- D. Shortage of trained staff at all levels.
- E. Limited medical facilities.
- F. Insufficient books on nutrition oriented toward the needs of the school child and/c^r the local woman.
- G. Lack of interministerial coordination, particularly at the field level, often resulting in a duplication of effort.
- H. Problem of working mothers, especially in urban areas.
- I. Absence of a weaning food.
- J. Lack of scientific means of evaluating the effect of nutrition programs.

VIII. COUNTRY PLANS FOR THE FUTURE REGARDING NUTRITION

In view of Swaziland's attainment of independence, the national developmental plans are still tentative, but the overall development program involves an investment of R2,310,000 over a period of five years. The main objective is to improve the living conditions of the mass of people including, of course, nutrition in particular. To this aim, R330,000 has been allocated to education, training and broadcasting, R3,196,000 to agriculture and R2,790,000 to housing utilities and community development.

REPORT ON NUTRITION IN TANZANIA

presented by Mr. G.A. Semiti

I. INTRODUCTION

Malnutrition in various forms is a great hindrance to development in the countries of Asia, Africa and Latin America. Tanzania, in common with the rest of the developing world, suffers from malnutrition to an alarming extent. Surveys that have been conducted in a number of regions - Kilimanjaro, Tanga, West Lake, Tabora, Dodoma and Coast - indicate incidences of malnutrition in one form or another of up to 70 percent among the nutritionally vulnerable groups - the children and mothers. The most important nutritional disorder is protein malnutrition which is commonest among young children. Protein malnutrition is responsible for kwashiorkor, the big killer which is most common among preschool children. Protein malnutrition is usually associated with calorie deficiency, the complex being called protein-calorie malnutrition (PCM).

In addition to PCM, the population also suffers from other disorders caused by deficiencies of protective foods - the vitamins and minerals. The major deficiencies in this group are vitamins A and B complex, and the minerals iron, calcium and iodine. Diseases associated with the various deficiencies are too well known to need repetition here.¹

The combined effects of PCM and the vitamin and mineral deficiencies are poor mental and physical development and susceptibility of the body to various infectious diseases such as malaria, bronchial infections, gastrointestinal diseases and tropical ulcers. And to the artist who wants to see "queen" legs, the rarity of the latter among youth could well be blamed on protein malnutrition and calcium

¹Deficiency of vitamin A is responsible for reduced body resistance to various diseases (e.g., tuberculosis) and also for at least 50 percent of the country's blindness. Deficiency of the vitamin B complex causes various skin and nervous disorders (pellagra, beriberi, dementia and diarrhea). Iron deficiency is responsible for nutritional anemia, so serious in pregnancy; calcium deficiency for rickets and poor teeth development, and also for unsightly legs; while iodine deficiency causes endemic goiter.

deficiency. The heavy child mortality of 25-40 percent among preschool children, and the short life expectation can largely be attributed to malnutrition, either directly or indirectly.

The treatment of kwashiorkor in Tanzania is estimated to cost 40 shillings a day for at least 30 days, i.e., a total of 1,200 shillings. In many cases, the treated patient may be readmitted. The cost, therefore, of malnutrition to the nation in both aesthetical values and economic terms may well be astronomical; in economic terms alone it could well nigh be our annual budget.²

It is becoming increasingly evident that a nation cannot develop quickly if it is losing its most vital resource - man - at such a high rate. Improved nutrition which will reduce mortality, lengthen life expectation, and produce a healthier young generation is, therefore, of prime importance in our development program. This fact, however, is not always realized even by professionally qualified people in the scientific world. International agencies - FAO, WHO, and UNICEF - have been fighting constantly for over 20 years trying to create an awareness of our nutritional problems among governments and policymakers, but their success has remained limited. In Tanzania there is a national outcry when an epidemic of smallpox claims one victim in an area, or when there is a brief shortage of meat or sembe (maize flour) in Dar es Salaam. When, however, as many as 400 children per 1000 are reported to die before the age of 5 in a given district, due largely to malnutrition, the report is thrown aside, presumably because those involved are children who are defenseless. But we should not forget that the children of today are the leaders of tomorrow.

There is now evidence to suggest that malnutrition may also be a cause of mental and physical retardation in at least half of the 60 percent of the young generation who survive beyond the age of 6 years. This should be a challenge to leaders and policymakers. If

²In calculating this, one should take into account the 25-40 percent loss of life, the cost of treatment of malnourished children, the loss to government institutions - schools, firms, offices, etc. - due to absenteeism and inefficiency caused by malnutrition.

malnourished children are basically dull, then a great expenditure on education may be largely wasted. This was conclusively shown in the school feeding trials in Dar es Salaam in 1962 (M.C. Latham) when children given an extra 25 g of protein as a school snack daily for 3 months grew twice as fast as the control group, and were observed to be more attentive. The significance of this situation can best be appreciated when we recognize that as many as 70 percent of the children are suffering from some degree of malnutrition. The tendency for one of us may be to shrug our shoulders and say "mine are not among them." That however, still leaves two families out of three, so the problem still remains of national importance.

In this paper I am going to dwell on protein malnutrition as a factor in national development. And I want to start by borrowing words from the Bible to underline the importance of protein. The words are "Seek ye first the Kingdom of Heaven, and the rest shall be added." These words I want to modify as follows: "Seek ye first enough protein and the rest shall be added." I am saying this because I believe that if our protein production and consumption, which are at about 80 percent of our national requirements were brought up to the optimum, we would have solved 50 percent of our nutritional problems. It should be noted that I am talking of production and consumption of enough protein, because improved nutrition is dependent upon what we produce and eat. This is very significant. In certain areas of Tanzania, like Kilimanjaro, Kigoma and Tabora, enough protein is produced but the bulk of this is not utilized by those who need it most - the mothers and children.

That brings me to what I consider to be the causes of malnutrition in Tanzania. It has been suggested that the major cause of malnutrition is ignorance. We do not know what to grow and eat, and when we produce the right foods we do not eat them in the right combinations or at the right times. We tend to divide food into staples and relishes, the former being considered essential, and the latter being an aid for pushing food down the throat. That is the source of trouble, for the staple happens to be poor in protein while the so-called mboga (a small quantity of plant or animal protein which is eaten with larger quantities of carbohydrate-rich foods) is the rich source of protein and protective elements. The staple may be ugali (a thick porridge which is prepared by stirring maize meal),

bananas, rice, bread, with .5-10 percent protein; the mboga may be beans, groundnuts, mchicha (leaves of Amaranthus spp.), kisamvu (leaves of Manihot spp.), mlenda (leaves of Hibiscus spp.), meat or dagaa (small fish) with 3-65 percent protein. Nor is this the only problem. The mboga is usually denied to children and mothers who need it most, while the lion's share goes to the men, who utilize a small fraction of what they eat. That is what I mean by ignorance. We simply eat without knowing that we require protein for growth and building the body, and that the mothers and children require 2 to 6 times per body weight the amount of protein required by men! Those who keep poultry or milk cows know the special protein needs of, say, layers and chicks; there are similar requirements for human beings, as we shall see later.

Ignorance of human nutrition is not peculiar to Tanzania as history shows. In fact, we can claim to be very much enlightened in this new science. If we look 2,000 years back, we find nutrition in the hands of Providence. In the Bible, we have the words "Give us this day our daily bread." This suggests a total lack of self-reliance in food production, and also demonstrates a lack of understanding of nutrition. I have been to the land of the Bible recently, and if the words were to be paraphrased now they would read "Eat chicken, bread, melons and vegetables," for that is the modern bread in Israel. The Koran makes an improvement on that, in that the responsibility for nutrition is given to the people themselves. I quote, "Man should so use the bounties provided for his sustenance that he should not suffer from hunger." This advocates self-reliance in food production, but shows a negative outlook. Coming to our times, we have two statements by two great statesmen, Churchill and Nyerere, which, though made in two widely different countries, give a practical solution to protein malnutrition, based on modern food science. The responsibility of producing the food is also given to the people and their government.

After the War, when Britain was hit by malnutrition, Churchill said, "The nation can do no better for posterity than to ensure the passage of a pint-a-milk-a-day down the throat of children." This famous statement resulted in the free supply of milk to all school children in Britain for over 20 years. The effect is peace and prosperity in modern Britain, probably to the extent of resting on their laurels.

In 1963, during the Freedom from Hunger Campaign Week, Mwalimu Julius K. Nyerere, the President of the United Republic of Tanzania, urged everyone to eat at least "a kibaba³ of groundnuts a day and at least a pawpaw a week." His words were "If everyone ensured the consumption of a kibaba of groundnuts a day, and at least a pawpaw a week, malnutrition in Tanzania would be reduced, and our enemy, disease, would be overcome." In the same speech he also committed the Government to take the steps necessary to enrich with protein and vitamins those foods which were impoverished during processing. The choice of the food crops, groundnuts, representing legumes which are our cheapest source of protein (and vitamin B complex), and pawpaw, an excellent source of vitamins A and C, is brilliant, and if followed by the population we can overcome malnutrition in a decade. It is pertinent to note here the need for combined action by the government and the people in overcoming one of the nation's biggest enemy and killer.

With those introductory remarks, I wish to go to the main theme of this paper, protein and prosperity, and try to discuss the role of improved protein nutrition in the social and economic development of Tanzania. What I have tried to show is that as plants need nitrogen and other fertilizers for maximum production and livestock requires high levels of protein for optimum meat, milk and egg production, so does the human body. It requires adequate protein for optimum growth and for good physical and mental performance. I have also attempted to suggest lines to be taken by the Government and the masses in increasing the production and utilization of protein resources such as legumes, fish, milk, meat, eggs and green vegetables. I have finally proposed that just as the Government is taking steps in providing nitrogenous and other fertilizers for plant growth, government efforts should also be put in special protein production schemes for human use.

II. PROTEIN IN HUMAN NUTRITION

Before discussing the causes and effects of protein malnutrition in Tanzania, it is probably prudent to say a few words on the role of protein in human nutrition. By doing this we shall be trying to answer some eloquent

³A measure equivalent to about 100 g.

critics who may be wondering why we should be worrying about protein. This will be trespassing into the field of biochemistry, which is best handled by experts, and so it will be necessary to touch on it briefly and with due caution.

The best way of introducing the subject of food biochemistry is probably to start with a little poem from Davidson's and Passmore's classical book on nutrition, entitled, "Nutrition and Human Dietetics," which is strongly recommended for the home library of all elites in Tanzania. The poem reads:

What are little boys made of?
What are little boys made of?
Slugs and snails and puppy dogs' tails;
That's what little boys are made of.

What are little girls made of?
What are little girls made of?
Sugar and spice and all things nice;
That's what little girls are made of.

That little poem associates boys' diets with slugs, snails, and puppy dogs' tails which though uncommon and unsightly are good sources of protein; while that of girls is given as sugar and spices and other sweet things which, though sweet, can supply calories but not protein. The author may have been trying to contrast the beauty of the two sexes; on the other hand he may have been trying to associate a good protein diet with strength, and a poor protein diet with frailty. Well, I leave it to the individual to make his own interpretation.

Now coming back to protein nutrition in the human body, what is the role of this much used substance, protein? Quantitatively, protein constitutes 17.7 percent of the body; the rest of the constituents are fat (13.8 percent); carbohydrate (0.8 percent); water (61.6 percent); minerals (6.1 percent).

Most of the constituents listed are part of the essential structure of the body. The exception is with fat, of which only 11 percent of the amount given is

essential, the balance being a reserve to be drawn on for energy supply during times of need. In overfed people, or those exhibiting obesity, excess fat may be as high as 70 percent of the body weight. As for protein, however, most of it is an essential component of the cells, the reserve being less than 15 percent.

Proteins are chemically a complex substance containing nitrogen, carbon, oxygen and hydrogen, and sometimes also sulphur, with large molecules with molecular weights of 17,400 to 900,000. In the native state, proteins may be soluble or insoluble in water. Proteins can be broken down by hydrolysis into simple units called amino acids, of which only 20 different ones are known. Amino acids are characterized by the presence of a carboxyl (COOH) group with acidic properties and an amino (NH₂) group with basic properties. Of the 20 amino acids, nine are essential for growth in young human beings, while the rest are nonessential. The essential amino acids cannot be made in the human body, and must be present in the diet. Every species of animal has its characteristic proteins which are carriers of specific genetic and immunological characters. The chromosomes and their genes which are responsible for heritable characteristics, the blood cells, the various hormones and enzymes, and the vital tissues (brain, heart, liver, muscles) are constituted by protein. The functions of protein, therefore, may be summarized as being:

- A. For growth and development of the body;
- B. For maintenance and repair of the various body tissues including red blood cells;
- C. For the manufacture of metabolic and digestive enzymes;
- D. For the formation of certain hormones such as insulin;
- E. For the inheritance codes carried in the genes.

It should be quite obvious from the above list of functions that proteins are vital in the body. If enough

protein is supplied in the diet, normal growth and metabolism is possible. If, however, protein intake is low, abnormal growth can be expected. It would probably be proper to compare the role of protein in the human body with that of nitrogen (and sulphur) in plant nutrition. Of course, those of us who have tried to raise chickens know very well how important it is to ensure a high protein regime in poultry feeding. Layers must have a diet with 18 percent protein, broilers with a 20 percent protein, otherwise, optimum production of eggs and meat cannot be obtained. As for human beings, the needs of protein differ between ages and bodily conditions. Infants and young children require 4 to 6 times as much protein per body weight as adults. Mothers, when pregnant or lactating, require twice as much protein as ordinary adults, because of the extra task of feeding the embryo and the baby. This information should assist men in giving serious consideration to their claim to the lion's share of meat, milk and other protein sources.

III. EFFECT OF PROTEIN MALNUTRITION IN TANZANIA

The effect of protein malnutrition in Tanzania is considered devastating to the nation's development. Evidence for this is derived from nutritional surveys, and feeding experiments. As mentioned in the introduction, protein malnutrition is believed to be largely responsible for the heavy loss of life in the early years which reaches a high rate of 25-40 percent in various regions. This should be contrasted with child mortalities of 2 percent in developed countries.

According to nutritional surveys carried out in the Coast, Tabora, Kilimanjaro, Dodoma, Tanga and West Lake regions, the incidence of protein malnutrition is very common among preschool age children. Actual samples taken among this group in all the regions have given protein malnutrition of the order of 40-70 percent, depending on the area. Associated with protein malnutrition are calorie deficiency disease (marasmus), nutritional anemia and various parasitic diseases. In one area, where attempts were made to assess the total births and survivors of children among 200 mothers, the result gave 50 percent child mortality; in another region, this was found to be 20-40 percent, showing two different districts.

There are a number of feeding trials which have been carried out on children and adults in Tanzania using a protein supplement to a basic staple diet. Two of these trials are worth referring to briefly, as they showed that workers' performance and school children's performance improved greatly with a protein supplement. These results suggest a correlation between low protein intakes and reduced bodily and mental performance.

The trials with adults, which, admittedly, were not scientifically laid down, were carried out in Nachingwea. Farm workers were left on a home diet for a given period and their performance, including attendance, task completion and abscondment was determined. The home diet was the usual ugali (maize and cassava) with some legumes and occasionally green vegetables. During this trial the work performance was poor, with absenteeism averaging 40 percent, and abscondment 10 percent. On a supplementary protein diet consisting of groundnuts and dagaa calculated to give a supplementary protein of 30 g per day per worker, the workers' efficiency increased spectacularly. Absenteeism dropped to 10 percent and abscondment virtually disappeared. This dramatic achievement on the farm during the trial period must have won the farm and the workers concerned more profit. The cost of the supplementary protein was limited to 0.20 shillings per day or 6 shillings per month, which was a mere 10 percent of current wages. Losses due to labor unreliability had been well in excess of this.

The trials with school children in Dar es Salaam by the Ministry of Health and Welfare Services in 1962 have already been touched on in the introductory section. (see Table I). The trial was conducted in 8-day primary schools in Dar es Salaam, using children of the same class. For a period of 3 months seven of these schools were given a midday snack containing 25 g of protein from different sources including meat powder, soy flour, M.P.F. and groundnut flour. The eighth school was left as a control and did not receive the supplementary protein snack. The results of the experiment were not only enlightening but also most challenging, as can be seen from Table I. Children receiving the protein supplement grew more than twice as fast as the control group, as shown by height and weight gains. Their hemoglobin also increased greatly. Reports from teachers about attendance

indicated that the protein supplement had greatly improved school attendance and performance. The conclusion drawn from these results was that the home diets eaten by the school children in the trial were grossly deficient in protein. Children of the age used would require daily intakes of about 50 g of protein, and so the results suggest their diet could well have contained 50 percent of the required protein, assuming a direct relationship between protein and growth. This latter hypothesis should be confirmed with urine tests to determine nitrogen retention in the trial subjects. What the situation must be like in rural areas compared with the country's capital is anybody's guess.

IV. IMPROVED PROTEIN NUTRITION AND DEVELOPMENT

In the preceding pages I have surveyed malnutrition in Tanzania with particular reference to protein malnutrition or more correctly, the complex called protein-calorie malnutrition (P.C.M.). I have attempted to show the high incidence of P.C.M. of up to 70 percent in the regions that have been surveyed and have suggested that P.C.M. may be the major killer of the "under five's" as well as being a major hindrance to the country's socio-economic development. A few words have also been said on the role of protein in the body. As for the most important subject of what causes P.C.M. in Tanzania, it has been suggested that ignorance may well be the source of trouble; people simply do not know what is best to grow and eat, and how best to eat what they produce. In this last section, an attempt is made to show what we can expect to achieve from the universal improvement in nutrition.

In this section we shall discuss the effect of improved nutrition in child development, and the action required by the Government and the people to overcome malnutrition. This is because protein malnutrition is most important among infants and young children who happen to be most vulnerable to this disorder. The trouble often begins at the time of weaning, when the baby is refused its mother's milk and given, in most cases, the fluid or semifluid form of the diet of the adults. This may be uji (porridge) from cereals or cassava, or mashed bananas and potatoes, with or without the addition of milk. This dish is notoriously poor in protein, let alone vitamins and minerals. In some cases, the uji or banana mash may be fortified with groundnuts flour or mashed beans. It is not known how much protein a baby of, say, one year can expect from such food a day. Assuming a daily

intake of an equivalent of 200 g or 6 oz of the solid food, the baby may have at its disposal 2-16 g of protein, depending on the source. Such a baby requires at least 30 g of protein a day. It is not likely to increase the intake by increasing the protein food, because the child's stomach is still limited in size. Nor is this the only trouble; the sources of the protein usually used are of low biological value, with low levels of certain amino acids, principally lysine and methionine. Maize, for instance, with a biological value of 47 percent means that at most only half of the protein consumed is utilized by the body. God knows how the poor baby fed on maize uji can survive.

Of course, the poor baby fed on low protein of poor quality does grow slowly and somehow manages to survive until some infectious disease hits him. When this happens, death may occur and the baby may join the large group of 25-40 percent dying before the age of 5 years. If the baby is lucky and the parents enlightened, he may reach the hospital in time and be treated at a high cost to the Government, estimated at 1,200 shillings; and there is no guarantee that the disease may not recur. Improved nutrition, particularly for weaned babies, would lead to the saving of life and the corresponding increase in life expectation, which is essential for accelerated development. By feeding the young children better, as Churchill said over 20 years ago, we would also be establishing a strong and intelligent generation for the future. Another more direct effect of improved child nutrition would be a big saving in hospitalization costs, as Mwalimu Nyerere has said repeatedly. The question, of course, is how to achieve this objective. The answer was provided by Mwalimu Nyerere recently. Namely, we should educate the people in nutrition, and since this is the object of the seminar, I want to merely touch on the possible approach to nutrition education. I suggest that we should try to ensure the following:

1. Universal nutrition education through Maendeleo, Elimu, Kilimo, Afya, TANU, T.Y.L., U.W.T., and National Service. We can use the press and radio, as well as schools and colleges. That calls for nutrition education in the curricula.

2. Production and utilization of cheap protein sources especially legumes, fish, mchicha, kisamvu, eggs, meat and milk. Production of nonconventional sources of protein, such as fish protein concentrate, oilseed protein, yeast and leaf protein.
3. Development of our own Tanzanian foods for special uses, i.e., for mothers and children. Excellent lessons could be drawn from Arusha, Kilimanjaro and Mbeya regions.
4. Government institutions should make a positive contribution to protein production and distribution, mainly fish, milk, meat, poultry, eggs and protein concentrates.

A. Nutrition Education for All

It is important for the population to know the simple principles of nutrition. Prolonged breast-feeding, for instance, which was an established tradition, should be advocated, and the habit of leaving weaned babies with their grandparents should be actively discouraged. Schools which are preparing leaders and workers for the future should teach nutrition as a subject; simple basic facts on food values like mchicha and kisamvu being superior to cassava root should be made universal. Kisamvu with 4-8 percent protein of good quality, is good compared with cassava root with 0.5 percent protein of poor quality. Those who eat cassava with kisamvu, groundnuts and fish are very advanced nutritionally. It should also be pointed out that our own traditional foods like mchicha, mlenda, millet and sorghum are often better than introduced foods like cabbage, yet mchicha and kisamvu are rare in the homes of elites and schools.

B. Production and Utilization of Protein Sources

Cheap protein foods in Tanzania should be increased in production. Table II gives the relative quantities of protein foods, but unfortunately, the cost is not available. It would appear, however, that the legumes (beans, groundnuts, cowpeas, pigeon peas, etc.) fish and green vegetables would be our best bet. Of these sources, fish should receive the highest government

consideration since Tanzania is currently producing only 100,000 tons per annum, when we should be producing at least 500,000 tons. What about NAFCO being interested in commercial fishing in lakes and the sea? Another area which calls for government action is the production of a cheap baby food based on cheap protein sources; Farex and Nestle are too costly for the masses.

C. Development of Protein-Rich Foods of Tanzanian Origin

At the moment there are few places in Tanzania outside the village where you can obtain loshoro, ngandi, puree, mtori, or mswa, which are rich protein sources. Kisamvu, mchicha, or nsansa are good protein and vitamin sources, but are rarely found among the elite. All these should be developed scientifically and given universal usage. It is pertinent to note here that there is a lot to be said for the loshoro of Arusha, the ngandi or kiburu of Moshi, or the puree of Pare, which are ingenious mixtures of cereals and legumes, or bananas, legumes/meat/milk.

D. Government Participation in Protein Production

Many countries in the world which have overcome malnutrition quickly have managed this through active and deliberate government participation. Examples include Russia, Japan, Korea and Senegal. Government participation in protein production is necessary because of the large initial outlay in, say, fishing gear and fish processing plants. Areas that would be of benefit in this field are fisheries, protein concentrates, milk, meat, poultry and baby foods.

V. CONCLUSION

In this paper some discussion has been stimulated on the unusual subject of "protein and prosperity" in Tanzania. An attempt has been made to show that unless protein malnutrition is overcome, much of our investments in industries and social services may be largely wasted. Ways of overcoming protein malnutrition and thereby achieving a better nutrition level for the population have been suggested. In conclusion, it should be stated that

as history has shown from the days of the Bible, the initiative for improved nutrition rests with the leaders. The masses can only be stimulated into action when the initial catalyst has been injected.

I wish to repeat the famous words of Churchill to reiterate the importance of protein in national prosperity: "There is nothing better a nation can do for posterity than ensuring the passage of a pint-a-milk-a-day down the throats of children."

TABLE I

TANZANIA - THE EFFECT OF PROTEIN SUPPLEMENTATION IN SCHOOL FEEDING TRIALS

School	No. of pupils N in trial	Food giving 25g protein daily	Cumulative height gain (inches)	Cumulative weight gain (pounds)	Hemoglobin percent gain	Weight gain (percent of control)
Mchikichini	46	Control	0.20	1.80	1.5	100
Kigamboni	45	Meat powder	0.63	2.84	6.7	158
Ilala A	56	M.P.F. A	0.55	4.68	4.4	260
Ilala B	62	M.P.F. B	0.50	3.20	4.9	178
Tabata	18	Amama	0.40	2.75	4.4	153
Kibada	15	Amama	0.58	2.60	3.6	144
Tandika	35	Maize & DSMO	0.62	3.90	4.1	217
Mbagala	39	Soy flour	0.58	4.80	6.0	267
Mean for Protein			0.55	3.54	4.9	197

121

From School Feeding Trials in Dar es Salaam by Dr. M. C. Latham, 1962.

The measurable effects of a 25g protein supplementation to school children can be seen in the above table. Growth has increased by nearly 200 percent, and hemoglobin by over 300 percent. Reports from school attendance and school performance also showed marked improvement during the 3-month trial period.

TABLE II

TANZANIA - ESTIMATED ANNUAL PRODUCTION OF
PROTEIN BY CROP

Crop	Food in Tons	Protein in Tons	Percent Protein of Total
<u>Cereals</u>			
Maize	670,700	57,010	32.0
Sorghum	153,800	15,640	8.8
Millet	116,900	7,600	4.3
Wheat	31,800	2,730	1.5
Paddy	94,700	3,820	2.1
	1,067,900	86,800	48.7
<u>Animal Products</u>			
Meat	129,100	19,390	10.9
Milk	183,000	6,400	3.6
Poultry	19,000	2,090	1.2
Fish	80,900	7,120	4.0
	412,000	35,000	19.6
<u>Legumes</u>			
Pulses	146,500	30,760	17.3
Groundnuts	40,600	10,550	5.9
	187,100	41,310	23.2
<u>Fruits</u>			
Bananas	766,200	6,900	3.9
Others	51,290	510	0.3
	817,490	7,410	4.2
<u>Roots</u>			
Cassava (Dry)	318,300	4,780	2.7
Irish Potatoes	22,900	390	0.2
Sweet Potatoes	228,700	2,570	1.4
	569,900	7,740	4.3
TOTAL	3,054,390	178,260	100.0

TABLE III

TANZANIA - ANNUAL TOTAL PROTEIN PRODUCTION BY
REGION (1964 - 66 AVERAGE)

Region	Population 1967 Census (000's)	¹ Estimated Total Protein Production(Tons)	Per Capita Production (kg)
Arusha	602	13,970	20.4
Coast (Excl. Dar)	504	3,960	8.1
Dodoma	708	7,130	10.2
Iringa	684	9,400	14.3
Kigoma	471	18,290	40.7
Mara	536	5,440	10.2
Kilimanjaro	651	8,730	13.2
Mbeya	956	13,190	13.2
Morogoro	683	12,710	18.4
Mtwara	1,033	4,550	4.1
Mwanza	1,058	12,640	11.2
Shinyanga	888	16,560	13.3
Singida	455	7,260	15.3
Tabora	552	13,230	23.4
Tanga	769	7,980	10.2
Ruvuma	393	2,340	6.1
West Lake	658	11,460	17.3

¹Excluding Protein from milk (6,400 tons), poultry (2,010 tons),
and vegetables (unestimated).

TABLE IV

TANZANIA - ESTIMATED ANNUAL PER CAPITA MEAT CONSUMPTION
BY REGION (1964 - 66)

Region	Population 1967 Census (000's)	Meat Consumption (Tons)	Per Capita Meat Consumption (kg)
Arusha	602	4,125	6.9
Coast (D.S.M.)	781	6,050	7.7
Dodoma	708	13,120	18.6
Iringa	684	422	0.6
Kigoma	471	2,610	5.5
Kilimanjaro	651	11,100	17.2
Mara	536	6,850	12.8
Mbeya	956	3,220	3.4
Morogoro	683	840	1.2
Mtwara	1,033	94	(0.09)
Mwanza	1,058	22,450	21.2
Shinyanga	888	36,270	40.8
Singida	455	720	1.6
Tabora	552	6,260	11.3
Tanga	769	9,260	12.0
Ruvuma	393	16	(0.04)
West Lake	658	5,960	9.1
	11,878	129,122	10.0

FIGURE 1

TANZANIA - ESTIMATED ANNUAL PRODUCTION OF PROTEIN BY CROP

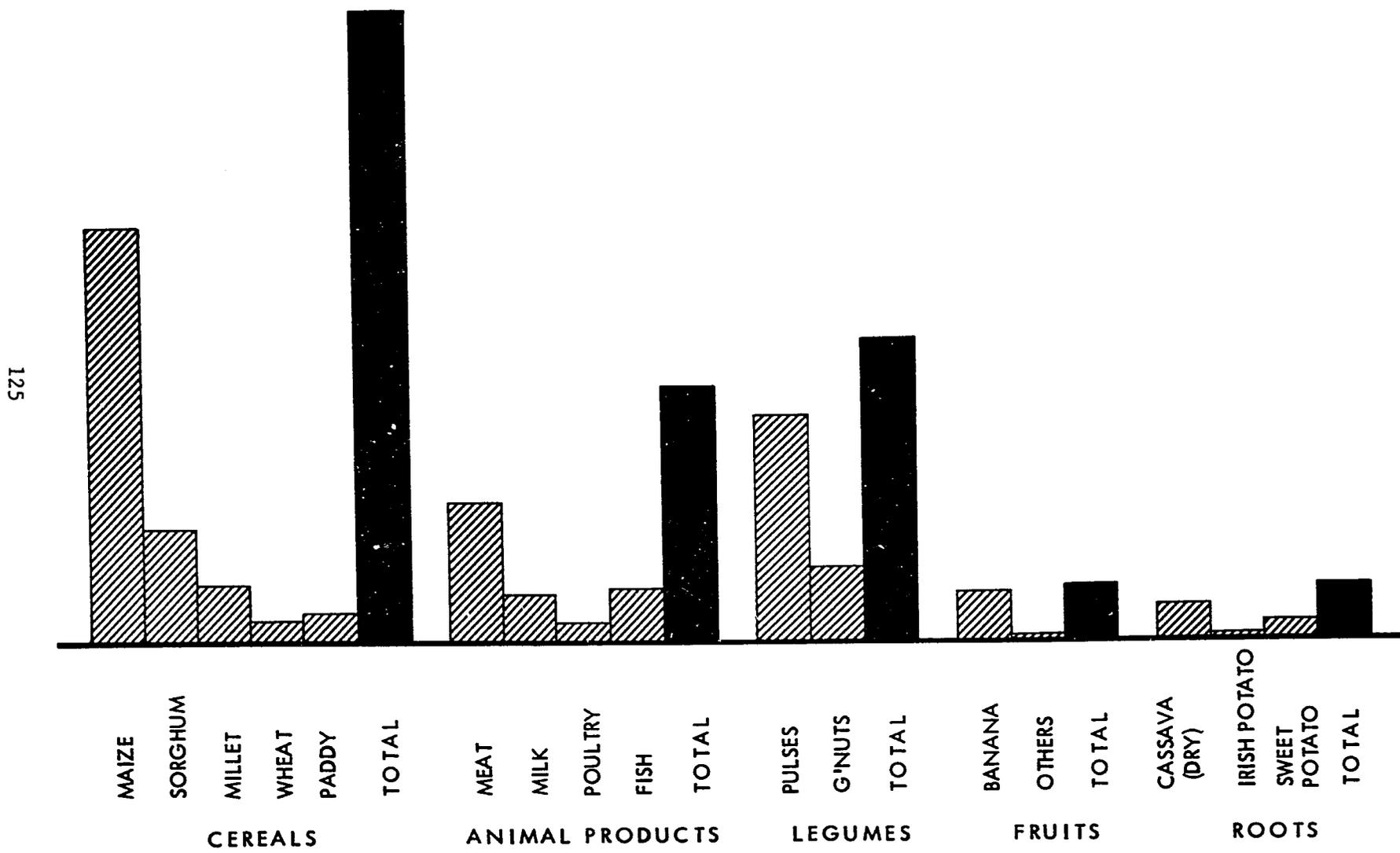


FIGURE 2

TANZANIA - PER CAPITA PROTEIN PRODUCTION BY REGION

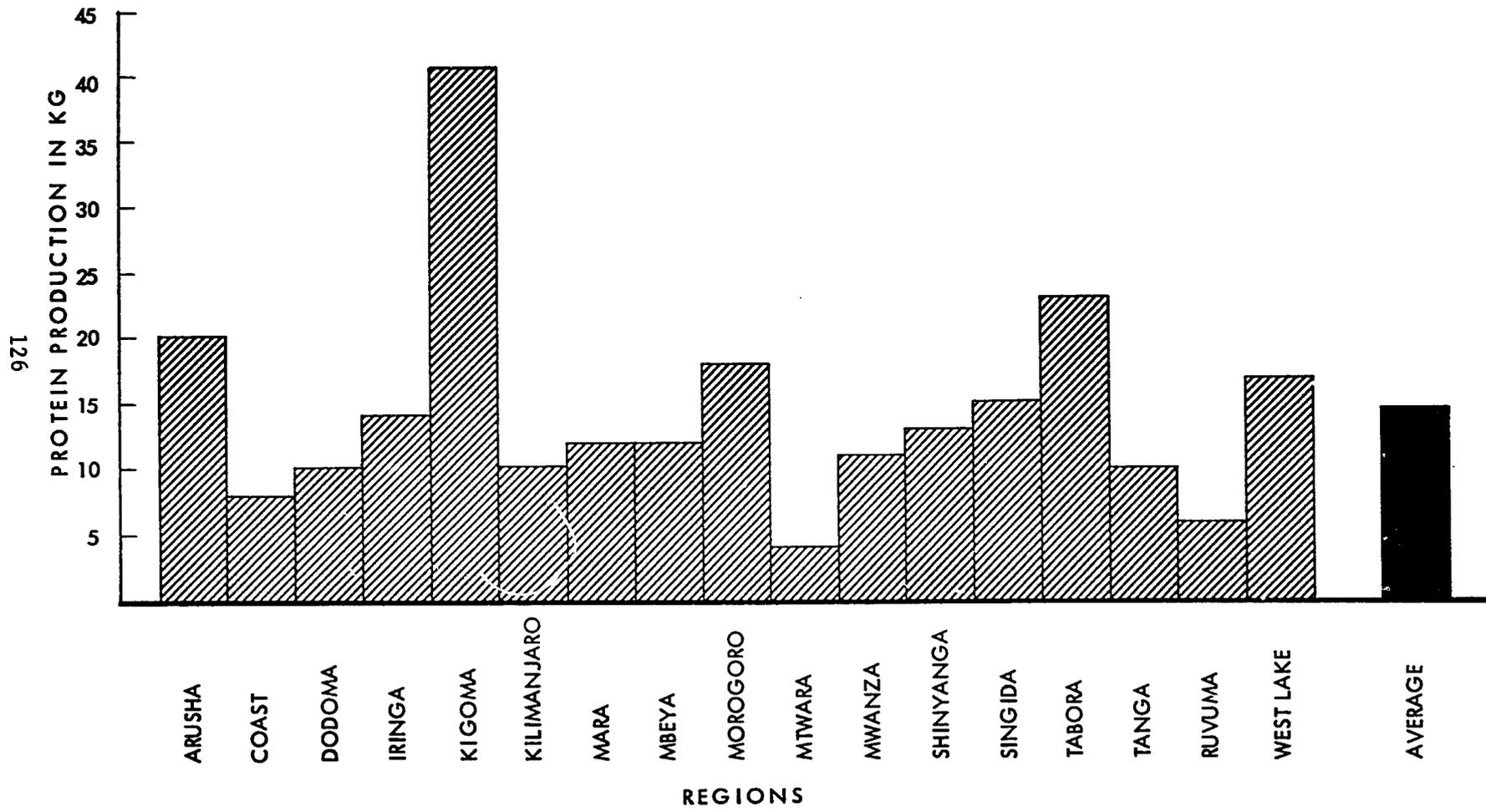
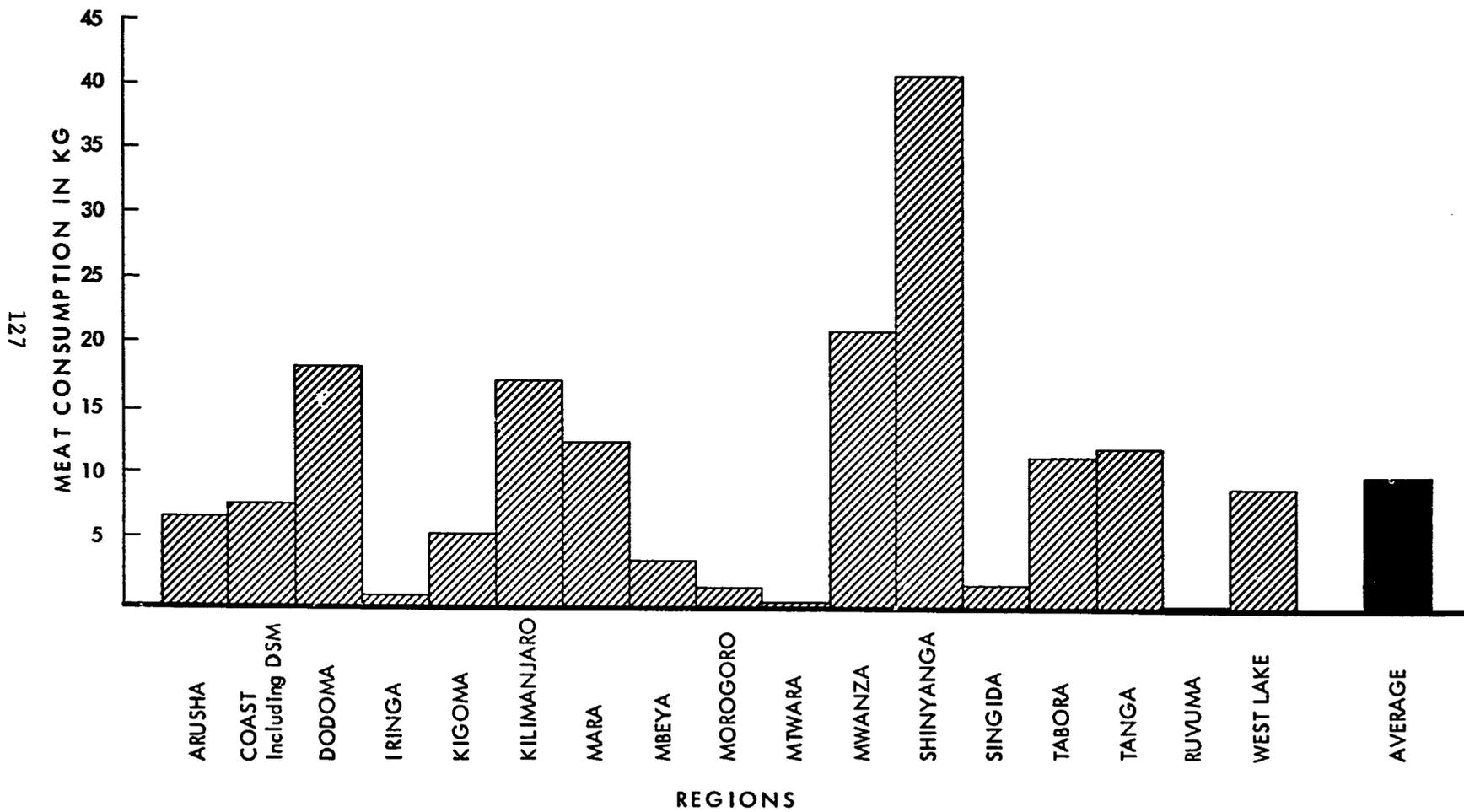


FIGURE 3

TANZANIA - ESTIMATED ANNUAL PER CAPITA MEAT CONSUMPTION BY REGION (1964 - 66)



REPORT ON NUTRITION IN UGANDA

presented by Dr. Samuel L.D. Muyanga

I. BACKGROUND INFORMATION

A. Geography and Climate

Uganda is in East Africa. It is surrounded by Kenya to the east, Sudan to the north, Congo (Kinshasa) to the west and Tanzania and Ruanda to the south and southwest, respectively. It has a total area of 91,134 square miles, one-sixth of which is swamp or open water. The equator crosses its southern part and most of it lies at 4,000 feet above sea level. It is well provided with rain and, except for one short dry season between January and March, it may rain any time during the year. Most parts of the country average 50-70 inches of rain annually.

B. Population

The total population in the last census (1959) was 7.5 million. Over 50 percent is below the age of 20 years and 20 percent is between 0-5 years. The growth rate is 2.5 percent per year; the crude birth rate is 5 percent. The average income per capita is 27.2 pounds per year.

The population density is 85 persons per square mile; but this varies from district to district with some areas, like Karamoja, having 15 persons per square mile and others, around Kampala or in Kigezi, having 500 persons per square mile. About 90 percent of the population is agricultural, living in the rural areas. A small percentage is nomadic, looking after cattle and more recently others have moved into towns to seek employment in the industries.

C. Government Food and Agricultural Policies

The traditional policy is that each homestead grows its own food, as well as cash crops. The Government has encouraged this. Because the country is well supplied with rains and fertile soil, there is enough

food in the country to meet everybody's needs and to prevent children from suffering from malnutrition. Whereas some parts of the country store some of the foods grown, other parts do not. This results in a great wastage, especially by insects and molds, of a big part of the food grown. There is a tendency for the people to sell to traders some of the foods which would be useful in the feeding of children. By this I mean that a big part of the legumes, such as beans, peas and groundnuts, is usually sold to traders, leaving everybody, including children, to feed on foods which are mainly carbohydrates.

D. Foreign Aid

For the last ten years, Uganda has been receiving milk in the form of DSM from UNICEF. This source has been withdrawn recently and we are now negotiating with the World Food Program for supplies. The milk which we were getting was used to treat children with severe forms of malnutrition and was given to children in the young child clinics for those who were mildly affected.

II. FOOD RESOURCES

A. Means of Production

As I have already stated, 90 percent of the population is agricultural. The bulk of this farming is subsistence. More and more farmers are borrowing tractors from the Government to help them on their farms. A few mechanized farms in the sugar estates are also found.

B. Principal Food Crops

1. Cereals in the form of millet (found mainly in the northern part of the country) and sorghum.
2. Roots and tubers (in the form of cassava, yams, sweet potatoes and Irish potatoes).
3. Legumes (beans and peas).
4. Fruits (bananas, groundnuts, green vegetables).

C. Livestock and Poultry

The Department of Veterinary Services estimates that there are 1.8 million head of cattle. The majority of these are indigenous but we have also an estimated 35,000 exotic cattle for milk and meat production. A big drive for scientific farming has been launched by the Ministry of Animal Husbandry and many of these farms are now producing enough milk for most of the country's requirements. These farms are owned individually, in cooperatives, in companies and some by parastatal bodies like the Uganda Development Corporation. Within a short time, the country hopes to be self-sufficient in milk production. Other dairy products, such as butter, are still imported.

A meat canning factory has been started in Soroti, and it is hoped to export some of the canned meat produced there.

Uganda is self-sufficient in poultry products. There are two major farms with about 35,000 egg-laying birds; there are numerous smaller farms all over the country. These supply eggs for the country and some are being exported to countries like Sudan, Congo and Ruanda.

D. Fishing

Uganda is well provided with lakes, and fishing takes place on lakes Victoria, Albert, Edward, George, Kyoga, Wamala and other minor lakes. In addition, the Fisheries Department is actively encouraging individual farmers to construct fishponds to produce fish for home consumption as well as for cash. It is estimated that there are now 10,000 such ponds. The commonest fish, Tilapia, is produced in these ponds. Last year, 106,000 metric tons of fish were produced in Uganda. Most of this was locally consumed, but 2,600 metric tons were exported to Kenya, Congo and Tanzania.

Steps are being taken to improve the fishing industries - bigger and better fishing boats are being constructed, the fishermen are being encouraged to use small engines on their boats, as opposed to the traditional rowing. Research is being conducted on the preservation of fish by providing ice plants at the major

fish landings and providing refrigeration in the boats. Methods of smoking and salting the fish are being improved. Canning of the local sardines is being tried.

E. Food Industries

As stated above, most of the food in Uganda is produced locally for individual consumption. However, food in the form of sugar has been produced for some time by two farms in Uganda. These two supply the country's need for this commodity.

A commercial concern called Africa Basic Foods, located in Kampala uses soy flour for its products. It manufactures products for use as porridge, bread, buns and butter. The soy beans are grown locally and the products are cheap. They are proving very popular in the shops as well as in schools. An expansion of this scheme, probably with government cooperation, will be very welcome.

III. DIETS

The diets in Uganda consist of the local staple and additional protein products, according to the means of the individual. The main local staples are steamed green banana, sweet potatoes, cassava (dried or fresh), millet, sorghum, maize, yams, Irish potatoes. The additional protein products may be meat, fish, eggs, milk and beans, peas and groundnuts. People usually have two meals a day and a very simplified form of breakfast.

IV. NUTRITION SURVEYS

As a result of a survey made in one of the districts, it was found that: the median age of terminating breast-feeding was 16 months; by age one year, a quarter of the children had finished breast-feeding; almost all the children had finished breast-feeding at 21 months. Other surveys were carried out in other districts and the pattern of breast-feeding varies a great deal. In some districts most children have finished breast-feeding by 1 year while others go on up to 2 or 2 1/2 years.

Surveys using weight and length as the standard found that many of the children were below the third percentile in the European standard; the majority of the children fell below the fiftieth percentile. Therefore, the 50 percent line is taken as the standard on our weight charts. We express the variation as a percentage of the standard. However, the weight of children from well-to-do families compares very well with those in the Western countries.

V. NUTRITIONAL DISEASES

Kwashiorkor or protein-calorie malnutrition is the major nutritional disease, followed by marasmus. Kwashiorkor is widespread. It is estimated that 25-30 percent of the preschool children have some degree of malnutrition. About 2,000 children die annually from malnutrition directly. Other children die of malnutrition indirectly from other diseases like measles, whooping cough and tuberculosis, having been debilitated in the first instance by malnutrition.

VI. CHILD FEEDING PROGRAMS

A. The Medical Research Council

The Medical Research Council sponsors an Infantile Malnutrition Research Unit at Mulago, Kampala. It is carrying out investigations in all aspects of child malnutrition in Uganda. Its findings have been of increased value in the treatment of malnourished children in the country.

B. Food and Nutritional Council

This Council advises the Government on all aspects of human nutrition. It was set up about 5 years ago at the request of the Ministry of Health. It is composed of members from I.M.R. Unit, Preventive Medicine Department of Makerere, Ministry of Health, Agriculture Department and Veterinary Department. It sits every 3 months and its advice has been responsible for the setting up of the Government Nutritional Unit which distributes packets of reinforced DSM. Each packet contains 59 g of DSM, 12 g sugar, 16 g oil, giving 20 g of protein

and 400 calories. These are distributed to areas which are specially known to be affected with malnutrition and have been very useful in the treatment of moderately malnourished children in the districts.

VII. NUTRITION EDUCATION PROGRAMS

A. The Nutrition Rehabilitation Unit (Mwana Mugimu)

This is situated at Mulago, Kampala. It is a project of the Freedom from Hunger Campaign and financed through the Save the Children Fund (U.K.), with assistance from Oxfam. The Uganda Government provides accommodations and salaries for some of the staff.

This is probably the best nutrition education we are giving in the whole country. Here a group of mothers collect to "learn by doing" how to feed their children, using the traditional local inexpensive foods. The mothers watch their children getting better only by giving them food. Breast-feeding and good methods of weaning are encouraged. Other community leaders also attend courses in this unit. Other smaller but similar rehabilitation units are already springing up in other districts.

B. Health Education Unit

This unit provides nutritional education in the form of pamphlets, posters, film shows and radio talks as well as seminars at all levels.

C. Maternal and Child Health Unit

This provides nutritional education in the form of seminars for the district staff, in-service training for the medical assistants, follow-up of diagnosed malnutrition cases in their homes, and in the form of routine health visiting.

D. Other Programs

Other departments like the community development are also taking part in educating the parents in nutrition.

E. Evaluation

Although much is being done in the form of nutrition education, we have not found any easy, accurate method of evaluating the results of our efforts. Those patients who have gone through the Nutrition Rehabilitation Unit have been followed up, and none of them have suffered a recurrence of the condition. Nearly 100 percent success has been achieved in this unit. There has been no definite evaluation of our other nutrition education programs.

VIII. MAJOR PROBLEMS INHIBITING PROGRAMS TO COMBAT MALNUTRITION

A. Communication

Our greatest drawback in the nutrition education program has been the fact that very often we fail to reach the people who need our education most. This is partly due to our village set-up where the houses are very widely scattered. This makes the work of a health visitor or a health assistant very difficult. Many times these homes are linked only by paths.

B. Traditions

Traditions are always difficult to change; especially traditions associated with food. The tradition for many homes in Uganda is that children take the same type of food as the adults. Quite often this type of food does not cater to the special needs of a growing child. We still must convince many people to make special but nutritious preparations for the preschool child.

C. Cash Crops

High protein foods cost money. The traditional cash crops in Uganda, i.e., cotton and coffee, are usually adversely affected by world markets. When this happens, the farmers get little money for their cash crops and this usually manifests itself in malnourished children.

IX. PLANS AND HOPES FOR THE FUTURE

Uganda has enough food for all her children to grow in reasonable health. The task ahead is to intensify our

nutrition education to reach that section of the people who need it most. This will mean expansion of the training program to encourage the people who will carry it to the villages to set up nutrition rehabilitation units in all areas.

REPORT ON NUTRITION IN THE UNITED STATES OF AMERICA

presented by Mrs. Jean Pinder

I INTRODUCTION

The United States is a vast area composed of 50 states, two trust territories, the Commonwealth of Puerto Rico and the Virgin Islands. Two states (Alaska and Hawaii), the trust territories, Puerto Rico and the Virgin Islands are not a part of the mainland. The population of the United States is approximately 200 million and is composed of people of several ethnic origins, i.e., various European backgrounds, African, Chinese, Japanese, American Indian and Mexican.

Though the United States is a unified single nation, there are considerable differences to be found in the various regions of the country in geography, predominant ethnic background groups, food patterns, and to some extent, economic infrastructure. For example, the northeastern part of the country has been predominantly composed of people of northern European background. In recent years, there has been an increasing migration of Puerto Ricans and Negroes into this part of the country. The southwestern part of the country has a large Mexican-American and African background population. The southeastern and central southern states have historically had very large populations of African background, and the western states large populations of Chinese and Japanese background.

The economy is highly diversified. Heavy industry is found principally in the northeastern part of the country, the automobile industry in the north-central, that is, the Detroit, Michigan area, and the movie industry in California. Various types of agriculture spread out into all sections of the country: grain production principally in the Great Plains states; cotton and tobacco primarily in the southern states; fruit and vegetable production in the southeastern and western states. These divisions are not mutually exclusive, but the greatest production of these crops tends to be in the areas indicated. Meat, poultry and dairy products are produced to some extent in all regions of the country; however, we tend to

think of the southwest as a principal cattle area and the north-central states as one of our major dairy production centers. However, as stated earlier, a great deal of all these products are found in all parts of the U.S. mainland.

Because of the high level of mechanization, only about 8 percent of the population is engaged in agriculture. Enough food is produced for the entire country and substantial quantities of all types of food and food products are exported. With this abundance of food production, an excellent network of roads, railways, seaways and air transport, one might well assume that there cannot possibly be any nutritional problems in the United States. Unfortunately, this is not the case, and as in other parts of the world, we do have nutritional problems of some significance.

II. MAJOR NUTRITION PROBLEMS

The major nutrition problem in the United States is associated with excess caloric intake. While obesity is recognized as a major health problem, undernutrition does exist in some segments of the population. Concern for those persons suffering from inadequate nutrient intake has resulted in a number of local surveys. The Department of Health, Education and Welfare has initiated a National Nutrition Survey, and the first phase of this study has been directed toward the low-income families in ten states. The following discussion refers only to this group.

Preliminary results indicate that nutrition problems, particularly retarded physical growth in young children, anemia, goiter and low serum vitamin levels occur within this population group. It is unreasonable in an affluent society to discover such signs as those seen to date.

The dietary inadequacies vary between the age groups. Iron intake is low in over 60 percent of the young children. Adolescents and older individuals both have low intakes of vitamin A, with almost 40 percent of both groups consuming less than half the amount considered adequate.

Although, as stated, these data represent a very small segment of the total group, these trends are not inconsistent with those reported from similar studies.

To date, 12,000 individuals have been studied under the National Nutrition Survey. Preliminary data processing has begun on 60 to 70 percent of this group and trends in nutrition deficiencies are becoming apparent.

When one recalls that clinical symptoms are apt to appear only after prolonged inadequate nutrition, the following findings are of greater concern:

1. Three and seven-tenths percent of the 0-6 year old subjects show evidence of vitamin D deficiency; 18 cases of rickets have been diagnosed.
2. Four to 5 percent of the subjects exhibit either/or both winged scapula and potbelly. These findings are associated with protein-calorie malnutrition.
3. Five percent of the total population examined to date exhibits an enlarged thyroid gland associated with low iodine intake. The World Health Organization classifies an area as having endemic goiter when 5 percent of the population has enlarged thyroid glands.
4. Eight cases of Bitot's Spots (frequently attributed to vitamin A deficiency) have been noted and confirmed.
5. Other changes in hair, skin and lips which may be indicative of poor nutrition have been noted.

A. Urinary Riboflavin and Urinary Thiamine Levels

Urinary riboflavin and urinary thiamine levels are low in a substantial portion of the total sample studied to date. Within the first 6,400 urine samples, 19 percent of the population had less than acceptable levels for urinary riboflavin and 9 percent for urinary thiamine.

B. Growth Retardation

The length of most children at birth is similar in both poorly-nourished and well-nourished populations. In the sample we have studied thus far from these low income groups, the children between 1 and 3 years of age fall below the average height reported for children of the United States.

C. Biochemical Analyses

Laboratory findings indicate that the sample studied thus far has characteristics of poorly nourished populations everywhere. Blood and urine levels are considered to be less than acceptable when they approximate the levels associated with disease status or when the levels are sufficiently low to constitute a risk status. Nine to 19 percent of all ages in this sample had blood and urine levels that were less than acceptable. These results are similar to and, in some cases, worse than the results from nutrition surveys of developing countries around the world.

D. Hemoglobin Levels: An Index of Anemia

One third of the children under 6 years of age had hemoglobin levels in the unacceptable range. While the prevalence declined in older age groups, there still were a large number with hemoglobin levels usually associated with poor nutritional health.

E. Vitamin A Deficiency

The findings for vitamin A present a somewhat similar picture. The population less than 6 years of age has the highest percentage of persons with unacceptable levels. These findings are characteristic of those reported from areas of the world where vitamin A deficiency is a major problem.

In population studies it has been suggested that 5 percent or more of the sample has values within the less than acceptable range. This constitutes evidence of vitamin A deficiency within the population. This is also the level at which night blindness appears.

F. Vitamin C (Ascorbic Acid) Deficiency

Serum vitamin C levels were less than acceptable in 12-16 percent of all age groups. Four percent of the total age group had scorbutic type gums. These findings suggest that the intake of food supplying vitamin C is reduced among all ages.

Sixteen and three-tenths percent of the overall population had levels for serum protein at less than acceptable levels. Seventeen and one-tenth percent had unacceptable levels of serum albumin. Values in the sample were found that are considerably less than those observed in populations where protein deficiency is a well-defined clinical problem.

III. MAJOR CAUSES OF MALNUTRITION IN THE U.S.

A variety of nonnutritional factors affect food choices and intake, which in turn, may lead to nutrient deficiencies.

A. Sociological

To date in our studies we have found seven cases which the physician diagnosed as severe malnutrition using such terms as kwashiorkor (severe protein and multiple nutrient deficiency) and marasmus (primarily a caloric deficiency). We did not expect to find such cases in the United States. As these unexpected findings began to appear, we asked ourselves about their causes. In the majority of these cases a universal contributing factor was lack of knowledge on the part of the mother. How to feed the child and lack of proper health care for these cases is often complicated by infectious disease or diarrhea.

Lack of fundamental facts about the basis for food choices and for persistence or change in food practices has prevented full effectiveness of current efforts in nutritional guidance of children and their families.

An American diet is normally quite adequate in essential nutrients, but the food practices of many individuals may be faulty through overeating in terms of

calories, or skipping meals, or using snacks of poor nutritive quality, or through gorging, especially on meals of high fat content.

We also have been struck quite forcibly by the suspicion that in America our food fortification programs are not what they should be. Most of these programs are voluntary. Anyone can sell bread that is not enriched, milk that contains little or no vitamin D and from which the vitamin A has been removed, or salt that is not iodized--price it at a penny or so below the cost of the fortified product and the unsuspecting will buy it.

B. Environmental

The environmental conditions and technological advances in the United States favor an adequate production, distribution and consumption of agricultural produce.

C. Economic

The great majority of the undernourished people are poor. The poor man has very little money to spend for food and he, therefore, must spend more wisely than the rich man. The rich man can make nutritional mistakes in the supermarkets that would be disastrous for the poor man.

There are areas of economic depression in the U.S. and numerous large family/small income situations where the per capita expenditure for food is so limited that it is not a question of choice of calories but of total calories.

IV. PROGRAMS TO COMBAT MALNUTRITION

A. Educational Programs

Many families spend ample money for their food, but their choices are such that malnutrition is not prevented. Aside from dietary deficiencies of specific essential nutrients, nutritional imbalances and excessive caloric intake are frequent. The most basic approach

to the correction of nutritional problems is through appropriate nutrition/health education. Several agencies of the U.S. Government are conducting nutrition education programs, most notably the Department of Health, Education and Welfare and the Department of Agriculture.

1. Department of Health, Education and Welfare
(DHEW)

The Children's Bureau of DHEW is primarily concerned with education and services for mothers and children. They receive dietary counseling about normal nutrition as well as any modified diets which might be prescribed for specific conditions. Counseling may cover such basic problems as preparation of formulas and foods for infant feeding or food budgeting.

In addition, Children's Bureau funds are used to purchase vitamin and mineral supplements as well as special dietary products which might be prescribed for expectant mothers, malnourished infants or children, or children with certain inborn errors of metabolism who are receiving care through a maternal and child health or crippled children's program.

Nutrition education as a part of health instruction is provided by multidisciplined health workers with parents and their children in well-child conferences, school health programs, home visits, parent education classes and institutional care programs.

The Children's Bureau Special Projects Fund allocates money for the support of graduate nutrition training in six educational institutions. An 18-month program established with emphasis on maternal and child nutrition was designed to prepare nutritionists and dietitians for present and expanding programs in maternal and child health.

In addition to these special training funds, many states use some of their regular grant-in-aid funds for the professional training of nutritionists already employed or about to be employed. Through such funds, nutritionists have been enabled to attend short-term workshops, or special workshops sponsored by professional organizations and programs which provide in-service

training in nutrition for multidiscipline workers serving mothers and children.

In addition to the nutrition services provided for the mothers and children in the U.S. described above, the Children's Bureau nutrition staff has helped to develop and strengthen nutrition services for mothers and children in other countries, e.g., providing consultation in many aspects of child feeding for the Agency for International Development; reviewing projects and proposals in maternal and child health nutrition of international organizations and preparing comments for U.S. position papers and/or for U.S. delegates' reference; providing nutrition training for health and welfare workers from other countries and training nutrition workers in maternal and child health.

2. Department of Agriculture (USDA)

The current program of the Cooperative Extension Service of the USDA has an objective related to improved nutrition of children--improve the nutrition of children through a continuing education program to help families plan, select and prepare food that will provide an adequate diet for the entire family. The Extension Service sponsors an out-of-school education program for 4-H Club boys and girls, young homemakers, and low-literate and low-income families. The financing, planning and carrying out of these programs is shared by the federal, state and county governments. There is an extension office in nearly every county in the nation.

There are programs to help families utilize foods received from the direct distribution program and from home gardens to help them make alternate choices where incomes are low, and to help low-literate and low-income families plan and prepare low-cost, nutritious meals, acceptable to the family. A program for young homemakers called "Food for Young Families" includes: what makes a good diet, feeding young children, buying and selecting foods, planning meals and principles of food preparation.

The 4-H programs (young farmers) cover nutrition, meal planning and food preparation. Families are reached through organized homemaker and 4-H Clubs, short courses, community meetings and through the mass media. About

650,300 youths aged 9-19 are reached through the 4-H Club programs. It is estimated that nearly 4 million children are reached in the 1.5 million families participating in the various adult programs. Limited resources have tended to confine the outreach to those families that seek and use educational programs to improve their situation. The Cooperative Extension Service is devoting more than 1,000 man years to educational programs in food and nutrition.

It is felt that this program needs to be expanded to reach more young families, including teen-age brides, and to provide subprofessional program aids to assist professional workers for more effective work with low-income/low-literate families. Ways must be found to extend programs for children and youths to those not currently served by 4-H Clubs and to motivate young mothers, teen-agers and children to follow good nutrition practices. Additional studies are needed to show the best methods of working effectively with persons of low literacy, who do not read or speak English or who are not reached by the usual educational processes.

B. Child Feeding Programs

1. National School Lunch Program

In addition to the education programs described, child feeding programs play an important role in combating malnutrition. One important program is the USDA National School Lunch Program. The two-fold objective of the program, as stated in the National School Lunch Act, is to "safeguard the health and well-being of the Nation's children and to encourage the domestic consumption of nutritious agricultural commodities and other foods." The program seeks to improve the diets of children through serving nutritious, well-balanced lunches and, within available resources, to provide such lunches to all children regardless of their ability to pay for them.

Last year, about 71,000 schools representing approximately three-quarters of our nation's school children participated in the program. Approximately 10 percent

of the lunches were served free or at a reduced price to children unable to pay the full price of the lunch. The program operates in all 50 states, the District of Columbia, Puerto Rico, the Virgin Islands, Guam and American Samoa.

Despite continued growth of the National School Lunch Program, there still exists the challenge of reaching 9 million children presently enrolled in schools which do not have a food service. Included in this number are approximately 1 million needy children. An additional half-million needy children are enrolled in schools which currently participate in the lunch program but which lack sufficient financial resources to serve these children free lunches.

Full cooperation and support to improving nutrition education activities under the National School Lunch Program is being received from the Interagency Committee on Nutrition Education. This Committee draws its membership from the various agencies concerned with nutrition education. More of this type of cooperation and coordination would facilitate the overall effort to improve child nutrition. Food service for children is now being conducted under the auspices of several agencies, using their own funds and authorities.

2. Special Milk Program

A principal objective of the USDA Special Milk Program is to improve the nutrition of children by encouraging the consumption of fluid milk in nonprofit nursery schools, child care centers, settlement houses, summer camps and similar nonprofit institutions devoted to the care and training of children. The program is available to 19 of every 20 children enrolled in school plus thousands of children enrolled in child care centers, institutions and summer camps.

Further coordination and cooperation among Federal agencies will be required, particularly where a more substantive food service is involved such as breakfast or lunch.

3. Distribution of Donated Foods to Schools and Camps

The objective of this USDA-sponsored program is to improve the level of child nutrition in schools and summer camps for children as well as to increase the consumption of domestically produced agricultural products.

The program is carried on cooperatively with agencies of state governments, with USDA delivering the foods free of charge to central receiving points in the state.

The distribution program is expected to benefit 21.5 million children in schools and 1.3 million children in summer camps. An estimated 10 percent of these children will be from economically deprived or low-income families where the lunch will be provided free or at reduced costs.

A contemplated expansion of child food service activities would increase the need and demand for donated foods - for a pilot breakfast program, the feeding of preschool children and the generally broadened lunch program services.

Through the Interagency Committee on Nutrition Education a group of federal employees from the several agencies interested in improving food intake in nutrition of children, the needs for expanding child feeding activities have been made known. The Department of Health, Education and Welfare, through its ongoing programs, likewise has encouraged more child feeding.

4. The Distribution of Donated Foods to Low-Income Families and Institutions

The objective of this program is to improve the level of food intake and nourishment of low-income families (including their children) and to improve the food service of nonprofit charitable institutions, including orphanages, child care centers, etc.

The Consumer and Marketing Service of the USDA operates this program cooperatively with agencies of state governments. USDA provides the foods delivered free of charge to receiving points in the state. State and local agencies are

responsible for certifying applicants and for the intrastate transportation, storage and distribution of the donated foods. Because expenses of local distribution normally fall to the county or city governments, they decide whether their areas will participate in the program. The effort is to provide a level of food assistance, which, coupled with the low-income families' ability to buy food, will give a nutritionally sound diet.

Approximately 4 million persons in needy families in more than 1,550 counties and some 1.4 million persons in charitable institutions, are currently receiving USDA-donated foods. The children benefited are those in these low-income families (we estimate nearly 2 million) and the children in the institutions that are receiving food donations. The value of food distributed to needy families and institutions in 1966 exceeded \$140 million.

As with federally-aided public assistance programs, participation in the Commodity Distribution Program by any state or political subdivision is optional. The fact that states and/or localities must finance all intrastate costs of operating the donation program, is a major deterrent to program expansion. Local apathy or attitudes are a constraint in some instances.

Some further expansion may be expected from continued persuasion and changed local attitudes. Limitations on effective program demand, however, would be greatly reduced with some federal sharing of intrastate commodity distribution costs, as is being done through the Office of Economic Opportunity.

Intensified efforts are being made to increase supportive food and nutritional educational activities on behalf of both commodity distribution and food stamp recipients.

A special effort launched through the Interagency Committee on Nutrition Education and HEW's Child Welfare Division to improve the food intake and nutrition of pregnant and lactating women, has met with considerable success. Through this effort local distribution officials are encouraged to vary the distribution rate of specific donated foods to this special category in order to provide greater nutritional help.

C. Food Stamp Program

The USDA Food Stamp Program is specifically designed to raise the level of nutrition of low-income families. Eligible families exchange the amount of money they would normally be expected to spend for food in return for food coupons of greater value. The program is specifically directed to enabling low-income families to obtain more nearly adequate food for their families. Even though children have access to an adequate lunch at school, this program helps improve the quality of the meals they eat at home. A fundamental knowledge of the principles of good nutrition is provided by supporting nutrition education programs.

The Food Stamp Program is primarily a direct action financial food assistance program. It represents a federal-state cooperative service effort in meeting the nutrition gap present in those families where income is a limiting factor in attaining an adequate diet.

Departmental research studies indicate that program participants represent primarily those in the lowest income ranges and families with large numbers of children. Children benefited are those living in families with income below the poverty line. At the end of June 1966, approximately 1.2 million persons were participating in the program. The best available information indicates that about 600,000 were children under 21 years of age.

Present plans are being developed to expand the Food Stamp Program to include 4.7 million persons in need of federal food assistance by 1970. It is estimated that about one-half this number would represent children. Current estimates indicate that full year financing of a program of that scope would require \$425 million.

Supportive nutrition education programs are also being developed in cooperation with numerous offices for Economic Opportunity Community Action Programs. The Division also works closely with the Department of Health, Education and Welfare to simplify the mechanics

of certification in an effort to facilitate participation in the Food Stamp Program.

D. Activities of the Office of Economic Opportunity

Although most of the activities of the Office of Economic Opportunity are devoted to improving the general income levels of people who now live in poverty, it is felt that the nutritional deprivation of young children presents such a serious obstacle to the effective use of educational and employment opportunity programs that specific resources have been devoted directly to nutritional supplementation and education in preschool programs for children from low-income families (Head Start Programs) and to research and coordination of information on antipoverty nutrition programs.

Head Start has established nutritional standards for both its summer and full-year programs. They include the serving of breakfast to all children who come to the class without it, the serving of a midmorning snack and the serving of a nutritious, well-balanced lunch.

In many places adequate facilities and trained personnel are not available to meet these standards, and reports indicate that the nutritional programs are most inadequate in the classes held in the worst pockets of poverty, where they should be the best. Although Head Start has not yet been completely successful in meeting these recently-established standards in all individual programs, it is encouraging all specialists in the nutrition field, those in the schools, in hospitals, in the extension service, etc., to offer their services to improve the nutritional aspects of the Head Start projects in their communities. Head Start also has consultants in every state who visit individual projects to provide technical assistance and suggest ways of making use of resources from the whole community to establish good nutrition programs in the Head Start classes. Consultants have suggested the furnishing of previously inadequate areas with appliances donated by the public utility company, using dishes from school cafeterias during the summer and borrowing stoves from home economics classes.

The importance of providing nutritious meals and nutrition education in every Head Start program has been demonstrated in the kit of nutrition materials sent out to individuals and committees involved in establishing and administering Head Start classes. This material emphasizes that service food to Head Start children satisfies not only their nutritional needs, but also sociological and psychological needs. Pamphlets furnish information for setting up adequate preparation and serving facilities, menus, training information and sources for further information on these subjects. The material also demonstrates how the educational aspects of nutrition programs can, and in fact, should be extended to parents.

The new food experiences of Head Start children can encourage parents to increase their efforts to serve more attractive and nutritious meals at home only if they have the know-how that is required to purchase and prepare better meals on a low budget. By making the nutritional activities of the Head Start program available, nutrition improvement is extended to all the children in the family.

At the present time, Head Start has about 550,000 children enrolled in its summer projects and almost 200,000 in its annual projects.

VI. MAJOR PROBLEMS ENCOUNTERED

The major problem inhibiting programs to combat malnutrition is a lack of nutrition knowledge among professionals and at the lay level. Physicians receive little nutrition training while in school and the majority of medical institutions provide little or no education in nutrition-related fields. A pervasive lack of interest caused by the assumption that "everyone knows what to eat" exists in nearly all medical schools. There is an even greater lack of nutrition education at lay levels. Many people are ignorant of the importance of nutrition in their daily lives and are not impressed with fortification of food commodities.

Inadequate manpower is a second major problem. There is a lack of trained personnel at the community level.

Most professionals are tied up in hospitals or are working with the clinical aspects of the problem. They are, in reality, isolated from the conditions which cause this situation.

Thirdly, there exists a financial problem in the United States. Funds are not readily available to support the nutrition programs necessary to combat malnutrition. As a corollary to this, the existing programs are food-oriented and not nutrition-oriented. Until the emphasis can be redirected to food quality instead of quantity, the funds presently available will continue to be misguided.

VIII. PLANS FOR THE FUTURE

The United States Government has initiated programs of food fortification, food stamps and increased school lunch which presently help to reduce the incidence of malnutrition in our population. Hopefully, these programs will be expanded and made more effective with the aim of eliminating malnutrition and its effects in the country. Plans to incorporate the existing programs under one roof are now being discussed.

A push for increased nutrition education at both the professional and lay levels has been initiated. Nutrition education has been introduced into the curriculum at many medical universities and community nutrition aids are being trained to assist in the lay programs.

Food standards are being revised and minimum nutrient intake upgraded. This revision is directed toward the elimination of symptoms of malnutrition such as anemia, goiter and rickets.

REPORT ON NUTRITION IN ZAMBIA¹

presented by Mr. A.P. Vamoer

I. BACKGROUND INFORMATION

A. Known Levels of Nutrition

Data on a national scale is lacking, however, there is abundant evidence of insufficient protein intake. Calorie intake by adults is generally believed to be adequate for light work, but certainly not enough for heavy work. There is evidence of seasonal shortages of vitamin A and vitamin C and probably riboflavin. There is widespread anemia and there are areas with endemic goiter.

With no general registration of births and deaths, vital statistics are lacking, but all investigations indicate that the mortality of preschool children is at least 300 per 1,000 and possibly as high as 500 per 1,000. The Schools Medical Service reports that of all primary school children examined, 25-27 percent have marked signs of malnutrition, and a further 50-60 percent have signs of undernutrition or milder malnutrition. The Schools Medical Service operates only along the Copperbelt and in the Lusaka area - the more affluent parts of the country. Dr. Blankhart reports "the worst nutritional conditions are found in isolated bush villages."

B. Nutrition Surveys

1. A Survey of Urban Families in Lusaka Townships
B. Thomson 1946
2. A Nutrition Survey of Serenje
B. Thomson 1947-48
3. An Investigation into the Food Habits and Consumption of the Africans of Kawambwa and Fort Rosebery Districts
B. Thomson 1948-50
4. Report by the Medical Officer attached to Nutrition Survey - Kawambwa
H. Trant 1948

¹Prepared by Mr. E.C. Thompson, Executive Secretary, National Food and Nutrition Commission.

5. Report on Nutrition and Health Survey
in Kawambwa District
D.A. Smith 1949
6. Report on the Nutrition Aspects of the
Health and Nutrition Scheme, Fort Rosebery
B. Thomson 1958-59
7. Report on Health and Nutrition Scheme,
Fort Rosebery
McCullough and Friis-Hansen 1958-59
8. Report on Nutrition Improvement
(FAO TA2368)
Lubbock and Clague 1966
9. Report on Visit to Zambia
(WHO AFR/NUT 33 Rev. I.)
D.M. Blankhart 1966

II. MAJOR NUTRITIONAL DISEASES AND THEIR PREVALENCE

Undoubtedly, the main nutritional disease is protein-calorie deficiency, which is the third highest individual cause of death of all patients admitted to hospitals. Many who die from other causes would have lived but for lowered resistance due to concurrent malnutrition. Anemia is an alarming problem, e.g., in the Matanda area 29 percent of the infants examined were found to have less than 6 g percent blood hemoglobin. Vitamin A deficiency has been indicated in rural areas where plasma values of vitamin A and carotene were found to average 26 mg and 70 mg percent, respectively (Friis-Hansen 1962). A mild degree of goiter is widespread.

III. THE MAJOR CAUSES OF MALNUTRITION

Malnutrition usually results from a combination of numerous causes. The following suggested causes are purely tentative; the Nutrition Survey and Services Project, described below, will provide the firm data on which to base future plans to combat malnutrition.

A. Sociological

1. Bottle feeding is one of the greatest killers, due to unhygienic bottles and unduly diluted feeds.
2. The increased rate of parity and employment of women has resulted in earlier weaning.
3. The lessening period of breast-feeding has been unaccompanied by an adequate knowledge of the child's nutritional needs.
4. Thin gruels of maize or cassava flour are used for weaning, with little or no protein added; gravies from relish dishes supply negligible amounts of protein.
5. Traditionally, meals are limited to two per day, often much less, e.g., an average of 1.34 meals per day at Shikamushile (Thomson 1958-59).
6. The size of a child's stomach precludes adequate intake on a basis of two meals per day.
7. In communal feeding, intake varies with the size of hand and manual dexterity, to the disadvantage of the young child.
8. There is maldistribution of food within the family, the father having the master's share of both staple and relish.
9. The sale of sweet, aerated drinks, fostered by massive advertising, has a pernicious effect on young children. On a follow-up recently of 107 serious cases at Ndola, 60 percent of mothers fed their children with such drinks (Lynch 1969).
10. Increase in migrant labor since the 1920's has denuded the rural areas of manpower for traditional agricultural tasks, resulting in an ever-increasing spread of cassava cultivation replacing millet production.

11. Increased beer consumption results not only in overindulgence affecting the family budget and preparation of meals, but in the use of beer as a soporific.
12. The effect of food taboos has significance, but in most areas alternative foods can be found.
13. There is no concept of deficiency disease; the explanation of the unknown is deemed to be supernatural.
14. The underweight child is so common that it is regarded as being normal.
15. There is lack of knowledge of human nutrition among all socioeconomic levels of the population, and among most professional and auxiliary staff.
16. There is lack of budgeting skill, and there are bad spending habits.
17. Obligatory, traditional hospitality makes heavy demands and although the visitor is seldom the guest of the child, it is the child who suffers.
18. There are many changes in food habits taking place, but most are nutritionally detrimental. Consumption of bread and buns is increasing by about 20 percent per year.
19. Crowded housing conditions in urban areas make consumption demands beyond the capacity of kitchens.
20. Young children are at special risk when they are twins, illegitimate, children of broken marriages, displaced by a new pregnancy, youngest member of a family of four or more or when the parents are alcoholics.

B. Environmental

1. There is only one rainy season, which limits production to one harvest without irrigation and results in shortage of greens at the end of the hot, dry season.
2. Rainfall is heavy in the north where the soils are leached and moderate in the center and south, where, in years of underaverage rainfall, yields are low. Excessive rainfall, as experienced this year, also affects yield.
3. Monkeys, bush pigs and birds cause serious losses of growing crops. The traditional bird scarers now attend school.
4. Research studies have shown that 30 percent of grain stored under village conditions is lost to insect pests and rats.
5. The usual tropical pests and plant diseases are prevalent, as are diseases of domestic animals.
6. Vector borne diseases are also prevalent, especially malaria, bilharzia and hookworm, all of which are synergistic with malnutrition.
7. The herds of wild game have been reduced from abundance to scarcity outside the game reserves; thus the most important traditional source of animal protein has been lost.
8. In many areas there is no tradition of cattle husbandry and the presence of the tsetse fly precludes cattle over vast areas.
9. Soil erosion affects not only local resources in the hilly areas, but through silting in the valleys, results in flooding and loss of arable land.
10. Where the chitamene system of cultivation prevailed, much of the woodland has been cut, and cassava replaces the former grain crops.

11. Traditional land tenure handicaps development; lands are held in trust tribally and a system of usufruct prevails in most areas.
12. A population density averaging 12 per square mile results in dispersed small communities, thus hampering the provision of services.
13. The state of secondary roads during the rains and the distances involved are obstacles to marketing.
14. In urban areas there is little provision for vegetable gardens.

C. Economic

1. About 70 percent of the population depends in whole or in part on its own production to feed the family. They do not have the purchasing power to buy from commercial producers.
2. The cost of foodstuffs consumed by the lower economic sector has increased in price by 54 percent during the last four years.
3. Although wage rates have increased since independence, the basic laborer's wage is very close to the poverty datum line.
4. Payment of wages monthly results in lavish spending at the beginning of the month and near destitution at the end.
5. The introduction of cash crops, an essential diversification of production, can be detrimental to food production.
6. The historic dependence on fruit and vegetable supplies from the south, results in short supply and inflated prices.

D. Demographic

1. From the results of the last census (1963), it was deduced that the natural rate of increase is 3.2 percent per year, thus the population is doubling every 22 years.

2. Food production per capita is falling behind the rate of population increase.
3. In 1963, it was reported that 46.6 percent of the population was under the age of 15 years. It can be assumed, therefore, that at least half of the population is nonproductive.
4. The drift to the towns from the rural areas is marked. Urban dwellers are increasing at an estimated rate of 8 percent per year, resulting in the creation of septic fringes around the cities, which generate their own peculiar problems.

IV. PROGRAMS TO COMBAT MALNUTRITION

A. Nutrition Education

Education or information alone is not enough. Even education and information services together do not meet the need. Communication is required. Annex I is an indication of the communications we are attempting.

During the last 12 months the Public Relations Unit of the National Nutrition Commission has produced:

<u>Pamphlets</u>	<u>Number of Pages</u>	<u>Number of Copies</u>
Nutrition in Zambia	32	20,000
Feeding Well Means Growing Well	broadsheet	2,000
How to Buy Food	"	2,000
How to Prepare Food	"	2,000
Malnutrition - A Disease We All Must Defeat	"	2,000
Annual Report 1968	24	500
Nutrition Teaching Handbook	14	3,000
Teachers' Guide to Basic Nutrition	16	11,000
Better Nsolo	6	3,000
 <u>Handouts</u>		
Eat Well to Work Well (English, Bemba, Tonga Nyanja and Lozi)	8	50,000

<u>Handouts</u> (cont.)	<u>Number of Pages</u>	<u>Number of Copies</u>
Child Feeding (as above)	8	50,000
Pregnant Woman (English)	6	10,000
Nutrition Group Handouts (from 1-10)	2	10,000
Various Smaller Handouts		5,000
<u>Posters</u> (26 x 35 inches)		
Good Breakfast		
Food for School		5,000
Good Father, Good Food		5,000
Bad Father, Bad Food		5,000
Babies on Scales		10,000
When Taking Baby Off the Breast		2,000
Feed Your Child with Cup and Spoon		3,000
<u>Posters</u> (17 x 26 inches)		
Nutrition Values		3,000
Eight Important Points		3,000
Bodybuilding Foods		6,000
Energy Foods		6,000
Protective Foods		6,000
Child Feeding		3,000
Marasmus/Kwashiorkor Baby		5,000
Before and After Marasmus		3,000
Before and After Kwashiorkor (2)		6,000
Three Babies and Foods		3,000
Good Food Makes You Grow		3,000
Our Body Uses Food		3,000
Groundnuts		3,000
Needs of a Pregnant Woman		3,000
Healthy Baby		13,000
Undernourished Girl/Boy		3,000
Breast-Feeding		3,000
Three Babies on Weight Chart		3,000
Under Five Clinics		3,000
Three Babies on Scales (small)		2,000
Feed Your Child with Cup and Spoon		2,000
Dzithandizeni (2)		3,000
Natuyafive		2,000

<u>Newspaper Campaign</u>	<u>Number of Pages</u>	<u>Number of Copies</u>
Healthy Baby Advertisement	circ. app.	112,000
Teaching Kit	circ.	3,000
<u>Slide Series (Strips)</u>		
Why and How to Fight Malnutrition	duplicates	100
Signs of Malnutrition in Children	"	100
Prevention of Malnutrition	"	100
Children Grow Up, Up, Up!	"	500
Clever Mother	duplicates not ordered yet	
<u>Films (25 minutes)</u>		
Good Food, Urban (adapted by RST) Nyanja, Bemba		4
Clever Mother	copies not ordered yet	
<u>Puppet Show</u>		
Professor Good Food	1 production	200 performances
Malongo, the Strong Boy	2 productions	50 "
<u>Radio</u>		
Nutrition spots of varying length	on the air	3,000 minutes
<u>Exhibition Stand</u>		
Produced		4 stands

B. Applied Nutrition

1. Under Five's Clinics

Priority has been given to combating malnutrition among preschool children. Based on the pioneering work at Ilesha in Nigeria, the Under Five's Clinic was accepted as the most effective tool, but it was decided to provide some service to as many as possible rather than an excellent service for a favored few. The first Under

Five's Clinic was started in May 1967 (there were postnatal clinics before that) and now there are over 500 in the country.

The object is to persuade mothers to bring their young children to the clinic monthly to be weighed and have the weight recorded on the "Road to Health Chart" which is kept by the mother. The children are examined by a medical assistant or nurse and personal advice given to the mother and any ailments treated. Immunological cover is provided for the common diseases; nutrition education and demonstration of local foods are given.

The Under Five's Clinics are run by the Department of Health, Public Health Departments of local governments and Mission Medical Services.

2. Nutrition Rehabilitation Centers

Two rural centers have been started for convalescent cases and early cases which will require hospital treatment later if not arrested. Therapy consists of education of the mothers.

3. Supplementary Feeding in Day Schools

Trials have been carried out with four possible supplements: reconstituted milk, New Zealand Milk Biscuit, Profort and instant Munkoyo. Significant gains in height and weight have been obtained with the New Zealand Milk Biscuit, but as it is made in New Zealand using vacuum ovens, the landed cost will be prohibitive.

The supplement being sought must provide a minimum of 10 g protein (NPU 70) and 200 calories, with vitamins and minerals added as required. There are other factors:

- a. The snack must be as cheap as possible;
- b. It must be palatable and acceptable to the pupil;
- c. It should have good storage qualities;
- d. It should be easily distributed;

- e. It should involve minimum extra work for the teachers;
- f. It should be easily accounted for;
- g. It should be manufactured locally.

The milk biscuit developed by the Dairy Division of CSIRO Australia meets all these criteria, and the action planned will be described in Section VII.

Study of Boarding School Feeding. Two nutritionists have started a study of the feeding in a sample of the 122 boarding schools. The study will determine the nutrient intake and compare it with the requirement; assess the facilities available - storage, kitchens, equipment, safety precautions and hygiene; the qualifications of those responsible and the kitchen staff; the present sources of supply and costs, other available sources of supply, etc.

Nutrition and Mental Development. This began as a retrospective study of children with known birth dates, who have an undoubted history of serious malnutrition during the first 24 months. The psychology department of the University of Zambia has devised, during the last four years, a battery of tests which can be applied to school children of all ages, independent of the spoken word, after initial explanations have been given. This battery of tests is being applied to the experimental group and a control group from a similar socioeconomic background.

During the development of this research project, it was realized that this battery of tests provides a tool for objective evaluation of mental development in relation to measures for nutritional improvement.

Food Depots. Under the aegis of the Freedom from Hunger Campaign, local nutrition groups have been started in Lusaka, Ndola and Kitwe and others are being formed. Membership of the group is open to all who are willing to help and the group elects its own executive committee. For example, the Lusaka Group consists of over 300 volunteers and runs 36 food depots.

In the urban areas, the main causes of malnutrition are poverty, lack of availability of foodstuffs and

ignorance. The food depots provide protein-rich and protective foods as cheaply as possible - many items are half the price charged in markets and shops. Thus, there is an availability of food and some assistance regarding poverty. Nutrition education and demonstrations of the use of the foods sold are given. The educational aspects are regarded as more important than sales.

C. Child Feeding

The malnutrition clinics of the mining townships have supplied supplementary milk products to children of miners for many years.

At the Under Five's Clinics dried skimmed milk has been supplied to children in need, but the rapid expansion to 500 clinics has stretched the local resources and supplies of skimmed milk powder are the subject of a request to the World Food Program.

Trials have been carried out in supplementary feeding of school children and it is intended that such supplements will be provided throughout the schools in due course.

V. GOVERNMENT POLICIES TO COMBAT MALNUTRITION

A. National Nutrition Policy

In March 1967, the Cabinet approved a National Food and Nutrition Policy. In summary, it is a program to reduce the wastage of manpower through death, disability and disease, due directly or indirectly to malnutrition, to increase the learning capacity of children through improved nutrition and to improve the productivity and working efficiency of adults.

The Cabinet approved the creation of the National Food and Nutrition Commission to implement this policy.

B. National Food and Nutrition Board

What's in a name? Various alternatives were considered for the administrative and coordinating body - a council, a bureau, a board or a commission. A "council"

is defined as "an assembly of persons meeting in consultation or to give advice." A "bureau" is defined as "a governmental department for the transaction of public business." A "board" is defined as "a number of persons elected to the management of some public or private office of trust." A "commission" is defined as "one or more persons appointed to perform specified duties." The body has specific duties to perform - the implementation of a policy. It was decided "commission" would be the most appropriate designation.

The National Food and Nutrition Commission was created by Act 41 of 1967. It has a membership of five, partly governmental and partly nongovernmental. It meets six times a year. The operation is modeled on cabinet procedure. There are agenda papers for each agenda item, written opinion papers for circulation to members between meetings and information papers.

The executive arm of the Commission is the Office of the Commission, which is the full-time center for the food and nutrition program. It is headed by the Executive Secretary, an administrator with knowledge of nutrition, supported by an Assistant Executive Secretary, an Administrative Officer, a nutritionist, an accountant, a stenographer and a registry clerk.

As part of the Office of the Commission is the Public Relations Unit directed by an experienced communications expert, assisted by a journalist/editor, a radio scriptwriter/producer, a cameraman/photographer, a graphic artist and translators.

Also established by the Act is the Expert Advisory Committee, chaired by the Executive Secretary so as to form a direct link with the Commission. The disciplines represented are administration, agriculture, agricultural economy, biochemistry, economics, education, medical nutrition, nonmedical nutrition, psychology, social medicine, sociology and statistics. The function of the Expert Advisory Committee is to provide professional and technical advice on matters relating to food and nutrition.

C. Laws Regarding Fortification

None.

D. Price Supports

The provision of milk in high density housing areas at a subsidized rate is the only price support for food crops.

E. Land Settlement in Zambia

1. Definition

"Land settlement means the permanent settlement of people in productive employment on the land".

2. Aims

- a. To make good farmers;
- b. To stabilize rural society;
- c. To raise the standard of living and the cash income of rural families;
- d. To provide fundamental education for the whole community.

3. Principles

- a. The consent and cooperation of the people in settlement;
- b. A viable economic base;
- c. A planned program of development;
- d. An agreed form of land tenure;
- e. The maintenance of soil fertility and structure.

4. Planning

- a. Initiation: selection of proposed settlement zone preliminary water and soil survey;
- b. Analysis: settlement initiation proforma to be approved;

- c. Survey of water, land capability, social and economic conditions;
- d. Final report: basic data, economic appraisals, phasing of infrastructural services, capital and recurrent costs, critical path schedule.

5. Resettlement

Land resettlement is one of the functions of land settlement. It is only one part of a total process. Land resettlement schemes are not a substitute for the general development of the rural infrastructure of roads, water supplies, economic and social services, for there can be no resettlement of people without these essential and basic services. The purpose of initiating a resettlement scheme may be: to relieve acute distress; to develop a hitherto undeveloped natural resource; or to provide for a special production need.

F. Agricultural Credit

Agricultural credit is made available to farmers to produce sufficient food for the farmer's needs and those of his family, and to produce a salable surplus of crops to enable the farmer to repay his loan to the credit agency while providing simultaneously for his other necessities of life.

If the level of production is such that the farmer would be unable to achieve these criteria, then assistance other than credit needs to be introduced as a first step in moving away from subsistence farming.

Such assistance may take the form of grants until such time as the farmer is able to produce the required surplus. It is considered unreasonable to expect a farmer to obtain agricultural credit when he would not be able to raise a surplus crop to repay the loan granted him. From the beginning, farmers must appreciate the need for loan repayment. Provision of credit to farmers below the subsistence level creates future problems from their inability to repay.

Farmers must, therefore, initially be able to operate as producers from resources other than credit. Availability

of credit would be introduced as a second step in their agricultural advancement.

VI. THE MAJOR PROBLEMS INHIBITING PROGRAMS TO COMBAT MALNUTRITION

Coordination of the diverse agencies, disciplines, divisions and departments in combating malnutrition has been, and is, the most intractable problem. Although almost every agency of the United Nations should be involved, there is no adequate administrative infrastructure to deal with one of the world's most pressing problems. Thus, there is no international example to form a national precedent.

Most developing countries have inherited an unhappy trilogy of effort:

- Ministries of Health - curative rather than preventive medicine;
- Ministries of Agriculture- cash crops and conservation, rather than food production;
- Ministries of Education - satisfying the needs of external examiners, rather than the needs of the country.

Bilateral aid and national development plans have tended to concentrate on memorials to expatriate architects and engineers, whereas it is only through the will and skill of the common man, that basic and permanent development can take place. Thus, the most basic development of all - the improvement of nutritional status - has been insufficiently supported.

The importance of education has rightly been recognized, but the relationship between nutrition and learning capacity has tended to be ignored, thus casting the costly seeds of education on the barren ground of malnutrition.

Because the body can adapt itself to a lower level of caloric intake by reducing effort, the relationship between nutrition and working efficiency has not been clearly

recognized. Reduced working efficiency is revealed by lethargy and sluggishness. Movements are slow, infrequent, subject to long pauses and all continuous effort is avoided. Superficial observers regard this as laziness not recognizing the relationship between nutrition and working efficiency.

The procedures for obtaining aid for nutrition projects are complex and sophisticated and the period of gestation varies directly with the size of the organization to whom the application is made. Where enthusiasm has been stimulated locally for a nutrition project and high priority accorded, such delays can result in change in priorities or even change of governments.

The lack of trained personnel at all levels - professional, auxiliary and field - is probably the greatest handicap. Even with intensive effort the remedy is slow.

VII. PLANS FOR THE FUTURE

A. The Nutrition Survey and Services Project

There is need to know more about the incidence and nature of malnutrition, the dietary deficiencies which cause the malnutrition, and the factors which cause the dietary deficiencies. This project is not just another survey, it is a combination of survey coupled with implementation of measures for improvement. The survey aspects are a means to an end - the initiation of means for improvement.

In January 1969, the Governing Council of the United Nations Development Program Special Fund approved an allocation of \$586,000 and the Zambian counterpart contribution amounts to \$624,000. The project is planned to be undertaken between 1969-1972. Data will be collected on family food consumption, and related factors and on food habits, patterns and beliefs.

In parallel, there will be a nutrition status survey, including biochemical investigations and related diseases. The financial support is the subject of current negotiations. This survey will include anthropometric measurements, clinical assessment, taking of blood, urine and stool

specimens. The biochemical determinations will include hemoglobin, hematocrit, total protein, albumin globulin ratio from blood, ascorbic acid and retinol in serum, urea, creatinine, hydroxyproline, thiamine, riboflavin and N-methyl nicotinamide in urine.

The Food Consumption Survey will cover, during the first year, 700 families, three times a year, for a period of six days during each visit. The Nutritional Status Survey will cover the same 700 families once; in addition, 2,000 preschool children and 500 school children will be examined three times for seasonal variation.

The sample will be on the basis of random clusters using census enumeration areas, administrative districts and ecological areas as stratification.

The data of both surveys will be programmed for computer, with the possibility of obtaining correlations for up to 30 variables.

The plan is to survey one province (Northern Province) during the first year. During the second year, Provinces II and III will be surveyed and after analysis and interpretation of the data from Province I, measures for improvement will be initiated. During the third year, the remaining Provinces will be surveyed, measures for improvement in Provinces II and III will be initiated and the measures taken in Province I will be expanded and intensified, with a view to them being taken over by the appropriate government department as part of the District Services.

The Public Relations Unit of the Commission will have the task of translating the scientific data into a form understandable locally, so that the local food and nutrition committees will be able to take a meaningful part in the planning and implementation of measures for improvement.

What the measures for improvement will be depend on the findings of the survey, but there are certain likely courses of action: establishment of Under Five's Clinics and M.C.H. Centers, health and nutrition education both formal and informal, village water supplies for potable

water and irrigation, improved environmental hygiene, improved village storage facilities, agricultural extension among subsistence producers, encouragement of Young Farmers' Clubs, Women's Clubs, etc.

B. Supplementary Feeding in Day Schools

It was decided that a supplement in biscuit form was the most desirable and a search was made for a suitable biscuit. Milk protein is denatured at baking temperature by the reaction between lysine and a reducing sugar. New Zealand developed a satisfactory biscuit by lowering the temperature by use of vacuum ovens. The product has produced significant results and is acceptable (needs water to drink simultaneously), but importation of the finished product is likely to be costly.

CSIRO of Australia approached the problem from another angle - the removal of the reducing sugar lactose, thus virtually preventing the Maillard reaction at baking temperature. The present composition of the biscuit is 20 percent milk protein "coprecipitate", 40 percent wheat flour, 20 percent butterfat, 10 percent sucrose and the balance is water and vitamin and mineral additives. This produces in solid form the approximate ratio of protein, carbohydrate and fat in milk.

It is intended to establish a pilot biscuit-making plant, capable of producing one ton per day, at Mazabuka, in a disused factory of the Dairy Produce Board. The Dairy Produce Board will be responsible for manufacture and distribution to the main centers.

It is intended to carry out research in replacing the imported ingredients by locally produced raw materials.

When soaked in water this biscuit doubles in size and can be fed by spoon. In this form its use as a weaning food will be investigated.

The initial plant will be capable of providing a school supplement for 30,000 pupils during a school year.

Evaluation of the effect of the supplement will include anthropometric, clinical and mental development assessment.

C. Study of Boarding School Feeding

A study of a sample of the feeding in boarding schools is currently taking place. The likely development will be the provision of courses for full-time caterer/boarding masters. The course will include bulk buying, efficient storage, menu planning, hygienic preparation, supervision of cookery, equitable distribution, prevention of wastage, accounting and stores control. It has been agreed in principle that a unit will be established in the Ministry of Education for direction, supervision and inspection of boarding school feeding.

D. Diploma Course for Female Nutrition and Agricultural Extension Officers

A three-year diploma course has been started at the Natural Resources Development College. The object of the course is to train women who will concentrate on extension in the subsistence sector. Traditionally, food production in this sector is mainly the task of women and it is, therefore, appropriate that the extension officers should be women.

It is also hoped to have female Agricultural Assistants trained at Monze Agricultural College, but female accommodations are not yet available.

E. Nutrition Training Center

Negotiations are taking place for the transfer of a Homecraft Center for use as a Nutrition Training Center. This center will concentrate on short term "in-service" courses for appropriate staff of state and local governments.

F. Revision of School Curriculum

In October 1968, the Minister of Education announced changes in the structure of secondary school courses. They will now include agricultural science, farm practice and agricultural machinery. This means a major curriculum revision which will be carried out with assistance from UNESCO. The Commission will be involved in all courses where aspects of human nutrition may be included.

G. Under Five's Clinics and M.C.H.

A new unit has been created in the Department of Health and it is hoped to extend and intensify the activities which have already started so propitiously.

H. Communications Program

The various activities under this program, as detailed in Annex I, will be developed and intensified.

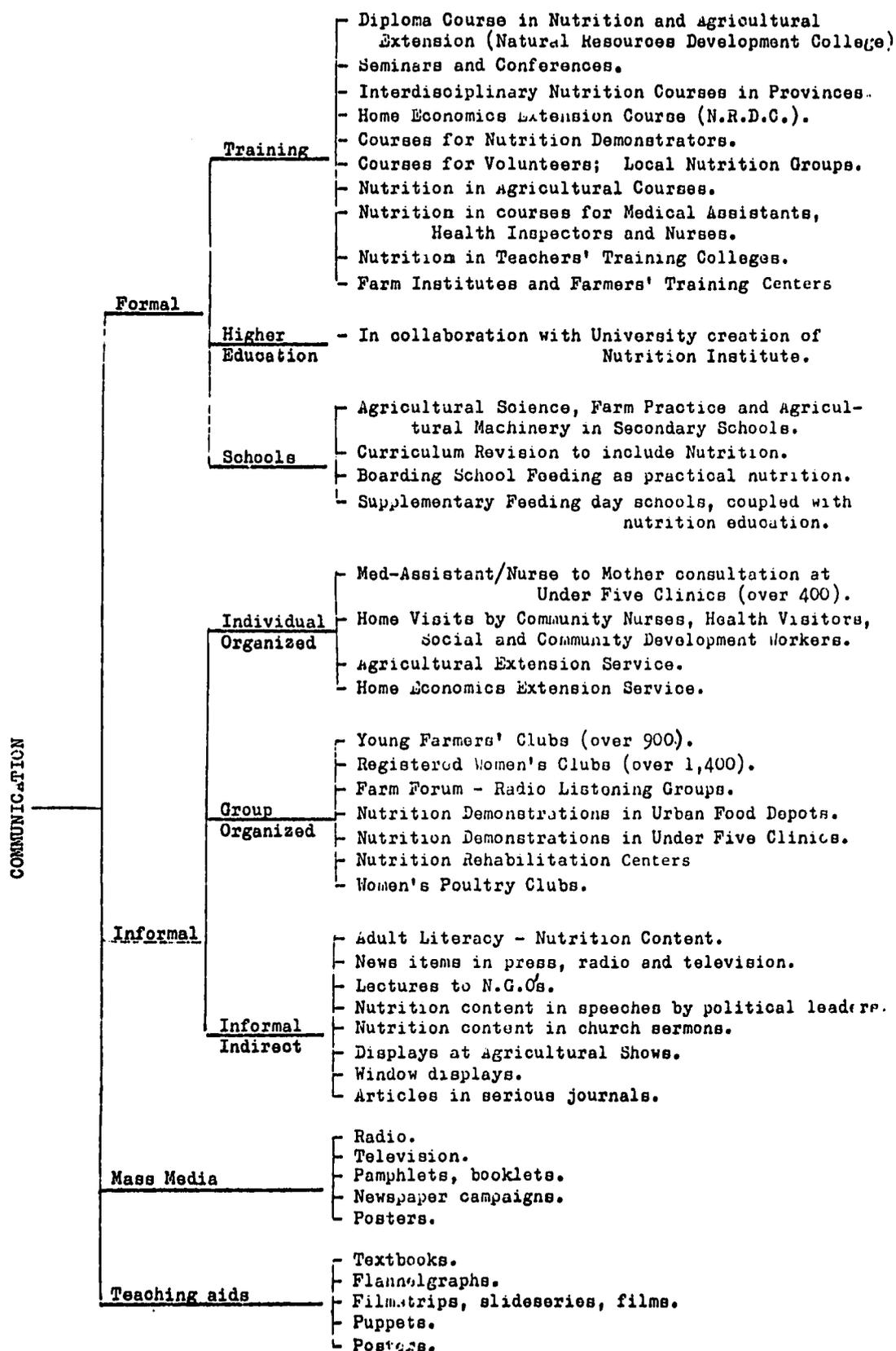
I. Food Depots

The good start made in establishing depots in various urban centers, through voluntary support, will be pressed ahead. Tentative plans are being made for the expansion of this service to rural areas.

J. Nutrition and Working Efficiency

So far most of the efforts have been applied to improving the nutritional status of the preschool and school children, the unproductive half of the population. Clearly, all developing countries require increased productivity and working efficiency. It is believed that improved nutrition could make a significant contribution in this regard and, as a first step, it is proposed to hold a seminar on this subject later in the year.

A N N E X I.



GENERAL DISCUSSION

Chairman: Dr. Demissie Habte (Ethiopia)

Dr. I.S. Dema (FAO): Mr. Chairman, I should like to make a few comments on the country reports we have just heard. I will take them in the order they were presented.

1. Botswana

I was very much interested in the remark on pellagra, but it could be much more useful if we were given some information on the seasonal incidence of pellagra and how it is related to maize availability and preparation.

2. Ethiopia

The point about urbanization, and its interference with successful breast-feeding, has been well taken, and I do hope that further studies will try to identify the influence of occupation; that is, if the mother must work to earn a living, how does this affect breast-feeding?

Iron deficiency anemia has been quite a problem in Ethiopia. If you go through the ICNND¹ report to which Dr. Demissie referred, you will see that the Ethiopian teff-based diet is very rich in iron due to the high iron content of teff.

Yet, we do see iron deficiency in the community. The explanation for this discrepancy could be that the iron in teff is in a bound form and is not readily available. So in the infant food program, teff is now being replaced with wheat which has a little less iron but of the kind that is more available to the body.

The Ethiopian delegation did not discuss the promotion of milk distribution. FAO and UNICEF are involved in this. There is

¹Interdepartmental Committee on Nutrition for National Defense (now the Nutrition Program, U.S. Public Health Service).

a milk factory, the Shoa Milk Factory, located in Addis Ababa, which is concerned with the collection of milk from long distances in Ethiopia and pasteurization of it in Addis Ababa for distribution to the needy. Unfortunately, it does not reach the needy because of its price. I think the suggestion offered by Mrs. Pinder that the poor be issued with some kind of coupons with which they can buy milk subsidized by the Government, is very useful. I hope the Ethiopian delegation will concur.

3. Kenya

I wish to congratulate the Kenya delegation for illustrating the nutritional disadvantages of cash crops and the neglect of staple foods. This is in reference to a nutritional and biochemical report concerning a community here in Kenya, that is, the Mwea-Tibere Irrigation Scheme, where it was found that the settlers who had been working on their cash crops had not been in any way nutritionally better than the subsistence farmers in the surrounding district. This underlines the point that extensive planting of cash crops is not the answer. We must combine cash crops with staple foods.

4. Lesotho

The Lesotho delegation mentioned their applied nutrition program which has been active since 1962. At this stage, FAO, WHO, and UNICEF are thinking of evaluating it before going any further, and I expected to hear a little bit about evaluation in the country report. Everybody feels that this program is working very well, but we have no supportive figures. It is true that many more families now have eggs, but we do not know how many of them are eating those eggs. There has been no real diet survey to show how much of these eggs and vegetables are being eaten in the community. Also, marketing is a big problem because of the common market union with South Africa. South Africa is flooding Lesotho with cheap eggs.

5. Malawi

We should think about the problem of food taboos with more rationality. Let us try to find why the specific taboos exist, and if there is an alternative. If Moslems do not want to eat pigs, why worry? We can give them sheep or cows.

I heard that there is a training program in Malawi for medical assistants, but I wonder what attention you are paying to home economics and agricultural extension, in terms of nutrition. Regarding your rehabilitation program, it would have been interesting to know what

kind of follow up you have. That is to say, how many women actually follow the teachings which you give them at the Center? It is nice to bring them to the Center and teach them, give them clean beds, clean plates, clean food, show impressive growth records of children and then discharge them. But what happens after that? How many relapse? How many return to repeat the training?

I was surprised to hear that there were no data on the nutritional status of children. If it is true that there have been no data on the nutrition of children, I wonder why you continue so much nutritional education. After all, what are you teaching? If it is true that you have no information, the Malawi Government is in a position to request assistance from the U.N. or bilateral agencies to help you undertake this kind of study. It is this kind of information which you need for shaping and advancing nutrition education programs.

Tropical ulcers were mentioned as a sign of malnutrition, and I think you should change your minds on this matter. It is a mistake to cite tropical ulcers as a sign of malnutrition, especially among farmers who, working through the bush, cut themselves one way or another. Nowadays, we think of tropical ulcers as more of an occupational disease than a nutritional one.

6. Somalia

For Somalia, I do not really have a reply for books on nutrition. The problem of books on nutrition is that the earlier ones which most of us read in the schools of medicine, biochemistry, nutrition or whatever, were not oriented to solving problems of nutrition. They were really describing physiological and biological processes such as chewing of food, digestion, absorption and utilization. In terms of solving common nutritional problems, those books do not meet the need. FAO, WHO and UNICEF have gone into this since 1965 and have produced a number of books which bear on the ecological and economic settings. We could give you some of the references. I am also happy to recommend the works of our distinguished Conference Convener, Dr. May, who has written a number of books on The Ecology of Malnutrition.

7. Swaziland

Coming to Swaziland, I have a humorous remark to make concerning the disappearance from the diet of many traditional animal protein foods, such as locusts, etc. I wonder if the officials in Swaziland would welcome more locusts in the hope that they might provide some additional protein? But of course, there is always

the question of calories. If locusts come and destroy your staples, no matter what amount of locusts you eat, if you do not have enough calories, you are left just where you started. We will have to think of the prevention of locusts' visitations side-by-side with the improvement of the production of acceptable foods.

8. Tanzania

The honorable gentleman who presented the Tanzania report understandably complained of protein-calorie deficiency, yet he is concentrating only on protein improvements. We have gone a long way to change our minds about protein deficiency alone; protein and calories go together. If you increase protein intake but do not ingest enough calories, the protein will be diverted into energy-producing channels, putting you back where you started. So, I would suggest that you consider the calories as well.

The described course of treatment for kwashiorkor lasting for 4 months is a bit long and the 120-pound cost is still high. I think this depends on the administrative services. The doctor who is in charge should perform other tasks while he hands the ordinary care to a well-trained nurse.

9. Uganda

Someone has complained about the discontinuation of UNICEF milk supplies. It is true that UNICEF milk is a prestige and baby food. I do not know whether the Uganda delegation is worried about UNICEF stopping it in order to encourage Uganda to produce its own baby food, as described in the report. Then you talk about asking for support; UNICEF is already supporting the production of the African baby food, this is why they stopped giving you milk from outside.

One thing I expected from the East African countries was a comment on workers' feeding. When you travel this country you see many coffee and tea estates where workers have been dragged from their homes and are living on the outskirts of the plantations. They are paid a small wage and are expected to add to their incomes by producing backyard or shamba coffee, and this, of course, fails. When the price of coffee, cotton or tea goes down, men are thrown out of work and feeding problems arise, giving rise to a high incidence of malnutrition among children on most of these estates. I am sorry that no one here has commented on the feeding of workers, either on the plantations or in the municipalities. I think the problem needs to be studied.

10. Zambia

The Zambian delegate has been through the Ibadan nutrition course, and I am sure we speak the same language. However, I would have expected the Zambian delegate to say a little more about the program being supported by the U.N. Special Fund to undertake an overall nutritional survey of the country and use this for immediate planning. The team is already in Zambia, and I think there is something to be learned from this project.

Mr. Meswele (Botswana): Mr. Chairman, regarding Dr. Dema's question, I would prefer that Dr. Lochrie, the Medical Officer for Health, reply. He will be here later (he is not feeling very well now), and I feel I should leave this to him.

Dr. Demissie (Ethiopia): I think we have finally realized that the abandonment of breast-feeding is inevitable with increasing urbanization and that in such circumstances the recommended action is to educate mothers on the best methods of artificial feeding while, at the same time, encouraging them to continue breast-feeding for as long as possible.

The fact that there is a high incidence of iron deficiency anemia, in spite of the abundant iron content of teff, our staple cereal, is a reflection of the fact that what a family has to eat in no way indicates what the preschool child is going to get.

The main reason why I did not mention the provision of milk distribution in Addis Ababa is because it affects an insignificant number of children. However, plans are under way to expand the project.

Miss Gondwe (Malawi): I would like to explain that home economics per se was not mentioned in the report because it is part of the overall program. For example, the nutrition program in community development is mostly in the hands of home economics. In addition, we have FAO advisors there who may be advised on this home economics program.

The extension service was not mentioned either. In Agriculture home economics is an extension service. Now this is a new thing, started this year. A course has been initiated in extension work for women rural home economists, who will be known as Farm Home Instructors, and who are to work in several rural training centers in Malawi. The Ministry of Education also has a home economics program, and it is part and parcel of the overall program.

Mr. Semiti (Tanzania): Dr. Dema wondered whether we considered calories to be important or not. We do, but we did not say this in the paper because in all surveys carried out the greatest needs have been approached. Most of the foods given to babies are fairly high in cassava flour and so on, and once we have protein to the desired level they are all right.

Another point that was raised was on the cost of treating kwashiorkor patients. The figure was quoted from the report of the Ministry of Health and, in fact, I have been wondering how they derived it. That cost, as Dr. Dema pointed out, is mainly an administrative cost which means it is the cost of the bed per night.

Mr. Vamoer (Zambia): I purposely left out of the country report an explanation of the nutrition survey planned for Zambia because this will be described later in the paper I have been asked to present on "Nutrition, Planning and Coordination." Briefly, when the Commission was formed and we realized we could not go on planning how to combat malnutrition without having basic data, we decided that we had to have a survey of the whole country in order to learn about the incidence and the nature of malnutrition: what are the deficiencies, what causes these deficiencies, and how can we correct them? So, we applied to the United Nations Special Fund which in January this year approved our request for \$586,000, matched by a Zambian Government contribution of \$624,000.

The survey will last until 1972 and will provide the basic data with which we can plan our nutrition program. It will be carried out in two parts: the first part will be a food consumption survey conducted by an FAO expert; the second part, which will be run concurrently, will be a medical assessment of the people in Zambia.

Dr. Muyanga (Uganda): I want to clarify my remark about the UNICEF milk. We did not get any warning before it was stopped. We were using it to treat children in the hospitals and at quite a number of our clinics which had nothing else with which to treat the children. However, I agree with your idea that it was stopped to encourage us to produce our own milk.

Dr. Glynn (WHO): The first point that occurs to me is the question of statistics. We are concerned with statistics from three points of view, essentially: first, their accuracy; second,

their comparability as between one country and another; and thirdly, their use, and this is most important in planning and training. Quite clearly, as I think has already been said, unless you have the basic data on which to plan and organize your training programs, much of what you may be doing will not have the required orientation to local problems.

In several delegations' papers, reference was made to the importance of the interaction between nutrition and infection. We are all familiar with the deleterious effects of malaria, measles, whooping cough, tuberculosis and gastrointestinal diseases in children. I think this is an aspect that could have been more highlighted because this is of very great and serious importance. I am happy to inform you that this whole question was reviewed by WHO in 1968, in the monograph series. The report should be available shortly, and I commend it to the medical members of this conference particularly.

As far as training is concerned, we are, I am happy to say, possibly able to offer you some further assistance. A number of you are probably familiar with that excellent textbook on infant feeding in the tropics prepared some years ago by Professor Derrick Jelliffe. I am happy to inform you that a revised edition of that book is now out and the form in which it is presented would, in my opinion, make it very useful, not merely for medical personnel but also for all workers who have an interest in nutrition as such.

The last comment that I would like to make is in relation to some technical aspects of food production in general. A number of countries have made reference to the use of such modern techniques as irrigation, pesticides, insecticides and other agents of this nature. It is one of the anomalies of life that we frequently find that the very instruments we use in the course of development can have deleterious effects on health and may, in many instances, create more problems than can be solved. In the case of irrigation, for instance, it has been well-established in tropical countries that unless certain simple concepts of sanitary engineering are included in irrigation procedures, you are running the risk of increasing malaria and bilharzia, to mention merely two diseases associated with water.

The other point which I think is important is the end product of food processing. Ministries of Health and, of course, my own organization, are interested in food production, distribution, storage and food hygiene in general. Obviously, the hygienic quality of the end product, whatever product it may be, is of very

considerable importance, and in a number of programs which have been designed to step-up agriculture and the livestock industry, insufficient attention has been given to this aspect, in my opinion.

Dr. Khan (Kenya): I want to put forward a certain plan which I have in mind after listening to the various reports which all agree that there is malnutrition and it is a problem. I would like to put to this distinguished audience certain priorities and, I would say, a seven-point plan, which I think we should keep in our minds all the time. The first one which, I think, is extremely important and relevant is a study of the effects of rapid urbanization on the family. The second one is to accept a certain criteria of the diagnosis of protein-calorie malnutrition. The third is to try to find a cheap protein food for Africa, for that matter, for the region south of the Sahara. Fourth, we should consider the possibility of fortifying dried skimmed milk or milk in any form, either with iron or niacin or one of the other nutrients which can prevent diseases like rickets, anemia or goiter. We should also consider fortification of fruit. Fifth, I would like to see us develop a program of nutritional immunization. I call it "nutritional immunization" because of the extent of the effect of disorders. Sixth, we should try to establish an institute of child health in every country, to provide health education, nutrition training and recommendations to the national advisory council. Seventh, and this is extremely important, we should plan for a yearly, or whatever you may suggest, perhaps a biyearly evaluation of our programs. I think if we present these programs and if they can be implemented, I think we shall be accomplishing a great deal.

Dr. Dema (FAO): Mr. Chairman, thank you for letting me take the rostrum again. I have one remark on Lesotho which I failed to refer to earlier, and I think this will concern most of our landlocked brothers and sisters to the south. I was looking through the tables attached to the country report, and I found that from birth to 14 years the Lesotho sex ratios are even. Thereafter, however, the proportion of males drops. Where do the men go? I raised this question with the Lesotho delegation, and they confirmed that the men go to the Republic of South Africa to work. This is something we have to think about when drafting resolutions urging governments to find alternative occupations for people. Otherwise, they will migrate, and if you look at the figures, you will see that large numbers of able-bodied males are leaving our countries.

NUTRITION AND HEALTH

by Dr. Demissie Habte
Deputy Director, Ethio-Swedish Pediatric Clinic

Nutrition is a dominant factor that determines all aspects of the health of infants and preschool children. Realization of this fact in developing countries has only come about in the last 30 years. It is now well-accepted that malnutrition is the most widespread and major health problem of the preschool child in our regions, and that a solution on a national and worldwide scale is of the utmost urgency. This awareness is attested by the many international conferences (like this one) on the nutritional problems of the preschool child.

One such conference, the International Conference on Prevention of Malnutrition in the Preschool Child, held in Washington, D.C., from December 7 to 11, 1964, summarized the urgency of the problem thus:

1. Preschool malnutrition is basically responsible for the early deaths of millions of children;
2. Of those it does not kill, preschool malnutrition permanently impairs physical growth and probably causes irreversible mental and emotional damage; and that
3. Preschool malnutrition is a serious deterrent to progress in developing countries; it weakens the productive capacities of adults surviving from the irreparable damages incurred in early childhood. The survivors become adults lacking the vigor and enterprise essential for productive advancement. Their shortened life span and decreased ability to produce gravely impede the physical, mental and economic growth of the population.

Feeding of infants and young children is still commonly held to be only the responsibility of parents or guardians. This is a gross misunderstanding with grave consequences because the general population lacks the basic knowledge for proper infant feeding and cannot, in many cases, buy or produce acceptable foodstuffs for their infants. Responsibility must shift to governments through appropriate agencies.

Possibly the first evidence of the interaction between nutrition and health is to be seen in low birthweights. During intrauterine existence, the fetus is a very effective parasite living on the mother, and at this time the primary condition for optimal health and development is a well-nourished mother. Low birthweights in developing countries (see table below) are most likely due to maternal malnutrition, particularly protein deficiency. The final trimester of pregnancy is perhaps the most important. Maternal malnutrition also leads to a high incidence of stillbirths and of premature births.

Birth Weights in Selected Countries

<u>Country</u>	<u>Birth weight</u>
Congo ¹	2.92 kg
Nigeria ¹ (Ibadan)	2.86 "
	2.89 "
(Lagos)	3.04 "
	3.01 "
Malawi ¹	2.99 "
Rhodesia ¹	2.86 "
Ethiopia ²	3.11 "
	3.05 "
Tanzania ²	2.86 "
USA ³ Males	3.40 "
Females	3.36 "
S. Africa ¹	3.07 "
Uganda ¹	2.95 "

Following birth, the infant is again dependent upon the mother for nourishment, security and warmth but proper growth and development henceforth will depend upon the adequate intake of calories and the various nutrients from whatever source.

Calories

Total calorie requirements of a thriving baby are high, ranging from 110-140 calories per kilogram from birth to the second month and from 100-110 calories per kilogram for the remainder of the first year. The undersized infant has a greater need and during periods of repletion will ingest 150-170 calories per kilogram. The calorie requirement per

¹Jelliffe, 1968

²Young, P.N. Ethiopian Medical Journal, Vol. VI, No. 1, 1967

³Nelson, Textbook of Pediatrics, 8th Ed, Saunders, Philadelphia, 1968.

kilogram of body weight progressively decreases with age proportional to the normal deceleration of growth with age.

Proteins

Protein is the most limiting factor of the diet, particularly in developing countries. Proteins supply the amino acids necessary for construction of new body proteins and for maintenance of body tissues. Of the 24 amino acids of physiologic importance, at least nine are essential for growth and must be provided in the diet. The proportion of these amino acids in the diet seems to be important, and imbalance may result in defective utilization and retardation of growth, particularly at marginal levels of protein intake. Experimental animals clearly show the effects of amino acid imbalance on growth.

Protein requirement is affected by the quality and digestibility of the protein, and by the amount of calories contributed by carbohydrates and fats. Animal proteins, such as milk, eggs, meat and fish, are of high nutritive value because at least half of their amino acids are "essential." On the other hand, vegetable proteins taken individually have a low nutritive value (contain one-third of essential amino acids), though when mixed properly this can be increased considerably. A small addition of animal protein to a vegetable mixture greatly enhances the nutritive value.

A nursing infant ingests 1.5 - 2.5 g/kg of protein from breast milk daily. The average intake at 1 month is about 2.5 g/kg falling to 1.45 g/kg at 6 months. A joint FAO/WHO expert group concluded that the following figures adequately cover the requirements for infants, in terms of either breast milk or cow's milk protein.

Milk Protein Requirements

<u>Age in months</u>	<u>g/kg</u>
0-3	2.3
3-6	1.8
6-9	1.5
9-12	1.2
<u>Years</u>	
1-6	1.0
7-12	0.9
13-19	0.8

It should be noted that the above figures refer to milk protein for the first year, and to "reference protein" subsequently (a protein of high biological value, containing a specified pattern of amino acids completely utilizable for anabolic purposes at maintenance level).

The rapidly changing requirement of protein in the first year of life is a measure of the rate of growth. Brain growth in man, which is largely a process of protein synthesis, is greatest in the first year of life and almost complete by the end of the second year. Height increases by 50 percent in the first year, 16 percent in the second year and 10 percent in the third year while weight increases by 200 percent, 25 percent and 16 percent, respectively. The skeletal muscles comprise about 25 percent of the body weight during infancy and increase to 45 percent by 12 years of age. A newborn infant derives all the necessary nutrients from breast milk for the first 4-6 months, and thrives adequately on it during this period. Subsequently, however, breast milk is insufficient to meet all the calorie, protein and mineral needs and additional food is mandatory for optimal growth and development. This additional food must be prepared taking into consideration the child's physiological and anatomical limitations, namely, an incomplete primary dentition and subsequent problems of masticating solid foods, a lack of digestive and absorptive tolerance to full adult diet, a smaller stomach capacity, a higher daily water need than adults, and, of course, the overriding awareness that during this period of rapid growth, the comparative nutrient needs, especially of protein, are highest.

No discussion of child nutrition in developing countries should pass without stressing the great importance of breast-feeding. Breast milk is the natural food for human babies just as cow's milk is the natural food for calves. Nutritionally, it is possibly superior to cow's milk; hygienically, it is safe and free from bacterial contamination; economically, it is the cheapest and most convenient; and psychologically, it is of value to the mother and to the infant. In addition, in our regions it is the most readily available and often the only source of protein (implying that breast-feeding should be encouraged as long as possible).

Minerals

Iron is necessary for the formation of hemoglobin and myoglobin as well as for several enzymes. Iron deficiency

anemia is of public health importance among infants and children in many of the developing countries. Its distribution is closely related to that of protein-calorie malnutrition because the predisposing conditions for both are similar; namely, inadequate intake of animal proteins, repeated infections resulting in loss of blood through the gastrointestinal tract and bone marrow depression. A newborn infant has about 0.3 g of total body iron at birth. By 20 years this has increased to 4-5 g. The difference has to come from an exogenous source. The store of iron at birth is sufficient to prevent a deficiency state in the first 4 months, but subsequently there is a necessity for continuous exogenous intake.

Under normal conditions, only about 10 percent of the ingested iron is absorbed, but when the diet of the child consists of starchy cereal foods, as with the preschool children in our region, the absorption rate is even lower, meaning that a much higher intake of iron is necessary.

Iodine

Iodine is essential for the synthesis of the thyroid hormones thyroxin and triiodothyronine, and its deficiency is widespread in certain subtropical and tropical countries, including central and west Africa. Clinically, this is best exemplified by endemic goiter. Recent surveys have indicated that, contrary to previous beliefs, endemic goiter occurs commonly among preschool children.

When endemic goiter exists in a population, there seems to be an increased incidence of cretinism and deaf-mutism. Iodine deficiency can be easily prevented on a national scale by the compulsory iodization of salt.

Fluoride

While in technically advanced countries the magnitude of dental caries (which can be reduced by ingestion of fluoride) greatly surpasses that of all other nutritional deficiency diseases, it is, fortunately, not a problem yet in developing countries.

Vitamins

Vitamin deficiencies were recognized earlier than protein malnutrition, and the attendant publicity that ensued has overshadowed and perhaps retarded awareness of the more important protein-calorie malnutrition. Every

doctor treating children must have been confronted with a mother of a marasmic child pleading for a prescription of vitamins to fatten her child! Of the vitamins, I shall concentrate only on A and D since they appear to be of primary public health importance in our region.

Vitamin A is necessary for vision (formation of visual pigments) and for the maintenance of epithelial structures. Its deficiency ranks among the most prevalent of nutritional deficiency diseases throughout the developing countries, and is an important cause of blindness. In India, Pakistan and Southeast Asia it has been estimated that more than 1 percent of all young children are affected. It is also common in Africa where, again, its incidence is closely related to that of protein-calorie malnutrition.

Vitamin A deficiency, primarily represented by conjunctival xerosis and keratomalacia, is common in our region for at least three reasons: first, intake of dairy products and meat is low; second, yellow and green vegetables are not ingested in adequate amounts; and third, the amount of fat in the diet is insufficient to assure adequate absorption of vitamin A and carotenes.

Vitamin D is closely connected with calcium and proper bone formation. The natural diet is not rich in vitamin D even under optimal conditions, and nature has arranged for the manufacture of this vitamin in the body through the effect of ultraviolet rays on the skin. The secretions of human skin (in deeper layers) contain a dehydrocholesterol, a provitamin D, which is converted by the ultraviolet rays of sunlight to vitamin D, which is then absorbed by blood. Deficiency of vitamin D results in rickets. The previous view that rickets was rare outside the temperate zone is now untenable and commonness of rickets in the subtropics and tropics is now recognized. In a children's hospital in Addis Ababa, the incidence of rickets in infants below 3 years of age has been estimated to be as high as 30 percent. That this should be so where sunshine is hardly avoidable is proof of the strong influence of tradition and beliefs.

Inadequate intake of nutrients, particularly of proteins and calories, results in physical and mental impairments. It is not the purpose of this paper to review the causative and contributing factors of malnutrition. It is sufficient to say that it is complex and involves multiple disciplines. However, one condition is always

present, an inadequate diet, and this may be so because of lack of suitable food or because the available resources are not being used.

The evidence that protein-calorie malnutrition impairs physical growth is abundant. It has been demonstrated clinically by a number of parameters, including height and weight, mid-arms and chest circumference and skinfold thickness, and chemically by depletion of serum proteins, change of plasma-amino acid ratio, etc. Perhaps the simplest and most obvious are curves of height- or weight-for-age compared to standard curves obtained from optimally-fed children (e.g., the Iowa and Harvard standard).

The African child grows satisfactorily for the first 4-6 months (while getting breast milk) comparable to Western standards. However, thereafter he falls behind and shows a widening lag which by the end of the preschool period approaches 2 years. That this difference is not genetic but environmental has now been amply illustrated by numerous studies of optimally-fed children from the same area. These children have growth curves identical to those from industrialized nations.

The number of children who can be classified as malnourished will vary according to the criteria used for the diagnosis of malnutrition. Surveys which consider 10 percent or more below expected weight-for-age as indicating malnutrition have reported that as much as 70-90 percent of the preschool children are malnourished. Whatever criterion is taken, it is clear that the number is considerable.

The extreme forms of physical impairment secondary to protein-calorie malnutrition are exemplified by kwashiorkor and marasmus. It is very important to realize that the incidence of kwashiorkor and marasmus deceive the true magnitude of protein-calorie malnutrition. A better understanding will evolve if we consider these conditions as the tip of an iceberg, a small fraction visible above the surface with a great expanse submerged and unseen.

The consequences of protein-calorie malnutrition on the brain have only recently been investigated. Early results of these studies are staggering and the implications relate strongly to the national programs and policies of developing countries. No sane government can now

remain idle and refrain from according the highest priority in national development programs to childhood nutrition.

From March 1-3, 1967, an international conference was held at the Massachusetts Institute of Technology on "Malnutrition, Learning, and Behavior." The results of the proceedings were recently published in book form, and most of what follows is derived from it.

For obvious reasons, it is not possible to study the effects of malnutrition on the human brain along experimental models. Therefore, the best and most convincing evidence that malnutrition is detrimental to the performance of the brain comes from experimental animals, namely, rats, dogs, pigs and hamsters. These studies show that malnutrition in the early life of experimental animals has a direct effect on subsequent function of the central nervous system and that deficiencies induced soon after birth have more of an effect on learning and behavior than those initiated at the end of normal lactation. This indicates that the environmental insult has to come during the period of rapid growth. The fetus, although in a stage of greatest growth, appears to be much less vulnerable to the effects of malnutrition because of its parasitic existence. Recent works on cell size and cell number have revealed a pattern of increase in cell number and cell size in various organs during normal growth of the rat. In prenatal and early postnatal development, cell organs appear to grow by cell division alone, then by both cell division and increase of cell size, and finally by increase of cell size alone. This shift occurs first in the brain and last in skeletal muscle. A nutritional insult, such as caloric deprivation, which occurs during the first phase, arrests cell multiplication, and compensatory feeding later does not result in catch-up growth.

Studies in humans report to show an association between malnutrition and performance in various tests of adaptive behavior, intersensory integration and intelligence. Dr. J. Cravioto from Mexico, a pioneer in this field, studied school children in a rural village of Guatemala. He compared children of short stature presumed representative of children exposed to malnutrition in early infancy with those of tall stature presumed to be representative of children least likely to have experienced a significant degree of malnutrition. He found a positive

association between anthropometric measurements and inter-sensory integration scores, and none between the latter and social and education factors.

Dr. Monckeberg from Chile followed a group of marasmic children for 3-6 years. He found that compared with other low-income children of comparable age from the same population, those who suffered early marasmus did not catch up in I.Q. and Gesell test performance by 3 to 6 years of age. A similar work from South Africa essentially confirms the above.

These and many other works are accumulating evidence that malnutrition in early infancy causes irreversible brain damage. While it is true that most of the studies do not wholly eliminate the influence of social factors, there appears now to be little doubt that malnutrition is at least one important factor.

In the final analysis, the development of a nation, its industrial and agricultural productivity, is the sum total of the individual efforts of each citizen. A citizen who is well-nourished and capable of learning is an asset to the nation. However, a citizen who is physically frail and mentally handicapped is on the other side of the ledger. The balance between the two determines the course the nation will follow.

Simple health measures are saving many lives, including those of malnourished children, and the population that has survived a nutritional insult is on the increase. This may have grave consequences on the economic and creative productivity of the nation.

Preventive measures against nutritional diseases are complex, just as are the different factors in its etiology, and must of necessity have a multidisciplinary approach. A nutrition program must consider medical and health matters, together with agriculture, education, economics, finance, sociology and community development so that the policy adopted represents the combined and coordinated synthesis of medical authorities, nutritional research workers, agriculturists, educators, anthropologists and community development workers. I shall not attempt to discuss all of these but will only present briefly the role of the health services in the struggle against malnutrition.

Dr. Jelliffe, in a WHO monograph entitled, "Infant Nutrition in the Subtropics and Tropics," gives an excellent review of this problem. Medical health workers represent the main group of interested participants in the fight against malnutrition, and as such, constitute the closest link with the target group, the preschool child. They form, in effect, a liaison between the preschool child on the one hand and the nutrition-policymaking group on the other. It makes sense, therefore, that the two primary duties of the public health worker are the identification of the magnitude of the problem as well as promotion of increased awareness of it, and the execution of the practical corrective and control measures of the policymaking group.

Twelve basic public health activities have been suggested for the control of malnutrition in young children.

1. Treatment in hospitals and out-patient clinics.
2. Supplementary feeding programs for malnourished children.
3. Development of weaning foods based on inexpensive local resources.
4. Education of mothers in child feeding practices.
5. Immunizations.
6. Periodic surveillance of the population at risk (early diagnosis and treatment).
7. Nutritional rehabilitation through special units or in day nurseries, kindergartens, etc.
8. Control of diarrhea.
9. General nutrition and health education.
10. School feeding and educational programs.
11. Combined programs of education and food production (school, family and community gardens).
12. Planning family diet."

Essentially the objectives of these activities are:

1. To reduce mortality due directly or indirectly to malnutrition in the preschool child

2. To reduce the incidence of malnutrition
3. To improve the nutritional status of infants and young children as well as pregnant and lactating women
4. To create an increased awareness in the community of the importance of nutrition
5. To promote all measures that bear on improving nutrition of the population.

In trying to meet these objectives, a program development may be evolved in three stages:

1. Direct attack on advanced malnutrition, i.e., curative stage.
2. Control when a balance between treatment and prevention programs is established.
3. Consolidation, consisting of the general promotion of improved food habits in the community.

It is obvious that these stages merge into one another imperceptibly and that at any one time all three should be progressing at the same time but with a shifting emphasis.

Such a program of development assumes the existence of an adequate infrastructure of basic health services and MCH activities. Without them, it is not possible to foresee how any nutritional program can succeed. The laying down of the basic health services, including MCH, quite clearly has a higher program priority.

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GENERAL DISCUSSION

Chairman: Dr. Y.N. Misomali (Malawi)

Dr. Munoz (WHO): I would like to congratulate Dr. Demissie on his excellent presentation. I want to confirm that endemic goiter has been found to be an important public health problem in many developing countries where well-conducted nutrition surveys have been carried out.

I would also like to point out the responsibilities and duties of the health service of a country, as follows:

1. To establish, strengthen, develop and expand the nutrition resources of the Ministry of Health.
2. To provide nutrition training for all personnel directly or indirectly engaged in nutrition activities.
3. To assess the nutrition problems of the country which have public health significance. These should be assessed individually, e.g., protein-calorie malnutrition, vitamin A deficiency, etc., and not under a global assessment such as "the nutritional status of the community," which is the usual approach. The nutritional status of the community is a complex nutritional problem, made up of many more definite components.
4. To plan and implement sound action programs to solve the problems found.
5. To coordinate nutrition activities with other government agencies.

Dr. Naboshe (Zambia): I am surprised that in discussing "Nutrition and Health" no mention was made of family planning. I can assure you that one of the main causes of malnutrition in Africa and other developing countries is over-population. You find that our people marry early and after 30 to 35 years of age they have five to seven children. If you go and teach these people nutrition only you are teaching them something they cannot fully use. Their main problem now is where to get food of any kind. You want them to understand agriculture, but most of our people are moving into towns. They are shifting from rural areas where they can cultivate crops to urban areas and they settle in the peri-urban slums where they cannot cultivate anything. As a medical practitioner, I find that most of my patients with malnutrition come from large families (7-10 children) or are children of unemployed parents. It is not enough to go and preach to these people; you must also satisfy their immediate need. Then teach them nutrition and child spacing.

In Zambia we have not done much in this connection. I have just returned from abroad and I intend to pose this question to my Government. However, I do not expect much immediate success as it is difficult for most people to see this point.

I would like to know what family planning measures have been implemented in other countries, especially in East Africa, because I consider unplanned parenthood to be one of the main causes of malnutrition. We can never succeed in our national programs unless we consider the question of family planning.

Dr. Khan (Kenya): I would like to congratulate Dr. Demissie on an excellent presentation. It is difficult to cover such a wide ranging topic in such a short time. Since his subject was "Nutrition and Health," I think it is important to appreciate that health and nutrition are intimately linked. I personally feel that nutrition and the incidence of malnutrition are very much related to the social and economic situation in a country. We public health workers are intimately concerned with promoting health and preventing infection. Most of us seem to continually talk about ignorance, poverty, and traditional practices, but we seem to ignore the interrelationship of infection and malnutrition. I would like to see us carry out studies to uncover the precipitating causes of infection that lead to malnutrition. As Dr. Demissie mentioned, there is much controversy about which is the antecedent factor, infection or malnutrition. I am one of those who strongly feels that infection plays a very important role.

We should regionalize our problems. For instance, in your country, one person in three has rickets. In my country, one in three has anemia, and this essentially is iron deficiency anemia. You also cited cases of xerophthalmia. In the last 5 years I have seen five cases, one of them in the last year. If we can establish priorities and relate the various conditions that exist, we can carry out effective public health programs. For instance, on the coast of Kenya we have many cases of iron deficiency anemia, the cause of which is not malnutrition or undernutrition, but essentially infestation with hookworms. So the recommendation for prevention is not that we give extra food and extra iron, but that we eradicate hookworm infestation. If we carry out regional programs of eliminating hookworm, it will do away with this type of anemia and associated malnutrition.

Mr. Marealle (Tanzania): I must emphasize the priority of protein-calorie deficiency as a problem not because in Tanzania we do not have vitamin deficiencies, not because we do not have goiter, not because we do not have mineral deficiencies, but because we have chosen protein-calorie deficiency to be the priority in our programs to combat malnutrition. In dealing with this we have again chosen nutrition training. In Tanzania about 35 years ago a physician was selected to devise ways of manufacturing vitamins for the soldiers in World War II. This

illustrates how ignorant of nutrient balances he was for soldiers need calories and proteins as well as vitamins. It also illustrates the need to begin training in nutrition at all levels in modern ways.

Countries like Tanzania, Kenya and Uganda do not have enough resources to carry on these services. In my country the budget for the entire Ministry of Health is about 120 million shillings and this, of course, includes all the voluntary and private services. If we were to divide this money among the population, it would amount to about 10 shillings per person per year. This is nothing--10 shillings buys about two bottles of beer and would not cover medical expenses for a year. So in terms of money, we do not have sufficient resources.

In terms of manpower, we are also short. We have only one doctor for every 30,000 people in Tanzania and I believe the ratio is similar for neighboring countries. Hospitals and health centers are few and far apart. The distances involved hinder many people from getting to these facilities.

In my opinion, we should begin by providing training in nutrition. I am happy to tell you that in Tanzania we already have two courses which provide training in nutrition at all levels. At one we train nurses, community development assistants and agricultural workers in nutrition for 9 months. When they leave they form district nutrition mobile teams to meet the 12 million people of Tanzania whom we cannot reach otherwise. Recently, we also initiated a short course in nutrition for teachers from different training institutions. When they complete the course, they take up teaching posts where they give their students instructions in the principles of nutrition. It is hoped that the students then go home and pass this new knowledge on to their parents.

These programs are a good start, but they fall very short of reaching the vast number of people in our country who are scattered over large areas.

Dr. Glynn (WHO): Dr. Demissie has presented an excellent paper. While there is a lot of work being done to ascertain the relative importance of nutrition and infection in the course of malnutrition, I think the important practical conclusion for this conference is the point made by Dr. Demissie himself, that any argument for the moment as to the relative importance of these things is rather academic. The best practical procedure is to assume their coexistence in each severe case of malnutrition and to act accordingly. In the Mulago Hospital attached to Makerere University, for instance, the routine treatment for severe cases of malnutrition includes rehydration, the use of antibiotics, antimalarials and the use of anti-hookworm drugs in particular.

I am indebted to Dr. Demissie for another important point he

made which, I think, is very frequently overlooked, namely the "M" in MCH. He mentioned the importance of maternal health, and the health of the pregnant woman and lactating mother. We have many conferences on child nutrition but few concentrating on maternal nutrition. For instance, it seems that we lack well-founded information on the question of maternal weight gain in pregnancy. Also, there is the question of the course of pregnancy and labor in a malnourished woman. There is the effect of hemorrhages, both anti- and post-partum in the anemic mother, and the results of the suggested association between malnutrition and congenital deformities in various parts of the world. These are all areas in which the information we have at the moment is completely inadequate, and I am happy to say that the University of Makerere is planning a meeting later this year which will look at some of these problems in greater detail.

The question of diagnosis in nutritional anemias is quite important and I am happy to say that WHO has given considerable attention to the standardization of laboratory diagnostic procedures with particular reference to diagnosis of iron, folate and vitamin B deficiencies. Studies are being conducted in various parts of the world to assess the effects of iron combined with folic acid and vitamin B₁₂ on the hemoglobin of children to whom they are being given and on their subsequent physical and mental development.

Mr. Berg (United States): Thank you, Mr. Chairman, for the opportunity to comment on this comprehensive paper. I make these comments with some reservations because I am not intimately familiar with problems of malnutrition in eastern Africa. These thoughts are based on experience in India for the past 3 years and I can only assure you that the severity and the implications of malnutrition in India are considerable.

I was fascinated by the latter paragraphs of Dr. Demissie's paper-- the range of possibilities, the large number of needs, the large number of opportunities and, most significantly, the large costs involved. Regardless of the country in which we work on this problem, we have limited resources. Mr. Semiti mentioned yesterday that in Tanzania the entire national budget would be required just to overcome the problem of kwashiorkor. Where do we start? How do we begin to plan when there are so many problems to attack and so many possible solutions?

We have in this field, as those of you who have worked in it for many years realize, a number of people who have favored various solutions to the nutrition problem. There are those who say the answer is more weaning foods. Some say the answer is better nutrition education, others better maternal and child health centers, others better agriculture, others new processed foods, others fortification of foods, others fish protein concentrates, single-cell protein and on and on. How do we grab a handle on this problem? How do we determine,

given limited resources, how to reach the most people for the least amount of money in the shortest period of time? In India we recently took a look at this problem and the approach may be of interest. First there was an attempt to project agricultural production over the next 3-5-10- and 15-year periods. These projections were then translated into nutrients, i.e., how much protein does this mean, how much vitamin A, how much iron? Simultaneously, there was a projection of population. Then there was an assessment of the gap, e.g., what is going to be the total iron deficiency, the protein deficiency, the vitamin A deficiency? This, of course, was done with full recognition that per capita figures do not mean much, and accordingly factors were incorporated to try to accommodate the needs of the lower income population. Once a rough idea was established of how much vitamin A would be required, for example, all the alternatives were laid out. What happens to the vitamin A supply when price policy is juggled? What happens when the market mechanism is adjusted? In a country like India where there are ration shops, what happens when the ration shop practices are changed? What happens when research is reoriented? Perhaps more emphasis should be placed on pulses and less on high-yielding varieties of grain. What are the relative costs for the fortification programs? How much does nutrition education cost?

Some think that it is enormously expensive to get someone to change his food habits. There is no question that if you sit in a village and pound someone over the head month after month and year after year, you may eventually get him to change his food habits; but are there other ways to achieve the same nutrition goal? In India, for example, one of the ideas we are toying with is the fortification of salt--not just with iodine, but with calcium, vitamin A, iron and lysine, which is the limiting amino acid in the Indian diet. In other words, is it possible to get the same nutritional impact without nutrition education? I am not suggesting that in all countries this is the answer; only that in the Indian context this is a possibility.

For years we have been hearing that the way to get more vitamin A and iron into the diet is to grow more fruits and vegetables. Who can argue with this? In India, to reach a target of the lowest income level, the study showed that it would require a 297 percent increase in the growth of vegetables and a 217 percent increase in the growth of fruit. This is neither feasible nor realistic, so are there other ways to provide that iron? Are there other ways to provide the needed vitamin A? We are looking at various possibilities of fortifying foods which already reach everyone. For example, everyone uses salt. In fact, the people who need nutrition help the most in India often use the most salt. Eighty percent of all salt in India is processed in relatively few centers so you could have complete control over it.

Please do not misinterpret my comments to suggest that nutrition

education is not good or growing more fruits and vegetables or applied nutrition is not good. However, it is suggested that we must widen the spectrum of possibilities and we must do it within the context of relative costs.

Dr. Dema (FAO): I have been very much impressed by Dr. Demissie Habte's presentation. Regarding Dr. Naboshe's comments about family planning, I wish to stress the population/resources ratio. It would be sinful to eliminate people and not try to develop their resources. The approach now is to link the two and the expression we use is "planning for improved family living." I do hope you take this into consideration when you put the proposition to your government.

Mr. Kigundu (Uganda): Mine is just a small comment about reaching the unreachables. In Uganda we started a program 5 years ago which is popularly known as PPP for Preschool Protection Program. The idea was to fight malnutrition and infection and to reach the unreachables through mobile services. It was begun as a sort of private scheme and we hope that the Government will take on the program and spread it over the country.

Dr. Demissie (Ethiopia): I would like to apologize for omitting any comments on family planning. However, I must point out that in this day and age family planning seems to be the fashion and people forget that there is such a thing as a maternity and child health service which, in all honesty, is really working for family planning. Dr. Dema has very kindly supported me in this. I disagree with Dr. Naboshe that lack of family planning is the primary cause of malnutrition in our developing countries. I would concur that family planning is an important activity which should be undertaken, but not without regard to other priorities, such as the provision of basic health services with which it should be closely integrated. You cannot convince me that the high infant mortality rates prevailing in the developing countries and malnutrition are due to lack of family planning. Possibly the most important problem in our area is the lack of adequate medical services, especially those aimed at maternal and child health. I think if you have these, family planning will be taken care of.

Dr. Khan mentioned the interaction between infection and malnutrition, and I agree with him wholeheartedly. We cannot go into great depths on this, but the relationship is very important. I also agree that nutrition problems vary from country to country and, therefore, initial surveys to assess the nutritional status of the population should be undertaken before a national nutrition program is embarked upon.

Mr. Marealle of Tanzania says we must stress protein-calorie malnutrition as the most important nutritional deficiency; and I would, in essence, agree with this. However, we should not forget

that simple caloric deficiency is an important problem which, with increasing urbanization, may come to the forefront. This is already the experience of some South American countries.

Mr. Berg has put the algebraic equation of the problem of malnutrition very well. I agree that the solution is not easy, but I would have thought that, coming from the United States, he could have put all his data into a computer to get an answer. I agree that it is very problematical whether the actual cost of nutrition education and the cost of other measures like food fortification are comparable or not. I am not certain. I would say that, by and large, nutrition education may be costly and positive results may be difficult to get in a short period of time. But I think the effects are longer lasting and farther reaching. I agree, however, that in a crash program against malnutrition nutrition education need not take priority and relief measures like distribution of food and food fortification measures may produce quicker results.

I am sure you are aware of the relationship between protein malnutrition and vitamin A, and I have pointed out the common etiology.

Mention was made of the Preschool Protection Program of Uganda. It represents a sound approach to a medical problem, i.e., first the target group is chosen, then the order of priorities among diseases prevalent in this group is determined, then practical measures are applied. The question of reaching the unreachables (preschool children) was the subject of an extensive international conference in Italy in 1963, and I will not pretend to offer solutions.

Dr. May (Convener): As the Convener, it is my privilege to try to summarize what we have learned from this morning's excellent presentation and discussion. Although the problems are very similar in all the countries involved, they develop in different ways because of local differences in geography, economics, culture, and so on. In other words, different ecologies produce the same problems. This results in the fact that although the problems are the same, they probably cannot be dealt with by a uniform program.

I am extremely grateful to my friend, Alan Berg, for his thoughtful presentation. What we must learn from this, I think, is that we must build our programs around the terms posed by each different ecology. We cannot do everything at once, and the idea of trying to determine first, second, and third priorities is an excellent one. Basic information on the many factors that produce malnutrition would presumably be programmed into a computer; the complex relationship between needs, production and distribution might thus be clarified.

NUTRITION AND AGRICULTURE

by Dr. I.S. Dema, FAO Secretary
Joint FAO/WHO/OAU Food and Nutrition Commission for Africa

While the identification of malnutrition in the community is an exercise best performed by the medical profession, it is still necessary to stress the close association between agriculture and the food and nutrition situation.

Some data from western Africa (Dema, 1965) supports the view that the physical well-being of the people is dependent upon available food supplies, which in turn depend upon local farming and economic conditions, and the handling and distribution of the foods. In addition, urbanization is creating demands for more and varied foods which must be derived from the farms in the rural areas (Dema and den Hartog, 1969). Hence, the remark that agricultural prosperity must be considered an essential background to public health problems, and that plans for agricultural improvements must include the procedures for ensuring adequate food supplies.

Rural people depend largely on what grows on the farms, which costs them nothing in cash. Moreover, because of transport difficulties and rigid preferences for local foods (which are generally starchy staples), the caloric and protein intakes tend to correspond with the size of cultivated land per capita. Although some kinds of livestock are kept, this is done mainly for traditional purposes and for prestige, hence animal protein sources figure very little in the local diets. The very challenging exception to this dependence of food intakes on farm acreages is the situation in the tree crop areas where arable tracts are diminishing in size.

It would be expected that first consideration would be given to applying the proceeds from the sale of cash crops to provide more food, but in fact, these crops are sold in order to pay for imports urgently needed for economic development, and also to pay for other pressing domestic needs besides food, for example, clothing, shelter, education and medical care.

The available combined dietary, biochemical and physical data on the cocoa farmers of western Nigeria (Collis, Dema and Omololu, 1962), and the coffee growers of the Mwea-Tabere Irrigation Scheme in Kenya (Wievsinger 1967) show that the presumably higher incomes from cash crops have not resulted in nutritional pictures for these communities that are significantly different from the patterns in the surrounding mixed-cropping zones.

By matching the growth and development chart of the children with the corresponding data on cropping and food intakes, there emerges a three-dimensional relationship which shows that the larger the food crop area, the better the chances for subsistence and the closer the physical well-being to that standard of the well-to-do classes (Dema, 1966). Thus, the better placed populations in regard to the amount of land under food crops seem to have better diets and more robust physical development. They are also more settled and are not tempted to emigrate in order to avoid poverty and starvation.

By recapitulation, it can be said that the major factors which prevent the farming people from rising above starvation may be summed up as follows:

1. Low levels of productivity per head, especially in the agriculturally overpopulated parts where large tracts of cultivatable land have been lost through accelerated erosion.
2. The preponderance of cash crops over staple foods, without fully appreciating the need to use the proceeds from the sale of cash crops to provide an adequate diet for all members of the family.
3. Inefficient marketing, storage and processing, often yielding products which are nutritionally damaged and bacteriologically contaminated.
4. The heavy burden of pests and diseases of man, his livestock and crops.

Food and Nutrition Activities within the Ministries of Agriculture

Food and nutrition activities have long attracted the attention and interest of FAO who, upon consideration

of the subject of "Nutrition and Food Policy" in 1957, requested that the Director General report periodically on the extent to which national food policies were being geared toward improved feeding of their populations. Progress has not been up to expectations in this direction, and the FAO Conference of 1967 put forward another idea on "Nutrition in Agriculture" aimed at forging a close liaison between nutritionists and agriculturists in the important task of planning food supplies and in improving food production and use in the affected parts of the world. The weakness in this liaison arises from the absence of the necessary technical units within the administrative structure of the Ministries of Agriculture. Clearly, the creation of food production planning units within the Ministries of Agriculture could provide the working contacts for the nutritionists and the agriculturists.

The FAO (1967) paper on "Nutrition in Agriculture" recommends that the responsibilities of the proposed units include the following subjects:

1. Collecting and collating data on the food and nutrition situation (including food balance sheets) and preparing appropriate documentation to form a basis for food and nutrition planning as a part of overall economic and social planning.
2. Advising, at the national and sectorial planning level, upon the production, importation, exportation and distribution of foods together with embargoes, tariffs or subsidies that may need to be introduced to improve the food and nutrition situation.
3. Advising on the initiation of food technological and industrial enterprises, including food conservation and processing, together with assisting in formulating food regulations and food standards.
4. Undertaking technical, educational and advisory activities concerning food and nutrition through advising the extension and information services of the Ministry and assisting in reorienting production to meet the food requirements of populations.
5. Assisting in the planning and implementation of applied nutrition activities

6. In addition to the above-mentioned responsibilities, the unit should participate in joint undertakings with other ministries that are concerned with the identification and solution of problems in the field of food and nutrition, e.g. Ministries of Health, Community Development, Education, Commerce and Industry and so on.

In a bigger way, the work of the food production planning unit can be linked with the Indicative World Plan for Agricultural Development (IWP) which aims essentially at:

1. Improving the nutritional status in developing countries.
2. Setting realistic, long-term, indicative targets for international trade in food and agricultural commodities.
3. Framing sound land-use policies.
4. Providing wider employment opportunities for the rural population in pace with population growth.
5. Balancing industrial and agricultural development.
6. Devising agricultural development strategy.
7. Strengthening economic cooperation among developing countries.

Human Nutrition Studies in Agricultural Training Courses

In addition to the creation of food and nutrition units within the Ministries of Agriculture, the inclusion of human nutrition training courses is an important issue of this program. Some universities in Europe and America now include agricultural topics in their degree courses in human nutrition. However, the introduction of human nutrition into our agricultural courses is rarely heard of. It is hoped that the universities in Africa will improve upon this situation, particularly now that beginnings have been made by FAO and UNICEF since 1965, in the publication of agriculture or nutrition textbooks, e.g. the volume on Nutrition in Relation to Agricultural Production (Dema, 1965). The FAO Nutrition Division is currently

preparing a series of manuals under the general heading of "Food and Nutrition in Economic and Social Development," which will include a manual entitled Nutrition in Agriculture.

The agriculturist is well-equipped for the study of human nutrition by virtue of his previous training in animal and plant nutrition. It only requires a shift in development planning emphasis to adequate consideration of agricultural and economic aspects of human nutrition.

It is hoped that by this approach the agriculturists can be made aware of the human needs for food so that they can more effectively plan their extension services, and thus establish more realistic targets for the production of food for domestic consumption and the expansion of agricultural commodities for international trade.

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GENERAL DISCUSSION

Chairman: Dr. Y.H. Misomali (Malawi)

Dr. Demissie Habte (Ethiopia): I wonder if Dr. Dema could elaborate on the importance of food wastage during production. I read that in India, for example, if means were found to eliminate the wastage of cereals and other food resources, the food deficit could be eliminated. How important is this problem in our region?

Dr. Munoz (WHO): Dr. Dema mentioned four problems which must be overcome in order to increase food production. One more problem should be mentioned, that is the shortage or lack of new scientific agricultural knowledge among farmers. The Faculties of Agriculture of the universities should spread knowledge outside their walls in order to impart to farmers improved agricultural methods and techniques. Health personnel should also be taught simple, basic agriculture knowledge so that they can understand the agriculturists.

Mr. Ocheru (Uganda): Speaking from my own point of view as an educator in the field, the Ministry of Agriculture is doing very well. I agree with Dr. Dema, but I feel that the educational system imposed upon the ordinary man in the village has misled the public. Emphasis is put on cash crops and not on food crops. When we go to the villages we encourage people to grow food crops and tell them to sell surpluses. Instead, they try to sell the whole crop, if they can. Some Ministries of Agriculture give subsidies for growing cash crops but not for food crops. These are two conflicting ideas, and we are finding it extremely difficult to convince the public to grow food.

I have not seen, either in a hotel or at the home of a family, a full coffee meal or cottonseed oil put on the menu. I think the Ministry of Agriculture should try to convince people to grow groundnuts, but the emphasis should not be on cash sales. The same is true for the Ministry of Animal Husbandry, which encourages the production of milk and chickens, but puts first emphasis on producing milk for sale. When we travel to the villages and tell the farmers not to sell all of the milk, they say, "What are we going to do with it?" Something should be done about this.

Dr. Onyango (Kenya): Dr. Dema mentioned distribution of food, but he did not elaborate on this point. If we take a country and its several regions, we will find areas of plenty and areas of food shortages. We sometimes blame the situation on the fact that the food is not well distributed within the country, but there are a number of other problems which must be considered. For example, there is the cost of collecting food, storing it, transporting it, and distributing it.

Dr. May (Convener): This problem of cash crops versus food crops is, of course, extremely important, and we see all over the world that it is being discussed. I agree completely with Mr. Ocherro that unfortunately the trend is to give cash crops priority over all food crops. I would like to know what your feeling is regarding the conversion of food crops into cash crops. The nonfood crops on the world market, generally speaking, are losing value, and we see a glut in coffee to the point where it has been necessary to impose quotas; we see gluts in sugar all the time. The possibility of making a fortune through the sale of nonfood cash crops seems to me at the present time rather limited. The price of food crops, on the contrary, is rising, so I think that this point of making food crops become cash crops is worth discussing; recommendations to this effect should be made to our respective governments.

I have another point of worry. I quite frequently hear people say, "If you promote cash crops, eventually the money earned will trickle down to the producer." From what I can see in my own experience, this just is not so. I do not say that eventually the money will not reach the lower economic level, but from what the statistics show, it takes a very, very long time. Meanwhile, the money remains at the top level and does not benefit the producer.

Finally, there is the question of the value of milk as a food as well as a cash product. I personally feel that milk is a great luxury. In order to have safe milk a number of sectors of the economy must develop at the same time. Veterinary services, refrigerated transport and sanitary containers are essential to the wholesomeness of milk, and obviously price it out of reach of those who need it most. Hence, increasing milk production will not combat malnutrition where malnutrition is rampant unless it is heavily subsidized.

Mr. Semiti (Tanzania): In Tanzania, we have made some experiments on the effect of increased production on certain foods which we want to promote. If you go to an area which produces the common bean, Phaseolus vulgaris, and try to encourage increased consumption, what happens? If we assume a daily per capita production of 100 g per day and you increase that by 50 percent, or even double it, you do not necessarily double consumption. Those of us who are used to maharagwe (as beans are called in Swahili) in school, know how difficult it is to continue eating maharagwe after leaving school, because maharagwe are not very palatable. Maharagwe are cooked in the traditional way, that is, they are boiled with salt. They become terribly monotonous and, as soon as you leave your secondary school and go to college, you do not want to see beans anymore. So you find it difficult to encourage the consumption of beans among adults and even among children. In the rural areas trying to vary the diet with French beans, which we would like to encourage, presents difficulties in a number of ways:

1. They become monotonous because they are cooked in only one way.

2. There is an element of indigestibility, and they are believed to cause stomachaches, especially among children.

3. Beans take up to 6 hours of boiling before they become tender. In many areas in East Africa, firewood or fuel is very expensive because much of the bush has been cleared for cultivation. Therefore, if you are going to spend 6 hours cooking beans, you are going to think twice about whether to cook them at all, especially when you know that after they have been cooked they are not very palatable. So you select foods that are easier to cook but which are less nutritious.

These problems are easily tackled, however, if we take some trouble. The cooking time could be greatly reduced by soaking the beans overnight prior to cooking. We think that beans could be cooked in more than 10 different ways; we could develop diverse recipes. They could be with green vegetables, with polished maize or whole maize, bananas, coconut milk and carrots. Cooked according to such recipes the beans are no longer monotonous, they are more palatable and you could probably promote their consumption that way.

Recently, a team of German nutritionists working in Tanzania have tried a combination of Phaseolus vulgaris with maize. The ratio is 1 to 2, and they found that in feeding adults the nutritional value is close to that of milk. Following those examples, they have been trying to encourage the consumption of the mixture in that ratio in schools.

A lot of work done in other parts of the world has indicated that leaf protein can be very good nutritionally as it is high in most of the essential amino acids. It is true that some leaves are low in methionine, but generally they are fairly high in protein quality, and as we were told yesterday, when dried, green leaves can have up to 30 percent protein which approaches a protein concentrate.

If we promote the consumption of green leafy vegetables, we would be taking a long step toward alleviating the problem of malnutrition. The only trouble is, how much can you get a person to eat a day? It has been estimated that as long as a person can eat 100 g of green leafy vegetables a day, he derives 3-4 g of protein. Since this is a good quality protein, probably that amount is enough. Green leaves also provide carotene, ascorbic acid, iron and, in some cases, calcium.

I propose that this meeting try to devise ways of placing emphasis on protein foods rather than calorie sources. For example, what is wrong with steak and vegetables? We do not have anything like this in Africa. We start with ugali or rice and then add meat and fish. In the developed world it is the protein which comes to mind first and then the calorie source, as in the combination of fish and chips. I do not know how they devised that; they must have put potatoes first before the concept of good nutrition was developed.

I should like to disagree with those advocates of poultry production as a means of improving nutrition. In Tanzania we think that probably we have about 10 eggs per person per year, so even if there were no taboo, we would not have one egg apiece for our 12 million inhabitants. If each family had three or four eggs for breakfast, they would not even last a week. So eggs and poultry in Africa, in Tanzania specifically, cannot provide an immediate solution. In addition, I will sound the warning which has been sounded by many, that poultry compete with the human mouth for cereals. We know the conversion ratio, 45 percent or, if you are

lucky, up to 70 percent; but why get our protein and calories indirectly? Why settle for 45 percent of it? In East Africa cereal production is still low.

In Tanzania we produce only 1 million tons of cereals and this is not enough. When we reach the production of two million tons then poultry can be encouraged because they may eat the surplus. At the moment, they are competing with us for our limited proteins and calories. And since our protein production is about 80 percent and that of calories 90 percent, I do not think we should encourage the competition, even though we get eggs which are first class protein. Why can't we improve our proteins by increasing the sources? Why can't we improve our protein quality by increasing the number of items in the diet? If we have three or four sources of protein, I am sure you will agree, we shall have the required balance.

Mrs. Ongudi (Kenya): I think Dr. Dema left out an important point in his paper, that is, supplementary foods. I would like him to tell us what FAO and other organizations are doing in the development of these new supplementary foods, and how they are accepted by the public in the underdeveloped countries.

I also think Dr. Dema should have touched on our problems of marketing and transportation in his presentation.

Dr. Muyanga (Uganda): As we saw yesterday, in the developed countries, like the United States or the United Kingdom, all the agriculture is carried out by a very small fraction of the population, say about 8 percent, and most people live in the towns. I do not know if we can do that in Africa. For instance, if we told everyone in Uganda to go to the towns and then started farming on a scientific basis, there would be chaos in the country. The disadvantage of traditional farming is that everyone grows what he likes, that is, some people grow maize only, others grow a bit of maize plus some cotton. In Uganda, the Ministry of Health began what we call the "Interdistrict Housing Competition." This competition is mainly sanitary. We want to make sure that everyone has a good house, and that everyone has other amenities of life, such as the means for staying clean. I would like to see the Ministry of Agriculture initiate an "Interdistrict Agriculture Competition." In other words, all the people who take part in that competition are told what crops to grow. I think that in this way we can make sure that everybody grows the essentials of life in his shamba.

Mrs. S. Ngui (Kenya): I do not think Dr. Dema mentioned anything about resettlement schemes. In this country, and I believe there must be other countries with resettlement schemes, we have found that people have been taken from their home surroundings to a new place without much information on how to resettle themselves so that they can develop faster. Sometimes they face difficulties about what to do with their new found wealth. To quote one example, in one area the farmers got together and sold all their beautiful grade cows and spent the money. When time came for repayment of loans, there was no money and there were no cows. So I think Dr. Dema would do us a favor to comment on resettlement schemes.

Dr. Munoz (WHO): I think Dr. May has brought to the discussion a very important point and this is to encourage the conversion of food crops into cash crops.

In principle I agree entirely, but in practice, what about the difficulties we are going to face? Usually the Ministry of Health has its policy regarding food crops from the health point of view, and the Ministry of Agriculture its policy toward cash crops as a means of bringing more hard currency into the country. Very often the two ministries are in conflict. It will be almost impossible to change the policies of these two ministries. The conversion of food crops into cash crops will take a long time, will need a long, well-planned training program to enable the farmers to produce more food crops. It means training and it means more financial assistance.

We know that this is one of the difficulties in developing countries, but it does not mean that there is no possible solution. Since we cannot ignore the problem and as the two policies are not incompatible, I would like to suggest that we should advise the Ministry of Health to encourage the farmers to slowly increase their food crops, then slowly these will become cash crops. And we should advise the Ministry of Agriculture that a program should be implemented at the same time to teach the farmers how to use the money they are going to make on the cash crops.

The two policies are all right, provided the health authorities realize that food crops mean not only foods to meet nutritional needs but foods for surplus, and provided the agriculture authorities realize that it is necessary to teach the farmers how to use the money properly to safeguard their health. I think this is a practical approach to the actual situation in developing countries.

Mr. Bohdal (WHO): From different textbooks we learn how to express the food values and food consumption as calories, proteins and other nutrients--the quantities of nutrients consumed. Afterwards, we compare these with recommended allowances and estimate which nutrients are deficient. We must apply a reverse process when discussing agriculture. The recommended allowances of, let us say, one family must be converted and expressed as foods for a balanced diet. Having in mind a family living in the subsistence economy which produces for its own consumption, the food must be further converted into the size of land needed for its production (according to the quality of soil, rainfall and yields). I feel it is necessary to concentrate more of the research activities on this "reverse process." It is the exact way to express the point of view of medical nutritionists when discussing the mutual impact of agriculture and nutrition and when outlining the nutrition education programs for different social groups of the population.

We find the majority of nutritional problems among the farmers producing for their families consumption. We should be able to give competent advice to the smallholders on what kind of food crops they should grow to provide more foods in the form of a balanced diet (again respecting the local ecology and prices) and to enable them to pay for them. Considering this, we shall find that a small piece of land used for cash crop production improves their living conditions.

It is necessary to estimate the limits (expressed as size of land) on the production of food crops, below which it is hardly possible to produce enough for the family's needs. In such cases, less could be done through nutrition education and more through research which in its final stage can recommend farm improvements.

Dr. Demissie (Ethiopia): I could not help but feel sympathy for my good friend, Dr. Dema, who I am afraid has come under fire, primarily because he believes that a speech should be like a mini-skirt, that is to say, short enough to arouse interest but long enough to cover the subject matter. I would like to make three very short comments, particularly in connection with the remarks by the delegate from Tanzania and by Dr. May. I think first priority should be given to the available resources before we embark on the introduction of a new type of food. The use of available resources is of primary importance. Also, we should not forget the fact that animal protein is superior to all other sources of protein, and whenever possible,

these should be consumed. When we talk about new foods there is always the problem of toxicity and this should be kept in mind. For example, beans have been mentioned as the base for a future infant food for this region, but before we apply this we must evaluate the incidence of glucose-6-phosphate dehydrogenase deficiency in the population.

It was suggested that since poultry compete with humans for food they should not be promoted as an important human food. Instead, research should be done on plant leaves for human consumption. I would like to say the contrary, namely, that poultry farming should be expanded and means of obtaining cheaper, noncompetitive foods for poultry should be researched.

Dr. Dema (FAO): I have listened to all the comments and I wish to say that I was using my terms of reference on "Nutrition and Agriculture." I was not concerned with the commercial aspect, but it is good that you have brought up these points and we will look into them in our study groups.

Dr. Demissie wanted information on the importance of wastage in agriculture and food handling. I can give you some reference figures for certain groups. It is estimated that for cowpeas you receive only one-sixth to one-third of the potential yield. This is due mainly to pest damage. There is also information on wastage in processing. For example, maize, especially if put through the wet process to obtain some pap, ends up with about one-third of the original protein content. For fats, we have information on the handling of red palm oil which is common in West Africa. If it is rancid, you end up with only one-third of its vitamin A and carotene content. It is quite a serious problem and more than justifies FAO's 5-point strategy, namely:

1. War on waste in the various aspects of food production.
2. Introduction of high yielding strains of food crops.
3. Bridging the protein gap.
4. Encouragement in international trade.
5. Development of human resources.

I have taken note of Dr. Munoz's point of giving medical people some training in agriculture and I think this again depends on the institution. My own university in Ibadan takes care of this very well. Medical students in the pediatric and health courses are taken to villages and shown the relationship between ecology, agriculture and nutritional health. This is an aspect which can be developed most conveniently in universities; it can be a teaching point as well as a planning point.

I was asked to comment on the problems of food distribution from areas of production to areas of scarcity. This involves a number of things: roads, storage facilities, and education.

Dr. May asked whether or not we can turn food crops into cash crops. I think this can be accomplished on a local basis, but will meet with some difficulties. Farmers are reluctant to sell food for export because it leaves the area and is no longer available to them. On the other hand, if food crops become cash crops there might be a tendency to oversell, which would not solve the problem. This can probably be done on a localized basis but would be difficult on an export basis.

What are the prospects of making money from milk? It really depends on the initial objectives. Most of the milk industries which we have here were started to try to get milk to the underfed. However, the milk is expensive and normally must be subsidized. Thus, milk in our present state and in the face of our present need could not be clearly money-making, especially if you must compete with imports.

I think the influences of promotion on consumption are part of nutrition education. If a food is produced by an estate the estate should make an effort to insure acceptability of the commodity. Private firms have no problem. They employ public relations people to travel and make propaganda speeches. I think we nutritionists are sometimes jealous of them because of their impact on people through this propaganda, posters, small gifts and coupons.

I agree with my friend from Ethiopia that the idea of developing poultry has been overemphasized. Dr. Demissie underscored the point that research into alternative foods for poultry is making headway. I notice that earlier poultry schemes were tied to foreign agencies which made

sure the poultry rations came only from outside Africa. They provided bran meal but the formula was never known. Food substitutes must be found. There are many wild leaves, vegetables and seeds which could be compounded for the poultry and pigs to eat while concentrating on ordinary staples.

Mrs. Ongudi from Kenya wished to know the FAO, WHO, and UNICEF strategy regarding supplementary foods. It depends on what you call supplementary foods. Do you mean supplementary to breast-feeding or just toning up with vitamins? We have a policy for some of the supplementary foods, especially the protein-rich supplements. These should always be supported by adequate calorie intake, otherwise they are wasted.

In reference to the question of the fortification of foods raised earlier by Dr. Khan, we are not encouraging the fortification of foods for several reasons. First of all, this calls for government control and there is no government arrangement by which you can take samples of a fortified food and analyze them for nutrient content and standards of safety. Anybody can manufacture anything under a brand name and sell what is, in fact, impoverished food. Therefore, FAO, WHO and UNICEF are not in favor of uncontrolled food fortification.

There was a question from Uganda asking whether or not we can afford to reduce the size of the farm population. I think this is an advisable action because presently too many people cultivate one piece of ground. This is what is referred to as agricultural over-population. Too many people work one piece of ground only to obtain low yields. Industrialization, along with improved and planned urbanization, would provide alternative jobs. A few farmers left behind in the villages and assisted by extension services can produce enough for the people.

Dr. Muyanga wondered how we could make sure that everybody grows enough food on his shamba. I think it is a matter of planning, taking into account the number of people to be fed, the size of the shamba, the nature of the soil, the crops, the yield to be expected, etc.

Mrs. Ngui asked about resettlement schemes and the work to be done to accommodate nutritional needs of resettled people. This has been a social problem in many areas.

We have come across resettlement schemes where the people are moving back into the towns. They had been resettled in the lake areas hoping that they would catch enough fish to eat, but were not allocated land for farming. Some donors sent them food occasionally but that was not enough. As a result, they are moving back into the towns to find jobs. Resettlement schemes usually fail because of poor planning.

Dr. Munoz raised the point about how to educate the people to use their money in a better way. It depends on whether the money earned from cash crops does reach them; if it reaches them I believe they know how to use it. The problem is that not enough reaches them and no amount of education can really change that yet.

To Dr. Demissie I will say that I agree with him. The use of available resources should have a high priority and wherever possible animal protein should be consumed. Also, research should be undertaken to develop cheaper sources of food protein. In conclusion, I wish to repeat that FAO strongly recommends that Ministries of Agriculture create, within their frameworks, units for planning food production. My plea is that you go back to your countries and verify that official activities generated within the Ministries of Agriculture establish units to be charged with the responsibility of planning food production to meet both the nutritional and trade needs of the community.

NUTRITION AND CHILD FEEDING

by Miss Grace Wagemu, Head
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Introduction

In the past, the term "nutrition" has been limited to the food we eat and the fluids we drink and their respective effects on our health and our mental zest. The expression, "We are what we eat," which is a password to many nutritionists, is very true.

Currently, however, the concept of nutrition has been broadened to encompass the many factors which affect our nutritional well-being, such as food production, population control, disease, malnutrition, poverty and ignorance and many other contributing factors or consequences.

Since the subject is immense and since I am limited to 45 minutes, I am going to discuss in succession a few points which I believe have major relevance.

Nutrition and Supplementary Child Feeding

It has often been said that the usefulness of child feeding programs in improving the eating habits of the whole household cannot be underestimated. Although this is a goal we must strive to achieve, I do not agree with the statement. I do not believe that supplementary feeding of a child can play a part in improving the eating habits of his whole family.

There are many factors which must be explored. These factors must be the base upon which to found the feeding program. It is my contention that if a supplementary feeding program is to achieve its intended end, the following factors must be considered before such a program is launched:

1. The program should be planned to cover the primary school child and to reach the preschool child. The latter should be given priority.

2. The program's directors or supervisors must familiarize themselves with the eating habits of the family from which the child comes. They should also have reliable knowledge of the kind of food that a preschool child has at home. It is important to know whether this preschool child is getting a balanced diet with adequate amounts of bodybuilding foods to meet its growth's demands. Protein-calorie deficiency usually sets in from birth to 5 years. In the first years of life, nutritional needs are relatively higher than in any later periods, but at the same time the meeting of these needs is more or less dependent upon other people, i.e., whether or not the family as a whole has enough to eat, and whether or not the parents understand the special needs of the young child. The problem in developing countries is that good nutrition is the exception rather than the rule and severe malnutrition is a threat everywhere.
3. For total effectiveness of supplementary child feeding, the total family must be involved. The key member in an African family who can play a role in improving the eating habits of the whole household is the mother, but the father has the money in his pocket. These circumstances illustrate the importance of nutrition education for the mothers and also the importance of reaching the husbands by making them aware of the dangers, both physical and mental, of malnutrition. This can be done through a well-planned program.

The causative factors of protein-calorie or protein malnutrition are, in most cases, ignorance and inevitable poverty on the part of the mother who, when a child is weaned early, does not know which foods to give to replace breast milk. Mother's milk is the best milk for a child. It should not be considered old-fashioned to breast-feed a child for 6-18 months. Mother's milk is the only milk that is safe and contains all the nutrients in correct proportions that a child needs for normal growth. All other milk is unsafe, from my point of view, in developing countries. There is always the danger of using contaminated water or dirty feeding bottles,

etc. This causes serious stomach upsets which bring a child's health below par, thus creating a favorable climate for other diseases to set in.

4. It is important to consider what foods our people can use as substitutes for milk. What is wrong with our African pulses and legumes? They are locally-produced and, therefore, cheap. They are staple foods of most Eastern African countries. These are the best substitutes for milk. How these can be used as weaning foods should be among the suggestions to come from the participants in this conference. Some of our African cereals are very good protein sources; one of the best is Eleusine coracana, or "finger millet." I do not need to mention its nutritional value but generally speaking, it is a very good grain that, I feel, this conference should recommend to be widely grown with government support.
5. We must always remember that supplementary feeding means adding to what the child had for breakfast (which in most cases was nothing at all, due to too much work on the part of the mother) and to what the child will have for supper. In a large family, the child who had the supplement at school or at a clinic may not share the family's evening meal because of the limited amount available and because the child was lucky enough to have one whole meal in quantity from the mother's point of view. The supplementary food in most cases is the only meal that a child has for the day. It is dangerous to assume that the child does enjoy the important three meals a day needed to meet his daily requirements.
6. The most needy sector of our population cannot afford to pay, say, 9 shillings per 3 months for a school feeding program. How can this sector be reached? And if reached, are the meals going to be freely given and if so, for how long? This very poor sector of our rural population represents approximately 40 percent of the total. Voluntary organizations can only cover a small number of the

children in this sector and there is also a danger of what might happen when their funds are exhausted.

I believe that if we decide to start a program which affects the country as a whole, the program must eventually become a national program. In the case of supplementary child feeding, the call for government support is irrevocable. Malnourished children of today will be of very little use to our nation in 1988. They will be stunted youths, both mentally and physically. Surely no patriotic country would like to see its future leaders, mothers, husbands and wives in a state they would not be proud of. That is how serious protein-calorie malnutrition can be.

The Importance of Continuity in Child Feeding Programs

The effect of abrupt discontinuance of supplementary feeding on the child who has been used to a good meal at lunch time is unknown, but is a factor which I feel should be seriously considered.

Currently, the most prominent child feeding program in Kenya is the National School Feeding Project. It is a voluntary program sponsored by Oxfam. This program is carried out in 72 schools within the Coast, Central and Eastern provinces. Although it has been in existence for only three years, its acceptance by parents, children and teachers has been very encouraging. To date, it has a total enrollment of 23,000 children in the program, 16,000 of whom are being fed while 7,000 have already paid their fees (which is 9 shillings per 3 months) and are waiting to join the program. This term, the number of primary children reached was 24,593. Their ages range from 7-14 years.

The food provided per child is:

Beans	-	2 oz
Maize	-	2 oz
Supro	-	1/2 oz provided by local food industry laboratory.

The program incurs an expenditure of 60 Shillings per 50 pounds of Supro, which is a high protein concentrate.

The personnel carrying out this important project are either voluntary teachers or paid staff. The program is accelerating at such a tremendous pace that the number of children anxious to join the project has increased to a point where the activity is becoming financially viable, in so far as the operational budget is concerned. (The operational budget includes items such as cost, transportation and distribution of food and cooking equipment.)

Progress and problems go hand in hand in a program such as this. The rising costs of foods and the problem of finding funds to meet transportation of food from the railroad to the actual schools, motivated the officials in charge to raise the amount of fees charged to children to meet the anticipated deficit. These fees would also be used to build a fund in preparation for the time when Oxfam would be pulling out.

The schools were encouraged to start vegetable gardens. The vegetables were used to supplement the food.

Details of problems in this particular child feeding project can be discussed with the help of the National Executive Officer who is present at this conference.

This National Child Feeding Program serves as an example of the importance of continuity in child feeding programs anywhere in developing countries. It also poses the question of "After Oxfam, then what"? Should this remain a voluntary organization activity which will always require outside aid on a contract basis? Should it be a self-help project? It can only be strengthened by the total support of the Government. How? This is the challenge which confronts this conference.

One thing is certain; it should not remain a relief program. It must be continuous without strain. It should be a long-term program designed to combat malnutrition in our younger generation.

Programs such as this should be institutionalized as a part of school or maternal and child welfare services. Here the Ministries of Education, Agriculture, Social Service and Health must be fully involved to form

and recommend a National Child Feeding Program. The plan needed to ensure that such a program continues must be made well ahead of time before external support is withdrawn. This is a long-term expectation requiring trained personnel.

Usefulness of Feeding Programs to Introduce New Formulated Foods

The usefulness of feeding programs to introduce new formulated foods and to determine acceptability has already been demonstrated by a few private organizations concerned with child feeding programs in Kenya. For instance, bulgur wheat, when first introduced in Aquinous High School in Nairobi, Kenya, was refused by the students. Home economists from the Ministry of Agriculture were consulted and when they visited the school kitchen, the reason for rejection of this nutritious grain became very clear to them. The officers in charge were rightly adding skimmed milk powder to the bulgur wheat. The trouble was that many African dishes have a green or yellowish color. This dish was white. The general advice given by the home economists was that onions, vegetables, curry powder and tomatoes must be fried and made into a stew into which cooked bulgur wheat should be mixed and skimmed milk powder added. When this was done, the result was satisfactory; the food is now fully accepted. The acceptance is encouraging since bulgur wheat is the only imported component of the dish.

Powdered skimmed milk is now accepted. Supro, CSM and soybean concentrates have been used in child feeding programs by the Catholic Relief Services, the Red Cross and others without marked resistance.

It is interesting to consider protein concentrates for human feeding. Processed and defatted cottonseed, groundnuts, soybeans and fish can be used to replace dried skimmed milk.

In Kenya the potential protein concentrate is groundnut only. Fish protein concentrate is not accepted due to its flavor. The soybean type grown in Kenya is only suitable for animal feed. It is bitter, unpalatable and very strong unless combined with many vegetables. Intensive research should be undertaken on the part of the Ministry of Agriculture to find which type of soybean should be grown according to ecological areas and suitable for human

consumption. Cottonseed concentrate is not useful in Kenya because the gross output does not warrant a nationwide use. Dried skimmed milk is acceptable, but I feel it should be produced locally instead of coming from UNICEF. This calls for increased production of dairy cattle in our countries.

I personally do not support the use of formulated foods at this stage of development. I would accept them when used by well-to-do and educated mothers who are wives-cum-career women. All the same, there are problems everywhere. The maid who prepares these foods is not trained and is liable to be careless in adding more liquid or more formulated food than required, thus causing a serious hazard.

Acceptability of formulated foods is only a problem for adults. Children can eat anything. Adults can accept a spoon of Supro or dried milk in their usual diet only as long as it does not alter the flavor they are used to.

The Advantages of Using Protein-Rich Local Resources

Animal protein is expensive and is not easily obtainable due to its shortage. The ordinary rural family cannot afford to give an egg a day to each member of its family. The family may have a few head of indigenous cattle and a few hens. I cannot blame this particular family if it decides to sell the half dozen eggs and the pint of milk it can get from its hens and cows. Money is very essential to buy a little sugar, salt, tea and other things. This situation is incurable. It is for us to find an equivalent, even a less equivalent substitute.

Pulses and legumes contain enough protein to be one answer to protein-calorie deficiency in developing countries, especially in Africa where they could be grown in plentiful amounts. This conference should concentrate more on how legumes and pulses can be produced in large quantities in our respective countries. The governments of our countries should be made to realize their importance from a nutritional point of view, especially where child feeding is concerned. Pulses and legumes should be included in agricultural development plans. The increased production of all

African staple foods should be given equal priority with commercial cash crops. Any African nation adopting such a policy would be helping to elevate its national income while at the same time elevating the nutritional status of its people.

Maximizing the Use of Space Available

In Kenya, I would like to see a total coordination of efforts to achieve this particular objective. In certain cases we can claim to have everything, and this might be true, but how to make use of what we have to get what we want becomes a problem. Currently, the space available can be maximized by total cooperation between governmental and nongovernmental sectors concerned with the health and nutritional status of our children and adults living in the rural areas. Facilities are there. It would be a wastage to start building centers for child feeding programs when there are so many other problems to be solved by governments.

Initially, the child welfare clinics, hospital wards and health centers under the Ministry of Health, the farmer training centers under the Ministry of Agriculture, the community development centers under the Ministry of Social Services, schools, under government or private sponsorship can be fully utilized to reach and protect a maximum number of children by coordinating efforts.

Cooperation with chiefs and county council officials can be a great help towards promoting child feeding programs. Chiefs and county officials in the rural areas are always ready to help. Their influence is even greater because they are key leaders in their respective communities. Their barazas or meeting halls, together with social halls, can be used with their kind permission.

In child feeding programs all feasible means should be utilized to reach the preschool and the primary school child. Food must be available. Personnel to carry out these programs must also be available with a working know-how in nutrition. Equipment requirements must also be considered.

The Role of Local Food Industries

In Kenya, we have limited food industries. The Unga Limited, House of Manji, Del-Monte and East African Industries are the most outstanding. The Kenya Creamery Cooperatives and Kenya Dairy Board, both have concerned themselves for a long time with dairy products.

The dairy industry, together with other food processing industries, has an important role to play in increasing the overall production of food and in improving the availability of animal protein. At present, the food industries existing are experimenting on artificial enrichment of local foods but they have not made any headway.

It is important that whatever the local industries can do in supporting child feeding programs, to bear in mind the importance of using safe, cheap ingredients available in the country where protein is needed.

The food industries have a role to play in child feeding programs. Maize meal can be enriched with protein, wheat and rice with vitamins, etc. The child feeding program directors working side-by-side with local food industries, with expert help of a qualified nutritionist and a food technologist can determine what should not be polished and what should be enriched with what to meet the local nutritional needs. The question here would be whether or not these enriched local products would be cheap enough for an ordinary rural family to afford.

The production of foods to be processed or staple foods must be increased to keep the local industries well supplied with local products required for child feeding.

Major Constraints on Child Feeding Programs

Limitations must be expected. Child feeding programs are only supplementary to what a child has had and is probably going to have. Therefore, the child feeding program cannot achieve everything.

A child, in principle, requires a good balanced breakfast, a simple balanced lunch and supper. We all know that at present this is an impossible achievement

for a simple rural family which depends on what it can produce from its small farm. The number of children in the family, the income of the family and its educational status are considered in our assessment of the amount and quality of food consumed by each child.

The programs, even those with enough funds, are constrained by a shortage of simple local foods like beans and maize. Most of the time these must be purchased from neighboring countries or borrowed from parents. Some food industries, like the Maize Marketing Board, have been known to donate maize to needy child feeding projects. We can help ourselves only by growing an abundance of pulses and legumes. If all would join forces, this vital goal could be achieved.

Currently, the child feeding programs in Kenya use available local equipment and facilities to carry out their projects. In some cases, children are asked to bring their own mugs, spoons and plates to school. This is unhygienic. Child feeding programs should go side-by-side with health and hygiene. Therefore, the utensils, benches and tables used should be of moderate standard and if funds are available, they should be purchased by the authorities concerned. It is no good for a child to eat a nice balanced meal with dirty hands under a tree.

Most important of all, a child feeding program should have personnel well trained in home economics with a nutrition bias. One nutritionist of this caliber can be a national supervisor of the child feeding program. The field supervisor must also be well versed in nutritional know-how so that he or she can give correct information while teaching mothers. They must be trained in a joint National Training Course which should include extension workers, health visitors, nurses, social workers, community development workers and teachers. Centralized nutrition training provides standardized information to those who need it. At the moment, voluntary workers are doing this job following the formulas given by the head of the program.

Difficulty of Reaching the Weanling Child and Preschool Child

The weanling child should be our great concern. He is in the hands of his loving mother who continually feeds

him with all types of carbohydrates. This is because she has not been reached by a nutrition instructor or merely because she does not attend a clinic for maternal and child care where this information is available and foods rich in protein are supplied.

In Kenya, the weanling child and preschool child are reached by the Catholic Relief Services (CRS), a private concern. CRS operates through 72 clinics, some government owned and others private. This program is the only one that reaches the 0-5 year olds. You cannot miss this age group in clinics and health centers in Kenya. The CRS objectives are as follows:

1. To keep infants and young children well;
2. To educate the mothers;
3. To supervise and treat children.

The project is run by a very limited number of personnel but due to close cooperation between the CRS and the officials in charge of clinics in which the project is carried out, the team has made its work profitable. The number of children reached per day, per clinic ranges from 40-60.

Using Such Programs to Ensure that Large Numbers of Children Receive a Specified Portion of Their Daily Nutritional Requirements

Unless one has a cross section of what the children eat at home, it is difficult for a child feeding program to cover the daily nutritional needs of children. The only way the program can help in ensuring that a large number of children receive a specified portion of their daily nutritional requirements is to follow the law of averages by assuming that all children receive more than enough carbohydrates per day, less green and yellow vegetables than they need and much less protein. From this assumption, which is partly true, a menu can be prepared with more protein, more green and yellow vegetables and fruits and relatively small amounts of carbohydrates.

Conclusion

The problem of child feeding in developing countries is of paramount importance. It is inseparable from the problem of maternal education, production of surpluses of nutritious crops and preservation of the surpluses to stretch the food supply safely. Child feeding must be part of a country's nutrition and food policy; it must be oriented towards self-sufficiency. Foreign aid is a temporary "gimmick." It is hoped that these problems will be thoroughly discussed in committees and that useful recommendations on this matter will be made to our respective governments.

GENERAL DISCUSSION

Chairman: Mrs. Anna Hlalele (Lesotho)

Dr. Demissie (Ethiopia): I would like to know the cost of running the Kenya National School-Feeding Program. I have repeatedly emphasized that if supplementary feeding is to be carried out it should be primarily during the weaning and post-weaning period. Available evidence to date shows that improvements in the nutrition of children above school-age may increase their heights and weights, but I do not think we are really interested in producing physical giants. We would like to develop intellectual giants. Therefore, it is important to emphasize feeding the infant and preschool child whose brain is still in the developing stage.

In my mind, supplementary food is synonymous with high protein food. WHO has set a number of standards for the composition of such supplementary foods including a protein content of not less than 20 percent. You are also correct in stressing that supplementary foods should be produced from available resources which, in a sense, means that the base material is a cereal and the protein source is a legume. It is important that this supplementary feeding program be intended to supply protein and not calories.

Home-made weaning food recipes are also important. These should be developed by people like home economists for the various regions of a country and should be publicized throughout the community. I think this approach has often succeeded where processed infant foods have failed to sell.

Mr. Kigunda (Uganda): If I understood correctly, Miss Wagemma said that imported foods were introduced in Kenya and, as far as we know, are doing more harm than good. These are better suited to the well-to-do class than to the ordinary person in the remote villages in the interior of the country. When one considers the price and other factors, one cannot help wondering how the ordinary village mother can use them. The directions are always in English, and one wonders how a village mother can get an interpreter to read the directions and understand how to mix this and that.

You raised another important point concerning the content of education we want our mothers and other people to understand. We accuse the village mothers of being ignorant but we ourselves are probably ignorant of the things these people want to know. I think it is extremely important that our nutrition education programs in East Africa reflect awareness that these people are lacking specific knowledge regarding food preparation, choice of supplementary foods, etc.

We have a service similar to district institutes in Uganda. We teach the farmers. We do not give them one talk as you are doing here in Kenya, but we give them a series of lectures in basic nutrition and we do it in close cooperation with the Ministry of Agriculture and Community Development.

I agree that vague ideas also are doing more harm than good. Unfortunately, they affect mostly the upper-class, the educated ladies. Then the lower-income women see that the wife of "So and So" does not breast-feed her baby or that she tries this and that and the lower class mother takes it for granted that this is an excellent way to rear children and begins to mimic.

I think the governments in East Africa and other countries in Africa should do something about commercial advertisements which definitely tend to overshadow our teaching.

I would like to know what view experts from FAO and WHO have regarding breast-feeding at work. I feel that as we are becoming more and more industrialized it is time we started appreciating this wonderful practice. This fact is realized by the increasing number of breast-feeding working mothers. They inevitably tend to leave their children with untrained ayahs, leaving all the imported and local foods at their disposal. Unfortunately, we do not have trained nursery nurses in this part of the world.

I think it is very important that we in East Africa as well as other countries on this continent understand the mutual supplementation of plants and cereals. This demonstrates the desirability of eating a mixture of legumes and cereals.

Miss Wagemer indicated that in Kenya the school feeding program costs 9 shillings per child per term. One wonders what 9 shillings can do in feeding a child for a term.

A point which I must disagree with concerns soybeans. When well-processed, the soybean becomes an excellent protein-rich food. From time immemorial the soybean has been and is still regarded as the "meat without bones" by countries in the East. Thus, I beg to disassociate myself from the speaker's remarks that the soybean is only fit for animal foods and is entirely unfit for human beings. Recent work has been done on this in Uganda. Dr. Harrison of the African Basic Foods Company is producing soy-fortified bread and buns for our school feeding program. One bun is equivalent to one egg. Soybean can be used in many forms -- pounded, sprouted and turned into milk. It is wrong to think that it can only be prepared and eaten in the pulse form. Heat renders soybeans free from trypsin inhibitors and with little skill it can be turned into many dishes which are highly nutritive.

This region is considered to be a low caloric region. If this is the case, then I fail to understand what is meant by carbohydrates being so plentiful in Kenya.

Most of our nutrition education program will depend on the mobilization of the services of voluntary workers. We should always remember that they are devoted, willing to help and do not cost much.

An important question as yet unanswered concerns the promotion of our health services. Should we take services to the people or ask the people to come to the services? These are the most needy people but, unfortunately, they have never been reached, hence they are not instructed where to go. Something ought to be done in the form of mobile services, so as to reach these unreachables. The existing centers cater to only limited sections. Even so, these people travel long distances and spend much money which they cannot really afford in order to come to the centers.

Mr. Vamoer (Zambia): I would have liked Miss Wagemu to give us more detail on the school feeding program which is being financed and organized by Oxfam. It would be a help for countries like Zambia which are in the process of trying to develop a school feeding program but who have not quite come up with the best food or method of distribution.

When discussing supplementary feeding you advised involving the whole family. I think it would have been better to emphasize the weaning child or to devise a local weaning food using local foodstuffs. Usually, when we talk about school feeding programs we think in terms of having foreign aid. Most of the school feeding programs have been supported by foreign agencies. We are thinking in terms of not only providing school feeding for the children, but also of providing employment to the people. An example is the school feeding program organized in Nigeria where the Ministry of Health and the Department of Public Health have selected the food vendors who cook the food on the school premises. This provides a school feeding program for the children as well as employment and income for the people in the country. Dr. Dema is very familiar with the food feeding program in Nigeria and I would like him to give us a little more detail on this if he does not mind.

Mr. Semiti (Tanzania): I would like to take up the point raised by the speaker concerning the emphasis on cash crops rather than food crops. We find that to produce two major cereals, such as maize and wheat, as cash crops we can only sell them to ourselves because they are produced in East Africa at the same price as wheat from Canada landed in Dar es Salaam or Mombasa. We cannot compete on

the world market. Maize exported from Kenya or from Tanzania is subsidized at around 200 shillings per ton, in order to be sold on the world market.

Why is the maize and the wheat in East Africa so expensive? Statistics show that these crops yield as well here as they do in other countries when commercialized. In fact, wheat is better produced here than in Canada. We get up to 10 bags per acre, whereas Canada produces 8 bags per acre, and yet Canada is producing wheat more competitively than Kenya and Tanzania. I suggest that the pricing policy is wrong. If we want to sell on the world market, our prices must be competitive.

I want to answer a small question raised by Miss Wagemba on fish protein concentrate. It was said that it was not acceptable in Kenya. The fish protein concentrate which we produce in Tanzania is acceptable up to 10 percent in maize or wheat.

Dr. Kigundu made a point in reference to soybeans which I would like to repeat. Some soy samples have been successfully produced here in Nairobi by the East African Industrial Research Organization for us in Tanzania. We sent them samples and they sent them back to us, and we successfully tried them in maize and wheat. The process involves the removal of a trypsin inhibitor. You can do the same domestically by soaking the soy beans for 2 hours and boiling them for 20 minutes, drying them and thereafter milling them. The flour is very acceptable.

Mr. Kambona (Tanzania): Mr. Semiti has touched on the point about production of fish protein concentrate (FPC), whose introduction into maize meal and wheat has been quite successful. We here who are trying to obtain more locally produced foods for fortifying our protein deficient foods are very much interested in this problem. It has been shown that this problem of flavor is one that can be quite easily solved. In Tanzania, we have been producing an FPC which is practically odorless and almost tasteless. But the problems which arise when you remove the taste and the smell are those which face the home economists. When this new product is added to the maize meal somebody must pay for it. When the housewife is confronted with this new product which has no outward difference from the product which is not fortified, she will see no reason to pay more for it. This might be nutritionally good for her and her children, but it is bad economics.

As I see it, there are only two solutions. The first one is to have the Government subsidize the production of protein-enriched food, to make sure that this produce reaches the people who need it. I know the increase in price is not very much, but the people who

can pay that price can obtain proteins otherwise; it is the poor housewife who badly needs the proteins, who will not be able to afford it. The second alternative would be to pass some sort of legislation prohibiting the sale of unfortified maize meal. If our countries want to fortify their foods, we must have legislation which will keep any unfortified foods off the market so that the poor housewife can buy only the fortified foods.

Dr. Dema (FAO): First, I want to take up where the last speaker finished on the question of flavor in fishmeal, which is now called fish protein concentrate. I feel that the whole controversy has been started by whoever produced the formula. The Dutch, who are operating in the Caribbean and in the West African country of Dahomey, have a fish protein concentrate which retains the ordinary odor and flavor. I think the chemists who studied this chalklike FPC were doing it for some non-African community.

Miss Wagemma remarked that child feeding programs should not remain relief programs and I think this is very important. It is true we need outside agencies to stimulate us, but as soon as possible we should try to "phase in." There are two types of school-feeding programs in Nigeria. The first one is in Ibadan and is run jointly by the Ministries of Health and Education. It does not cost the Government anything apart from giving health certificates to the women who sell the foods. They prepare the food in native ways -- beans, rice and yams and a little bit of fish here and there. The Health Department makes sure that there is a decent eating place for the children. The teachers are authorized to collect the money from the children at the beginning of the week. In Lagos, the capital city, food programs were treated in a capital way, big American cookers, bulgur wheat and the lot. It went very well for awhile and was very impressive, but sooner or later the wheat ran out and the feeding formula was changed. Local foods are now being used. Using local foods is the way to go about it rather than looking for sophisticated proteins.

Miss Wagemma's paper gives a very good account of what has been done by the Kenya school feeding program. I realize that this is very much linked with health and I wish you had mentioned somewhere the keeping of children's growth and development records. It should be part of the school meal program. Performance can be assessed very rapidly by watching the height and weight of these children.

Miss Wagemma has rightly emphasized the need for food control and food standards. This is an attempt to link food control with consumer education and as I mentioned in the morning, this requires government action. Internationally, there is the FAO/WHO Codex Alimentarius which is meant to assist countries in legislating food standards, especially foods that go into international trade.

This technique involves sampling, food analysis and law proposal. For instance, we are now talking about fish. If you use international fish protein concentrate you will find that it is not acceptable in the African countries. So you must develop your own food standards. There is the need to maintain hygiene standards, both in processing and in presentation. Then there is food inspection. As mentioned earlier, it will be necessary to arrange for government machinery to pick samples while in the process of manufacture and while on the market, testing them occasionally. Of course, you must have the law behind you to prosecute the defaulters. It is of no use to pass a law if there is no penalty. This implies the need for education. The housewife, as someone mentioned, should be able to know what brand of fish protein concentrate or dried milk protein best meets her needs. This is an aspect which I think could go back to the home economist, as Mr. Kambona mentioned. Quite a good deal here depends on consumer education.

Dr. Khan (Kenya): I want to emphasize that there are three different problems: One is the problem of urban areas today; the second is the problem of rural areas; and the third problem is the abandoned child or the abandoned mother. For all these three there are different solutions.

The problem in the rural areas is basically one of poverty and ignorance. For the working mother I think it was an excellent suggestion that we should help to promote breast-feeding in the areas of their work. For the poor family there should be some place, especially for the preschool or school child to be given extra feeding or supplementary feeding at a cheap rate. And for the abandoned child, or the abandoned mother, there should be a place of residence where they can be well-clothed and looked after.

This question of bottle-feeding crops up everywhere. I think we must accept the facts of life. Bottle-feeding is here to stay, and however much we may fight, mothers are going to feed their children with the bottle. So what we have to do is to provide some form of health education to show them how to clean the bottles, how to prepare clean water.

About 5 or 6 years ago we had an ample supply of dried skimmed milk, and we started a project assisted by the Government to have milk clubs in the rural areas. We found this to be extremely successful. The social workers came and prepared this milk at a central location where all the children came. I am sure this extra supplement, even of one glass of dried skimmed milk given by a health worker with a little health education for the mother, is an excellent idea.

We talk of all these vegetable proteins, but we have not given sufficient stress to the animal protein which is available in many of our countries. For instance, in East Africa we have an ample supply of fish and milk, and we must consider how we can utilize the resources, whether or not we want to produce an extra food which is not nationally accepted. This is a slow process which will take years, and I think you must sit down and decide what extra food should be introduced. Then we can use the radio, the television, the health educators, and the health centers everywhere in a planned program to introduce this extra food into the culture where it will be ultimately accepted.

Private industry, foreign aid, voluntary local organizations, can start programs but when they have found their roots, the host country should take them over. If we ask the Government to embark on some ambitious projects, there are always different priorities and they may fail easily. I think that at this particular juncture, we should try to take aid from all possible sources.

Mrs. Abeba (Ethiopia): There is one thing bothering me and that is the shifting we are doing in introducing different food items. We have gone from the introduction of UNICEF dry milk to the supplementary foods which are prepared in many way, and now we are thinking of introducing soybeans. I am not against this, but if soybeans are not part of the common diets within East Africa, can we use other legumes, such as peas and chickpeas? We must not only present what is good and necessary for them, but our presentations must be acceptable to the people.

Miss Wagemu (Kenya): Dr. Dema mentioned the flavor of fishmeal. It must be realized that all fishmeals are not the same. Some are odorless and probably they are tasteless; therefore, they can be mixed with our own types of foods to enrich them. But there is one type that I tasted myself, and I understand it was the whole fish crushed -- bones, everything together -- and the taste was terrible! This is why I said it is not acceptable in Kenya, and I do not think it is widely used in Kenya.

At least we know what we lack in Kenya thanks to the work done by the WHO Nutrition Unit headed by Dr. Bohdal. It is of no use to merely feed children with a high protein food or a very good supplementary food. I think the most important step is to measure the success of the project through evaluation of their health status and recording their weights.

This is being done on a small scale through the cooperation of the Ministry of Health nurses in the clinics. Their job is to maintain a chart showing the rise or drop in a child's weight. Even if a mother cannot read she can see the drop in the curve and she will work hard to increase the weight.

Soybeans are a very important food and I agree with Mr. Semiti that they cannot be grown everywhere. Even in Kenya, soybeans can be grown only in a few areas like the Uasin Gishu area and in the Western Province. There are different types of soybeans and the type that grows easily in Kenya is useless for human feeding. In our Home Economics Division at the Ministry we took half a bag of this type of soybean and conducted a special workshop. First, we roasted it a bit to see if it could be used like groundnuts, but it still retained an odd flavor. Then we ground it and used it as a powder to add to our soups. The flavor still persisted. Then we boiled it and found it was very hard to cook. We continually experimented with it and found that this was not a good type although it was very rich in protein. Probably the type that you grow in Uganda is better. I am in close contact with Dr. Harrison. His samples are first class, which means you are growing a good type of soybean. He brought me a few samples and I used them here.

You mentioned the idea that carbohydrates are not plentiful. I think it is the only food in Africa that is really plentiful.

I said earlier that in Kenya the age group from 0 to 5 years is not reached in the poor section of the population who cannot go to the clinic. I must mention here that we have health visitors and social workers and home economics extension workers who work at the field level. These women go into the field and visit various homes. We must try to make our workers from different ministries or organizations know that the rural women must be reached with nutrition education. Thus we will make our fieldworkers aware of the need and the subject.

I think every woman is born a home economist, even if she does not have a certificate or a degree. When protein-enriched food is made available to them or if it is locally produced and if it is odorless and tasteless it is up to them to prepare recipes acceptable to their people.

Dr. May (Convener): In summary, any supplementary child feeding program must be aimed at supplementing what the child eats outside the program. Too many of these programs are based on surpluses: what happens to be available is given. I wish that in your recommendations you would insist that these programs be based on needs. This will eventually entail growing what is required to meet these needs.

The second most important point, I think, we owe to Dr. Ali Khan. There is a big difference between rural and urban areas. In order to plan a sound supplementary feeding program you have to know what the rural child eats and what the urban child eats, and it is obviously different.

NUTRITION AND EDUCATION

by Mr. Louis Ochero
Senior Health Education Officer, Uganda

Many people confuse nutrition education with nutrition instruction. Instruction is a one-way process from the teacher to the pupil. Education is a two-way process which may begin with instruction but which develops into active participation by the pupil to assist his understanding of the subject. The teacher must periodically check on how the learning is proceeding. Today, my talk will be confined to nutrition education because it is more effective. Before I discuss the nutrition education and child feeding system which we employ in Uganda, it is important to describe Uganda in terms of its land and its produce.

Uganda is a fertile land and produces enough food for its people. It has an immense potential for even greater production of grains, roots, fruit, fish, meat and milk. But there are problems of marketing and distribution and the available food is not always evenly distributed and equally available to all. There are also problems of storage and food is lost through the attacks of rodents and insect pests.

There are numbers of people in Uganda who suffer each year from diseases or conditions due to a lack of nutrients in their diets. In children, this all too often leads to death, a dreadful wastage of future citizens of Uganda. For every one case of disease there are 100 people who do not even realize that they are unwell but who, through poor diet, are lacking in energy and lacking in the will to improve their lot.

Without doubt, our most important nutritional problem is protein-calorie malnutrition, principally affecting children under the age of 3 years. Important too, but less easy to detect, is protein undernutrition which probably affects to some degree the majority of our preschool and primary school children.

The supply of animal protein in Uganda appears to be somewhat borderline and this is of great significance in the feeding of these children. Making the fullest use of vegetable proteins such as beans and groundnuts, it is possible to raise a child but the health and growth of

such a child would be improved by the addition of animal protein. The Medical Research Council Infantile Malnutrition Unit at Mulago and the Nutrition Rehabilitation Unit Project of the Freedom from Hunger Campaign, financed through the U.K. Save the Children Fund with assistance from the Oxford Famine Relief Committee (Oxfam), have shown that an excellent mixture of local vegetable foods developed for curing malnutrition acquired a still higher value when even a small quantity of milk was added. The same must be true of the largely vegetable diets that are given to most children in Uganda today.

There are many factors which contribute to the development of malnutrition, some social, some psychological, some related to infectious illness or parasitic infections. It is always difficult to generalize, but I would say that the chief causes of malnutrition in Uganda are widespread ignorance of the food needs of a rapidly growing child and the lack of regularly available animal protein. Both these causes are related to the present system of subsistence agriculture in Uganda.

Education in child feeding is, therefore, of vital importance. Mothers must be taught to use properly the available protein foods and those which will become available in increasing quantities. If successful, this will have the double effect of preventing malnutrition and stimulating the demand for these foods. Already, nutrition education is given by several bodies, such as the Ministry of Community Development, voluntary agencies, the Pediatric and Social Medicine departments of Makerere Medical School and Mwanamugimu, among others. My own ministry has a Health Education Division which provides for teaching the various aspects of nutrition. Already, most districts have Health Centers with facilities for teaching by Assistant Health Visitors and this is intended to expand the system even further.

District Health Education Committees have already been opened throughout the country to stimulate and support health teaching at all our health units.

Our educational system in Uganda, directed at mothers and the family, community workers, public, administrators and physicians, and the facilities needed to carry out such a program of grass roots education throughout the country are detailed below.

In Uganda, mothers and the family have nutrition education through:

1. Medical institutions
2. In-the-home followups
3. The Ministry of Culture and Community Development
4. The Ministry of Agriculture
5. The Ministry of Animal Industry, Game and Fisheries
6. The Ministry of Information
7. The Department of Pediatrics and Child Health, Makerere Medical School
8. The Mwanamugimu, Mulago Hospital
9. Voluntary organizations

Through Medical Institutions

The importance of incorporating nutrition education into hospital activities cannot be overestimated. Mothers can see the improvement in their own and their hospital neighbors' malnourished children, and so are probably in a receptive state for advice. Assistant Health Visitors are attached to Medical Units and where there is a shortage of these, advice is given to the mothers by midwives during child welfare clinics, or by the nursing staff while the child is being admitted. It is felt that to treat a child with kwashiorkor is only part of the hospital's function. It is just as important to ensure the avoidance of malnutrition in the mother's subsequent children.

Beginning in the clinic, cases of kwashiorkor can be demonstrated and the cause of the disease explained to the mother. Where there is a belief that the kwashiorkor is caused by another pregnancy, cases where this is not so can be used to undermine the belief. At the same time, treatment of early cases simply by local dietary can be used to reinforce the explanation of the true cause. Demonstrations of improved feeding methods are always given. The mothers themselves take part in this and give prepared dishes, sometimes made by the mothers themselves, to the child on the spot, during the demonstration by the Assistant Health Visitor.

In the Homes Through Visits and Followups

When a case of malnutrition has been treated in the hospital, a special form is filled in by the Medical Assistant (sample attached) and this is given to the members of the health staff working in the area. The health staff in

question is mainly the Health Assistant and in case of a health center, the Assistant Health Visitor will carry out the home visit followup.

Visits to the home will result in discussions with the whole family. The subject of the foods especially needed is introduced. It may be possible at this stage to bring in a cash motivation for the growing of these foods if a part of them can be marketed.

Improvements in hygiene, including the hygienics of food storage and preparation, vaccinations and immunizations, are also exercised. This is gaining greater success in Uganda at the moment.

The Ministry of Culture and Community Development

This is carried out by community development workers through short courses at rural training centers, at the village level and through club programs involving the women leaders to demonstrate the preparations of balanced diets.

Training for club leaders and groups in simple nutrition education is carried out at the district level or at the Nsamizi Community Training Center in Entebbe. The program for such groups includes nutrition, child care, other homecraft skills and personal hygiene. When these leaders go back to the villages, they do play an important part in teaching the mothers and are able to carry out a program of grass roots education.

Taboos, local traditions and beliefs may make it difficult for the women at such low levels to accept certain foods. Examples of such taboos are the eating of eggs, fish and chickens by women. Each tribe or area has different objections to eating them.

The Ministry of Agriculture

The staff of the Ministry of Agriculture, mainly Field Assistants, do express a wish for higher earnings from agriculture. It is felt best to tackle this first by agricultural extension--through improved strains of seeds, fertilizers and improved planting methods. This can give farmers a surplus production that can be sold for cash. To this is added instruction in their children's needs for protein foods, the cultivation and storage of these foods, and the use of these foods in improved dishes for children.

The staff also encourages the planting of vegetables, such as tomatoes, beans, peas and other local foods, which contribute to improving the diet in a home.

The Ministry of Animal Industry, Game and Fisheries

This Ministry has recently embarked on a milk dairy scheme throughout the country. Along with this, the health educators are trying to persuade the mothers and families not to sell all their milk but to leave enough for the children. A fish industry is also in operation in most districts, which enables the health workers to advise the people to "eat more fish."

The Ministry of Education

Already, school meal programs and school gardens are being advocated and many schools in Uganda are putting the plan into practice. School children and students work in their school garden, not as a punishment, but during a worked-out school timetable. During this time, lectures on protein foods and balanced diets are given. Practical demonstrations by the teacher are often very useful. Among the many schools which are involved in this type of education is Gayada Girls School, not far from Kampala.

The Ministry of Information

Radio talks are given regularly in vernacular languages on the importance of nutrition education, child feeding and better farming. Radio is becoming more and more popular in Uganda and one may be surprised to find more than 10 transistor radio sets in a single village of 2 square miles. In the evenings, or during beer parties, radios are always a priority asset. In one village in Uganda, an agricultural worker was surprised to find a young farmer cultivating in the early morning with his radio hung on a piece of stick near the garden.

The Department of Pediatrics and Child Health, Makerere Medical School

This institution does not only offer an opportunity for research but also is the main key for the medical students at Makerere to become acquainted with infantile malnutrition. Closely connected with this unit is the Mwanamugimu.

The "Mwanamugimu," Mulago Hospital

This is one of our most important institutions, providing the required nutrition education facilities for mothers at the professional level, middle level, auxiliary level and the lowest literacy level.

The unit is situated on the grounds of Mulago Hospital and utilizes two buildings on loan from the Ministry of Health. It is directed by the departments of Preventive Medicine and Child Health of the Makerere Medical School and Mulago Hospital.

The word Mwanamugimu is derived from a Ganda proverb "Mwanamugimu ava ku ngozi," meaning, "the beautiful flower comes from good roots," refers to the healthy child (Mwanamugimu) coming from a mother who was well-cared for. "Mwanamugimu" when used alone has the significance of the proverb itself.

The clinic is essentially a planned learning situation for mothers. An individual passes through this unit in several ways:

1. Attending the Outpatient Department as a mother or father or relative of a child with mild-moderate kwashiorkor;
2. Being admitted to the residential center as a mother with a malnourished child;
3. Being admitted to the residential center as a woman club leader for training;
4. As a visitor.

The Outpatient Department has a daily attendance of from 30 to 60 mothers with ill children referred by hospitals and dispensaries within a radius of 65 miles. Most of the children come from the dispensaries attached to the Mulago Hospital. Cases of malnutrition discharged from Mulago (usually prematurely because of bed shortage) are referred to the unit for their continuing rehabilitation. The child receives simple dietary and drug treatment while the mother is taught the correct use of locally available traditional food. The mother is taught by the trained educators and by other mothers from the residential center. A demonstration kitchen is used and all the teaching is done using materials and utensils that are available in

every home. An immunization service is also provided utilizing the adjacent government Young Child Clinic. Eggs from the unit's poultry are sold. A mother may purchase the demonstrated protein-rich meal for immediate consumption by her child. The mother, and when possible the father, regularly attend with the ill child. All mothers are encouraged to direct any neighbor who has a child with kwashiorkor to the department.

Mothers who are club leaders or have high status in their communities, or wives of chiefs, school teachers, religious leaders, or wives of wealthy men, are admitted to the residential center as potential "influencers." These mothers are carefully selected by the unit's rural visitors who are constantly in contact with the chiefs, leadership organization and prominent individuals. Mothers are also accepted through recommendation by community leaders, chiefs and other high status individuals who are acquainted with the structure and function of Mwanamugimu. Preference is given to the mothers who live in the areas where kwashiorkor is most prevalent. While a majority of these mothers come from areas within a 60-mile radius of Kampala, the unit encourages mothers to come from other districts of Uganda. The unit hopes that these mothers, after a stay of 3 weeks in the residential center, will return to their respective communities as "influencers." The mothers and their clubs are visited periodically by the members of the staff and assistance is given in the teaching.

Through Voluntary Organizations

Voluntary agencies like the Save the Children Fund, the Grail, Red Cross, mission or church organizations and social workers do carry out sufficient nutritional education at the village level.

What is needed to carry out a program of grass roots education:

1. Through health workers (Health Assistants, Assistant Health Visitors, midwives and health educators);
2. Through community workers running women's clubs at the village level;
3. Through active nutrition educators (the type trained at the Mwanamugimu);

4. Through social workers (voluntary agencies);
5. Through school children?

How the Health Assistants, Assistant Health Visitors and midwives carry out their nutrition education has already been explained as well as that which concerns the community and social workers.

The program that I am going to elaborate on most is that of the "active nutrition educators" trained at the Mwanamugimu. I am stressing this point because significant results are being achieved and if this scheme is extended throughout the country, which we have started to do now by having established centers in Lira in the northern region, Mbale, in the eastern region, and Mbarara in the western region. Through the medium of these simple nutrition educators, a program of grass roots education can be reached.

How do the nutrition educators function? The women are taught how to teach and how to organize women's clubs in the villages, how to find cases of kwashiorkor, and how to influence their neighbors in better nutrition. They are informed that to be an educator they must first practice in their own homes what has been taught to them. Others, who have neither the time, the facilities nor the status to permit them to organize or participate in club activities, are taught the importance of their example in influencing others and the need to practice what they have learned at Mwanamugimu. Each mother is given support in this by the rural staff. Following admission to the center, the mother may be visited at home and interviewed further. An assessment is made of the home environment and an attempt made during this and subsequent visits to contact neighbors, local chiefs, religious leaders and club leaders, and to explain to them the role which the mother is expected to play when she returns home. The fathers and neighbors are encouraged to visit the unit, especially during the weekly visiting day. Following discharge from the unit, the staff makes periodic visits to the home of the mother.

The mothers, as they see their children's health improving, become convinced of the value of this education. They learn to put into practice the principles they have learned about the nutritional needs of children combating kwashiorkor. Mothers who have been taught this way long

enough to become convinced that kwashiorkor is a nutritional disorder are encouraged to convert mothers newly arrived to this way of thinking.

School children, if taught the value of human nutritional education, can pass the information and practices to their parents when they have come back home from school. This is one way in which the people in the rural areas may be reached.

Facilities Needed to Educate the Community Worker

As already stated, the community workers in Uganda have nutrition education training facilities at Nsamizi Training Center in Entebbe. This is a center where community workers are trained. Courses are often organized for the junior staff at the district level and this may last as long as one month. In turn, club leaders, mainly women, attend lectures followed by practical demonstrations at their district centers. These courses usually last 3 months. In addition to club leaders, or Community Development Assistants, we have much lower educators called "part-time workers." These may or may not be paid a salary, but voluntarily assist in running village women's clubs. These part-time workers also receive regular training and it is from this group that we often select those for training at the Mwanamugimu unit in Mulago.

From time to time, as we hold "Health Week" seminars or county health education seminars, some mothers voluntarily request to be trained at the Mwanamugimu for 3 weeks so that when they go back to their villages, they, too, act as educators.

Community development clubs are springing up in every Gombolola (subcounty) throughout Uganda. This is a government scheme. Material is supplied by the Ministry of Culture and Community Development, but the erection of the buildings is done through self-help. These clubs also offer facilities for the Nutrition Education training of the community workers as well as the mothers.

How Do We Educate the Public, the Administrators and Even Physicians

In Uganda, the education of the public as well as administrators is done through Agricultural District Shows which are held throughout the country. Actual demonstration by medical personnel is carried out. The Assistant Health Visitors and the nurses are the main staff which

participate in the demonstrations which also include child care. The food that is demonstrated is always purchased from the local market in the area concerned. In this way, fathers and mothers and the general public as a whole can be educated.

Another channel is through District Health Education Seminars. During such seminars, the members of the District Team (the representatives of each Ministry at the district level) take part. Chiefs, politicians, church leaders, members of voluntary organizations and the members of the Ministry of Health are invited to attend. This is often followed by discussions and we have a day's session on "Applied Nutritional Education" followed by actual demonstration. This has proved very useful and is a shortcut to the education of the public extended to county levels and even Miruka levels. The latter is now in progress in Mubende District.

Radio, an "instructional" rather than "educational" way of teaching nutrition, is useful, and already in Uganda programs on applied nutrition and child feeding are being relayed in the local languages.

The press and booklets are useful only in the case of administrators and the middle-class population who can read and write, but are obviously unsuitable for the illiterates.

Physicians need to attend organized seminars, such as the one we are now holding, or those organized through the aid of UNICEF. It is important that nutrition education be included in the curriculum of medical schools. Physicians should never be content with what they know. Visits to the Medical Research Malnutrition Unit at Mulago, as well as to the Mwanamugimu, would, I feel, assist in educating the physician, the administrators and the public as a whole.

Nurses should be taught applied nutrition and it should be stressed that "food" is one of the first and best medicines we have on earth. To enable the nurses to develop an interest in nutrition education, the serving of food in medical units should not be left to ward assistants or dressers. The Nursing Sister and staff nurses should supervise as closely as possible the cooking and serving of the food. I say this because the nurses take it for granted that this job is for the low class; so much

so, that the nursing students are not taking much interest when nutrition education is being taught to them.

In conclusion, I extend my thanks to the delegates for offering me this valuable hour to speak to this seminar on the theme "Nutrition and Education."

GENERAL DISCUSSION

Chairman: Mrs. Anna Hialele (Lesotho)

Mr. Kingundu (Uganda): I have been asked to explain our Preschool Protection Program (P.P.P.) in more detail. This project was started about 5 years ago in one of our Western Region districts. The purpose was to immunize all children from 0-5 years of age against certain childhood illnesses, such as whooping cough, polio and tuberculosis. The work is carried out by 20 mobile teams which visit the entire district. The teams educate the rural population in the principles of hygiene, food preparation, and child care. This morning Dr. Glynn told me that a project of this nature could be very simple and very cheap. It is important to know that what the mothers are taught is being put into practice in their own homes. Therefore, followup is very important. Live demonstrations are also important because posters and other visual aids seem to have limited effectiveness. The village mothers want to see the "real thing."

Although it is desirable to have some animal protein in the diet, we know that all over the world animal protein is difficult to obtain and its price is prohibitive. Therefore, the use of vegetable protein mixtures is advocated.

It appears that food taboos are dying a natural death. They are not so important as they used to be in feeding the preschool age group. However, they are still important in other vulnerable groups such as pregnant women and lactating mothers. Mothers preparing their meals in the traditional way are now putting bananas and other nutritious foods in their dishes. This makes the work very natural and uncomplicated for them.

We advocate combining ministerial efforts in order to avoid duplication and to effect economies.

I do not agree that packaged school meals are unhygienic or that they are bad. I think that if we wait for teaching kitchens and modern conveniences, we are not going to achieve our aims. The whole idea is to provide meals for our school-age group. Nutrition education in Uganda emphasizes the relationship between food and health. We try to convince the parents that their children suffer from a disease which could have been prevented by proper preparation of the foods they have in their homes. A number of times we have asked the

mothers to feed their children with beans, peas and groundnuts without seriously considering the quantity and quality, this is not adequate instruction. When a physician prescribes a medicine, he tells the patient how to use the medicine and in what dosage.

We need some guidelines for food educators so that they will know that a handful of beans, for instance, will provide 20 g of protein. The mothers need standard nutrition measures, too.

The point has been made never to give proteins alone because they will be converted for the purpose of supplying energy. That is why an egg should be mixed with maize or porridge for breakfast.

Mr. Marealle (Tanzania): I refer to the speaker who said that meat or whatever product in the house is usually given to the children. He asked us to destroy the books which support the premise that proteins are never given to children. I beg to differ. Last year in Tanzania we conducted a survey in one of the so-called richest areas - that is Kilimanjaro. This area contains approximately 900 butcher shops, which means that about 900 calves are killed every day. In this same area we found that 5 percent of the population suffered from severe protein-calorie deficiency. You can convert those 900 cows into grams of protein, but where do they go? Obviously, they go to the fathers and mothers. If we went to the houses we found that the children were given just a little bit of meat to make them happy and the rest was taken by the father and mother. So, before you destroy your books on this subject, think again, because it is true that food and mostly protein is not evenly distributed in the family.

I have another comment on radio and television health education. The masses who are in the villages do not own a radio or television. How do we reach them if we use radio and T.V. alone? How do we know that they will receive the messages we want them to receive?

Mrs. Taole (Lesotho): Mr. Ocherero mentioned the home economists, the community leaders, and the leaders in the villages. How would you coordinate the efforts of these different departments? How can you be sure that one department dealing with nutrition is coordinated with another one toward one point?

You mentioned that in the medical department you use followups. Does the child leave the hospital with a written

discharge? If the child was admitted for malnutrition and the doctor has prescribed a certain type of meal for the child at home, how can you be sure that this child will get that type of food at home? What kind of followup are you doing in the villages?

Nutrition is not included in the hospital training syllabus. Nurses are trained in curative measures. So the housewife must devise methods of training nurses in nutrition. They know the value of food but are not familiar with the methods of applying this knowledge to the villagers.

Miss Gondwe (Malawi): It is true that the most important foods are usually given to the men and in most cases the children suffer. I do not agree, however, that this happens because we do not know how to prepare food, especially for those who have been weaned. Children from 3 to 5 years of age or even those from 3 to about 10 years usually eat with their mothers and the men eat separately. This is according to our customs. The problem is that we consider ourselves more important than our children. Usually, even I regard myself as a more important person than a child. This is an area for education.

Mrs. Abeba (Ethiopia): Mr. Ocherro makes us feel that his program is successful because he used the media in all ministries and departments. However, he did not tell us enough about the end results of this approach. What are your bases of measurement? We are not successful yet and we want to learn more from you if you have good results.

Mrs. Ngui (Kenya): We are not centralizing nutrition education at the lowest level. We must train those who are going to teach these poorer people and the higher level people as well (the scientists and non-medical nutritionists). I would have liked Mr. Ocherro to tell us a little more about the other levels of education -- that of the dietitians and all the doctors at Makerere University, for example.

I have a figure here which shows that Mr. Ocherro's radio broadcasts would have reached about 5 million of the 7.5 million inhabitants of Uganda. What happens to the rest of the people? How are you catering to them?

In order to conduct a comprehensive followup right to your border, you must have an auxiliary staff. How many trained workers do you have and how do you train them to followup and make sure these cases do not repeat?

We must devise education materials relevant to the type group we are using as instructors in nutrition, e.g., nutrition field-workers and assistant health visitors in the Ministry of Health. We encourage them to do the demonstrations themselves while they are in training so that they are capable of doing this in the villages with a few mothers. One of the best ways of teaching is by demonstration because we are dealing with people at the lowest level of learning. We have a 3-month course at the Karen College for nurses with certified school education. We hope this will help to give them an attitude toward nursing which is helpful in the wards or out in the field.

Before they go for final education practice, we provide another series of lectures which are aimed at giving them up-to-date information on field activities. We have an advanced degree course in the University College in Nairobi. Here again, although the nurses are learning at the highest level, they should have grasped the facts of education at the bottom level. They come out with field workers into the fields and they spend a few months or a few weeks. This will help them in planning when they are finished.

Dr. Demissie (Ethiopia): Mr. Ochero's paper was most interesting. The success that you are finding in Kampala must be directly related to the vigor of your personality. My own country has a Health Education Department in the children's hospital where I work and the results have been very discouraging. Malnutrition is more than simply a lack of food. What are the morbidity and mortality rates of your patients at the rehabilitation center where, I presume, they are getting only food? In my hospital, in spite of energetic treatment, we have a mortality rate among kwashiorkor cases of 25 percent.

Also, since mothers usually have many household duties and other children to care for, how can you convince your mothers to stay for a long period of time at your rehabilitation center? What is the average length of stay for the mothers?

Mrs. Dlundu (Swailand): I would like to ask one or two questions of Mr. Ochero. I see that your program is directed toward rural women only. Are there any future plans to cover the women in urban areas, particularly the "mother's substitute" that the public health nurse or the clinic nurse often comes across? I would also like to know whether or not you are engaged in any preventive measures. In other words, do you have programs to prevent kwashiorkor cases from occurring in such large numbers? You are fortunate that these victims come to you for help; they do not always come to us. However, I am worried about one thing in particular -- the certificate.

I wonder if it will eventually act as an incentive to leave the child until he is sick and swollen and bring him to the clinic in order to get a certificate after he is cured.

Also, do you have a weaning food? We do not have one and it is one of our major problems. Do you have preschool feeding programs for the children after they have been cured and returned home? Do you followup with a feeding program? Do you find it does cause a problem?

Mr. Ocherro (Uganda): I thank the people who have commented on my presentation. Let me respond to a few of the points made.

1. Consumption of meat

I have stated that the methods by which children are given meat are counterproductive and do not encourage the children to eat. In fact, meat is given to children in big pieces because of the fear that if it were given in small pieces they might choke on it. There is no evidence that because the mother is sitting next to her child, while the father is eating at the high table, the child is eating the food he should. Where I come from the main dish is millet and dried meat mixed with sim-sim sauce or ground-nuts. If you want the child to eat this food the mother must give it to him. If she is only feeding herself, and forgetting the child, then the food is not made into a paste and he does not eat. On the other hand, I do not think that the 900 cows eaten in my district were eaten only by adults. In Uganda, I think mothers are conscious of their duties and will see to it that the child eats the meat which is prepared for him in small pieces and sauce.

2. Use of Radio

In Uganda people are very conscious of radio. In Kampala hundreds of people walk the streets with transistor radios in their hands, and a young man would have a very hard time marrying a girl if he did not possess a radio. This could be a wonderful way to educate people. Uganda has about 8 million people; if 5 million can be reached by radio, leaving only 3 million unreached, the three quarters of the people who have been educated will teach those who have not.

3. Breast-feeding

I am all for breast-feeding. I would not spend money on a bottle of milk when my wife has milk in her breast which is free of charge and intended to feed the baby. We all know that breast milk is the best for children. I do not see why we should carry milk bottles along and add dust and dirt to the child's food. I think it is uneconomical and unwise.

4. Followups

When the child has been admitted to a hospital or dispensary he will eventually be discharged. At that time a form is completed, which is not given to the mother but to the health assistant, with the address of the family and instructions to followup the case. It is the health assistant's responsibility to apprise this family of what measures should and could be taken to avoid the need for the readmission. These health assistants, of course, have been taught from a syllabus in nutrition education.

5. Preparation of food

I know people who have said that a child should not receive precooked food when a mother takes him to a hospital. The mother should be involved in preparing the child's food. In this way she gains an education which will be useful when she has another child. Experience with this technique has shown us that this information covers an 80 to 90-mile radius. We believe in inservice training for paramedical staff, such as nurses, midwives and assistant health visitors, to whom we would give 1-year training in our two specialized schools. I think we have trained about 100 people now, which is not enough, so we are continuing to provide this education.

6. Visual Aids

I insist that all visual aid material must be local and must not be brought from America, England or Japan. The demonstration materials used for teaching the mothers must be those available in the villages. Thus we need to use a pot, a calabash, or a gourd or whatever is used in the villages themselves. The demonstrator must not carry anything with him but must use the food and the tools found in the homes where he is making a demonstration. I do not agree with the speaker who yesterday said that he was suffering from lack of demonstration material, posters and booklets. I personally feel they are not necessary. I feel that I can convince all of you without using posters, for the good reason that if you are going to put a poster up for a week, nobody takes any notice of it after the week is over. It should be used as an aid to intensify your own educational potential.

7. Educating the Rural Women

While every city or municipality of importance has its own organization, its own medical officer, health inspectors and health assistants, outside the cities these must be provided by the central government. We do assist the villages in organizing community centers, but other than that, we do not interfere. Some of this propaganda

is delivered through radio and television talks in the cities. There is money for this purpose. But it is difficult to persuade modern women who have heard about Western ideas to stay within their own cultures. I am referring to women who are called "community leaders" selected at conferences and seminars. They are influential because they come to listen to demonstrations made by Dr. Church and his team. These demonstrations are so lively that many mothers come voluntarily for a period of 3 weeks whether they have a child suffering from kwashiorkor or not. They are influential because they return to their villages and teach. They are given certificates for attending the course. These mothers are usually club leaders with a high status in their community. They are wives of chiefs, of school teachers, of religious leaders. The certificate is only given to a woman after several visits to the villages to see if she is actually practicing what she has learned. The certificate of attendance is not given to mothers who come with sick children unless after the child has been set right she comes on her own requesting to be trained as a community leader.

8. Preschool Feeding Program

This is not very developed in Uganda. It is a voluntary activity and has brought some confusion between the Ministry of Education and the Ministry of Health. As a result, the program is not working well. I personally feel that the program should be under the Ministry of Health.

NUTRITION AND INDUSTRY

by Mr. John J. Kambona, Chief Fisheries Officer
Ministry of Agriculture, Food and Cooperatives, Tanzania

Introduction

The total world fish production is about 60 million metric tons per year, of which only about 4 million tons are produced in Africa. Almost three-fifths of this latter amount comes from four countries, namely South Africa, South-West Africa, Angola and Morocco. Only one, Angola, falls within the tropical region. Senegal, Uganda and Tanzania each produce more than 100,000 tons.

The importance of fisheries production, however, cannot always be measured in terms of statistics, and even where the production is low fisheries products form an important source of protein. In almost all countries of tropical Africa there are a great number of individuals taking part in both the fishing operations and the processing of the catch. In underdeveloped fisheries the quantities handled by individuals are relatively small.

In all developing countries in the African region there is a need to plan a more effective way to utilize in full fish catches for human consumption. A balanced fisheries development program must give priority to fish utilization if fishermen are to improve their economic level and if mechanization and improved fishing techniques are to be generally introduced. It is important to decide at an early stage in what form fish should be distributed to the population and this will determine the first steps for improvement of fisheries processing. Perhaps the outstanding argument used in defense of accelerated fishery development programs in virtually all countries has been the widespread shortage of animal protein prevailing in many African countries.

The limited opportunities for increasing animal protein supplies from domestic agricultural supplies has in many countries directed the attention of governments to possibilities for increasing domestic fish supplies, especially since the latter derive mainly from small-scale operations restricted both as to range and

methods. A common device used in such planning has been the calculation of production targets based on the extent to which deficiencies of animal protein could be made up from fish supplies.

It is, of course, desirable to have some such long-term target as an aid to forecasting the future position of the fishing industries in the general food economy nationally or on a regional basis. There are, however, some fairly obvious dangers in relating present development activities to overall needs if insufficient attention is paid to prevailing demand. This is particularly the case with fisheries.

There are two factors in this connection which are closely related:

1. Physically, fish is not and cannot become readily available to large areas of the population, especially in larger countries like Tanzania.
2. Fish consumption is strongly influenced by consumer preferences. Powerful habits conditioned by familiarity and tribal customs which include preferences for certain species of marine fish in coastal areas or for freshwater fish in inland areas and prejudices against headless, gutted or iced fish, are common in many countries of Africa.

Whatever desirable long-term nutritional needs may be recognized, these factors compel consideration of the extent to which fishery programs are or should be constructed in recognition of prevailing economic opportunities. Since, due to perishability and inadequate facilities, the area of distribution is greatly restricted both in time and space, the importance of storage, processing and transport is considerable although it does not appear to be reflected in current fishery programs, possibly because the fisheries departments have little influence in these matters, outside the vicinity of the fishing centers.

In the present context it might be timely to consider how coordination of government planning and effort could reduce the magnitude of these problems, with special reference, perhaps, to two aspects, viz.:

1. How will the demand for fish products be influenced as a result of higher per capita incomes, industrialization and urbanization and what opportunities will the latter provide for increasing availability?
2. To what extent can consumer preferences be changed in favor of fish products which are, or could be, readily made available. What provision should be made in nutrition programs?

Opportunities for Development

In relation to the nutritional objectives mentioned above, much attention has been paid to the potentialities of the large areas of marine and inland waters which are or might be brought under exploitation. There are manifold opportunities for increasing production by intensification of existing operations on the basis of improved methods and by extending the area of exploitation and there is little doubt that increases of considerable magnitude are physically possible.

In eastern Africa especially, the inland fisheries are also of greater importance and here, too, very substantial increases could be achieved by systematic management of the resources, including extensions of the operations to large areas of dams, swamps and marshes and fish culture in family ponds.

The very magnitude of the increases envisaged, coupled with the scarcity of information about the size, composition and behavior of the fish stocks, may well explain the great importance attached to biological research and to experimental and exploratory fishing in fishery development planning. There is no doubt that the situation calls for very extensive, systematic investigation of the resources and for much regional cooperation in this field. The questions which arise are how far these investigations have been and are being conducted with reference to the particular needs of the fishing industry and its role in supplying the badly needed proteins to the millions of protein-starved east Africans and to what extent is lack of information about the stocks impeding the intensification and extension of fishing operations.

Technological Improvements in the Fishing Industry

While in the broadest sense the opportunities for development may be obscured by ignorance or exaggerated by optimism about the fishery resources, they can be identified more readily within the area of established fishery operations. The mechanization and improvement of indigenous craft and the application of more efficient methods on or very close to known fishing grounds have provided the most outstanding means of promoting immediate, albeit localized, increases in fish supplies, notably in Singapore, Hong Kong and Bombay and, on a small scale, in Ceylon and Southern India.

Under the present state of an underdeveloped fishing industry, much wastage occurs through inadequate facilities and technical experience for handling, processing, storing and marketing fish products. There is no doubt that supplies could be more completely utilized and significantly increased from existing fishing operations, if they could be handled, processed and marketed with greater efficiency. We in Tanzania have realized that preservation and processing and handling techniques are among the biggest bottlenecks to any plans which aim at increasing fish supplies for human consumption. In order to remedy the situation, in 1967 we set up an experimental fish processing station at Nyegezi, Mwanza. This station has been charged with devising ways of improving the traditional methods of fish processing, mainly drying, smoking and salting. We attached a greater importance to this problem because we know that well over 97 percent of the fish eaters in Tanzania consume these products and it would be pointless to try and introduce immediately unfamiliar fishery products to the people at this stage.

We also realize that the indigenous fish processing methods are unsuitable for processing all types of fish which occur in our waters and this has led to a considerable underexploitation of our fishery resources. Our station at Nyegezi, therefore, undertakes trials in the development of new fishery products. In this way we have produced good quality fishmeal and subsequently high grade Fish Protein Concentrate suitable for human consumption from the vast stocks of Haplochromis which are found in Lake Victoria. Likewise, from the unpopular

Protopterus (African Lung Fish) we have produced high quality fish sausages. Utilizing the vast quantities of cassava flour we have produced fish chips. This is just a pointer of the things to come in the future, but there remains the big problem of introducing these products on the market to test consumer reaction before we contemplate embarking on large-scale production.

This station also undertakes work on fish freezing to cater to the palates of the high income groups. We have not forgotten the possibilities of canning our fish, but we have encountered problems. Technologically, our freshwater fish do not appear suitable for canning. Economically, we do not have the large fleets landing the vast quantities that make a fish canning industry economically feasible. Nutritionally, it is difficult to justify fish canning in a country where a majority of the people are on the subsistence level of economy. The kinds of fish (e.g., Stolothrissa and Limnothrissa) which are suitable for canning cost only about 5-10 cents on the beach, and it is ridiculous to expect to sell this product to the masses at about 2 shillings per can of about 8 oz.

Our experiments at Nyegezi have shown that it is possible to improve the traditional fish processing methods using simple equipment at relatively low cost. Why have our fisheries, which would only require modest investments, not developed more rapidly and over a wider area? Much of the explanation lies, of course, in the limited resources and lack of professionally trained personnel in the fishery services. In great part, it may also be found in the present small economic importance of the fisheries and in the overall economic structures within which the developments are confined. From the point of view of planning, the danger of inconsistencies lies in the fact that fisheries development programs may be justified by long-term nutritional targets envisaging large-scale increases in fish supplies. In practice, their sizes are determined by immediate economic, political and social considerations.

Fisheries and General Economic Development

The extreme dependence of the fisheries on other broader sectors of economic activity and development

requires no emphasis here and there can be few cases where the requirements of an expanding fishery industry will have any significant impact on overall economic planning at the national level, especially in relation to industrialization and urbanization.

It is, therefore, imperative that we should explore ways and means of assisting fisheries within the framework of established plans for general economic development.

Communications provide an outstanding example. One of the most acute and chronic problems in the fisheries of East Africa is that of access roads in, for example, the areas bordering Lakes Nyasa, Rukwa, Tanganyika, Kitangiri, parts of the shores of Lake Victoria in Tanzania and Lake Rudolf in Kenya. In many fishing villages the question of access has determined the area of distribution and the level and form of fish products supplied. It largely explains the prevalence of crude drying processes.

Beyond the problems of immediate access to the fishing villages is the consideration of the communication system as a whole. In this broader sense, the distribution of fish is greatly restricted in many countries and, unlike the more advanced fishing countries, all centers of production are rarely connected for practical purposes with all centers of consumption.

This leads to the question of the development of fishing port terminal facilities and the development of maritime industries generally. Some developing countries, e.g., India, are much concerned with the provision of adequate harbor facilities for their fishing fleets, while we in East Africa are still at the drawing-board stage. Aside from purely navigational aspects, the opportunity for greatly improved shore facilities is obvious, e.g., storage, processing, icemaking, marketing arrangements, maintenance, repairs, chandlery, etc. Until such time as the governments are able to provide this infrastructure necessary for fishery development it is not possible to think of any other shortcuts to this problem. The many jobs so created and the new skills required will act as social stabilizing influences in the village and will tend to arrest the migration of young men and women to towns in the vain search of gold-paved streets.

In the wider fields of industrialization and urbanization there will be new opportunities for promoting fish consumption arising from the greater convenience of marketing a perishable product in urban centers and the higher incomes which might support heavier purchases of fish products. Associated with this, certain shifts of population may be envisaged which may give rise to problems of food preferences and, therefore, to nutrition education/home economics programs designed to promote more efficient utilization of available food supplies. Clearly, in this connection, and particularly in the matter of animal protein requirements, there may be good grounds for promoting higher consumption of fish products whenever these could be made available at realistic prices.

In a majority of cases, our fishermen form part of the agricultural population, and aside from the purely technical aspects of fishery management, their social and economic problems require consideration in that context. The incentives which attract a greater investment in a more productive and prosperous agriculture are those which will also promote the development of the fishing industry. Imaginative credit facilities which assist the fishermen in acquiring modern vessels and more efficient gear must be made available to them.

It is evident from the situation briefly described above, that there is rarely any private incentive to invest in fisheries except as a speculation in which wide margins and high interest rates offset the considerable risks involved. As in other sectors, development in fisheries calls for investment capital from outside sources, either from government (foreign aid) or from private concerns, and the need for more generous tax laws to attract such investment. There is also the need here to consider how far certain costly projects, e.g., harbors, roads, markets, etc., should be nonself liquidating or should be subsidized or should be expected to pay for themselves out of fisheries incomes alone. It would appear to me, at least in the early stages, that subsidization is the only answer to the problem and that the other sophisticated methods of financing will come later.

In the early stages of fishery development, while the expanded market is being sought, the fishery concerns

should be on the lookout for guaranteed markets, such as schools, army barracks, hospitals and orphanages, as this will facilitate enormously the consumption of the large quantities of fishing arising from the program. These institutions also serve as very good testing grounds for some of the new products. By exposing the next generation to these new tastes we might be helping our young people break from some traditional taboos against eating fish.

Conclusion

I hope that the main points raised in this paper will convey some idea of the relationship between fisheries and other economic activities and the types of problems which arise in the planning and execution of fishery development programs. It is implicit that the scale of fishery development programs must be closely tied to the existing resource base, human and physical, of the nations involved. Thus, a total strategy is required which will permit the accelerated use of reserves without incurring unnecessary or excessive allocation of scarce national resources. Regardless of the path chosen - building upon traditional industry or introducing revolutionary change, or preferably some combination of the two - the many critical factors which interact and constrain each other in fishery development require a broad-based integrated approach to ensure their phased growth both as a systematic whole and in relation to the overall growth of the economy and society.

Today, the developing countries are in a position to make rational choices about the wide range of technological achievements available to them simultaneously. However, these must be adapted to suit the local conditions. Scientific research has provided a better understanding of the distribution and movement of desirable fish species and improved techniques for their harvesting, processing and distribution. The future undoubtedly will bring many new improvements in the full use of the aquatic resources for the greater benefit of mankind.

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GENERAL DISCUSSION

Chairman: Mrs. Raqiya Haji Dualah (Somalia)

Mr. Watson (Kenya): When I was in the Army there was a saying, "If it is stationary, paint it; if it moves, salute it." I think Mr. Kambona is suggesting, "If it moves, eat it."

Seriously, the most important point to my mind which Mr. Kambona has touched upon is the importance of coordination. Not only coordination interterritorially, as it were, between the various fishery authorities, but a much higher degree of coordination between all the authorities, all the organizations that are concerned with nutrition and development.

The importance of nutrition in the rural communities has been touched upon in previous papers. It has been pointed out that in farming areas which are producing protein foods for sale elsewhere, there are protein deficiencies in the diets of the people. In most of these areas there are, of course, many different solutions and there should be a sufficiently widely-based extension and advisory service available to the farmers to be able to offer them the variety of alternatives. One such alternative is the family fishpond, the fishpond on a farm, not intended as a major cash earner, but as a readily available source of protein food for the farmer and his family. Here, for example, there is a need for far greater coordination between the fishery authorities and the agricultural departments in the countries concerned

It is, I think, this need for coordination and for more effective planning in our development programs that requires strong emphasis in the reports and recommendations of this conference.

Mr. Berg (United States): If it is not presumptuous, I would like to take a moment to discuss another dimension of industry and its relationship to nutrition. In short, how can the food industry be helpful in creating a greater awareness of the problem of malnutrition and what, specifically, can it do about overcoming it?

In India, as in some countries in East Africa, there are a number of food processing firms. They know the food business, they know communications, they know marketing and almost by definition, they know something of nutrition. Yet, with all these capabilities, there has, until recently, been little involvement in the campaign to combat malnutrition. I must note several unusual activities which have taken place in India and which may be applicable here. As Mr. Ochero mentioned yesterday, the lack of knowledge about nutrition is not restricted to villagers nor even to the poorer sections of the population.

In India nearly two years ago, representatives from most of these food industries met with Government officials and members of the scientific community to discuss the problem of malnutrition in India and what industry might do to help fight the disease. What emerged from this meeting as an organization called the Protein Foods Association of India, composed of 32 firms and financed by these firms. Their objective is to do things collectively which no firm would have the resources or the muscle to do individually. For example, they sponsored the market research jointly, they sponsored basic package research jointly because one of the problems in developing a low cost protein food is often that the package cost 50 percent or more of the entire product. Food industries are working with the Government on a joint basis, talking through such problems as licensing difficulties, trying to obtain duty-free imports on necessary equipment, and trying to get special tax shelters to encourage the production of foods which could be a risky business in a country like India.

They are about to launch a national advertising campaign to create an awareness among the general public of the problem of malnutrition. A recently completed 20-minute film will be shown in 3,500 cinema houses and numerous pamphlets have been prepared. There will be a series of national advertisements in major newspapers and magazines. A few of the themes of this campaign are: "Today's seeds are tomorrow's flowers -- maybe," "The tragedy is not that they weep, but that they can smile," "Are all children born equal?" "Your child's plate is his horoscope," and "Will your child stand out from the crowd?"

The result of industry involvement has been a series of products either now on the market, or being market tested. An example is a bread, known as Modern Bread, which is probably the most potent loaf of bread made anywhere in the world. It has lysine and vitamin A added as well as the B vitamins. This year there will be 50,000,000 loaves of Modern Bread sold in India. When all plants are completed by next year, this figure should double.

The first promotion of this bread stressed the health aspect with the theme, "Good for both health and growth." Although sales took place, no image of the bread was satisfactorily created. A great deal of pretesting took place to find a suitable new image. A dozen different animals and other figures, including children, were tried. Finally a lion mascot proved to have the greatest recall values.

Having established a base image, research was conducted to convince the bakeries that an image had been created. The lion was used as the foundation for a nutrition education program. What obviously is being attempted is to present the education in a humorous way -- a way people will enjoy and will look at -- not the traditional, formal nutrition education which discusses what calcium does for toenails.

In addition to the press and related radio and cinema coverage, Modern Bread also plans to publish a humorous pamphlet, "What Every Parent Should Know About Nutrition." This will be mailed to all those responding to the offer in the advertisements and will also be distributed through the schools.

I mention all this to show how industry can use its skills to help create an awareness of the problem of malnutrition and at the same time help promote nutrition through a better product.

Dr. Glynn (WHO): Among the problems associated with fisheries Mr. Kambona has mentioned the question of health habits. One of these is schistosomiasis. I share Mr. Kambona's view that one need not be too pessimistic about the future possibilities of control of this disease. The present position is that control of major illnesses is very expensive, and while much can be achieved by the application of simple public health and sanitary measures,

nevertheless, for an effective breakthrough we are still awaiting developments, either in the form of drugs to kill the snails, or drugs to kill the worms or, ideally of course, both. WHO is assisting a research center in Mwanza in Tanzania, which is actively engaged in the study of a number of these problems, including the testing of new compounds. The future for the control of this disease, which one might almost describe as an occupational disease of fishermen, is certainly not without hope. The other point that interested me particularly was Mr. Kambona's reference to the fact that the need for processing and the control of processing methods are not always adequately reflected in fisheries programs. The FAO/WHO/UNICEF Protein Advisory Group has concerned itself for quite some time with questions of processing and quality control guidelines for new processed food products. Professor Jelliffe, in the book I mentioned sometime ago, has suggested some common criteria that a processed food should meet: it must be of good quality; it must have been tested for bacteriological and possible toxic ill-effects; it must be culturally acceptable; it must be prepared from local ingredients, such as those described by Mr. Kambona; it must be cheap; the resulting product must be stable; and it must be conveniently packaged. It is evident that the aspect of this that interests us most is the question of the bacteriological and toxic ill-effects. There will probably be a need in every country for government legislation to deal with this question of processed foods.

Mr. Vamoer (Zambia): Private industry in Zambia is trying to help us in the fight against malnutrition. There is an organization called the Nutrition Industrial Corporation of Zambia which has developed a soup with a 25 percent protein content and is fortified with vitamins and minerals. In order to get the 25 percent protein, you must drink about 6 pints of this soup, which is not very feasible for one person in one day. We are trying to promote this by mixing it with a porridge and using it as a food. Another company called the Syndicate has come up with a soup drink which has 30 percent protein. This is being promoted and used in schools in the Copperbelt. The Marketing Board of Zambia, which is a government subsidized body, is now coming into competition with private industry in buying more fruits and vegetables. They are buying directly from the farmers in the rural areas and selling directly on the market, thereby eliminating the middleman and cutting the cost of vegetables and fruits.

We are also receiving help from private organizations such as the Rotary Club which last month staged a gala in Ndola to help raise funds for the Ndola Nutrition Group. They raised as much as 2,000 shillings. In this way, these organizations, private industries and clubs are trying to help us in promoting health and fighting malnutrition in Zambia.

Dr. Likimani (Kenya): I think the question of the role of industry in combatting malnutrition is one of the biggest problems facing the developing countries. If we start from our main industry, such as meat production, there is the difficulty that the means of communication from the area where the meat is produced to other areas do not exist. Thus, there may be an overabundance of important products in certain areas while they are lacking in others. Efforts to provide transportation facilities for important foodstuffs are usually frustrated by economic factors. Milk is another example. Milk, as you all know, is a very sensitive substance to cart for any distance, and the farther it is taken from the area of production, the higher the price. The only solution is to try and reduce the amount of water content, in other words, to transform it into powder form. Unfortunately, the industrial capacities of many countries do not allow for this important step to be taken.

Most of our countries are agricultural and we must bear in mind the necessity of exporting the main product of our countries. Those countries which are mainly agricultural must strike a balance between foodstuffs for domestic consumption and for export. We should diversify our economies in order to be in a position to grow and export various agricultural products which do not contribute to nutrition at home--products such as coffee, tea, sisal, etc. It is difficult to plan diversification by growing export products at the expense of agricultural products required for good nutrition. The two usually do not go together.

Turning to the fishing industry, the biggest handicap here, as has already been stressed very ably by Dr. Kambona, is that fishing is an industry which requires a tremendous amount of raw material, namely fish, to operate effectively. Our sea is full of fish of all kinds which would be of great benefit to the hinterland but because we are not so favored in industrial strength, other countries such as Japan come and fish just outside our territorial waters and take vast quantities of fish and process them for the American market. These are the sort of difficulties many of the developing countries face.

Dr. Demissie (Ethiopia): I was intrigued with Mr. Berg's presentation of the advertising approaches one can take. I think it is high time that we utilize American advertising techniques in promoting nutrition education in our countries.

We have been talking about private industry in relation to food production, and we have said very little about the main problem: the role of private industry in the processing of infant foods. Our main concerns are the preschool child and motivating an adult to buy good food for the child. This difficulty of motivating the family to buy food for the preschool child conflicts with the traditional advertising technique which plays up the child. Perhaps we should change our approach to this whole concept of promoting food for infants. Maybe we should go along with the local cultures; we could first promote foods for adults--for the man of the house, then for the women and so on. Perhaps we should mention the child last.

Mrs. Ngui (Kenya): We talk of boring family meals. I think the reason for this is mainly that our people are not able to obtain those foods which would make the meal interesting. The woman cooks that same boring food simply because she does not have the money to purchase the things that are readily available, including fish. I buy fish quite often, but I would say that the class we are concerned with is not capable of buying as much fish as I would. Even when a poor woman does buy fish she has only one way of cooking it and that is usually boiling it over a fire. The economy at this stage, I think, does not allow women to make the most of whatever ideas or cookery education she may have.

Mrs. Pinder (United States): I wonder whether or not that part of the population which is in greatest need of supplementary weaning foods can afford to purchase them. Should we think in terms of industrial development of these kinds of foods or should we try to devise some type of weaning food using components normally a part of the diet or normally available in the area? For instance, if it would make a good weaning food, what about teaching mothers to grind groundnuts with ripe bananas, if bananas are available in the area? As Mr. Ocheru was showing us yesterday, mothers can be taught to utilize some of the beans and other products available locally for supplementary feeding for the preschool child.

Dr. May (Convener): I would like to add one point to what Mrs. Pinder just said and stress one much neglected aspect of the food industry, namely, the home-based industry. Making jam will stretch the life of fruit almost indefinitely; smoking will extend that of fish for months; curing meat will do the same. At the present stage of development of African countries, these techniques could render invaluable service in increasing the shelf life of food. Pending a rise in the purchasing power of the people which would permit them to buy the more sophisticated products of the food industry, I believe that great emphasis should be laid on the promotion of home and village industries based on the improvement and modernization of ancestral techniques.

Mr. Kambona (Tanzania): The discussion this morning has clearly stressed the need for coordination. Very often we find that in government departments the left hand does not know what the right hand is doing. I think in this important task, where we are declaring a war against malnutrition, coordination, not only between the government departments but also between government and industry, is quite essential.

Another important point raised concerned the question of creating an awareness of the problem. Several speakers emphasized this but it is surprising how many people, even in high government positions, are not aware of this problem because they themselves can afford to provide better food for their children. "It does not happen to me, it happens to my neighbor." This is the attitude.

A third point raised was the important question of fortification and the problem of creating a positive image. I think the nutritionists could take a hint from the advertising people. Although you see them promoting liquor, they never show you a poster of a man struggling home drunk. They show him with his girl friend drinking the first bottle. I think that if they showed him struggling home drunk and crashing into cars, the liquor consumption would drop.

Another problem which I think requires attention is the question of health habits. I am very optimistic by nature, and I am glad to find that some other people share this optimism with me. While we are waiting for science to come to our rescue, let us continue to exploit our resources. Mosquitoes and snails cannot be eradicated overnight, but we can at least make an effort to eradicate malnutrition.

With the industrialization of our foods has come the need for quality control. This is important from two aspects. First of all, quality control protects the consumer. Secondly, for those of us who are trying to promote new products, like fish, if we make a bad start it will make it very very difficult to begin again. For example, in the developed countries iced fish took a long time to get into the market, because by the time it was iced, the fish had already gone bad. This gave rise to a saying that iced fish is bad. If you ice fish when it is still fresh it is a very good food. If you start on the wrong foot and people know that you cheated them in the first instance, it will be very difficult to bring them back into line again.

I was very much interested in the point raised by Mr. Vamoer from Zambia, about limiting the middleman in order to lower prices. Of course, we would all welcome this. We know the people who would benefit from this step would be the producer--the farmer or fisherman--or the consumer. Afterall, our main object in trying to develop the food industries is to benefit the producers and consumers.

I was very interested in this question of our industries struggling to establish themselves. Whereas, we see that there are quite a number of obvious channels which they could take, they cannot take advantage of these simply because the other sectors of our economy have not caught up with them.

Again, this question of our communications and transportation was cited. I think this calls for more imagination in the processing and the presentation of our products. If it is difficult to transport fresh milk, wouldn't it be easier to transport it as skimmed milk or as a powder?

The question of investment is a big headache. As Dr. Likimani has pointed out, we have ships coming from 13,000 miles away to fish right outside our harbors, taking the products 13,000 miles away, and sending them 6,000 miles across another ocean. Here we are looking at them and clapping our hands saying that they are doing very well. But I think the investment in our freshwater areas, in our small swamps would not be as great. With a small canoe you can make a much better contribution to increase the production of fish in a small lake than you can in the ocean, and we in this part of Africa are not very short of water. In fact, our waters are estimated to be able to produce more than 10 times the present freshwater fish production.

A whole change of approach to our problems of infant food production is needed. I agree that mothers should be encouraged to be more imaginative about utilizing the local foods rather than relying on expensive industrial foods, while our industries are still being established. I do not think we should try to jump and run; we should stop and crawl. We should try to explore all other uses of the local products readily available in order to produce proper foods for our children.

I was challenged on this question of monotonous meals. I would like to assure Mrs. Ngui that I have been to homes where money is not a problem but where the housewives showed much more imagination in plaeting their hair than in preparing the food. I'm afraid this sometimes includes my own good wife.

Finally, I would like to emphasize the point about the intermediate stage and using more imagination in utilizing available resources. As the Convener rightly pointed out, I do not think we should forsake the ancestral African techniques of processing. After all, these ancestors were not as green as they looked. They were scientists in their own ways and although they used crude methods, they did serve a purpose.

NUTRITION, PLANNING AND COORDINATION

by Mr. A.P. Vamoer, Assistant Executive Secretary
National Food and Nutrition Commission, Zambia

Applied nutrition projects are notoriously difficult and all too often the results have been described as being disappointingly meager. Pilot projects are of limited value, for a national problem demands a national approach, and this means coordinated action on a national basis at many levels. Only through powerful and sustained political support can there be any hope of success.

In the Zambian context it seems that there are three essential factors for successful coordination and they are of equal importance:

1. A comprehensive and unambiguous long-term policy embodying specific demands for coordination;
2. An unbiased, competent and acceptable coordinating body which has adequate authority; and
3. Within agencies, effective units or personnel capable of being coordinated.

In a paper delivered in 1965 on "National Agencies and Public Health Nutrition," Dr. Jose Bengoa of the World Health Organization recommended that there be four bodies dealing with nutrition. They were:

1. A department or unit in the Ministry of Health;
2. An Institute of Nutrition devoted primarily to research and training;
3. An advisory technical body, representative of technical opinion on nutrition; and
4. A national coordinating body on nutrition and food policy.

Certain vital aspects, however, seem insufficiently covered; there is a need for a long-term policy, effective administration of that policy and efficient execution of administrative decisions.

Professor Derrick B. Jelliffe has stated that in most parts of the world the prime nutritional need is organizational, but it must be remembered that organization is only one of seven factors involved in administration. The seven factors appear to be:

1. Foresight - foretelling the future and preparing for it.
2. Planning - both in relation to implementing projects and advising policymakers on policy.
3. Coordinating - the molding of diverse departments and agencies with varying motivations towards unified action.
4. Directing, or, if circumstances are favorable, instructing or commanding.
5. Controlling - not only regarding policy implementation and finance, but in more mundane matters such as stores and transport, requisitions and reports, etc.
6. Organizing - the creation of a chain of command or communication with emphasis on effective decentralization.
7. Evaluating - the essential two-way process which makes a program dynamic.

Following a study of the administrative infrastructure, or lack of it, in other developing countries, it was decided that for the Zambian program five bodies were required: for policymaking; for administration and coordination to implement policy; for the execution of administrative decisions; for professional and technical advice on matters relating to food and nutrition; and for research and training.

The policymaking body is the Cabinet, thus ensuring collective responsibility of the Government for the program. In March 1967, the Cabinet approved a comprehensive policy, which included the administrative infrastructure. It laid down certain basic principles:

1. The program will be national in character, initiated and activated by the Government of the Republic of Zambia with assistance from international agencies and friendly governments;
2. Each ministry will be responsible for executive action relating to subjects within its portfolio;
3. Priority will be given to implementation of plans based on present knowledge, rather than research, but the need for further research is recognized and accepted;
4. The maximum cooperation and understanding of the people will be ensured at all levels of planning and execution;
5. The ultimate responsibility for adequate nutrition rests with the family.

The nature of the body responsible for administration and coordination required careful consideration. A review of international experience and practice indicated that coordination was the most puzzling problem. Indeed, there were some who even despaired of coordination at a high level, and advocated that cooperation can be achieved most easily at the local level, where personal contacts can be exploited on a fairly informal basis. This is undoubtedly true. It is then argued that if such efforts are successful at the local level, a demand for central coordination will follow. This is not accepted as a practicable proposition within a reasonable time scale, and such efforts are likely to be of limited duration and end in frustration.

In many countries the initiative in nutrition planning and coordination devolves on National Institutes of Nutrition. By their very nature and definition, such institutes are primarily devoted to research and training. They can exert influence only by advice. Their efforts at coordination can only be secondhand, and normally such institutes are founded on the basis of, or are dominated by, one discipline.

In some countries an individual ministry is allotted the task. In such circumstances, nutrition tends to be

relegated to a low priority among the many activities of a busy ministry. There is a natural tendency to prefer objectives entirely within its own ministerial sphere of influence and control: they are much more easily administered; rivalries and jealousies are eliminated; and it is much more satisfying to the personal ambitions of those involved, as credit for success cannot be in dispute and any lack of success is more easily locked away in the ministry's own cupboard. Specialist ministries are notoriously inept at coordinating the activities of other specialists, who, in turn, resent and resist extraneous attempts to exercise initiative and leadership over their activities. There is, then, a tendency to set up distinct objectives for each agency, so that each pursues its own in isolation. The inevitable result is that the different agencies get out of phase in attaining the overall program. Those with the easier task may make accusations of lack of effort and lagging by the other disciplines, who then recriminate on the failure of others to understand their problems. Any hope of successful coordination recedes irrevocably.

Other countries have adopted a National Nutrition Council or Committee, mainly composed of representatives of the various ministries involved. Between 1964 and 1966, this was tried in Zambia. The Council met twice - the first and last meetings. Eleven meetings of the Executive Committee were held but, on the average, an individual representative attended only three meetings. The Chairman excepted, the membership from ministries changed completely three times in 18 months. The only continuity was files of minutes, and the mere presence of a file in the registry of a ministry, even if it can be found, is no adequate basis for effective coordination. The level of representation was normally such that there could be no ministerial commitment; at best, the member would undertake to report back to his ministry and urge early sympathetic consideration.

There seemed to be no completely satisfactory precedent to follow, so thought was given to what the characteristics of an effective coordinating body should be. It appeared that they were:

1. A conviction of the soundness and vital importance of the program which it administers and a determination to carry it out;

2. The authority to carry out the approved policy relating to the program with ready access to the source of policy in the event of obstruction;
3. The respect of the disciplines or agencies to be coordinated, possible only if the representation is administratively competent, professionally qualified and has knowledge of the problems and the people;
4. An unbiased approach in its efforts to obtain harmonious collaboration among the different disciplines towards the ultimate objectives;
5. Effective units within each agency which are capable of being coordinated;
6. A self-effacement permitting all credit to go to the executing agencies;
7. A capacity to shoulder the responsibility for deficiencies and a resilience to be able to remedy any such failure.

A "commission" is defined as "one or more persons appointed to perform specific duties." There were clear duties to be carried out: to reduce the wastage of manpower through death or disability; to increase the learning capacity of children through better nutrition; and to improve the productivity and working efficiency of adults. So it was decided that a commission was the most appropriate body to be formed. This could have been done by administrative directive. Such a course was not followed, in the belief that: a) authority enshrined by statute would facilitate coordination; b) the creation of a body corporate would increase flexibility; c) such an independent body would be freer from the stultifying effects of bureaucratic procedures; and d) debate in the National Assembly would make public the full knowledge of the Government policy and support.

In March 1967, the Cabinet approved a long-term policy which included the establishment of a National Food and Nutrition Commission. When the bill to create the Commission came before Parliament, the Minister took the opportunity to explain fully the Government's policy in this regard. He also made it clear that much of the

success will depend on the selection of the Commissioners. In his second reading speech he said, "the Commission must have the respect of the various agencies, so it is proposed that the majority of the Commissioners should have professional qualifications which will assist them in dealing with this highly technical and complex problem. I propose that the Commissioners should be selected from the best men and women available, whether in government or out; they would not be representatives of Ministries, but individuals selected for their knowledge and ability to further Government's intentions." The Presidential Assent to the Act was given on 15th July, 1967, and on the basis described, the Commission was appointed.

A high-powered commission can at best meet only infrequently. Hence, it must have an adequate executive arm to carry out its decisions. The need for a well-qualified Executive Secretary has been noted in many papers, but the task on a national basis is far beyond the capacity of one individual. Ancilliary staff must also be of high caliber. The staff of the office of the Commission in Zambia consists of: the Executive Secretary, an experienced administrator with knowledge of nutrition; an Assistant Executive Secretary, with knowledge of nutrition; an Administrative Officer; a Nutritionist; an Accountant; a Personal Secretary; and a Registry Clerk. There is also the Public Relations Unit, to which reference will be made later.

The office of the Commission is the full-time center for the program. Its prime task is to implement the decisions of the Commission, which involves constant liaison with ministries and departments of government, international agencies, friendly governments, local governments and nongovernmental organizations. It is responsible for the execution of work outside the normal subjects of ministerial portfolios, such as the Nutrition Survey and Services Project. Naturally, it provides the secretariat support for the Commission and its committees, and is responsible for financial and stores control. An important aspect is the collation of information on food and nutrition and on the many activities of diverse agencies. It assists in the organization of seminars, conferences and courses, but the most significant factor at this stage may be public relations regarding food and nutrition.

The vital role of educational and informational processes in combatting malnutrition is well known, but we believe that a combination of education and information does not meet the need. What is required is effective communication, and communication is only a meaningful activity when it is considered a two-way process. It is not only a question of sending out a message, but also the problem of analyzing and interpreting the recipients' reactions to the message; the result of which is, in its turn, a basis for an adjustment of the message. In this way, communication means a continuous circulating flow of information, a concept somewhat different from the traditional idea of information activities.

The Public Relations Unit of the Commission is directed by a communications expert, who is assisted by a journalist editor, a cameraman/photographer, a radio scriptwriter/producer, a graphic artist and translators. Other assistance can be called on as required. The Unit's task is to create a systematically designed structure out of an indefinite number of methods, media, agencies and opportunities.

The professional experts - nutritionists, physicians, agriculturists, etc. - are responsible for the content, but where experts differ, as does happen, an administrative decision must be made and accepted. The definition of the form and the shaping of the content into messages is the task of the communications expert.

This is a highly professional subject, demanding skills and expenditures and, should attempts be made to introduce the techniques without expert staff with insufficient financial support and in conditions which are not favorable, the whole exercise will be doomed to failure. This would not be because it was beyond the powers of communication to solve the problems, but because of inadequate application. There is, in our opinion, considerable risk involved in the tendency to leave communications to the judgment of administrative leaders or experts themselves, instead of referring the problem to professional communication expertise.

Advice on professional and technical matters relating to food and nutrition is the responsibility of the Expert Advisory Committee, which is chaired by the Executive Secretary who can give direction regarding the needs of

the Commission and report back in detail. Members are drawn from the university, government, international agencies and the general public. The disciplines represented are administration, agriculture, agricultural economics, biochemistry, economics, education, medical nutrition, nutrition, psychology, social medicine, sociology and statistics. Not only does the Committee comment on matters referred to it by the Commission, but it is free to recommend courses of action, projects or studies which may further the objectives. It confines itself to broad, national guidelines, leaving detailed planning within these guidelines to local organizations.

No firm arrangements have yet been made regarding an Institute for Research and Training, but the possibility of joint action by the University of Zambia and the Commission is under consideration.

A national program requires national effort and the involvement of all available human and material resources. Consultation with nongovernmental organizations in Zambia resulted in the belief that it would be preferable to start with local committees of nongovernmental organizations directly responsible for action in their areas, and only when there was a sufficient number of effective and active local committees should the attempt be made to create a national committee representative of active local interests. Meanwhile, the Commission is recognized as the National Committee of the Freedom from Hunger Campaign, and events may prove that this is the best arrangement for our local circumstances. Fortunately, as an independent statutory body, it has the flexibility to promote all aspects of the Campaign. There is great merit in avoiding duplication of effort at the national level and in ensuring coordination of governmental and nongovernmental action.

In the rural areas there are few effective nongovernmental organizations. Where work in the field of nutrition is most active, provincial food and nutrition committees, as subcommittees of the Provincial Development Committee, have been formed. In one province, district committees have been started and later there will be ward and village committees. It is considered fundamental that the people are involved both in the planning and execution of their own measures for improvement.

An administrative infrastructure, basic though it is in a National Nutrition Program, cannot be successful unless there is comprehensive data on which to plan and a network of trained personnel who can reach the families both in the cities and peri-urban areas and in the remotest villages.

When it came to attempts to plan a National Nutrition Program, it was quickly realized that basic data on which to plan was lamentably lacking. There was need to know more about the nature and incidence of malnutrition and its related diseases, the dietary deficiencies which cause the malnutrition and the factors which cause the dietary deficiencies. So a request was made to the United Nations Special Fund for assistance in the Nutrition Survey and Services Project. This is a combined project in which the survey is merely a means to an end - the improvement of the nutritional status of all people. Data will be collected regarding food consumption, production and storage; food habits, patterns and beliefs; nutritional status; biochemical investigations; and related diseases. During the first year, the survey will be carried out in one province. In the second year, the survey will be carried out in two further provinces and, after analysis and interpretation of the data collected in the first province, initiation of measures for improvement will begin in the second and third provinces, and in the first province there will be expansion and intensification of the work already begun and the transfer of the responsibility for the services to the normal departments of government, as it is only when such services are incorporated as part of the Government's activity in the field that they can be deemed permanent.

The Zambian Food and Nutrition Program is thus based on having an adequate administrative infrastructure, an effective means of communication, and a systematic method of planning on a national basis.

GENERAL DISCUSSION

Chairman: Mrs. Raqiya Haji Dualeh (Somalia)

Dr. Munoz (WHO): I would like to report that in the Sudan we have established a Technical Advisory Committee on Applied Nutrition, which is a first step toward coordination.

Mrs. Ngui (Kenya): Not long ago in Kenya we did not have much coordination. However, at the end of 1967, FAO sponsored a conference at Limuru which was followed by another one held at Karen College where we gathered all the people with responsibility in the field of nutrition. These meetings helped us very much in organizing whatever activities are being carried out in this country. The Limuru conference was attended by all the ministries concerned, i.e., Education, Health, Agriculture, Community Development, Cooperatives and Social Services, and all the voluntary agencies working in Kenya. The international agencies participated as observers. This was very useful and from that time on we have found that we know who to consult on such and such a problem.

Another thing that came out of the meeting was the use of the same vocabulary when you are teaching nutrition. Prior to this we had several teaching aids and found that some people were using a British book which referred to the "basic five" groups of foods, while others educated in America were using books which referred to the "basic seven." This led to a lot of confusion. Now we are all using the same vocabulary and I feel this is a step towards coordination in the field.

A proposal for a National Nutrition Board has been passed through all the preliminary stages and I hope it is going to be implemented in the very near future. Although it is not yet clear under whose direction the Board will operate, it will coordinate the work of all ministries plus the work of the university and any other institutions involved in nutrition.

Mr. Marealle (Tanzania): In Tanzania in 1966, we established a National Nutrition Committee which is composed of the four ministries concerned: Health, Agriculture, Education,

and Community Development. Before that, there was a duplication of work; each Ministry was carrying out its own nutrition programs in exactly the way it found fit. There was duplication of work and waste of the very limited manpower we had. Therefore, in 1966, this committee was set up to coordinate all the nutrition activities in the country.

I appreciate that this committee is only advisory, and therefore, the ideas formulated by the committee will probably remain on paper. Therefore, we are now trying to set up a commission similar to the one which exists in Zambia.

Dr. Muyanga (Uganda): In Uganda we have a Food and Nutrition Council which was created six years ago at the request of the Ministry of Health. It includes members from the Infantile Malnutrition Unit at the Makerere Medical School, the Ministry of Health, the Agricultural Department, the Veterinary Department, the Community Development Department, the Education Department, and the Information Department. This council is advisory; it has no authority. However, the council has provided us with a lot of information regarding food distribution, storage and levels of nutrition among the children. As far as I am concerned, I would be happy if we had a body with some executive authority such as the one they have in Zambia.

Mrs. Hlalele (Lesotho): I would just like to mention that before the launching of the Nutrition Education Scheme in Lesotho in 1961, the Permanent Bureau of Nutrition was formed which is, in fact, a national board with representatives from four ministries: the Ministry of Agriculture (which was responsible for executing all the decisions of the Board), the Ministry of Health, the Ministry of Education, and what we then called the Department of Local Government. All this was done because it was realized that although the problem we were facing was a nutritional one, the other ministries have a lot of work to do on the Board and in the villages. As we all know, problems of nutrition go hand-in-hand with problems of education. After all, this is an educational program. At the same time, there are many problems which confront communities and therefore the Department of Local Government, which has a Community Development Section, was found to be indispensable in assisting the carrying out of this program.

We in the Ministry of Agriculture, particularly the Nutrition and Home Economics Section, have discovered that after we have been given the job of carrying out all the policies and all the instructions and decisions made by this national body, have more or less been left on our own to carry out everything, even sometimes to make the decisions. Many times we have to take the initiative and try to get the other ministries and organizations to cooperate. This does not in any way mean that they are not willing to cooperate but what I am trying to emphasize is the fact that one particular section, which is the executive section, in most cases has to try and drag these people into the job and show them what their responsibilities are. So my big question is, how can we actually put coordination into action? This is my main worry. We often sit at meetings and discuss things, but action is often one-sided.

You will notice that in our report we did mention the fact that the King has a representative. This enables the scheme to make progress because it is only through the chiefs in my country that we can get land allocated. We need land for the communal gardens, for the poultry enterprises, for our own individual gardens. It is in this way that the King becomes involved and, in turn, his subordinates, like the local chiefs, also become involved.

This Permanent Bureau of Nutrition has at the district level what we call District Development Committees. In these committees again we are represented along with the other ministries and all the voluntary organizations. It is in this way that we try to reach the people in the villages. We organize courses in which all the people in the ministries are involved and we hope to be able to speak the same language.

I must mention here that the Ministry of Agriculture tends to be the only ministry which always invites members of other ministries and the voluntary organizations to attend the courses it organizes. I would like this conference to try and find a solution for getting everybody involved in nutrition--truly and fully involved--in such a way that you do not have to be nagging at them or reminding them of what they are supposed to do almost all the time. In my own country, I am afraid the other ministries probably feel that the nutrition scheme belongs to the Ministry of Agriculture alone whereas in actual fact it belongs to the Board, which should be working hand-in-hand in every step that is taken. How can we overcome this problem of coordination on paper and not in action?

Dr. Misomali (Malawi): In Malawi until now we have not had any national coordinating body on nutrition, but as I mentioned in my country report, a body is in the process of being created and the proposal has already been passed to the Cabinet for a decision. The form this coordinating body is going to take has not yet been finalized, but it is most likely going to be an executive body instead of an advisory one. The first step will be to amalgamate similar departments such as we now have in the Ministry of Health and the Department of Community Development. We decided to establish a coordinating body because when we went out into the field we found that the Ministry of Local Government under the Department of Community Development, the Ministry of Health and sometimes the Department of Agriculture through its agricultural extension program were all sending people around doing the same thing and wasting funds.

Dr. Dema (FAO): I think Mr. Vamoer has put forward some solid points for consideration and I am intrigued by his idea that there should be effective units of personnel capable of being coordinated. This is the key. We should be able to speak in the same language. If you can get the technical people in the various ministries to coordinate, you will have made progress.

I agree that there should be a department or unit of nutrition in the Ministry of Health but there should also be somebody working along the same lines in the other ministries involved with food and nutrition. This is why we proposed a Food Policy Planning Unit within the Ministry of Agriculture. It need not be called a Nutrition Unit but it might deal with nutrition as well. You may not have enough personnel to form a complete unit but one consultant providing advice from time to time would be a beginning. Over that you have the umbrella of the national board. This is the approach we recommend.

Dr. Demissie (Ethiopia): A nutrition council or something similar was founded in my country in 1958 or 1959, but failed to meet regularly. Subsequently, another committee was established in 1964, and even that committee failed to meet again. What we are doing now is to add a nutrition institute or a nutrition unit that has been working in the field of nutrition since 1961. That nutrition unit is an independent body without any official attachments to any of the ministries. What we tried to do was slowly involve the various government ministries, for example, the Ministry of Education. We told

the home economists that we could help them develop a nutrition program to include in their curriculum. We told them that we would supply books on nutrition, specifically for elementary schools, for high schools and for teachers' colleges. We told the Ministry of Agriculture and the Ministry of Health that we could help them in a number of ways. We offered to produce posters for them or provide other assistance. Now that we have gotten our message across, now that the various ministries have moved their ears, we are transforming the Children's Nutrition Unit into an Ethiopian Nutrition Institute which would have a closer link with the Ministry of Health. The main aim, is not to be really part of any department of health; we would like to be a part of the Prime Minister's Office as an independent body, in which case we will have authority over all the various ministries. This is in the working stage, Mr. Chairman. As far as I am concerned, the nutrition committees and councils can go the wastepaper basket or at least, we should perhaps change our approach.

Mr. Meswele (Botswana): In Botswana we do not have a nutrition committee as such but we have a Famine Elect Committee which includes representatives from the Ministry of Agriculture, the Ministry of Local Government and the Ministry of Education. First, the Famine Committee delves into the question of who, in fact, needs food, what type of food and why, and the whole question of food distribution. The Community Development Department has taken a keen interest in the field of home economics. It is interesting that everyone so far has said that their nutritional or home economics unit is located within the Ministry of Agriculture. Ours happens to be in the Ministry of Local Government in the Department of Community Development. The Community Development Department located within the Ministry of Local Government has formed throughout the country what we call Village Development Committees. Recently, we formed District Development Committees. Very little has been done in this respect since they have only recently been formed. At the village level this committee consists of the village headmen and the district counselor and then, of course, the elected members. At the village level, you would find a demonstrator, a representative of the Health Department, and a representative of the technical ministries. Our home economics unit, which is responsible for nutrition work through this committee, organizes courses in nutrition and child feeding. They advise on school feeding, preschool feeding and expectant mothers. They also work through different voluntary organizations which are represented on this village committee. There are over 100 women's clubs in one organization called the Botswana Council of Women

and about 80 branches of the Y.W.C.A. Then you have other organizations like the Red Cross and so on. The Red Cross, in particular, has people who know how to advise on food and health, and who take a keen interest in advising parents, expectant mothers and schools on how best to feed the children, feed the expectant mothers, etc. It is the village committee which, in fact, coordinates the activities of these different organizations. We have tried--and when I say "we" I mean the Community Development Department--to enlist the cooperation of other ministries such as the Ministry of Health and Education and the Ministry of Agriculture. We have also been able to recommend the formation of a national nutritional committee.

Miss Dlamini (Swaziland): In Swaziland, a Territorial Food and Nutrition Committee was formed in 1965. It represented the Ministries of Health, Education and Agriculture and an FAO nutritionist. In 1967, a subcommittee was formed to produce visual aids to be used by all the ministries concerned, that is, speaking in one language. But for some reason or other the meetings became very irregular--they were supposed to be one every three months. I suppose they had to raise the status of the various committees. It was decided that only the permanent secretaries of the three ministries should be from the committee. Later, it was decided that a separate body should be formed and it is now being planned.

Dr. Ali Nur (Somalia): As you know from our country report on Somalia we do not have any committee or body for general coordination in the field of nutrition. However, many ministries and many other organizations are working in the field of nutrition, such as the Ministry of Health, with hospital clinics and centers; the Ministry of Education, the Ministry of Agriculture and also the Ministry for Community Development. I hope we will build as soon as possible for better helping of our people on the recommendation of our Committee on this subject of a National Central Committee for Coordination in Nutrition.

Dr. Khan (Kenya): I would like to draw the attention of the distinguished delegates to the theme which has been stressed over and over again: the lack of coordination.

What are our aims? When we talk about nutrition and health, every ministry says what important work it is doing in particular fields. The aim is to have an effective manpower resource in our developing countries. How can we bring this about?

I think the most effective form of coordination would be a central body which I would call a Food and Nutrition Institute. This body would have three departments: a Department of Nutrition, a Department of Health and a Department of Agriculture, with three chiefs who would then coordinate their own various fields. The Department of Nutrition could carry out surveys, growth and development studies, food evaluation, community nutrition and education programs. The medical man, under the umbrella of health, could carry out effective maternal and child health programs, effective family planning, research, nutritional rehabilitation and health education. He would help in the improvement of crops, food storage and the promotion of certain fertilizers. The directors of these institutes should not be responsible to a ministry of the individual specialities, but be responsible to one ministry, or responsible to a National Advisory Council which should have executive authority. In my own country, I suggest that the institute be responsible to the Ministry of Economic Development and Planning. Only in that way can we all effectively contribute to the worthwhile goal of effective manpower in our developing countries.

Mr. Vamoer (Zambia): I hope I did not give the impression we have solved the problem of malnutrition through this program. I mentioned when I presented the country report that one of the problems we have is still coordination with the ministries. The Commission has been in existence for less than 2 years, in fact 22 months, and about a year and one-half of this has been given to planning the Commission itself. We feel that with the help of the expert committee guiding the Commission on broad national lines and by leaving the details to the people actually implementing the policies, we are involving the people in the planning and the execution. We are beginning the survey for the Northern Province and we have presented the plan to the Provincial Nutrition Committee, which is shared by the Permanent Secretary to the province and the Secretary to the Provincial Medical Officer. These tell the District Committee which explains to the public and villagers what the whole program is about. The ministries are cooperating with us. The Department of Community Development has turned to us to give them posters and booklets on nutrition with which they can teach the local people on local labors. The Ministry of Education is revising the curriculum, so we feel we are on the right track.

We did look into the possibilities of establishing a special nutrition institute. This was ruled out for several reasons.

There already exist nutrition units in the Ministry of Health, and in the Ministry of Agriculture. If the Commission had a nutrition unit to teach, this would result in a duplication of effort. Therefore, the approach was to use the existing institutions for coordination.

Dr. Likimani (Kenya): I believe it is essential to draw from this meeting recommendations which can be implemented and which will promote the cause of nutrition. May I warn against generalized recommendations that, in fact, do not get to the point. The drafted recommendations must be specific. However, since no one wishes to dictate policy to any country, our advice should remain couched in such terms that the people in charge in the various governments can see how these recommendations can be applied in the context of their countries' circumstances.

We all know that it would be important to have a coordinating body or a National Nutrition Council to take responsibility for nutrition. Hence, some degree of centralization is essential; otherwise, we may continue to have conferences for any number of years without making any real progress. Some have even suggested that this body, since it involves several ministries, should be directly under the Head of State. May I strongly recommend that with all due consideration to proprieties, we had better say exactly what we mean to say and not be afraid of calling a spade a spade. We must be as precise as possible. A meeting like this should produce well-defined, diplomatic recommendations without fear of causing displeasure.

My best wishes go to the people who will draft the final report.

COMMITTEE REPORTS

COMMITTEE ON NUTRITION AND HEALTH

Chairman: Dr. Demissie Habte, Ethiopia
Rapporteur: Dr. J.A. Munoz, WHO
Members: Dr. G. Lochrie, Botswana
Dr. Z. Onyango, Kenya
Dr. Y.H. Misomali, Malawi
Mrs. N.H. Dlodlu, Swaziland
Dr. S.L.D. Muyanga, Uganda

Noting that:

Malnutrition is responsible for the deaths of a significant portion of infants and children in our region and permanently impairs the physical and mental well-being of the survivors;

Malnutrition is closely interrelated with infection, infestation and poor environmental health;

Most governments have inadequate financial and personnel resources to face the problem of malnutrition.

The Committee on Nutrition and Health recommends:

1. That the importance of the physical and mental impairments associated with malnutrition should be widely recognized and the implications of these to national economic productivity should be of the highest concern to our governments.
2. That basic health services be strengthened and expanded so that as many mothers and children as possible have health care easily available. Particular attention should be given to improvements of existing maternal and child health services and they should be reinforced by nutrition activities.
3. That priority be accorded to the vulnerable groups, i.e., expectant and lactating women, infants and pre-school children.
4. That external assistance be sought to help governments in solving nutritional problems of the regions.

COMMITTEE ON NUTRITION AND AGRICULTURE

Chairman: Dr. I.S. Dema, FAO

Rapporteur: Mr. A.N. Nalumango, Zambia

Members: Miss Valetta Dlamini, Swaziland
Mr. G.A. Semiti, Tanzania
Mrs. Anna Hlalele, Lesotho
Miss D. Gondwe, Malawi

AIM

To establish machinery within governments to strengthen food and nutrition activities within the Ministries of Agriculture.

PREAMBLE

The Committee on Nutrition and Agriculture recognizes and accepts the role of improved nutrition as a prerequisite to the orderly development of a nation socially, economically and politically. The Committee also takes cognizance of the fact that malnutrition is directly the cause of:

- a. Retarded physical and mental development in early childhood;
- b. High infantile mortality and morbidity;
- c. Reduced working efficiency in adults;
- d. Migratory movements arising from local food shortages, causing social instability in the family and community.

The Committee on Agriculture recognizes the agricultural factors influencing malnutrition on the continent of Africa and notes that this undesirable state of affairs is due to the following:

- a. Low agricultural productivity owing to inadequate inputs, both material and technological ("material" includes availability of arable land and judicious government policy on land tenure and land resettlement);

- b. The preponderance of cash crops over suitable food crops and promotion of cash economy at the expense of improved nutrition (e.g., over-selling of staple foods and nonconsumption of edible and nutritious cash crops);
- c. Inefficient marketing, storage, processing and distribution, resulting in products which may be nutritionally inferior and microbially contaminated and unsafe for human consumption;
- d. The heavy burden of pests and diseases in man, his livestock and his crops.

RECOMMENDATIONS

The Committee on Nutrition and Agriculture recommends that:

1. In view of the absence of the necessary technical units and of the organizational and administrative frameworks for handling food and nutrition programs within the Ministries of Agriculture, a competent Food Production Planning Unit be set up within each Ministry of Agriculture with the following responsibilities, depending upon resources, as suggested by the 1967 FAO Conference on Nutrition in Agriculture (see FAO Conference Document C67/13, 1967):
 - a. Collecting and collating data on the food and nutrition situation to form a basis for food and nutrition planning;
 - b. Advising upon the production, exportation and distribution of foods together with embargoes, tariffs or subsidies that may need to be introduced to improve the food and nutrition situation;
 - c. Advising on the initiation of food technological and industrial enterprises and assisting in formulating food standards and regulations;
 - d. Undertaking technical, educational and advisory activities on food and nutrition through advising the extension and information services of the ministry;

- e. Assisting in the implementation of applied nutrition.
 - f. Participating in joint undertakings with appropriate ministries to identify and solve food and nutrition problems;
2. Governments participate actively (administratively, financially and commercially) in the production of inexpensive protein foods;
 3. Governments plan sound land use policies with regard to the proportions of land reserved for trade crops and for food crops.
 4. Realizing the shortage of qualified personnel in the field of applied nutrition in relation to agriculture, orientation courses in nutrition for agricultural extension and other rural development extension workers be initiated.

COMMITTEE ON NUTRITION AND CHILD FEEDING

Chairman: Miss Grace Wagemu, Kenya
Rapporteur: Mr. T.G. Davies, UNICEF
Members: Mrs. Jean Pinder, U.S.A.
Dr. I. Maboshe, Zambia
Dr. Mohammed Ali Nur, Somalia
Mrs. Ann Taole, Lesotho
Mrs. H.A. Mosala, Lesotho

INTRODUCTION

In preliminary general discussion, the Committee agreed that children are hardest hit by nutritional deficiencies during their years of most rapid growth, extending from the moment of conception through gestation, infancy and into the preschool period (age group 4-5 years).

With growth beginning at the moment of conception, the nourishment of the child in the womb is of extreme importance. Following birth, the infant depends for some time upon its mother's milk. It follows, therefore, that the nutrition of children and pregnant and lactating women are inseparable in the physiological sense; the health of the mother and her child are interdependent. Both must be safeguarded.

On these premises, the Committee identified the following categories as constituting the groups at greatest risk:

Pregnant and lactating mothers
Weanlings
The preschool child

The Committee was of the opinion that from the standpoint of the child, prolonged nursing, specifically, continued breast-feeding, was most advantageous. Breast-feeding should persist for at least 12 months or even, where possible, longer.

The Committee strongly deprecated the habit of bottle-feeding, which it noted with concern was being increasingly

adopted in African communities. The example, frequently displayed in this respect by otherwise educated and socially prominent mothers, setting a pattern for imitation by other social groups, was strongly deplored. However, wherever bottle-feeding is practiced, the appropriate hygiene and sanitary education should be given.

The Committee noted that a distinction needed to be made between nutritional problems arising in urban/peri-urban areas and the rural areas. It was also agreed that supplementary feeding programs, wherever introduced, should logically be directed specifically to meeting the deficiencies prevailing. Different supplements would, therefore, be necessary in differing localities and communities.

The Committee took cognizance of the fact that problems of malnutrition persisted beyond the range of their designated priority groups and probably among school age children and the increasing number of female workers employed in urban, industrial, commercial and governmental establishments.

RECOMMENDATIONS

The Committee recommended that:

1. Breast milk being a food par excellence, breast-feeding should be continued for as long as possible, with a minimum of 12 months. Within the initial 12-month period, supplemental feeding should be gradually introduced at appropriate stages and in appropriate form.
2. Supplemental feeding of weanlings and preschool children should, in nature and constituents, be oriented towards the recipients' nutritional needs rather than based indiscriminately on the fact of the availability of any particular surplus commodity.
3. Supplemental feeding programs should, insofar as possible, be based on locally available commodities as an assurance of continuity.
4. In recognition of the differing nature of causes of malnutrition as between urban/peri-urban and rural communities, and in view of increasing urbanization, the approaches towards solution should include:

In urban/peri-urban areas:

- a. Appropriate enrichment of staples;
- b. Provision of low-cost, low-fat milk (in countries where dairying is practiced);
- c. Government subsidization of locally-produced nutritive supplements for distribution to vulnerable groups through health and welfare institutions;
- d. Provision of supervised, hygienic canteen services in industrial, commercial and government establishments employing female workers (the facilities not to be limited, however, to females).

In rural areas:

- a. Encouragement of increased and improved production of better quality food crops--in home and school gardens, community plots and as an integral part of any government programs for diversification from primarily cash crop agricultural production. (Produce should include the legumes, green and yellow vegetables, fruits, nuts, poultry, fish and small animals.)
- b. Supplemental feeding programs with priority for the vulnerable groups should be arranged, on a continuing basis, through health, social welfare and community institutions.
- c. For school age children, supplemental feeding programs should be organized, at suitable local institutions--schools, community centers, etc., based primarily on local products (to ensure continuity) and constituted to supplement the customary home diet. In the interests of continuity, donated supplies should be regarded, when available, as serving to supplement, and not replace the local resources.
- d. Where schools are unable to provide a meal service (this applies to both urban and rural areas) local food vendors, suitably instructed in hygienic handling and in the types of commodities

to be purveyed and then granted a licence to operate, should be allocated suitable accommodation space within the school precincts for daily use at appropriate hours.

5. All supplemental feeding programs in urban/peri-urban and rural areas, serving both the designated vulnerable groups as well as all others, should be supported by an intensive and continued program of health and nutrition education as a means of ensuring maximum and persisting benefit to the recipient individuals and families. This educational program should be so organized as to secure the actual participation and involvement alongside government cadres (health, education, social welfare and agricultural personnel) of village headmen, other voluntary leaders and non-officials.

COMMITTEE ON NUTRITION AND EDUCATION

Chairman: Mr. L. Ocheru, Uganda
Rapporteur: Mr. Bohdal, WHO
Members: Mr. Washington R. Meswela, Botswana
Mrs. Raqiya Haji Dualeh, Somalia
Mrs. Abeba Wolderufael, Ethiopia
Mrs. Esselina Sithebe, Swaziland
Mrs. Frances Trinidad, Malawi
Miss E. Njonjo, Kenya

INTRODUCTION

The importance of introducing nutrition education to the public cannot be overestimated as it is the only way that mothers and the public as a whole can be made conscious of the importance of feeding their children properly and so assist in eradicating dietary deficiencies.

The first and most important approach to nutrition education should be to create an awareness in the community and the Government that nutrition deficiency does exist in the community and that it does constitute a major problem. For this reason the Committee makes the following recommendations:

1. The educational method should be attuned to fit the different classes of people in the community.
2. The people should be taught:
 - a. The general principles of a balanced diet in the simplest form possible.
 - b. Food for weaning and feeding the child at different ages.
 - c. Food for expectant mothers.
 - d. Food for lactating mothers.
3. The importance of preservation of food values as well as food and personal hygiene must be stressed because, more than often children die from infectious gastroenteritis.

4. The importance of training technicians to carry out nutrition education should be noted and the establishment of training institutions should be undertaken by the Government.
5. The teaching of nutrition should be directed at the following groups:
 - a. The public at large and, in particular, mothers, community leaders and politicians.
 - b. Students at all levels of education, as well as teachers in vocational schools.
 - c. Personnel engaged in health care, including medical and auxiliary workers.
 - d. School masters and teachers of all sorts.
 - e. Social workers.
 - f. Workers with voluntary organizations.
 - g. Medical and auxiliary workers.
 - h. Agricultural workers, etc.
6. Education media to be used should be practicable to enable each and every part of the community to be covered. The media should include radio, T.V., press, films, printed materials, manuals for mothers and instructors, drama, etc.
7. The content of nutrition education programs should be planned in such a way that it can reach all different classes of the community. Nutritional recipes and diets should be based entirely on local resources which can be improved to form an adequate diet. Weaning foods for each region should be studied for their nutritional value and their usefulness in supplying an adequate diet for the children. Home economists or other research workers should be encouraged to develop new recipes based on local tastes acceptable to the community concerned.

COMMITTEE ON NUTRITION AND INDUSTRY

Chairman: Mr. J.J. Kambona, Tanzania
Rapporteur: Mr. C.E.P. Watson, Kenya
Members: Mr. E.M. Kigundu, Uganda
Dr. A.A. Khan, Kenya
Mr. A.L.D. Marealle, Tanzania
Mr. Hailu Guadey, Ethiopia

The Committee on Nutrition and Industry, noting the potential role of industry in nutritional improvement makes the following recommendations:

Increased Productivity

1. Industry, and particularly that sector dealing with the processing or preparation of food, must initiate and sponsor schemes designed to increase productivity, both within the industry itself and by the primary producer who supplies the raw material for the factories. Governments should at all times support and encourage any such efforts aimed at providing incentives to increase production.

Processing

2. Industrial-scale processing, as it develops, should not hinder efforts designed to improve on traditional, small-scale systems aimed at reducing food wastage and the production of more hygienic and longer-lasting commodities at family and village levels, which can contribute to the creation of employment in the rural areas. Dried and salted fish and meat, fruit and vegetable preserves are examples of commodities which can be dealt with at this level.
3. The location of larger scale industry must take into consideration the need to generate employment in the rural areas so as to reduce the rate of urbanization.
4. In developing nations the prime need is for industry to be planned to give maximum employment opportunities, provided this can be done competitively.

Subsidies

5. Noting that only certain agricultural commodities are subsidized at present, it is recommended that governments review the needs of other commodities for similar assistance in order to promote increased productivity and longer term economic development.
6. The methods of such assistance could be direct financial aid by means of grants and loans; expanded technical support in providing servicing facilities, either free or at subsidized cost to farmers and fishermen using machinery; more favorable tax laws to encourage both the producer and the food processing industry.
7. It is recommended that producer price stabilization policies be reviewed and made more effective than is presently the case.
8. Governments should review their policies aimed at giving protection to local industry. Protective measures, such as tariff barriers, must be designed with the consumer in mind rather than just the local industrialist, so as to ensure that such industries are forced to become efficient and also that products reach the consumer at the lowest possible cost. Control by means of restrictive import license is preferable to tariff barriers.

Manpower Training

9. The primary producer needs more technical training to enable him to produce more and earn more.

Research

There needs to be a great intensification of research by both government and the private sector.

10. Research by industry should be aimed principally at developing new techniques in food processing, and new products intended for sale to the lowest income groups in forms which are not only as cheap as possible, but also as simple as possible to prepare for consumption. There is a particular need for precooked foods for weaning children so as to ease the burden of the mother.

11. Research by governments and technical agencies should concentrate on the development of more productive strains, hybrids, etc., covering the whole range of food crops, domestic livestock and fish.

Legislation

12. Governments should review the coverage of legislation and enforcement, and, if possible, institute new legislation aimed at: the mandatory enrichment of staple foods to standard specifications and at standard costs; the establishment of comprehensive and enforceable quality and commodity standards and more effective control of adulteration, false labelling and fraudulent packaging methods; the establishment of maximum and minimum price controls wherever this is feasible.

Advertising and Publicity

13. Noting the vast expenditure by private industry on advertising such commodities as beer, cigarettes, cosmetics and detergents in comparison with the rather paltry outlay on advertising food commodities, much greater attention must be paid to this need by both governments and industry. A more professional approach to package design is also essential. Particularly in those countries where governments control such communication media as radio and television, the desire for advertising revenue must be controlled or used to subsidize more intensive advertising by governments to promote nutritional improvements in general, such as consumption of the main protein foods, and by the food industry in promoting individual brands of food products.

Marketing, Distribution and Communications

In order to facilitate efficiency and reduce costs of marketing and distribution, the following measures need urgent consideration by governments:

14. A more realistic approach in planning the establishment of producer cooperatives to ensure that societies are not formed unless adequate staff is available to ensure proper supervision and management in

the early stages. Cooperative management must be recognized as a professional task and not be left, as at present, to the amateur and often misguided efforts of the cooperative members. Governments must be prepared to subsidize the salaries of trained managers who can be posted to start new cooperatives on the right road and to train local counterparts.

15. More effective action is needed by governments and local authorities to provide properly designed and hygienic wholesale and retail market facilities.
16. More emphasis must be given to the provision of finance for all-weather feeder road development in food producing areas, instead of concentrating on the main cash crop production areas; for example, feeder roads to fish landings, ranches, etc.

Storage and Preservation

17. Much more work needs to be undertaken by both governments and industry to improve on current food storage facilities designed to fully utilize glut production over a much wider range of commodities and ensure even availability of food during periods of shortage. This work needs to be undertaken at three levels: at the home or village community; at the collection or processing center; and at the national strategic reserve level.

COMMITTEE ON NUTRITION, PLANNING AND COORDINATION

Chairman: Mr. A.P. Vamoer, Zambia

Rapporteur: Dr. G. Glynn, WHO

Members: Dr. J.C. Likimani, Kenya
Mrs. S. Ngui, Kenya
Mr. Alan Berg, United States of America
Mrs. C.W. Kuria, Kenya

PREAMBLE

Country reports and related discussions have demonstrated that in many areas programs designed to combat malnutrition have not been fully effective. It has also been apparent that, generally speaking, nutritional problems have not been accorded the priority in national plans required by virtue of their importance.

A more systematic approach with a fresh orientation, designed to take into consideration difficulties already encountered, seems indicated. In this context the following recommendations have been formulated.

RECOMMENDATIONS

The Committee on Nutrition, Planning and Coordination recommends that:

1. The problem of malnutrition be better defined in the respective countries' collection of statistical data, and that nutrition surveys be carried out on accepted lines wherever no recent surveys have been made.
2. To overcome a basic obstacle to economic and social development the following general objectives for a national program to combat malnutrition be considered:
 - a. Reduction of mortality in vulnerable groups due directly or indirectly to malnutrition.
 - b. Reduction of the incidence of malnutrition.
 - c. Improvement of nutritional status, with special reference to vulnerable groups.

Objectives should, insofar as possible, be defined in measurable terms (e.g., where vitamin A deficiency is a major problem, reduction by X% over X period of time, at X cost, the number of children thus affected).

3. Alternative solutions be considered, such as price policy, reorientation of market mechanisms, child feeding programs, nutrition extension and education, fortification programs, reorientation of research activities, introduction of new foods or improvement of existing ones, control of communicable diseases and parasitic infestations, or combinations of the above. Programs might be selected on the basis of cost, time required to be effective, likely impact and feasibility.
4. Existing resources be assessed and how these relate to selected plans be determined.
5. Further requirements over and above existing resources be determined. This appears to be essentially contingent upon the existence of administrative surveillance machinery in the form of an independent central authority, with technical competence to make recommendations to Parliament, and its own budget. The approach to the multi-disciplines involved should consist of the establishment of a strong authority possessing the power to introduce bills in Parliament and to issue regulations and decrees, and which includes a strong technical component of its own covering the basic disciplines involved in combating malnutrition (such as health, agriculture, industry and education). Most important, this authority must, to be effective, have its own adequate budget, voted by Parliament as part of the national budget. The Zambia prototype could be developed and added to in the highly different circumstances in individual countries. This authority must be placed at such a level as to be responsible to a Cabinet Minister or to the President or Vice President in order to avoid interdepartmental rivalries. An independent evaluation system should also be automatically involved in the operation of this authority.
6. Creation of a climate favorable to acceptance of the plan be created through discussions and mass media to foster public and political awareness of the problem.
7. Political authorities be approached and a plan be submitted.

CLOSING ADDRESS

by The Honorable J.D. Otiende, M.P.
Minister for Health, Republic of Kenya

This afternoon brings us to the conclusion of the Eastern African Conference on Nutrition and Child Feeding. I am sure it has been a busy week for you participants.

This conference could not have been possible without the keen interest of Dr. Jacques May, Chief of the International Unit of the Nutrition Program of the United States Public Health Service. As Conference Convener, his task was to initiate and coordinate activities between the United States Government and our government. We have been pleased to participate and extend our sincere appreciation. Our thanks also go to his able assistant, Miss Donna McLellan, who has, with considerable skill, tact and efficiency, handled the conference logistics and managed the secretariat.

I have special thanks for Mr. Harold Snell, the Director of USAID, and his staff for the valuable contribution they, too, have made in organizing this conference. In fact, they have been responsible for all that was required and accomplished for the successful operation of the Conference.

My sincere thanks also go to the Governments of Botswana, Ethiopia, Lesotho, Malawi, Somalia, Swaziland, Tanzania, Uganda, Zambia and United States for having accepted graciously our invitations to send their representatives. Please take my greetings and heart-felt thanks to your governments.

Many thanks are also extended to the representatives of the International Agencies, that is, the Food and Agriculture Organization, the United Nations Children's Fund and the World Health Organization. I have been told of their useful contribution and guidance during the conference. I personally know that they have a better understanding of our problems because of their international outlook.

I cannot know whether you delegates have enjoyed the meeting and your stay in Nairobi, but I suspect that for reasons of diplomacy and good manners you will say "Yes."

We have been proud to have you here in Kenya, not just as participants but as friends. Please accept my thanks and rest assured that you are welcome in this country at any time.

I have also a word of thanks for the observers who have attended this conference. By their continued presence they have exhibited keen interest which they themselves and the organizations they represent have in the deliberations of such an important meeting.

It is my pleasure on this last day of your gathering to congratulate you on the effectiveness of your labors. I have followed them day-by-day and can tell you that your work has been extremely useful in stressing the importance of nutrition to social and economic development and in stressing the importance of good health through good nutrition. This problem of social and economic development in our countries is the great task of this century. It is a task which must be accomplished from within, except for occasional instances of external assistance and projects intended to promote self-help.

I have reviewed your recommendations and thoroughly agree with them. More than lip service should, indeed, be paid to the health of the infant. Well-balanced education, which takes into consideration the great benefits of breastfeeding and, at the same time, corrects the sometimes tragic consequences of unsanitary and unhygienic bottle-feeding should be disseminated. You have indicated a point which is often neglected--the fact that the nutrition of the mother is essential to the nutrition of the child. While we all know that during pregnancy the child does not necessarily suffer from the depletion of the mother's reserves to build its own body composition, we do not speak enough of the importance of good nutrition to sustain the ambition of the mother, who very soon after delivery must perform many tasks and supply her child with nutritious milk. These goals can certainly be achieved through the strengthening of basic health services on whose infrastructure the promotion of healthy, ambitious future generations rest.

The stress you have given to supplemental feeding to assist the mother in the second phase of her nursing is invaluable. Your recommendations that this supplemental feeding should be oriented to meet the needs of the child

rather than to eliminating occasional surpluses, is of great importance. While in Kenya we are trying to adopt the right approach in so far as possible. We know that very often one is confronted with proposals which take the easy way out. There is no doubt that such a policy will also serve as an incentive to the farmer to produce a surplus of the valuable foods that can be used in supplementary feeding.

You have rightly emphasized the importance of education in nutrition, and in this respect the emphasis on the mother, the political worker and the producer as well as the consumer provides the welcome basis for a widespread plan of universal education for the public in these matters.

The problem of balancing the production of food crops and cash crops is one that has been of constant concern to the Government of Kenya and, I am sure, to our brother governments. It is a difficult thing to do and I wish to stress the help we receive from the Food and Agriculture Organization of the United Nations in its Indicative World Plan. You have suggested that a Food Planning Unit be added to the Ministry of Agriculture. While I cannot speak for my colleagues in this field, I am sure that I can stress the importance of such an entity within the Government.

Many of you have stated in public and in private that the food resources of Africa are, in fact, adequate and that poor distribution of these resources is an important factor in the faulty diets that we all deplore. It is important to remember that if mothers knew how to preserve in the home the food that is collected at harvest time and that if we could finance a scientific plan for storage at all levels, we could stretch our reserves to the point where emergency programs might not be needed.

Industry has a great role to play in helping us expand our food resources, not only by developing new and cheap ways to process existing foods, but by advertising intelligently and efficiently the benefits that can be derived from well-balanced high-protein foods based on local resources. By intelligent, I mean honest. Propaganda is a part of education only if it is honest. Therefore, I urge that any advertisement promoting a food be based on a strictly accurate description of the product.

This, together with a generous limitation of the margin of profit, will help, perhaps not the majority of the suffering masses, but a substantial part of the population in the middle- and low-income levels.

I am happy you have insisted that these processed foods be based on local resources. As I said a minute ago, these resources are abundant and diversified, ranging from milk through legumes and fruit to the fish in our lakes, rivers and coastal waters. Utilizing these indigenous resources is the only way for the food industry to create an incentive for surpluses among the producers. I fully realize that subsidization of local foods and of the advertising needed to promote them is an investment in the future and should not be considered luxuries that governments in lesser developed countries can ill afford.

Another point which you have made which is of great concern to our countries is the utilization of manpower. While the delegate from the United States has stated that only 8 percent of the entire U.S. population provides the food for all the inhabitants of the country, we must remember that such an astounding accomplishment is the result of an intensive utilization of mechanization in the production of food crops. This is all right for the United States. It certainly would not do, at least at this time and for the immediate future, for a developing country where there is a large surplus of unskilled labor that should, if at all possible, be kept on the farm. Hence, you have recommended that any planning for the future be labor-oriented rather than machine-oriented.

One of the great challenges to the governments of African countries is to make the villages and the rural areas attractive so that the young people do not come to the cities in droves. Hence, we must improve the traditional techniques of agriculture so that they result in increased production, which in turn, will result in surpluses that can be sold. With that money the villages can be embellished, housing can be made more pleasant, overcrowding in the huts may be avoided and all the attractions that modern science has allowed to develop in the cities may be at least in part, transferred to the villages. Let me insist that it is no shame for a "school leaver" to settle down in the rural areas. There is no loss of status when a young man with a primary education remains in the village and makes the village where he was born a more attractive and beautiful place. All this will be the result of careful planning and coordination.

I am now coming to what is perhaps the most important, boldest and most original recommendation to come out of this conference: the creation of a supra-ministerial authority, perhaps even a special Ministry of Food and Nutrition, responsible only to the Head of State, empowered with multiple competencies of its own. This is indeed a new idea in government, but new ideas are just what we want. I notice that in your concept, this authority should have its own budget voted by Parliament and I agree with you that this is extremely important because without such a provision, active development of our food resources and a better distribution of these resources is impossible. Who says that the money invested in such an authority will not be recouped many times over by the savings which a better coordinated program, eliminating duplications and errors, will allow?

I fully realize that some external help, either multilateral or bilateral, may be needed in order for our governments to make a start in establishing such an authority. I do hope that the funds to do so will be found, because I agree with you that such bodies are needed and that advisory councils are not strong enough to do the job. I will, therefore, within the orbit of my influence, do my best to support your recommendations.

I hope you have had a pleasant stay in Nairobi and that you will come back often to visit us in Kenya. In the name of my Government, I wish you all a safe return to your homes. I hereby declare the Eastern African Conference on Nutrition and Child Feeding adjourned.