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CENTO Conference on COMBATING MALNUTRITION IN PRESCHOOL CHILDREN

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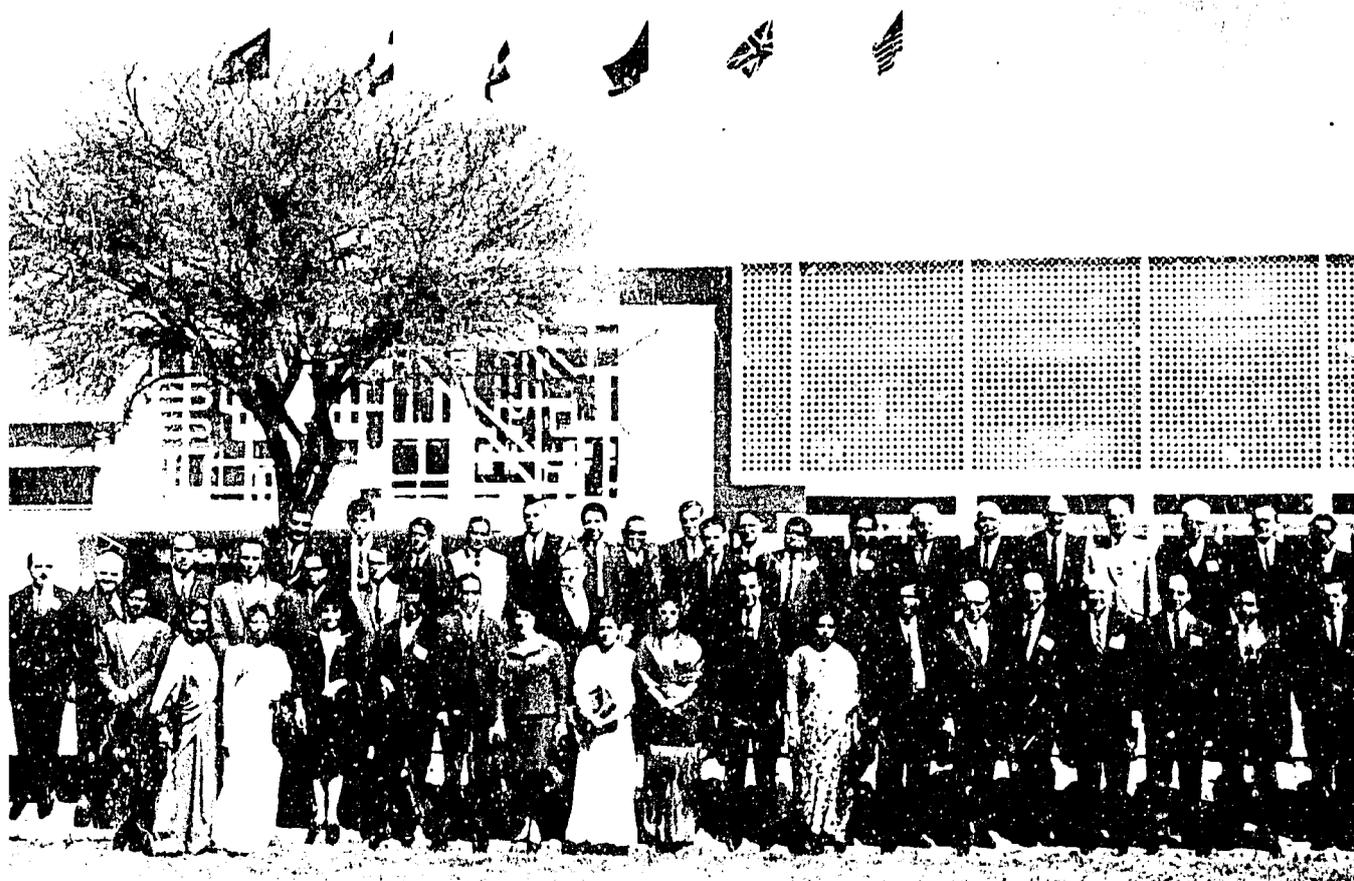
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FOREWORD

One of the major problems in the field of public health nutrition in the CENTO region is malnutrition of preschool children. This malnutrition is basically responsible for the early deaths of millions of children and in those it does not kill, permanently impairs physical growth and probably causes irreversible mental and emotional damage.

This book contains articles which explain the present situation of malnutrition in preschool children in the CENTO region. It is hoped that the recommendations presented in the CENTO Report will be followed and that increased interest of all concerned will stimulate planning for improved food production and distribution, diet, and parental education to ameliorate this condition.

*Participants of the
CENTO Conference on
Combating Malnutrition in Preschool Children*



In the background can be seen the new National Health Laboratories, Islamabad, Pakistan.



WELCOME ADDRESS

BY

BRIGADIER C. K. HASAN, M. B. E.,
Director General of Health, Pakistan

Honourable delegates, ladies and gentlemen,

It gives me great pleasure to be able to extend a warm welcome to you all, on behalf on the Government of Pakistan on the occasion of the inaugural session of the CENTO conference on combating malnutrition in preschool children.

We are grateful to the CENTO Coordination Committee for having chosen our newly-built national capital and our National Health Laboratories as the place for holding an important seminar.

This meeting is a highly significant one in view of the fact that the preschool child belongs to the most vulnerable group, and represents an important proportion of the population of the developing countries.

During the last decade, despite the undoubted development in the field of health and social welfare, the infant and the preschool child mortality rates are still very high in the developing regions.

Man has long realized the relationship between the food he eats and the health he enjoys, but it has only been during comparatively recent times, that he has begun to understand the reasons why this relationship exists. However, in spite of this increased understanding large areas of the world and millions of the people who inhabit them suffer from indifferent or poor health and die each year through malnutrition. It is a tragedy that these sufferings continue despite our knowledge of why and how they occur.

The Government of Pakistan has long been aware of the importance of nutrition as a basis for continuing good health of the people. In 1956 a well-organized nutrition survey of the Armed Forces of Pakistan was undertaken with the cooperation of the interdepartmental committee on nutrition for national defence. The information obtained by this ICNND survey focussed interest on obtaining similar information for the civilian population, so that the proper remedial measures could be undertaken where necessary by immediate and long-term measures. With this aim in mind the Government of Pakistan established a Directorate of Nutrition Survey and Research in November, 1960. The immediate task assigned to this Directorate was to conduct a nationwide nutrition survey to secure adequate data from all over the country to make estimations of the inadequacies in food consumption and to appraise their effect on the nutritional status of the people.

This survey has recently been completed in East and West Pakistan, and has brought to light that some of the nutrition problems are widespread in the country and some of the deficiencies are very serious indeed.

The most widespread deficiency disease in Pakistan is protein-calorie malnutrition affecting most adversely the vulnerable groups of our population, namely, the preschool children and the expectant and nursing mothers. They represent 40 percent of the total population. As a consequence of this prevailing protein-calories malnutrition the death rate of infants and preschool children is still very high, the vast majority of which are due to infectious diseases which are precipitated by fatal protein malnutrition. One cannot but shudder to know that about 50 percent of our children below five years of age are on the borderline of optimal nutrition, more than 30 percent of them are in a state of poor nutrition, and about 3 percent are suffering from acute protein-calorie malnutrition.

The most frightening of all is the growing evidence that a malnourished child in the preschool age group may suffer from mental retardation that cannot be reversed even though adequate and balanced food is consumed in subsequent years.

A clear relationship exists between adequate intake of protein and outcome of pregnancy for both mothers and newborn infants. The baby girl of today is the mother of tomorrow. Prolonged dietary inadequacy, no matter when it occurs in her life, is a serious threat to the physiological responsibility of her eventual motherhood.

Along with this protein-calories malnutrition other deficiency diseases which affect the population, specially our children of pre-school age group, are xerophthalmia and keratomalacia due to vitamin A deficiency, nutritional anaemia due to iron deficiency and ariboflabiosis. It is evident from our survey findings that about 50,000 children below the age of five go blind every year in East Pakistan due to acute vitamin deficiency in their diet. It is also evident that in our children protein deficiency and vitamin A deficiency act synergistically.

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INAUGURAL ADDRESS

BY

COLONEL M. K. AFRIDI
Consultant to the Ministry of Health
Government of Pakistan

Ladies and Gentlemen,

It is a great pleasure and proud privilege to have the honour of participating, however briefly, in this international assembly of distinguished scientists hailing from the four corners of the earth. In your deliberations during the coming week you will cover a subject which is of the utmost importance to every country in CENTO irrespective of its status of economic development. For obvious reasons, however, your conclusions and recommendations would naturally be directed more specifically towards improving the situation as it exists in those member countries whose needs in this field are relatively more urgent and pressing. I am convinced that this pooling of knowledge and experience of child nutrition experts in the CENTO region will help expedite measures aimed at bringing health happiness to all.

Insofar as Pakistan is concerned, the problem of malnutrition in preschool children has been a matter of grave concern to the government and the people alike on account of its direct impact on the health and vitality of the nation. Our President, Field Marshal Mohammad Ayub Khan stressed this point by emphasizing that it is the health of the child today that would determine the standard of the health of the nation tomorrow.

While inaugurating the Third Afro-Asian Pediatric Congress at Karachi, the Central Health Minister, Kazi Anwarul Haq pointed out "In Pakistan as in all other developing countries, sickness and mortality amongst the children are quite high. " It has been estimated that some four hundred thousand infants die in Pakistan every year before they attain the age of one year. And over 26 percent of all live-born children die before their fifth birthday. These are alarmingly high figures and are indicative of the ravages of malnutrition amongst our children population.

It is very gratifying to note that all developing countries are making serious efforts to protect the weaned infants and young children from the clutches of deadly protein-calorie malnutrition. The Pakistan National Science Council has appointed a Committee to study the protein problems in the country and suggest measures for utilizing the available resources to meet the protein gap. It is encouraging that our President is personally taking a keen interest in this vital problem.

It would be presumptive on my part to comment on the technical aspect of malnutrition in a gathering of experts most of whom have devoted the greater part of their life-careers to nutritional problems. I would, however, like to commend the comprehensive nature of your agenda which rightly reflects the wide and varied ramifications of the problem of nutrition and the importance of coordinated approach to their solution. In this context, permit me to stress the need for not only inter-departmental cooperation in the implementation of nutritional program but also for the inter-departmental integration and identity of effort. The very high incidence of protein-calorie malnutrition in the youngest segment of our population indicates that the prevailing concept of the feeding of infants and school children are gravely deficient. Measures designed to remedy these defects should be so planned and adjusted that they can be carried out by existing agencies of mass health campaigns such as malaria and smallpox. These efforts would then be carried to the furthest limits of the populated areas at minimum cost.

I am particularly pleased that I have been invited to the inaugural session which is being held in the premises of the National Health Laboratories, a project which has been of very close interest to me, as I am convinced that scientific formation for most of our activities in the field of curative and preventive medical practice are feasible only in an Institute such as this.

Now before you proceed to business and start your useful sessions,
I must thank you all and declare this conference open.

May your discussions be illuminating and your conclusions fruitful.

Thank you.

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NUTRITION PLANNING AND NATIONAL DEVELOPMENT

BY

DR. W. H. SEBRELL, JR.
Director, Institute of Nutrition Sciences
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To be effective, programs for nutrition planning and national development must take into consideration the problem of the rapidly increasing population of the world. At the present rate of population growth it is estimated that the world population will double the present estimated 3.5 billion people by the end of this century. This dramatic figure of 7 billion people becomes meaningful when we realize that it took one million years for the world population to reach the one billion mark in 1800 and then only another 168 years to more than triple that total to over 3 billion people in 1968.

Unfortunately, the rate of population growth is highest in the developing areas where the food supply is increasing at the slowest rate. In developing countries the rate of population increase ranges from 2 percent to 4 percent a year. This rate may not seem large until one is aware that a 3 percent rate of increase will double the population in 24 years.

It is a distressing observation that in the developing countries with high birth rates and a declining mortality rate the children suffer most, particularly in terms of dietary deficiencies and consequent health problems. In select countries with high birth rates the percentage of the population under 15 years of age averages as high as 40 percent in contrast to other countries with low birth rates where such age groups are less than 30 percent.

At the present rate of population growth in developing countries it has been estimated that during the next 20 years food needs in such countries will more than double. The effects of successful family planning will make their impact in the future only if programs are started now.

A glance at the statistics shows that a great decrease has been made in the death rate while the birth rate has not dropped correspondingly. Yet in spite of the decrease in the death rate it is a paradoxical fact that the infant mortality rate in developing countries continues to be excessively high. In order to ensure against the deaths and incapacities considered inevitable for some of their children, millions of people believe that many children are necessary to guarantee their family security. We know that the high death rate among infants and younger children is often the direct or indirect result of protein-calorie malnutrition. It therefore follows that adequate nutrition for the preschool child will increase survival and thus assure parents. This in turn can have a very meaningful effect on the success of family planning efforts.

In my country, the President's Science Advisory Committee, in its report on the World Food Supply, pointed out the "apparent paradox" that the reduction of fertility rates in the developing countries depends on low infant and child mortality and that "a reduction in childhood mortality will reduce rather than raise the rate of population growth." These thoughts are summarized in Volume I of the report:

"If lowered infant and child mortality is a precondition to acceptance of family planning, and the major underlying cause of excessive childhood deaths in the developing nations is malnutrition, it follows that an increase in both quantity and quality of food in these countries is essential to achieving stability of population growth."

If an effective child nutrition program is fundamental to the success of family planning programs, it is also true that family planning is of prime importance to the long range success of child nutrition programs.

In some countries there has been a very good increase in the food production. However, the benefits of this have been largely

nullified by the population growth, which has increased so rapidly that the per capita supply of food has actually decreased and in some countries it is even less now than it was 20 years ago. Therefore, we are faced with a gradually worsening situation in the per capita food supply with an accompanying increase in malnutrition which is going to become more serious in the next few years, unless effective methods of correction are found in time. The reason for this situation is that the developing countries have not been able to utilize rapidly enough the technology for increased food production, improved food processing and food conservation, which are basic to success in feeding their own population. An important contributing factor to this situation is a lack motivation on the part of farmers to increase production. Farmers everywhere will not respond to a statistical or theoretical demand. They will respond enthusiastically to an effective demand - that is the willingness and ability of people to purchase what the farmers produce at a price which will yield a reasonable profit.

The increasing food gap and its accompanying malnutrition, will contribute both directly and indirectly to political and social unrest, as well as to malnutrition. The only solution is a more rapid increase in food production, better food distribution, and a slower growth in population.

The results of the malnutrition produced by this widening food gap do not fall on the population equally. Unfortunately, famine in which large numbers of people die because of an absolute lack of food has already occurred many times. These are critical situations which are temporarily alleviated by emergency relief measures. It is the chronic condition of partial starvation that is more extensive and largely hidden because the deaths and the damage to growth and development are concealed in the small child in the lower economic groups and the effect is an increase in infant mortality, morbidity, and a failure to grow. Malnutrition often ends in death but is concealed in the mortality statistics because the death is attributed to deases such as dysentery, measles, tuberculosis or pneumonia. Infection frequently exacerbates the effects of malnutrition while the malnutrition may result in death from the infection.

The problem is much more involved than just an increase in food production. Food never has been equitably distributed either internationally or nationally. Those parts of the world that need

food increases the least produce much more than they require while those developing parts of the world where the need for more food is most urgent are not producing as much as they need and the inequality of food distribution falls hardest on the lowest economic groups. There is another important factor involved in this situation. The adults are moving about and are at work and have better opportunities than children to obtain food. Furthermore, since they completed their growth, their nutritional needs have decreased and they are better able to survive on a poor diet than are children. The school age children often are able to secure additional food at school or to find food from other sources outside the home. Therefore, the most serious effects of malnutrition are found in infants and in the preschool children. The most important form of malnutrition in the infant and small child is a complex syndrome that is best described as protein-calorie malnutrition.

This syndrome presents wide variations according to the diet that is consumed. In many areas the principal condition is marasmus. This is essentially starvation often found in the infant who is weaned too early onto a diet inadequate primarily in calories. The child with this form of malnutrition has a dry shrunken appearance and presents the picture of starvation. On the other hand, if the child has been breast fed too long and weaned onto a diet that contains sufficient calories but insufficient protein, the form of protein-calorie malnutrition known as kwashiorkor develops. Here the child is older, although the disease is rarely seen after the age of five or six years. It has been estimated that protein-calorie malnutrition is so prevalent in some areas that up to 50 percent of the children between the ages of one and five years may be affected. The damage done by this form of malnutrition is not only physical but also psychological and mental and often results in irreparable damage to both growth and development. Although I shall continue to emphasize the need for protein, it should be kept in mind that the protein foods supply the same number of calories as do the carbohydrate foods. Therefore, a protein food has the double advantage of supplying as many calories as a carbohydrate food, such as cassava, and at the same time helps to meet the essential protein needs. The problem is not one of replacing cassava but rather to add a greatly increased production of high protein foods to the cassava so that both the calorie-protein need can be met at minimum cost and with the least upset to established farming practices.

While a great deal of attention has been given to the growth of children, because this is the thing that is most easily measured, the effect on development is much more complex and difficult to measure.

In addition to the widespread protein-calorie malnutrition, there are other forms of malnutrition which continue to be serious problems, such as vitamin A deficiency which may lead to permanent blindness. Anemias of nutritional origin and pellagra and beriberi are still very widespread.

What are the possible answers?

Efforts at population control through family planning have not been quickly accepted by many countries nor by the bulk of the population in developing countries. Experience to date indicates that these programs have moved so slowly that they will be of little significance in the near future, unless more effective methods are developed and applied. Such programs are of critical importance.

At the same time, increased food production, improved distribution, the development of food mixtures and the use of unconventional sources of food are of equal importance. The basic needs in such food programs are:

1. Increase to the greatest extent possible the production of the foods that are already being grown.
2. The provision of the necessary capital to provide the fertilizer, seeds, agricultural machinery and agricultural chemicals necessary to achieve maximum production as soon as possible. This requires a cash economy, the use of indigenous savings and a source of credit at reasonable interest rates.
3. The elimination of unnecessary losses in production transportation and storage due to rodents, insects, other pests and weather.
4. Distribution systems that will enable the demand in one area to be met by production in another, in a way that will enable production to increase with economic reward to the producer.

5. Education, so that the consumer can understand the need for good nutrition and how it is to be obtained and that the producer will know how to produce the needed food in the largest quantity. This is particularly important to the millions of families in developing countries who live on a subsistence economy and who must be taught what foods are necessary for them to maintain their health and the kinds of foods which they must produce or for which they must barter to supplement their own production. The problem cannot be solved just by increasing the current crops. For example, cassava, which is a large and cheap source of calories in many parts of the world, contains less than 2 percent of protein which is of extremely poor biological quality. Therefore, just an increase in the production and consumption of cassava cannot be expected to prevent protein calorie malnutrition.

On the other hand, if we try to increase the animal protein by raising more animals and producing more milk, the caloric production per unit of land is greatly decreased and the land will not yield a maximum protein and calories. We are, therefore, led to the conclusion that the most important thing to do at the present time is to increase the production of the cereal grains since the caloric yield per unit of land is high for cereals and these are the products which already are widely produced and accepted. There are four cereals on which most of the world depends for its basic calorie supply. These are rice, wheat, corn and sorghum. For example, as Mangelndorf¹ has pointed out, at least 50 percent of the world's people get at least 60 percent of their energy from rice. Therefore, it is to the increased production of these cereal grains to which our attention must be primarily drawn. However, these cereals yield protein of inferior quality. Therefore, additional sources of protein must be found. This means turning to unconventional food supplies to make the quality of the protein more nearly equal than from animal sources. The most important of these are the following:

Protein from oil seeds - The press cake, or meal, which remains from the commercial production of oil from soy beans, cottonseed, peanuts, sesame, and other oil rich seeds, is one of the most feasible and potentially useful sources of protein for human consumption. These products are usually employed as fertilizers or as animal feeds. About 63 million tons of oil seeds are being

1. Mangelndorf, Paul C., Proceedings of Nat. Acad. Sci. Vol 166, 1966

produced in the world at the present time. This material is approximately 50 percent protein which, although not as good biologically as protein, is still of good quality and is usually deficient in only one or two of the essential amino acids. The problem is a technical one of adapting commercial production to producing oil seed meal of a quality clean enough and free from harmful substances so that the product can meet the standards for human consumption. When these products are used as animal feeds, it requires four pounds or more of vegetable protein to produce one pound of animal protein. In a situation of need, this is obviously inefficient use of protein and, would be better utilized by feeding directly to man. These oil seed meals can be mixed cereal grains to provide a protein mixture of higher biological quality that can be adjusted to meet the protein needs of children and adults. The problem is one of making better use of an enormous and nutritionally valuable food resource which is at present largely wasted.

Fish products - Foods from the sea also offer attractive possibilities as a major source of relatively inexpensive protein of good quality which has the further advantage of being free of the need for using arable land. Fish can be successfully cultivated in ponds, irrigation ditches and marshy areas which cannot be used for other crops. The further exploration of the sea to determine the most feasible and productive areas and the development of suitable preservation and transportation procedures could make a large contribution to meeting the protein deficit with a desirable low cost product. Commercially feasible products of fish protein concentrate made by solvent extraction of whole fish have been made and shown to be cheap, wholesome, and nutritious foods. These products offer a wide variety of possibilities which merely need technological development.

There is the possibility of making great contributions to increase the food supply through the development of breeding techniques for both animals and plants. A great deal of attention has been given for many years to the improvement of livestock by better breeding practices through the use of selected genetic strains. It is also possible to improve the nutritional value of plants through selective breeding.

The new strain of rice developed at the International Rice Research Institute in the Philippines can greatly increase rice production. If this rice can also be bred to yield a higher per-

centage of protein and a better distribution of essential amino acids, it can make further enormous contributions to solving the nutritional problems in rice eating countries. This potential has been demonstrated in studies on Opaque 2 maize, which has an improved lysine and tryptophan content. If this can be made commercially feasible, it, too, can make a very important contribution to improving nutrition. It is possible that similar improvements can be made in millet and wheat, which are now being studied.

A further method of extending the food supply that is immediately applicable is by the use of the chemical industry. The protein value of cereal grains such as wheat, rice and corn, is limited by their content of two or three essential amino acids and it can be made nearly equal to that of milk protein by the addition of the limiting amino acids. The first limiting amino acid is lysine and the second limiting amino acid is threonine, except in corn where the second limiting amino acid is tryptophan. Lysine is now being commercially produced in several countries in large quantities at a price that makes it economically feasible to add it to grains. It has been shown by many animal studies that the addition of lysine to wheat makes its protein quality much closer to that of milk and meat and, therefore, when used in feeding programs, it should be a nutritionally better product in diets containing carbohydrate foods. Lysine should now be added to wheat and its nutritional efficiency evaluated under conditions of daily use by groups subject to protein calorie malnutrition. Synthetic threonine at the present time is not available in commercial quantities. However, the lysine makes such an improvement, at such a reasonable cost, that it is a procedure that should be introduced as soon as possible, especially in areas in which protein malnutrition is a serious problem. The large scale use of lysine fortified wheat has already been started in Japan and on a smaller scale in India.

The body has a limited need for the essential amino acids. After these essential needs are supplied, the rest of the protein need can be made up from simple compounds of nitrogen, so that by the addition of these simple and inexpensive sources of nitrogen, the relatively scarce and expensive animal protein products such as dried skim milk, can be diluted and their benefits extended to many more people.

Although we can easily make cheap, highly nutritious products in the laboratory, it is very difficult to get people to accept new

food products with which they are unfamiliar and which may have unaccustomed odors and tastes. Whenever a new or unfamiliar food is offered to a group of people, it is of the utmost importance to have an educational program to teach and demonstrate proper methods of preparation and how to make tasty dishes as well as teaching the nutritional value of the product. This is important even with products such as bulgar wheat if people are not already accustomed to the product. Otherwise the food is likely to be discarded, spoiled by improper handling or used to feed animals. It is essential that before attempting to introduce a new food, the present food habits, religious taboos, beliefs and customs be carefully studied.

Many difficulties have been experienced in the past in trying to introduce new food products, because the above mentioned factors were not taken into consideration beforehand. Often a product is developed in the laboratory on the basis of its nutritive value, and introduced by free distribution in clinics, institutions, and school lunches. This may result in undesirable associations so that attempts later to prepare and distribute the product through normal market channels may encounter considerable difficulty. The problem should be approached, instead, with commercial assistance, especially from those skilled in food technology and marketing, as to how a desirable product can be made and sold, at a reasonable price. This brings in the technical knowledge of the food industry and the food technologist which are so essential to the successful development of commercial products. Their approach is how to get a salable product which is also nutritionally sound.

It is obvious that a maximum of effort will be required if the growing threat of extensive mass malnutrition is to be averted. Many proposals have been made for many programs in many countries. These can be summarized into a set of general recommendations which can be used by all to create a maximum effort. These are as follows:

1. Use all feasible means to increase the production of protein foods from both animal and plant sources, especially the cereal grains and legumes, including the proper use of fertilizers, agricultural chemicals and modern food production methods.
2. Develop the fish and sea food industry to the maximum by improved preservation and transportation and production

of fish protein concentrate and create a demand for such products.

3. Reduce food losses by improved methods of storage and by the control of pests, insects, rodents and molds.
4. Develop and introduce genetically improved livestock and cereal grains and other food plants.
5. Increase the production of oil seed meals for human consumption, especially soy beans and cottonseed and use these products to the fullest possible extent.
6. Use protein supplements, vitamins, minerals and synthetic amino acids to improve the nutritive value of food products.
7. Encourage and assist the development of commercial food processing and distribution so that the food supply can be conserved and products introduced and made acceptable through the normal commercial channels. This requires government cooperation with the food industry, securing the assistance of food technologists and financial assistance in capital investments in plant and machinery, and possibly subsidies to introduce new and desirable products until they can become sustaining financially.
8. Education of food scientists, food industry employees, farmers, agriculturists, nutritionists, physicians and public health workers and the general public on the production and acceptance of new food products and on the need of good nutrition for good health. This will require research and training centers, especially for food science, for animal and human testing, marketing and academic training at the doctorate level, as well as other professionally qualified people in nutrition.

In their planning, government and public health programs often have neglected the food industry. Many food programs are sponsored by government and relief agencies and the food moves outside the regular channels of food distribution. This often is necessary and justified in an emergency to reach people who are unable to obtain

food through regular food outlets. However, in the long run in order to effect a permanent solution, it is essential that food move through the regular food channels. Good use often can be made of regular food channels to get food to people of low economic status through subsidies, food coupons or other ways of supplementing the ability to obtain food, without setting up a food supply line duplicating or paralleling the regular channels for food movement. It is necessary to enlist the assistance and cooperation of the food industry in introducing new foods or in attempting to alter food habits. The food industry knows the problems involved in obtaining public acceptance of a new food product and food technologists in the industry can render invaluable assistance in efforts to make the most efficient use of the food available. The regular channels of food trade also furnish already established routes for getting food to people. If government and industry work together to direct the consumer's demand toward nutritionally desirable products, and at the same time create new and larger markets, this would have the added advantage of having the good nutritional food become part of the regular food supply of the population.

Alan Berg² has recently called attention to the economic importance of malnutrition in national development. This is an area which has received relatively little study but is most important to a developing nation which must make the best economic use of its human resources. The economic loss from malnutrition is hidden in the costs of hospitalization and welfare and the human loss is hidden in early death, the limited number of productive years and the decreased productivity of people who are physically and mentally handicapped. However, these losses are of tremendous importance and are difficult to evaluate. Berg cites evidence that in southeast Brazil, the typical worker produces nearly five times as much during his lifetime as the average person born in nutritionally deficient northeast Brazil.

Some of the characteristics of malnutrition are lethargy, lack of initiative, and decreased physical activity. Therefore, in malnutrition, a worker's productivity can be expected to decrease. This sluggishness is often attributed to laziness, indolence and other

2. Berg, Alan D., American Review. Vol. 12. pg. 27, 1968
Foreign Affairs, October, 1967

causes when the real cause is malnutrition. Areas with the lowest per capita protein and calorie consumption are those with the lowest productivity. Berg notes that in building the Pan American highway, the introduction of three well balanced meals per day increased the concrete paving from 1.8 to 5.9 cubic yards per day. On a rubber plantation in Indochina, during World War II, there was a 50 percent increase in work output after opening a canteen which provided a liberal diet. In Costa Rica, as a result of improved sanitation and meals for laborers on a public works project, the amount of earth moved per man per day increased from 240 to 1157 cubic meters. Other studies in other countries have shown comparable results. It is generally known that whenever the food intake is improved in malnourished people, work production increases. Such increased production from better nutrition far exceeds in economic value the cost of supplying the food. However, this is only one of the economic benefits to be derived from good nutrition.

People in a good nutritional state do not require as much hospitalization and there is less absenteeism from work. Also, the medical costs of treating malnutrition are many times greater than the cost of providing the food to prevent malnutrition. Berg cites the estimate in Guatemala of the cost of 90 days of hospital care for each case arising from inadequate nutrition to be \$600.00, compared to an annual cost of \$7 to \$10 to prevent malnutrition. There are many other economic benefits from good nutrition, such as the prevention of blindness from vitamin A deficiency.

The Philippine government's estimate of the economic cost of the vitamin deficiency disease beriberi is more than 11 million dollars per year for this one disease. Although this type of data is not precise, it does lead to the conclusion that the economic cost of malnutrition far exceeds the cost of providing the necessary food for good nutrition and is so great that developing nations can ill afford this added drain on their revenues.

One of the greatest needs for a successful program is better communication between nutrition scientists, government leaders and the food industry. This requires a national plan for a coordinated nutrition program that will translate the need into effective action, either through an official governmental office, department, or ministerial committee.

The necessary technology and resources are already available to combat the problem. Coordinated approach is needed to the intricate problems of making food production, food distribution, food habits, education and economics, all fit together. There are wide gaps between the objectives of the scientific community, the food industry and the programs of political leaders. Long range programs for permanent improvement must be planned in relation to the development of entire communities. In planning such programs, the motivation, education and economic limitations of the people concerned must be carefully considered. Nutritional problems cannot be isolated from the remainder of community problems. They must be part of a total program involving the welfare and development of the entire community.

Therefore, national planning and cooperation in designing and carrying out such programs are essential. There must be close, realistic and effective coordination between the programs of the ministries of agriculture, health, education, and economics.

The prospect for the immediate future is that nutritional conditions are going to get worse before they get better, unless we quickly are able to get comprehensive and practical programs into operation. There is an immediate and pressing need for better production and distribution of foods to combat protein calorie malnutrition in small children, from whatever sources and with whatever means of distribution can be made available. In addition, more trained leaders are needed who can comprehend the gravity of the food and population problem and can have a full understanding of the need for cooperation and carefully planned action on a large scale.

Although there are many active nutrition programs of considerable magnitude in many countries, what they have been able to accomplish so far in actually reducing the morbidity and mortality from malnutrition still is far from the goal that must be reached. Technically we know how to overcome malnutrition. The application of this technology must be done as quickly as possible. It is difficult and we have hardly begun to meet the crises. Unless we can successfully introduce practical and successful programs, the development of the human resources in the developing nations which include most of the world's population, and thereby the development of the nations themselves, will never approach their full potential. Much has been said on the need and importance of nutrition programs in national

planning. Yet the best of efforts would come to naught should a country fail to see the need for parallel action in planning its population growth through programs of family planning.

You, who are represented at this conference, because of the uniqueness of your knowledge, your interest and influence are the leaders, the torch bearers and the ones who must carry the burden of creating and making the nutrition program and family planning a success.

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REPORT OF THE CENTO CONFERENCE ON COMBATING MALNUTRITION IN PRESCHOOL CHILDREN

INTRODUCTION

At the Fifteenth Session of the Economic Committee held in March 1967, approval was given for the convening of a conference on nutrition, and after discussion between the Country Coordinators it was agreed that the conference should concentrate on the vital problem of combating malnutrition in preschool children. A conference, organizationally and financially assisted by the Government of the United States was held at Islamabad from March 18 to 22, 1968, on this subject.

The conference was called to order by Miss S. E. E. Buchanan, Assistant Economic Secretary of the Central Treaty Organization. An address of welcome was given by Brigadier C. K. Hasan, Director General of the Ministry of Health, Pakistan. An inaugural address was given by Colonel M. K. Afridi, Consultant to the Ministry of Health of the Government of Pakistan.

After opening statements from the leaders of the delegations of all the five countries, Lt. Col. S.M.H. Bokhari, Leader of the Pakistan Delegation was elected Chairman. After taking the chair, Lt. Col. Bokhari proposed the election of a Vice-Chairman and it was agreed that the Leaders of the other Delegations should act as Vice-Chairmen, as and when required.

A keynote address was delivered by Dr. Henry Sebrell, Director of the Institute of Nutrition Sciences, Columbia University, New York, on the subject of "Nutrition Planning and National Development."

The first day's deliberations were brought to a close by a tour of the National Health Laboratories at Islamabad.

CONFERENCE OBJECTIVES

The specific objectives of the conference were:

- a. to direct the attention of representatives of government agencies towards the problem of malnutrition in the pre-school child, especially as it affects the individual and country development.
- b. to establish guidelines for effective national nutrition programs for combating malnutrition in preschool children based on coordination of country resources and cooperation of responsible government and private agencies.
- c. to prepare recommendations for consideration of Member Governments.

COUNTRY REPORTS

Summaries of Country Reports on malnutrition, programs to overcome malnutrition in infants and preschool children and agricultural and food processing resources for developing foods for pre-school children were presented by the Delegates of Iran, Pakistan and Turkey.

MISCELLANEOUS REPORTS

Papers were presented by Dr. Aykroyd on the "Diet and State of Nutrition of Pakistani Infants in Bradford, Yorkshire" (see British Medical Journal 7 January 1967, 1, 42-45) and also referred to a paper by Professor B. S. Platt entitled "Malnutrition and Efficiency of Assistance to Developing Countries" which was presented to the Seventh International Congress of Nutrition, Hamburg, 1966.

A paper on the "Importance of Child Nutrition Programs to Family Planning by Their Contribution to Family Viability" was given by Dr. Batul Raza.

CONFERENCE PANELS

In order to cope with the different aspects of the problem, the conference divided into two groups for the ensuing four days, one dealing with Health and Training, and the other with Planning and Development. The six panel reports are presented below.

GROUP I: HEALTH AND TRAINING

PANEL REPORT ON BASIC REQUIREMENTS FOR NUTRITION PROGRAMS

The Panel to consider basic requirements for nutrition programs was held on March 19 under the chairmanship of Dr. Kamaluddin Ahmed (Mr. A. Domingues acting as Rapporteur) and submitted the following report which was adopted in Plenary Session.

Lack of knowledge on the correct feeding procedures for infants and preschool children is one of the principal reasons that many mothers in developing nations are faced with about a 50-50 chance that their child will not live to become an adult. Malnutrition is a major factor in the excessively high mortality rates among infants and preschool children.

This fact emphasizes the need for adequate nutrition training of persons to reach these mothers and through them, the infants and children. Today there is a serious shortage of nutritionally trained individuals to meet the manpower requirements of programs at all levels, from village training activities, elementary and secondary schools, and universities and graduate schools.

Factors which must be considered in developing training and education programs include: a) knowledge of the customs and eating habits including available foods, b) a clear definition of the nutritional problems, c) an understanding of the types of applied programs and the potential of such programs.

It is also important that nutrition educators be able and willing to develop and use the type of training aids which are most effective.

Training programs must be designed to reach the village population. For this reason, it is important that such activities be

directed toward, or when desirable and feasible, operate within, the framework of already existing governmental systems at the village level, for example the MCW centers. Nutrition training programs operating through existing institutions will help strengthen the services of such centers, and by supplementing the training of already existing personnel, will effect a more efficient use of available manpower.

Consideration needs to be given to providing proper supervision of the lower echelon of nutrition workers in order that the maximum benefits can be realized. In-service or continuous training programs should be made available to insure adequate training of these workers and to encourage their continuing interest.

The Working Group has made the following RECOMMENDATIONS:

1. That an accelerated nutrition training program should be undertaken to train individuals at secondary, college and graduate schools. When needed and desirable, training at post-graduate level should be considered.
2. That there be established nutritional training institutes or colleges to train technical personnel at the graduate level.
3. That there should be an evaluation of existing educational institutions to determine whether their present academic programs are related to the needs and goals of the country, and following this study programs can be modified as indicated.
4. That governments should encourage and support education and training by offering grant-in-aid and scholarships to deserving students interested in careers in nutrition and governments should also consider the possibilities of direct support in the nutrition field, so as to attract more students for this discipline.
5. That basic nutrition should be introduced into the curriculum in all general education.
6. That all nutrition workers at the village level should receive coordinated in-service training including refresher courses to maintain continuing interest, prevent conflicting advice and insure cooperation at the village level. Practical and

proven visual training aids should be developed, i. e., mobile training units, movies, flip charts, still pictures, drawings, primers, etc., designed basically to educate and motivate interest in nutrition of both the literate and semi-illiterate.

7. That where necessary, comprehensive nutritional surveys should be carried out to develop adequate data which can be digested and which will serve as basis for both pilot and large-scale nutritional programs.
8. That there should be established within the framework of the MCW, community development, or similar centers, an applied demonstration nutrition training program directed toward mothers.

PANEL REPORT ON FOODS FOR PRE-SCHOOL CHILDREN

The panel to consider foods for preschool children was held on March 20 under the chairmanship of Dr. Ayşe Baysal (Miss Baysan Birgöl acting as Rapporteur) and submitted the following report which was adopted in Plenary Session.

The diets in most developing countries are low in fat and have a low caloric density. In addition these diets are usually based on cereals and contain considerable fibre. Thus it is very difficult for a preschool child to consume an adequate amount of the typical diet to meet nutrient requirements.

Also the protein quality is lower than diets containing a mixture of animal and vegetable protein. Vitamins are usually present in lower than required amounts. In order to overcome these problems considerable work has been undertaken throughout the world to develop more concentrated foods, rich in protein, and containing significant amounts of other needed nutrients. In this manner the nutritional needs of the infant and preschool child can be met. Since cost must be considered, these food are generally mixtures of cereals, oilseed cakes, and sometimes small quantities of animal products. Vitamin and minerals are often added.

Development of these special foods has been strongly supported by the United Nations Agencies: FAO, WHO, and UNICEF. Technical assistance in the development and production has been provided to a large number of countries.

Specific areas of discussion related to development and production of foods for preschool children included:

1. The need to consider the production of complete foods (containing all required nutrients) or to primarily seek to formulate supplementary foods.
2. The production of food from locally available raw materials, considering both convention and unconvention protein sources.
3. The cost of the food product should be kept as low as possible so that people in low income groups are able to purchase it.
4. Full use should be made of all existing technological methods to produce foods less bulky, and in a form suitable for infant and preschool children.
5. There should be investigation of food packaging materials, and final packaging should be low in cost, but adequate to protect the product under the conditions of storage and distribution.

Discussion of the above points led to the following RECOMMENDATIONS that:

1. Governments should take the initiative in stimulating the production of low cost nutritious foods for infants and preschool children.
2. Governments should establish an organization or group to act in an advisory role for the development, evaluation, and production of these foods. This organization should coordinate the activities of the food technologists, nutritionists, clinicians, and personnel involved in the education of the mother. Persons in both the public and private sector should be involved in these activities.
3. Carefully organized products be established for the development and evaluation of these foods including:
 - a. formulation of mixtures high in nutritional value, but low in cost and prepared whenever possible from locally available raw materials;

- b. adequate chemical and biological evaluation to insure that the foods are fit for human consumption;
 - c. small scale feeding experiments to test the products acceptability, and nutritional value under actual use conditions (for this type of evaluation UNICEF has prepared a series of guidelines for testing).
4. Governments should seek ways to stimulate the interest of the private sector in developing new foods.
5. Consideration should be given to the enrichment of staple foods with vitamins, minerals, amino acids and protein concentrates, and if desirable and feasible, these additions should be implemented and evaluated.
6. A means should be established for the cooperation between countries in solving this problem; and that there should be an exchange of information between the participating countries on the development of foods for the preschool child.

PANEL REPORT ON DESIGNING NUTRITION PROGRAMS TO FEED THE PRESCHOOL CHILD

The panel to consider designing nutrition programs to feed the preschool child was held on March 21 under the chairmanship of Dr. W. R. Aykroyd (Dr. M. M. Rahman acting as Rapporteur) and submitted the following report which was adopted in Plenary Session:

The individual aspects of programs to feed the preschool child had been considered in the previous working group sessions, therefore the discussions concentrated on the practical coordinated efforts needed to reach the preschool child.

Based on the many points discussed, the following RECOMMENDATIONS were proposed:

1. That there should be production of suitable protein rich foods from various sources, and that careful consideration should be given to the distribution of these products as a means for combating malnutrition in young children; and that there should be a review of the past and present methods of

distributing protein rich foods since this activity has sometimes raised many difficulties, e. g. distribution of skim milk powder. Account must be taken of the potential for producing nutritious protein rich foods on a commercial scale.

2. That there should be well designed pilot programs in order to demonstrate the most effective methods for reaching the preschool child; such programs, when successful, should quickly lead to the dissemination and use of protein rich foods, in an orderly fashion to the entire nation and can also help to promote further development of similar foods by commercial organizations.
3. That since the education of the mother is most important, mothers must be taught the value of supplementary foods, including protein-rich mixtures, and natural and processed high protein nutritious foods; and how she can best prepare them for feeding infants and preschool children. (Such teaching can be often effectively carried out in the village centers with a minimum of equipment. Demonstrations can be given to mothers attending centers with their children, with mothers taking part in the preparation of the supplementary foods for their own children).
4. That in designing programs use should be made of all available knowledge about local food resources, dietary habits, nutritional status, and the location and prevalence of malnutrition.
5. That in-service training courses of two or three month duration should be organized for personnel from different disciplines who would have responsibilities in the program to insure that educational activities will have a uniform basis, and avoid giving the mother several different ideas on each subject.

GROUP II: PLANNING AND DEVELOPMENT

REPORT ON NUTRITION IN NATIONAL DEVELOPMENT PLANS

The Panel to consider a) Nutrition in National Plans, and b) Responsibility of National Planning Organizations for Coordination, was held on March 19 under the chairmanship of Dr. Baghar Shariat (Mohammad Bagher Namazi acting as rapporteur) and submitted the following report which was adopted in Plenary Session.

It is agreed that the population of a country must be well fed if it is to be an active participant in national development. Malnutrition retards national development in two ways: It produces individuals who must be cared for by society, thus draining all national resources and it lowers the productive output of individuals by retarding them physically and possibly mentally, thus lowering a nation's human resources potential. Therefore, it is important that nutrition be accorded highest priority in the plans for national development. Good nutritional status is essential for creating a favorable foundation for economic development. It also has significant social implications.

It is recognized that nutrition is the responsibility of many sectors within the government and realistic planning must take into consideration the capabilities, goals and relationships of each of the sectors. The current national plans give an emphasis to nutrition which was not present in earlier country plans. While this is an encouraging development, it must be recognized that the present state of knowledge does not permit formulation of comprehensive integrated plans to avoid wastage of scarce resources and produce optimum returns from investment in this field. There is also recognition that this problem must be treated in a cross-sectoral manner. To complete with other programs which are making a demand upon available resources, it is imperative that nutritional problems and needs are clearly identified.

In view of the above consideration, the Panel RECOMMENDS:

1. That a national policy of nutrition be developed within the framework of the plan for economic development giving high priority to the question of combating malnutrition especially among preschool children.

2. That the question of nutrition planning be undertaken at an inter-sectoral level to ensure that all interested and responsible agencies are acquainted with the program goals, and with the planning body playing a leading role in coordinating the nutrition program horizontally and vertically with the national plan. The system of planning should take into account the need for continuous evaluation and follow-up as a built-in process.
3. That the policy and plan for nutrition be drawn up on a short and long-term basis, with short-term relief measures clearly identified.
4. That the plan be realistic and pragmatic and take account of the need to adapt to the special social, economic administrative, and institutional systems prevailing in each country.
5. That surveys and data compilation be undertaken expeditiously to serve as a basis for formulating the national nutrition policy; in the process of building up the statistical base essential for formulation of the national policy and plan for nutrition, each ministry and public body involved in the inter-departmental efforts can contribute by collecting and compiling relevant statistical data.
6. That attention be given to the development of a systematic approach to planning and the determination of needs and priorities in the field of nutrition, so that the relative importance of this program is given the required attention in the overall national plan.
7. That during the development of the national nutrition policy, and the formulation of specific programs, consideration be given to the development of the essential manpower resources which represent a prime limiting factor in program implementation.

PANEL REPORT ON FOODS FOR PRESCHOOL CHILDREN

The panel to consider foods for preschool children was held on March 20 under the Chairmanship of Dr. Ismail Şener (Dr. M. Ataur Rahman acting as Rapporteur) and submitted the following report which was adopted in Plenary Session.

The panel discussion centered around three main points:

- a. methods for stimulating production of agricultural products useful for preschool feeding programs,
- b. encouraging commercial development and marketing of nutritionally acceptable foods, and
- c. incentives which would lead to production and marketing of high protein food products for preschool children.

In working out a longterm solution for malnutrition two closely related objectives must be realized; 1) people need to be educated to recognize the problem of malnutrition, and motivated to avail themselves of nutritious foods; and 2) nutritious foods must be available to them through normal channels at prices within their means.

Planning for a long-range program must take into consideration the following priorities: a) that there should be an increased availability of food through increased production, b) that the processing of foods should be modified, if necessary to increase their nutritional value, c) that the foods should be fortified with amino acids, protein concentrates, vitamins and minerals when necessary, and the value of these additions evaluated.

It is recognized that in the development of new foods or food mixtures, these products should be: a) wholesome and nutritious, b) available and processed, c) low cost, d) acceptable in taste.

Stimulating the production and consumption of new foods for preschool children can be carried out in two ways: 1) Providing incentives to the producer; and 2) Creating motivation on the part of the consumer through education and promotion.

The panel therefore RECOMMENDS:

1. That the government should have a role in the development of new foods by:
 - a. Promulgating regulations regarding the composition, processing and marketing of foods for the preschool child.

- b. Sponsoring or supporting research on food habits, purchasing patterns, and acceptability potential.
 - c. Providing when necessary and feasible, incentives to the food industry by: i) sponsoring feasibility studies, ii) providing technical assistance, iii) providing for easy access to credit, iv) providing preferential treatment in the import of necessary machinery and equipment, v) granting tax holidays for specified periods, vi) insuring a guaranteed market through purchase of a portion of the product for government sponsored programs.
2. That the government should have a role where feasible and desirable in stimulating demand through consumer education and promotion by: a) familiarizing the population with the use of the new foods, b) including information on new foods in new and existing education and publicity programs.

PANEL REPORT ON COORDINATION OF NUTRITION PROGRAMS AT THE PLANNING LEVEL

The panel to consider coordination of nutrition programs at the planning level was held on March 21, under the Chairmanship of Mr. Mohammed Bagher Namazi (Mr. Charles R. Gurney acting as Rapporteur) and submitted the following report which was adopted in Plenary Session.

The delegates agree that widespread malnutrition is a consequence of deficiencies in many sectors. Therefore, expertise must be drawn from many disciplines and be coordinated effectively so as to correct nutritional deficiencies as rapidly as available technology and resources will permit.

Each country recognizes that many agencies of the public and private sectors are presently involved, at least to some degree, in nutrition-related activities. Each country has recognized the need for coordinating these activities so as to prevent the waste of duplication and to hasten the achievement of established nutrition goals.

Up to this time each country has made efforts to coordinate its nutrition-related activities through National Nutrition Committees, Advisory Committees on Nutrition and similarly named bodies. These

bodies have had varying degrees of success; however, it is felt that to achieve maximum effectiveness such coordinating bodies should be redesigned. It is agreed that a nation's nutrition coordinating body should: 1) be at the policy making level of government, 2) have adequate technical and staff support, 3) be assured through the country's Development Plan of adequate funding, 4) have a well defined influence upon the allocation of the country's expenditures in nutrition related undertaking, 5) be established independent of existing sector controlling agencies, but responsive to these agencies' requirements and goals and cognizant of the responsibility toward representing fairly the interests of the consumers, government agencies, and food producers and processors.

It is RECOMMENDED that:

1. The government redefine the role of its existing coordinating body, or establish a new coordinating body, and assign to it the responsibility for drafting the country's nutrition plan and the authority to supervise and evaluate the implementation of the plan;
2. The coordinating body should carefully evaluate the: a) short and long range nutrition goals, b) the activities in nutrition, of all government agencies, and c) the potential of all existing nutrition programs;
3. The coordinating body be delegated the responsibility for reviewing and evaluating all legislation, programs and schemes in the nutrition field, and that programs in nutrition should not be implemented without the prior consultation with this body;
4. The government charge the nutrition coordinating body with the responsibility for advising the chief of government on all related policies and problems through appropriate channels.

SUMMARY OF FINDINGS

The Conference accepted the thesis that malnutrition among infants and preschool children in developing countries is a major health problem. High mortality in these age groups is directly related to chronic malnutrition though the specific cause of death is more often a disease

which would not prove fatal to the well-nourished child. Reduction of the mortality rate is important; recent studies on the relationship of malnutrition and learning ability point out an even more critical problem. Chronic malnutrition in early years has been found to result in children with reduced learning ability, possibly due to a retardation in the development of the central nervous system.

In addition, malnutrition of mothers could also contribute to irreversible retardation of the infant. This strongly supports the concept that programs to combat malnutrition must be directed towards the mother. Since family planning programs are also directed toward women, they must be made to understand the relationship between effective family planning and combating malnutrition in the infant and preschool child. When infant mortality is reduced, and the mother knows her infant will not die during the first three years of life, experience has demonstrated that family planning receives maximum acceptance.

National development depends on the ability of the population to become educated and capable of rapidly responding to the demands of development. If the resources directed toward national development are to produce the optimal return, it is mandatory that the population be capable of achieving optimal intellectual development. Malnourished infants and preschool children are not the strong building blocks needed for effective national development.

The marked improvement in food supplies in many countries has aided the total population toward achieving an adequate diet. However, in general, the infant and preschool child have not received major benefits from these successes. Ignorance in the feeding of infants and preschool children is a major factor in this problem. There is a lack of adequate methods for reaching the mother and her children, and the nonavailability of foods which could be used for providing an adequate diet, particularly in protein.

At the present time, the major limiting factors are the poor coordination of effort between responsible groups, inadequacy of information on the magnitude of the problem and those factors responsible for it, an insufficient number of trained personnel, and lack of adequate procedures and resources for reaching the malnourished population.

It was agreed that with the limited resources now available it is necessary to evaluate carefully the various alternatives available for overcoming malnutrition in the preschool child, and to coordinate all immediate efforts to achieve maximum results. At the same time, long-term solutions must be sought, and training of personnel initiated in order to be able to increase the efforts toward eliminating this problem in the coming years. In order to accomplish the goal, all sectors of the economy must be made aware of the problem.

The conference considered the many factors which must have a role in the solution of this problem. The approved recommendations of the panel groups, as well as the final conference recommendations, are directed toward both specific problem areas and the coordination of efforts required to overcome this problem.

RECOMMENDATIONS

The final RECOMMENDATIONS of the Conference are:

1. That the autonomy of institutions engaged in nutrition research and advanced technical training should be protected in order to ensure the effectiveness of their functions; and it is recommended that methods be utilized to coordinate the various research programs being carried on within the respective countries by universities, institutes of nutrition and others.
2. That the CENTO Sub-Committee on Health be requested to investigate methods for facilitating the inter-country exchange of information on nutrition, with special consideration to the following:
 - publishing and distributing on a continuing basis the experiences and findings of the respective countries, and
 - developing a scheme for encouraging, coordinating and funding mutual visitation of nutrition leaders and workers in the respective countries through travel fellowships sponsored by CENTO or other international organizations.
3. That post-graduate training with special attention to the problems of preschool children be encouraged, and that

such training be carried out as far as possible in institutions within the region making full use of the existing facilities.

4. That within two or three years another conference on nutrition should be sponsored by CENTO as a useful sequel to the one of 1968; and that participation by food technologists, food industry, and other related specialties should be represented at the meeting in addition to those present at this meeting.
5. That countrywide working conferences be held to investigate the methods for providing the mother with training and experience in infant and child feeding.
6. That a conference of food manufacturing and research organizations in each country be called by the nutrition coordinating body, to provide information on the problems of providing food for the preschool child, and to encourage the participation of these groups in combating malnutrition in the infant and preschool child population.
7. That the national nutrition coordinating body should use all available publicity and education media to promote good nutrition to the entire population calling special attention to existing problems.
8. That the nutrition coordinating body encourage the support of voluntary organizations for programs to combat malnutrition, and provide information on the magnitude of the problem and practical solution to these organizations.
9. That while continuing to recognize that malnutrition was most critical among those in the preschool age group, attention was called to the fact that many of the recommendations of this Conference, although directed to preschool children, were applicable to older groups as well; and it was recommended that application of measures suggested be made to such older groups, insofar as appropriate.

ACKNOWLEDGEMENTS

The Conference expressed its appreciation and gratitude to the Government of Pakistan for acting as host to the Conference and for the generous hospitality extended to the delegates.

The Conference also expressed its thanks to the United States Government for the role it played in organizing and financing the Conference, and its appreciation for the excellent facilities and organization provided.

The Conference adjourned with an expression of appreciation to the Chairman and to the Vice-Chairmen for their leadership and able help towards the smooth working of the Conference; and to the Secretariat for its efficient servicing of the meeting.

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PRESENT SITUATION IN TURKEY REGARDING MALNUTRITION IN INFANTS AND PRESCHOOL CHILDREN-TYPES OF PROBLEMS, MAGNITUDE OF PROBLEM, LOCATION

BY

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INTRODUCTION

An assessment of prevalence of malnutrition in infants and preschool children may be a part of the overall nutrition survey of a community. However, a specific survey of these vulnerable age groups should be carried out in rural and urban areas. Methods for assessment of the prevalence of malnutrition are age, specific mortality rate, antropometric measurements, clinical signs, ecological factors, and biochemical tests. At the present time, there is no overall nutrition survey of the Turkish population. A few individual surveys of certain groups have been carried out in certain areas of the country. In these surveys one or two methods have been used to assess nutritional status of young children. In this report some of the findings regarding malnutrition in infants and preschool children will be reviewed.

STUDIES OF INFANT AND CHILD MORTALITY

There are very few reports about the infant and child mortality rate in Turkey. In one study 346,263 children were surveyed and it was found that for each 1,000 live births 205 died by 12 months and 100 died between 2 to 4 years of age.¹ In another study 2,713

children were surveyed and the infant mortality rate was 168 per 1,000 live births.²

Another individual survey in central Anatolian villages indicated that in each 1,000 live births 298 die by the age of 24 months. Breaking down the mortality rate to the specific age, it is found that 46.3 percent of the total mortality was among 1 to 6 months, 26.8 percent among 6 to 12 months and 20.2 percent among 12 to 24 months of age. Death of new born children was found to be 5.7 percent.⁴

The infant mortality rate differs in different regions of the country and also in the rural and urban areas. The result of the last Demographic Survey regarding infant and child mortality is shown in Table 1. The average mortality rate is 154 and 40 per 1,000 for infant and toddlers, respectively.

TABLE 1
Infant Mortality in Turkey

<u>Region and Area</u>	<u>Mortality Rate</u> <u>Per 1000</u>	
	<u>Infants</u>	<u>1 to 4 Year</u>
Central Region		
Urban	140	36
Rural	204	71
Black Sea		
Urban	98	28
Rural	152	35
Western Region		
Urban	149	33
Rural	141	44
Southern Region		
Urban	83	37
Rural	172	57
Cities		
Ankara	113	18
Istanbul	123	9
Izmir	84	13

In the cities the infant mortality rate among the children of low socio-economic groups is much higher than in children of high socio-economic groups. The findings of a survey indicated that the infant

mortality rate was 27, 150 and 65 per 1,000 for the high socio-economic groups, and the low socio-economic groups of the city, and a village close to the city, respectively.⁶

Statistics may not reflect the problem of infant mortality and the causes of mortality. Investigators found that collecting correct birth date data is very difficult. In the villages birth certificates may not be obtained on time because of the parents wish to delay the time of military service. In the villages where there are no health centers and sometimes even no governmental organization, mortality may not be recorded. Therefore, it may be assumed that the mortality rate is higher than the figures indicated.

The main causes of infant and child mortality in certain areas were reported by several investigators. The findings of a survey regarding causes of infant mortality are shown in Table 2.⁷ The reported chief causes of death are shown in Table 3.⁴ The rate of secondary infections in malnutrition cases were found to be very high.⁷ In general, children are brought to the hospital because of secondary infection not malnutrition. In the clinics in the Ankara area mortality caused by malnutrition is reported at 18 percent of the total deaths. These figures may not reflect reality because secondary infections are usually listed as the cause of death as indicated in Tables 2 and 3.

TABLE 2

MAIN CASES OF INFANT AND CHILD MORTALITY IN TURKEY

<u>Causes of Death</u>	<u>0 to 1 Year</u>	<u>1 to 4 Year</u>
Dystrophy and growth retardation	26.7	2.1
Gastroenteritis diarrhea	21.0	25.8
Pneumonia	26.1	34.5

STUDIES ON ANTROPOMETRIC MEASUREMENTS AND CLINICAL SIGNS

To establish the nutritional condition, weight and height for age of small children is considered the most useful, easily available and reliable parameters. When the weight and height of a given population is compared with the standard and the number or per-

TABLE 3

CAUSES OF INFANT AND CHILD MORTALITY
IN CENTRAL ANATOLIA VILLAGES

<u>Causes of Death</u>	<u>Percent of Deaths</u>	
	<u>0 to 1 Year</u>	<u>1 to 2 Years</u>
Acute loss of flue and electrolytes	44.8	13.3
Pneumonia, bronchopneumonia	29.0	40.0
Pneumococcal meningitis	4.3	-
Turberculous meningitis	3.2	20.0
Severe malnutrition	3.2	3.7

TABLE 4

BONE AGE IN RURAL AND LOW SOCIO-ECONOMIC GROUPS
OF INFANTS AND CHILDREN IN THE ISTANBUL AREA⁶

Age Group	Mean Chronological Age		Mean Bone Age		Mean Bone Age Percent of Normal	
	Rural	Urban	Rural	Urban	Percent	Urban
6-12 months	11.0 months	10.0 months	6.5 months	10.8 months	58.8	108.0
13-24 months	20.5 months	20.6 months	14.7 months	21.9 months	81.8	100.3
2- 4 years	3.3 years	3.4 years	2.7 years	2.8 years	71.7	82.4
5- 7 years	6.1 years	6.1 years	4.2 years	4.8 years	68.8	78.7
8-10 years	9.3 years	8.7 years	8.8 years	7.8 years	94.6	89.6
11-14 years	11.9 years	11.7 years	11.5 years	11.7 years	10.6	91.5

centages of children falls below the given standard then they are considered to be malnourished.

Studies on determination of standard height and weight are carried out in many countries. However, these standards may not be directly applied to Turkish children. For this reason, weight and height standards were made by using a well fed group of Turkish children.⁸

Weight and height of the children from two months to five years in the villages around Ankara have been compared with this standard. Children lower than the standard deviation are considered not normal. As shown in the figures (last page of this paper) the percentages of children considered underweight were found to be 15, 29, 46, 52, 38, 35 and 16 for the age group from 2 to 6 months, 7 to 12 months, 13 to 18 months, 19 to 24 months, 25 to 36 months, 3 to 4 years and 4 to 5 years, respectively. Weight of the children in Muş province in eastern Turkey follows the same pattern. The percentage of children lower than the standard deviation were found to be 15, 16, 21, 59 and 44 for the age group of 2 to 6 months, 7 to 12 months, 13 to 18 months, 18 to 24 months and 25 to 36 months respectively.

In a study in the Istanbul area, weight and height of the children of different socio-economic backgrounds were measured.⁶ The growth rate of the children from high socio-economic groups of the city followed the same line of growth rate as the American standard. Growth rate of the children of low socio-economic groups in Istanbul and in a nearby village were found to be significantly lower than in the children of high socio-economic groups. As shown in Table 4, bone age was found to be retarded in higher percentages of children in rural areas and low socio-economic groups in the city.

In a study at the childrens' hospital in Ankara⁹ weight measurements of children under the age of two years were evaluated by the Gomez system. In this system children between 90 percent and 75 percent of the standard weight are considered to have first degree malnutrition. Those between 75 percent and 61 percent as second degree, and 60 percent and below as third degree. In this study, children lower than 50 percent are classified as having fourth degree malnutrition. In this classification, 43 percent of the children under the age of 2 years seen in the clinic as outpatients were malnourished.

According to a survey of children in the Istanbul area¹⁰ 30 percent in the low socio-economic groups of the city and those of a nearby village were malnourished when compared with children of high socio-economic groups.

Recent studies indicate that the average birth weight in Turkey is comparable to that in Europe and the United States. In general retardation in growth starts after six months of age and reaches the highest degree between 18 and 24 months. As a child stops growing it begins to waste away and becomes irritable and unappealing. This picture is defined as nutritional marasmus. Among the children classified as malnourished on the base of height and weight measurement, 0.7 percent of them exhibited a very severe degree of protein-calorie deficiency symptoms.¹⁰

In a central Anatolian clinic very severe malnutrition cases were three percent.⁴ In all studies it was found that relatively few severely malnourished infants and small children showed signs of kwashiorkor. The majority of the cases of severe malnutrition had marasmus.

The most frequent serious complication of malnutrition was found to be diarrhea which leads to dehydration and acidosis, and pneumonia. These problems cause death before reaching care of doctors in most of the marasmic children. The high mortality rate in the first two years of age supports this finding.

Other clinical signs of malnutrition among infants and pre-school children beside marasmus are found to be anemia and rickets. Twenty-five percent of the children of 0 to 3 years of age in the low socio-economic area of Ankara had signs of anemia. Studying the cause of anemia it was found that 19 percent was due to inadequate iron intake.¹¹ In a study of infants and children in the villages of central Anatolia, the percentage which showed signs of anemia was found to be 2.8 and 4.6 percent respectively.⁴

Iron deficiency anemia was reported as a common nutritional problem in pregnant and lactating women as well as in infants and

children. Early marriages, frequent pregnancies and inadequate iron supply was reported as the main cause of anemia.^{12, 13} When a mother was anemic usually the baby was born with insufficient deposit of iron and the condition gets worse with a diet very poor in iron and protein. The other factors related to the high incidence of iron deficiency anemia were intestinal parasites and pica. It has been reported that 64 percent of the children with pica were anemic.¹⁷ Anemia among children without pica was 17 percent. Pica is a medical problem among preschool children of low socio-economic groups of Turkey, especially in the summer months, when children are left by themselves, and eat whatever they find around. Pica is most common among preschool children. Intestinal parasites are another factor which causes anemia. The result of a survey²⁰ indicates that 87 percent of the preschool children in the Black Sea region had parasites. The problem of parasites is more common among children of low socio-economic groups.

In the study of village children in central Anatolia, rickets was found to be one of the main causes of morbidity.⁴ In this study it was reported that 14 percent of the infants and 11.5 percent of children 12 to 24 months of age had signs of rickets. Rickets was found to be manifested as early as 3 months of age.¹⁴ Early cases of rickets were seen more among the babies of osteomalacic mothers and babies born in the winter in the villages. Many infants in the villages and in poor sections of the city seem to start walking at a relatively late age. They have fewer teeth and open anterior fontanells. One can see the result of late classification in the growing long bones of the children when they start walking. In a clinical observation in the villages one-third of the children had bowlegs.

It was reported that specific signs of vitamin deficiencies were common among school age children. The predominant signs were cheilosis, angular stomatitis, dry hair, thickened conjunctiva and pigmented conjunctiva.¹⁵ These signs are attributed mostly to riboflavin and vitamin A deficiencies. The result of a survey of school children in the Izmir area indicated that high incidence of A vitaminosis occurs among village children.¹⁶ Table 5 shows the percentages of school children with signs of A vitaminosis in various socio-economic groups.

TABLE 5

INCIDENCE OF A VITAMINOSIS IN SCHOOL CHILDREN

Percent of Children with Signs of A Vitaminosis

Groups	<u>Vit. A</u>	<u>Vit. B</u>	<u>Vit. C</u>
High socio-economic	2.8	0.5	2.3
Middle socio-economic	14.4	1.8	10.1
Low socio-economic	23.2	4.3	19.9
Village socio-economic	37.8	19.9	27.2

In our study of village children near Ankara the predominant observed clinical signs were cheilosis, angular stomatitis, constrictive change and bleeding gums. However, there was very poor correlation between clinical signs and weight and height measurement and dietary intake. Some of the observed signs in skin and hair may be due to very poor personal hygiene. For this reason one cannot be sure whether some of the clinical signs observed were due to malnutrition.

STUDIES ON ECOLOGICAL FACTORS

The nutritional status of children in the first year of life depends on the method of feeding and stored nutrients in the foetal period. In the first years of the life, children depend on some other person to meet nutritional needs. For this reason it is very important that the person responsible for the child has some knowledge of nutrition requirements.

In studying the feeding pattern of infants and children, the first determinant is usually whether the baby is breast fed or not. Most of the mothers in Turkey breast feed their babies. However, the breast feeding period is too long in most cases. As shown in the Table 6 a long period of breast feeding (24 months and over) is common in eastern Turkey and in the rural areas. One of the reasons of this long period of breast feeding is to prevent second pregnancy.

Although most mothers breast feed their babies, the milk may not meet the nutritional needs of the baby, especially after four months. It has been reported that 43 percent of the malnutrition

cases were among breastfed babies, and 42 percent mixed-fed infants.⁷ Frequent child birth, hard physical work and inadequate diet may influence the capacity of the mother to produce milk. Almost all mothers felt that their milk was not enough for the fourth or fifth child. Table 7 shows when supplementary food is given to the children. Mothers in the urban areas and in western Turkey start to give supplementary foods earlier than those of rural and the eastern part of the country. This difference may be due to the fact that mothers in urban areas and in western Turkey have more education.

The kind of supplementary food is very important in child feeding. It can be seen from Table 8 that starch, sugar and cereal are the main supplementary foods given to babies in Turkey. Nearly 50 percent of the children do not get milk and milk products. Meat and eggs are seldom given to the children. Although most children get supplementary foods, the amount of food given usually is not enough to meet protein and calorie needs. The average calculated milk consumption was about 100 grams sugar and 20 grams of starch and 10 grams cereal products. This may be the reason for high prevalence of marasmus rather than kwashiorkor. The problem is not only inadequate protein but also inadequate calories. Sugar and starch usually comes from a packaged mixture sold as baby food. The sugar-starch mixtures (Paro-Ari) are highly advertised as the best foods for growth and development of babies and are relatively inexpensive. High quality baby foods (SMA, Bebefe) prescribed by doctors are not popular among the majority of families because of the high price. Packaged baby foods are used more by the families in urban areas than those of the rural areas. They are also consumed more in the western part of the country where there is more means of communication and higher incomes. (Tables 9, 10, 11).

Although on the labels of the mixtures it is recommended that the powder should be mixed with milk, most of the mothers ignore the recommendation or cannot read it or do not have milk. Although these poor quality mixtures are commonly used in most cases the amount consumed by the child is relatively small. The children who consume these mixtures and cereal flours without milk supplement have more rickets than those who consume these mixture with milk. When these foods are given from the early months in small amounts because mothers milk is not sufficient, marasmus was found to be a more common nutritional problem.

TABLE 6
LENGTH OF BREAST FEEDING PERIOD

Region	Percent of Infants Breast Fed				
	None	6 months	12 months	18 months	24 months and longer
Aegean	0	10	15	39	36
Marmara	17	13	27	34	11
Central	0	16	21	22	41
Black Sea	10	33	19	30	8
East	4	11	20	26	39
Southeast	9	7	12	16	56
Ankara					
Urban	11	48	22	13	6
Rural	4	14	29	18	31

TABLE 7
TIME OF STARTING SUPPLEMENTARY FOOD

Region	Percent of Infants (Months Beginning)				
	First	3 to 4	5 to 6 to 7	8 to 9 to 10	11 to 12
Aegean	37	28	14	3	18
Marmara	18	25	25	5	26
Central	25	30	20	5	20
Black Sea	29	34	17	3	17
East	16	10	21	3	50
Southeast	8	8	17	8	63
Ankara					
Urban	11	25	26	14	22
Rural	10	4	41	23	22

TABLE 8

KINDS OF SUPPLEMENTARY FOODS CONSUMED

Region	Percent of Infants Consume Foods						
	Milk Yogurt	Meat Egg	Cereal Products	Sugar Starch	Fruits Veg.	Only Meal Juice	Nothing
Aegean	45	2	23	60	14	3	14
Marmara	55	21	16	66	23	2	18
Central	62	2	9	60	4	12	7
Black Sea	73	17	17	78	15	0	7
East	49	2	28	28	13	6	17
Southeast	33	2	26	26	9	4	36
Ankara							
Urban	42	5	69	40	49	-	-
Rural	62	3	50	46	17	-	-

TABLE 9

 APPROXIMATE AVERAGE AMOUNT OF SUPPLEMENTARY FOOD
 CONSUMED
 (per infant per day)

Region	Foods (gm.)			
	Milk Yogurt	Meat Egg	Cereal Products	Sugar Starch
Aegean	76	Little	13	30
Marmara	136	7	9	26
Central	93	Little	9	22
Black Sea	167	4	10	21
East	78	Little	12	14
Southeast	40	Little	17	12

TABLE 10

CONSUMPTION LEVEL OF PACKAGED BABY FOODS

Region	Percent of Infants Consuming Packaged Baby Food		
	Paro	Ari	SMA-Bebefe
Aegean	16	20	7
Marmara	26	38	2
Central	21	11	2
Black Sea	27	42	10
East	15	3	3
Southeast	7	6	2
Ankara			
Urban	22	26	8
Rural	7	2	1

TABLE 11

CALCULATED NUTRITIVE VALUE AND PRICE OF COMMON
BABY FOODS
(per 100 grams)

Baby Food	Price TL.	Kal	Prot. gm.	Ca mg.	Fe mg.	Vit A mg.	Vit. B1 mg.	Vit. B2 mg.	Niasin mg.	Vit. C mg.
SMA	5.50	506	12.0	330	6.0	2650	0.71	1.06	-	52
Bebefe*	4.71	492	16.0	-	-	-	-	-	-	-
Ari	1.38	370	1.7	10	0.5	0	0.42	0.33	3.7	0
Paro	0.84	369	1.1	1	0.1	0	0.01	0	0.2	0

* Although on the package neither raw material nor the other nutrients are given, this product is powdered milk and has several kinds according to the fat content of powdered milk.

FACTORS WHICH EFFECT THE FEEDING PATTERN OF CHILDREN

Cultural and educational background of the families - In Turkey a large portion of the population lives in rural areas distributed into 34, 597 villages. Some of these villages consist of few residential units and there are long distances between them. It is very difficult to provide educational facilities in these small units of inhabitants. According to the latest statistics, the percentages of population that can read and write are 63. 5 percent for men and 32. 3 percent for women.¹⁸ Results of our survey indicate that 64 percent of mothers are illiterate, 20 percent completed five years of primary school, 14 percent just read and write and only 2 percent have secondary education.

The socio-economic condition of the families is another factor which determines the nutrition of the children. The latest statistics report that the per capita national income is 2, 180 TL. (around 200 U. S. dollars).¹⁹ However, because of poor distribution of national income among the population, the buying power of many families is quite low. Naturally, this makes most families depend on cereals for nutritional needs.

In the villages the value of an individual is measured by his ability to work. Small children are not able to work, therefore their social value depends on the parents' wish. Value of a child to his parents depends on whether it is a boy or girl, first or last child, wanted or unwanted when born. In the families with very little resources children become a burden. Parents accept disease and death as natural as they accept health and birth. In such a social environment, the health of children depends on nature. If the mother produces enough milk the infant can get along fine until the time he can eat whatever he finds.

A child has the same social role when the family moves from the rural to the urban area. Since 1950, there has been a large movement from villages to the cities. Certain changes take place when the family moves to the city. It becomes more difficult to take care of a large family, thus the infant mortality is higher. Since they cannot produce food they buy inexpensive products. They may try to spend more money on clothing and housing than on food. They often try what is advertised on the radio. Since they do not grow vegetables or raise livestock they usually buy dry, high starchy foods.

The third factor affecting child feeding practices is the non-availability of high quality food at relatively low cost. Even though we teach the families nutritive value of various foods, if they cannot find them or grow them or buy them, no improvement can be expected regarding child nutrition. At the present time all of the baby foods of high quality are very expensive and the families cannot be expected to buy them. Relatively cheap food mixtures are very poor in nutritive value. Therefore unavailability of baby foods in high quality but low cost becomes an important factor in nutritional status of infants.

SUMMARY

No overall nutrition survey of the Turkish population has been carried out for the assessment of nutritional status of various groups. Few reports have been published concerning the prevalence of malnutrition among infant and preschool children. Findings of the reports available indicate that malnutrition is an important problem in child health.

Types, magnitude and locations of the problem:

1. From 30 to 50 percent of infants and children are below the standard weight and height.
2. The average birth weight of children is comparable with those in the United States and Europe.
3. Retardation in growth starts after three months of age and reaches the highest degree at 18 to 24 months.
4. Among growth retarded children 1 to 4 percent are brought to the hospitals with the signs of very severe marasmus.
5. The main secondary complication of malnutrition is gastroenteritis and pneumonia.
6. Most of malnourished children die from secondary infections and these are listed as the cause of death.
7. The infant and child mortality rate is very high, with an average 154 and 40 per 1000 for infants and toddlers (1 to 4 years of age) respectively.

8. Other signs of malnutrition are anemia and rickets.
9. Malnutrition is more common among the children of low socio-economic groups of the cities and the villages.
10. The most important factors affecting malnutrition are ignorance, unavailability of high quality, low cost infant food mixtures and poor socio-economic conditions.

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PRESENT SITUATION OF NUTRITIONAL STATUS OF INFANTS AND PRESCHOOL CHILDREN IN PAKISTAN

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INTRODUCTION

Nutrition is considered to be the most important factor in national health as malnutrition adversely affects the life, development and health of more people than any disease. It kills millions of infants and small children and retards the development of millions more in the developing areas of the world.

In most of the tropical countries, there is almost an unbroken pattern of general undernourishment of children especially in the preschool age group. It is estimated that about 70 percent of the children of this age group in the developing regions of the world are suffering from malnutrition, particularly the protein-calorie type.

The mortality rate of children of this age group, especially the one to four year age group, is very high in the developing countries. It is considered 50 to 60 times higher than that in the developed areas of the world.

NUTRITIONAL STATUS OF CHILDREN IN PAKISTAN

According to the 1961 census the percentage of children under five years of age in relation to the total population of Pakistan is 17.4. The breakdown by sex and provinces is given below:

	<u>Percentage in Relation to Total Population</u>	<u>Males %</u>	<u>Females %</u>
East Pakistan	18	9.1	9.3
West Pakistan	16.6	8.5	8.1

According to the estimation of midyear population of 1965 in Pakistan, the total population comes to 115,559,000. The number of children under five years is 22,650,000 which represents about 20 percent of the total population of the country.

To define the problem of nutrition in any country and in any group of population, it is necessary to obtain information about the quality and quantity of diet which the people of the country eat.

A nutrition survey involving dietary appraisal and simultaneous health examinations coupled with biochemical assessment of nutrients in blood and urine of representative groups of population provides the most useful information in respect of different areas and various social and economical groups of population of the country.

Consequent to the foregoing consideration, a nation-wide general nutrition survey was conducted in Pakistan by the Government. As a part of this general nutrition survey in Pakistan, about 1500 children below the age of five years in both the wings of the country were examined to assess their food consumption pattern and nutritional status.

CRITERIA FOR ASSESSMENT OF THE NUTRITIONAL STATUS

Dietary Intake

The food consumption patterns of children in both East and West Pakistan were evaluated. The paediatrician recorded the clinical findings. The dietary history was collected from the mothers of these children and entered on paediatric cards especially designed for these studies. The following tables will show the per capita/day intake of foods and the nutrient intakes.

In East Pakistan an evaluation of dietary intake was made with the children up to four years of age from the dietary history collected from mothers.

TABLE 1

MEAN PER CAPITA NUTRIENT INTAKE OF CHILDREN BELOW FIVE YEARS IN
EAST PAKISTAN (NUMBER EXAMINED=119, QUESTIONNAIRE METHOD)

Age Group	No. of cases	Calories	Protein (g)	Fat (g)	CHO (g)	Calcium (m)	Iron (mg)	Vit. A (I. U.)	Thiamin (mg)	Ribo-Flavin (mg)	Niacin (mg)	Vit. C. (mg)
2 years	35	865	22.77	22.77	140	397	2.53	798	1.03	1.07	6.44	14.42
3 years	50	987	25.00	21.00	174	403	2.59	718	1.08	0.97	7.09	23.00
4 years	34	1036	29.64	18.26	192	407	4.46	525	1.00	0.80	8.81	14.60
Average upto 4 years		968	26.2	20.7	169	403	3.1	680	1.04	0.95	7.4	18.3

N. B. Waste factor not considered.

TABLE 2

AVERAGE PER CAPITA CONSUMPTION UNITS OF CHILDREN AGE 1 TO 4 IN WEST PAKISTAN
(Number Examined: 503)

Food Groups	Per Capita intake (gm) edible portion	Calories	Total Protein (gm)	Total Fat (mg)	CHO (gm)	Calcium (mg)	Iron (mg)	Vit. A (I. U.)	Vit. B1 (mg)	Vit. B2 (mg)	Niacin (mg)	Vit. C (mg)
Cereals	187.45	645.0	18.94	3.18	135.16	48.83	5.30	-	.5319	.1372	6.50	-
Starchy and starchy roots	22.90	16.0	.39	.62	2.22	1.60	.14	-	.0183	.0069	.28	1.83
Sugar and syrup	1.00	3.8	-	-	-	-	-	-	-	-	-	-
Pulses	5.50	19.8	1.14	.26	3.29	8.91	.46	.50	.0270	.0099	.09	-
Vegetables	24.42	5.5	.32	.05	0.94	21.47	.43	911.47	.0149	.0295	.14	12.17
Fruits	1.00	.5	.01	.50	0.01	.07	.01	6.60	.0003	.0004	.01	.19
Meat	5.04	10.9	.75	.86	0.04	.45	.09	1.51	.0025	.0066	.16	-
Eggs	1.16	1.6	.12	.12	0.01	.51	.03	10.32	.0010	.0031	.001	-
Fish	.50	.6	.13	.01	0.01	.19	-	-	.0003	.0005	.013	-
Milk	119.39	120.3	4.77	8.92	5.24	190.83	.24	155.51	.0479	.1432	.121	1.19
Fats and oil	-	-	-	-	-	-	-	-	-	-	-	-
Total:	368.36	824.0	26.6	14.52	146.92	272.86	6.7	1086.91	.6441	.3373	7.31	15.4

N. B.: Waste factor not considered.

TABLE 3

NUTRIENT REQUIREMENTS FOR PAKISTANI CHILDREN
(AVERAGE PER CAPITA/DAY)

Age Group	Population 1961 (%)	Calories	Protein (gm)	Calcium (mg)	Iron (mg)	Vit. A (I. U.)	Thiamin (mg)	Ribo-Flavin (mg)	Niacin (mg)	Vit. C (mg)
upto 1 year	2.82	1140	21.8	550	8	800	0.41	0.57	6.84	10
1-3 years	11.01	1323	19.8	450	8	675	0.48	0.66	7.94	15
1-6 years	10.84	1730	27.5	450	10	800	0.63	0.87	10.38	15
Average	-	1481	23.4	461	8.9	744	0.54	0.74	8.9	14.4

- Note:
1. Additional allowances for lactation of mothers have been included in group 0-1 year.
 2. Calories requirements have been adjusted at 25⁰C mean environmental temperature.
 3. 10% allowances have been taken into account for wastage in cases of calories and proteins.

From the actual intake against the requirements, it is evident that the diet of our infants and preschool children is deficient in calories, especially in quality, protein, vitamin A, calcium and iron. The deficiency in vitamin A, calories and protein is critical, and more acute in East Pakistan.

WEANING PATTERNS (East Pakistan)

From the information collected about weaning patterns it is observed that in East Pakistan over half of the children are breast-fed until they pass their second birthday. Only 2.8 percent of mothers cease breast-feeding their children before one year of age. As reported by mothers in West Pakistan 52.4% of mothers breast-feed their babies up to 24 months and above, 31.73% up to the age of 21-24 months, 5.50% up to the age of 18-21 months, 3.3% up to 15-18 months and only 1.94% up to 12-15 months.

SUPPLEMENTARY FEEDING OF BABIES

Tables 3 and 4 show the patterns of giving supplementary foods to the babies in East and West Pakistan:

TABLE 4

INFANT FEEDING SUPPLEMENTS: TYPE OF FOOD, AGE STARTED

Type of food	Age of child in months				
	6-9	9-12	12-15	15-18	18 & above
	Percent of mothers reporting				
Biscuits	41.1	22.3	10.8	17.9	7.8
Banana	39.7	19.6	12.1	14.0	13.9
Rice	16.3	12.3	14.9	38.9	18.2
Other cereals (Barley)	19.4	21.8	12.7	24.3	21.5
Meat or fish	8.2	4.1	10.2	47.0	26.5
Other foods	20.7	14.4	14.5	28.0	21.6

TABLE 5

AGES, NUMBER AND PERCENTAGE OF BABIES STARTED ON OTHER FOODS BESIDES MILK IN WEST PAKISTAN

Number of mothers	Food Items	Ages					18 months & above	Total
		6-9	9-12	12-15	15-18			
1583	Biscuits	193 (10.7)	14.6 (31.3)	55 (11.8)	6 (1.3)	67 (14.3)	467	
	Banana	-	1 (100.0)	-	-	-	-	
	Rice	85 (11.4)	272 (36.4)	197 (26.3)	24 (3.2)	170 (22.7)	748	
	Roti	167 (15.8)	372 (31.4)	345 (29.1)	46 (3.9)	234 (19.8)	1184	
	Other fruits	19 (17.3)	31 (28.2)	30 (27.3)	2 (1.8)	28 (25.5)	110	
	Other foods	14 (10.7)	25 (19.1)	28 (21.4)	3 (2.3)	61 (26.6)	131	

N. B.: Figures in parentheses show the percentages.

It is shown that the items like biscuits, banana, rice, roti, fruits and other cereals are the major food items used in supplementary feeding. Meat, fish, egg, etc. have a very insignificant place in these diets.

DISEASE HISTORY IN CHILDREN UNDER FIVE YEARS

All the mothers with children under five years of age who presented themselves at the clinics during the survey were questioned regarding the following disease history which is considered to be the major conditioning factor of malnutrition in children.

From the answers it is evident that the three conditioning factors like diarrhea, upper respiratory tract infection and the infestation of the intestinal parasites are found to be prevalent amongst these children in the following proportion. In East Pakistan 31%, 30% and 20% are affected by current, recurrent and recent diarrhea respectively; and 40, 23 and 22% are affected by current, recurrent and recent

respiratory infection respectively and 53% are infested by intestinal parasites. In West Pakistan 22% suffer from current diarrhea, 18% from the upper respiratory tract infection and 35% suffer from the parasite load.

Clinical Findings

Deficiencies in diet have both clinical and sub-clinical manifestations. Several nutrient deficiencies may appear together making difficult the diagnosis of a particular deficiency. The classical deficiency diseases which present one dominating sign of deficiency are found to be less common in our children than the clinical picture of combined form of deficiency diseases.

The General Impression

About 50 percent of the children examined were found under the border line of optimal nutrition and 35 percent were found to be in poor nutritional status. From the tables of the clinical findings furnished below for both East and West Pakistan it will be seen that anaemia manifestation of iron deficiency conditioned by parasitic infestation, xerophthalmia, keratomalacia and night-blindness manifestations of vitamin A deficiency (particularly in East Pakistan), kwashiorkor and marasmus due to protein and multiple nutrient deficiency are prevalent in children of Pakistan. The deficiency in protein and calorie in our survey manifests clinically in pot-belly, apathy, muscle wasting, marasmus and pre-kwashiorkor diseases. Considering the total child population below five years of age in Pakistan the percentage prevalence of kwashiorkor and marasmus is not negligible. As in other developing countries the protein-calorie type of malnutrition is prevalent here among these children in alarming proportions. This is super-imposed by nutritional anaemia, vitamin A deficiency in the form of kerato-malacia, nightblindness with the threat of complete loss of eye sight of about 50,000 children annually in East Pakistan alone.

TABLE 6

PERCENT PREVALENCE OF CLINICAL FINDINGS
IN CHILDREN BELOW FIVE YEARS OF AGE IN EAST PAKISTAN

	<u>Males</u>	<u>Females</u>
Number examined	535	485
<u>General Impression</u>		
Apathy	6.0	3.5
Irritability	6.0	4.9
Pallor	19.8	20.4
<u>Hair</u>		
Dry	1.1	0.4
Dyspigmented	0.0	0.2
Thin	3.7	1.8
Easily plucked	0.2	0.4
<u>Eyes</u>		
Conjunctival dryness	5.4	3.7
Conjunctival wrinkling	3.2	2.7
Conjunctivitis	1.9	1.8
Bitot's spots	0.4	0.0
Keratomalacia (Xerophthalmia)	1.1	0.2
<u>Lips</u>		
Angular lesions	4.1	1.8
<u>Gums</u>		
Bleeding	0.2	0.0
<u>Tongue</u>		
Filiiform papillary atrophy-slight moderate/severe	1.9	0.4
<u>Glands</u>		
Thyroid enlarged	0.4	0.0
<u>Skin</u>		
Inelastic	1.7	1.2
Petechiae	0.2	0.0
Dermatitis	0.4	0.6
<u>Abdomen</u>		
Hepatomegaly	2.6	1.8
Splenomegaly	1.1	1.0
Pot-belly	5.0	4.9
<u>Skeletal</u>		
Muscle wasting	4.9	2.5
Costochondrial beading	0.2	0.0
<u>Lower Extremities</u>		
Bilateral pedal edema	0.9	0.2
Calf tenderness	0.2	0.2
<u>Clinical Impression</u>		
Marasmus	1.9	0.4
Pre-kwashiorkor	1.1	1
Kwashiorkor	0.2	0.2

TABLE 7

PERCENT PREVALENCE OF CLINICAL LESION IN CHILDREN
(0-4 YEARS) WEST PAKISTAN

Total number examined	303
<u>General Impression</u>	<u>Percent</u>
Apathy	2.9
Irritability	22.1
Pallor	44.5
<u>Hair</u>	
Dry	0.9
Dyspigmented	0.7
Thin	33.9
Easily plucked	Nil
<u>Eyes</u>	
Conjunctival dryness	0.3
Conjunctival wrinkling	Nil
Conjunctivitis	Nil
Bitot's spots	Nil
Keratomalacia (Xerophthalmia)	0.3
<u>Lips</u>	
Angular lesions	0.3
<u>Gums</u>	
Bleeding	Nil
<u>Tongue</u>	
Filliform papillary atrophy - slight moderate/severe	Nil
<u>Glands</u>	
Thyroid enlarged	Nil
<u>Skin</u>	
Inelastic	0.9
Petechiae	Nil
Dermatitis	0.3
<u>Abdomen</u>	
Hepatomegaly	Nil
Splenomegaly	0.3
Pot-belly	13.9
<u>Skeletal</u>	
Muscle wasting	3.3
Costochondrial beading	Nil
<u>Lower Extremities</u>	
Bilateral pedal edema	Nil
Calf tenderness	Nil
<u>Clinical Impression</u>	
Marasmus	1.9
Pre-kwashiorkor	0.3
Kwashiorkor	Nil

Indirect Criteria of Assessment

If infant mortality and preschool child mortality are high, i. e. 10 to 15 percent and 1 to 2 percent respectively, while major disasters do not exist, we can conclude from these mortality figures that the young children have low resistance against infectious diseases which is only the case when they are undernourished, from pregnancy and birth onwards. It is now an established fact that preschool malnutrition is basically responsible for the early deaths of millions of children. The following tables will show the infant and preschool mortality rates in our survey in East and West Pakistan.

TABLE 8

PERCENT OF LIVEBORN CHILDREN DYING BEFORE THE AGE OF THREE YEARS

	<u>Below 1 month</u>	<u>1-6 months</u>	<u>7-12 months</u>	<u>1 year</u>	<u>2 years</u>	<u>3 years</u>
Percent mortality	8.7	5.3	2.7	3.3	3.2	2.6
Cumulative percent	8.7	14.0	16.7	20.0	23.2	25.8

It has been shown that our infant mortality is 13% in West Pakistan and 16% in East Pakistan; and preschool child mortality (1 to 4 years) is 9% in East Pakistan and 12.1% in West Pakistan. The comparative figures in U. S. A. is 2.4% and 0.1% respectively.

ANTHROPOMETRY

Nutritional anthropometry is considered with the measurement of the variations of the physical dimensions and the gross composition of the human body at different age levels and degree of nutrition.

This measurement is not concerned directly with the nutritional assessment of the individual but rather suggests simple methods that will supply useful, if approximate, information concerning the nutritional profile of the community and be of value in guiding public health programmes.

TABLE 9

NUMBERS, PERCENTAGES AND AGES OF CHILDREN DIED ACCORDING TO THE
STATEMENT OF MOTHERS INTERVIEWED IN WEST PAKISTAN

Location	No. of mothers interviewed	No. of live- births	No. of children died	Ages at the time of Death								
				Below 1 month	1-6 month	7-12 month	2 year	3 year	4 year	5 year	5 and above	Age not known
Rural	980	4980	1589	193	267	183	377	212	95	95	221	-
Urban	565	2865	792	164	113	105	138	85	37	37	122	4
Total:	1545	7845	2381	357	380	288	515	297	132	65	343	4
Child mortality		-	30.4	4.5	4.8	3.7	6.6	3.8	1.7	0.8	4.4	0.1
Cumulative (percent mortality)				<u>4.5</u>	<u>9.3</u>	<u>13.0</u>	<u>19.6</u>	<u>23.4</u>	<u>25.1</u>	<u>25.9</u>	<u>30.3</u>	<u>3</u>

TABLE 10

COMPARISON OF INFANT MORTALITY IN OTHER COUNTRIES/1000 LIVE-BIRTHS*
(position up to 1964)

Sweden	14.2	U. S. S. R.	30.9	England	19.9
Finland	16.9	Ceylon	52.8	Wales	
Switzerland	19.00	Portugal	69.00	France	23.4
Australia	19.1	Philippines	68.2(60)	Canada	24.7
Japan	20.4	Netherlands	14.8	Belgium	25.8
U. S. A.	24.2	Denmark	18.7	Hungary	39.8
West Germany	25.3	New Zealand	19.1	Mexico	66.3
		U. A. R.	19.0(61)	Chile	119.0 (1960)

* From United Nations statistical publications.

Growth

Growth rate of children is one of the most simple, inexpensive, reliable and important tools available as an index of nutritional status. Growth is a manifestation of life in the young and its rate and quality are related to the general health and nutrition of the individual child.

There is no fixed norm for optimal growth but a decrease in growth rate precedes other so called specific signs in most types of malnutrition. Rate of growth in health is a better criterion of adequacy of nutrition in infancy and childhood. Deviations from expected growth may indicate unsatisfactory nutrition and warrant an investigation into environment, history of disease, the quality and quantity of the diet. The height and weight of children up to 4 years in East and West Pakistan will show that the rate of growth is all right up to 8 or 9 months and is comparable to the norm of European children but after that the rate of growth of our children remains far below this norm. The average weight of a 2 year old child should be 12.4 kilos with range of 10 to 15.5 kilos, but our children at the age of 2 years attain an average weight of 9.4 kilos in boys and 7.6 kilos in girls in West Pakistan and 7 kilos in boys and 6.3 kilos in girls in East Pakistan.

CONCLUSION

The problem of malnutrition in preschool children seems to be a major one in the field of public health nutrition in Pakistan. The preschool malnutrition is basically responsible for the early deaths of millions of children, and in those it does not kill, permanently impairs physical growth and probably causes irreversible mental and emotional damage; and that is why it is a serious deterrent to progress in developing countries.

Nutrition is one of the primary needs of the preschool child. If it is adequately provided, it will help in meeting all the needs of the child including the total health needs and social needs. Improved nutrition in children will ultimately result in better adulthood in all its physical and psychological attributes.

SUMMARY

Malnutrition in the preschool child is one of the major public health problems in Pakistan. The child population of this age group in Pakistan represents about 20 percent of the total population of the country.

The evaluation of nutritional status was made of this group of children along with other groups of population in the country. Protein-calorie type of malnutrition is found to be widespread affecting about 85 percent of the children examined, about 3 percent of which was found to be suffering from severe protein malnutrition. These deficiencies are superimposed by xerophthalmia, keratomalacia, nutritional anaemia and ariboflavinosis. The situation is more serious in East Pakistan. Infant mortality is found to be 13 to 16 percent and preschool child mortality is 9 to 12 percent in East and West Pakistan. There is prolonged breast-feeding among these children. The protective foods like meat, fish, egg, etc., occupy a very insignificant place in their weaning foods whereas cereals and other starchy foods occupy a major place. Along with economic factor, ignorance of the mothers plays a major role for malnutritional situation of the preschool child in Pakistan.

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THE PRESENT SITUATION IN IRAN

BY

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Mr. Chairman, Distinguished Delegates, Ladies and Gentlemen, I am presenting a brief statement on the present nutrition problems in Iran, especially those in infants and preschool children, and a resume of the activities and achievements of the Food and Nutrition Institute of the Government of Iran.

THE IMPORTANT PROBLEMS

The main nutrition problems in Iran are not those of caloric deficiency, but are those stemming from a low intake of animal protein, vitamin A, vitamin B complex, including riboflavin, folic acid, vitamin B₁₂, and to some extent, vitamin C. The average daily intake of calories in the rural households of Khuzistan, East and West Azarbaijan, Dashte-Mishan, and Gorgan varies between 2,524 to 3,121 calories per person per day, and total protein varies between 66 to 90 grams per person per day against the respective requirements of about 2,500 calories and 60 to 62 grams per person per day. But intakes are on the lower side in the rural households of Gilan, Fars, Ghashghaee, Kerman, and Khorasan, where caloric intake ranged from 2,050 to 2,410 and protein was 45 to 62 grams per person per day. Cereals contributed 70 to 80 percent of the protein in the latter group; for example, in Khorasan, cereals contributed 65 percent of the calories and 71 percent of the protein. The average intake of animal protein was low in nearly all regions. Excluding the animal protein intake of 17 grams in

Azarbaijan and Khorasan and of 11 grams in Khuzistan rural households, average animal protein intake was 4 to 9 grams per person per day. The situation was comparatively serious in the low income urban households, in which the calorie, total protein, and animal protein intakes per day ranged between 1,600 to 2,470, 40 to 61 grams, and 2 to 9 grams respectively.

In some places there are deficiencies of calcium and iron. These are due to inadequate availability and consumption of milk, beans, and pulses, and in the supplies of green and other vegetables. There are great variations in the availability of these nutrients in the diets. Surveys showed that vitamin A ranged between 1,036 to 1,842 I. U. per day in the diet of Azarbaijan and Khorasan, but was 242 to 736 I. U. in all other regions. Riboflavin was 0.80 to 0.92 milligrams per day in Khorasan and Azarbaijan, but was between 0.40 to 0.66 milligrams in other regions. The vitamin C intake was 24 to 44 milligrams per day in Azarbaijan and Khorasan, 18 milligrams in Khuzistan, but about 10 milligrams per person per day in all other regions.

Anemia

Although the presence of anemia in Iran has been recognized by physicians as a major problem, records of only one survey are available. In collaboration with Dr. Wadsworth, WHO nutritionist, investigations on the incidence of anemia in the province of Gilan in the Rasht area of the Caspian littoral were undertaken in 1960 by Dr. Emami and later by Dr. Shahbazi. In all, 863 people were examined. The level of hemoglobin was estimated by the cyanomet-hemoglobin method (using an Eel portable colorimeter) and the hematocrit by microhematocrit.

Compared to the WHO standard, 165 persons, or 20 percent of the people, had an appreciable degree of anemia, 4 percent had a level between 7 to 9, and 2 percent were 7 g/100 ml or less. The anemia, judged by the mean corpuscular hemoglobin concentration, was nearly always micocytic.

Extensive areas of hookworm infestation exist along the Caspian Sea and the Gulf Coast. The extent to which this contributes to anemia in these areas is unknown. Also, a large proportion of the iron in the diet is contributed by cereals. The extent to which this form of iron is available is open to question.

Goiter

The Food and Nutrition Institute commenced investigations on the incidence of endemic goiter in Iran in 1963. Large scale investigations were made in the Shahriar and Ali Shahvaz areas, near Tehran, where the great prevalence of goiter was found due to deficiency of iodine in water and food. In cooperation with the Atomic Research Center of Tehran University, the investigations were continued by the administration of radioactive iodine to determine PBI content of blood. This was done in the biochemistry laboratory of the institute.

In Tehran school boys, maximum incidence was in the 13 years age group. Seventy-two percent had goiter, but it ranged between 30 to 61 percent in other age groups. In the girls, 78 percent of the 13 years age group were affected, but 25 to 68 percent in other age groups. In the Ali Shahvaz area, 73 to 78 percent of the villagers had some form of goiter. Of the goitrous persons, 88 percent were above 7 years old.

This survey was extended to the Varamin area of Tehran Province and to four other places in lower Mazandaran Province. In the former, 4,000 persons were examined and the incidence of endemic goiter was detected in 47 percent of the subjects. In the lower Mazandaran, 14 to 35 percent of the males and 31 to 51 percent of the females were affected. During the Household Food Consumption Surveys, incidence of endemic goiter in children was found in nearly all the regions, but no visible signs were detected in the adults. Of the rural children, 1.5 percent of Khuzistan, 9 percent of East Azarbaijan, 15 percent of Fars, 24 percent of Derman, and 12 percent of Gorgan were affected. Despite the high incidence in the children in some regions, the adults were rarely affected.

Favism

This is a syndrome of acute hemolysis followed by anemia. It develops among a proportion of those with a deficiency in the enzyme glucose-6-phosphate-dehydrogenase when they eat or come in contact with the green broad bean (Vicia Fava) or the flower of the bean. Epidemic outbreaks of this condition, which are known locally as "raghalizaleh," have occurred along the Caspian littoral. During the first six months of 1965, 1,123 cases occurred. The mortality rate is low.

Favism is not an acute national problem; however the publicity given to it has brought a need to study the illness to devise preventive methods. An example of the publicity given to the condition was a demand that a ban should be laid on bean growing and the crops in the fields should be destroyed. As these beans are one of the principal sources of protein in the area, such action might be harmful to the nutrition status of the local population.

Favism presents several problems of special interest. It is most common in the first two years of life, and more frequent in boys than girls. In some persons it regularly appears every year, in others irregularly. Blood donated by females and by people living in other areas is believed to be most effective in treatment.

The local inhabitants firmly believe that the juice of the wild persimmon tree is effective as a prophylactic and that grape sugar is effective in treatment. It should be pointed out that although much is known about the lesion at the cellular and biochemical level, nothing is known about the toxic factor existing in this bean.

Vitamin A Deficiency

Our surveys show a low intake of vitamin A. In the clinical examination, blindness was also reported from a number of areas.

Vitamin C Deficiency

The level of vitamin C in the diets is also low in many areas, particularly in the winter months. This finding was reflected in the clinical examination in which bleeding gums, gingivitis, and stomatitis were common. Only in Kazeroun was the family intake of vitamin C in excess of 25 milligrams. The people in this area showed the lowest incidence of gum conditions. Within the large areas of Iran, conditions exist in which a number of nutritional diseases develop.

Kwashiorkor and Marasmus

Kwashiorkor is known in Iran as protein deficiency edema and is common among children and infants. Kwashiorkor is not uncommon in Tehran and in other parts of the country. However, dietary marasmus is far more frequent, especially in babies, and is probably responsible for a higher mortality rate. These two

forms of the protein-calorie deficiency syndrome are the major health problems of the small child in Iran, not only because many infections, notably measles and diarrhea, prove fatal when they develop in a malnourished child, but also because of their direct implications.

Only a few figures for the weights of small children are available. Corkill and Hedayat (1963) list figures for 1,450 children under the age of 2 years. The weights of these children are similar to those from areas in Africa and Asia where protein-calorie deficiency is known to be a major problem. Infants or children suffering from the clinical forms of malnutrition are prone to dehydration, which is difficult to treat and which carries a high mortality rate. The Institute, together with the pediatric clinic of the University of Tehran, is currently investigating this condition and is finding that there is a plurality of biochemical alterations that make therapy directed to each case a primary need for survival. Also, the need for posthospital recovery of nutritional status is a must, if a child is to recover completely.

Beri-beri

This occurs along the Caspian littoral, an area where highly milled rice is the staple food. Normally, the diet is supplemented by food purchased from the towns. In winter, however, many of the farms are snowbound for long periods and no food other than rice is eaten. Under these conditions, beri-beri is seen at the local hospitals.

Rickets

Iran is a land of abundant sunshine, yet children with severe rickets are not uncommonly seen. By custom the children are dressed in long clothes which cover the skin of the arms and legs, and this factor could be of significance.

BIOCHEMICAL FIELD SURVEY

In the survey, biochemical assessment of hemoglobin and blood contents as well as serum protein contents of school children were determined. Later nursing and expectant mothers were also included in this investigation. In Dashte Mishan (Khuzistan), 46

subjects were examined for serum protein content and 324 for hemoglobin content. The average serum protein content was found to be 7.5 g/100 ml. Ten percent had counts above 15 g/100 ml.

ANTHROPOMETRIC MEASUREMENTS

Height and weight measurements were taken of the household members during these surveys. Altogether, 13,211 subjects had been measured up to the 12th Survey. The adult weights were used for determining the calories and protein requirements, and measurements of the children were used for comparison of their growths in height and weight.

The average adult height and weight and the increase in the heights and weights of the boys from 4 to 15 years old is shown below.

AVERAGE HEIGHTS AND WEIGHTS OF HOUSEHOLD MEMBERS

	Males (4-15 years)		Males (over 15)		Females	
	<u>Height</u> (cm)	<u>Weight</u> (kg)	<u>Height</u> (cm)	<u>Weight</u> (kg)	<u>Height</u> (cm)	<u>Weight</u> (kg)
Khuzistan	55.5	27.1	166.8	62.7	154.2	50.6
E. Azarbaijan	62.8	29.3	165.5	61.7	51.8	62.8
W. Azarbaijan	57.0	26.7	165.4	61.5	52.2	57.0
Fars	58.8	32.2	162.5	57.1	46.8	58.8
Kerman	54.5	28.3	164.1	53.0	45.5	54.5
Gorgan	58.5	30.1	165.0	60.1	51.1	58.5
Ghashghaee	58.4	26.9	166.1	58.9	48.4	58.4
Khorasan	55.3	25.4	164.2	58.0	49.3	55.3

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CURRENT PROGRAMS IN IRAN

BY

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The importance of nutrition for the welfare of the population of Iran and for the formulation of agricultural policy based on these nutritional needs has been recognized for some time. The Government of Iran, with assistance from FAO, WHO, and UNICEF, established the Food and Nutrition Institute in 1961 by decree of His Imperial Majesty the Shahanshah of Iran. In 1964, the Institute, originally established on the top floor of Firoozgar Hospital, was shifted to more commodious quarters at 462 Pahlavi Avenue. This location was considered most suitable to accomodate all the Divisions of the Institute. The Institute has recently acquired 30,000 square meters of land for the construction of a new building to house the College of Nutritional Sciences as well as for research and other activities. It is expected that construction will begin during the Fourth Plan (March 1968).

The institute takes all necessary steps within its power to carry out thorough investigations of the nutrition problems in the country. It conducts systematic field surveys in all parts of the country with regard to food pattern and habit, and to the nutritional state of the population with special emphasis on mothers and children. In this way, it should be able to determine the extent of severity of the existing nutritional problems. On the basis of the study findings, the Institute develops proposals of practical means for the improvement of the nutritional status of the population.

As one of its major objectives, the Institute, in cooperation with Tehran University, imparts suitable training to specially selected high school graduates in a four year course, to qualify as Nutritionists. It also cooperates with and provides technical guidance to governmental and non-governmental agencies. This is instrumental in improving the production and distribution of food and in promoting the consumption of more nutritionally adequate diets.

The Institute is involved in educational, medical, extension, and community development activities. Students from the fourth year at the School of Nutrition are requested to spend practice time involved in the different activities of the Institute and international students (Pakistan, Turkey, Nigeria) carry out projects as part of their post-graduate training.

Nutrition education to villagers includes weekly nutrition demonstrations on weaning, correct food habits, care of the newborn, cooking, and home economics. Nutrition education at the school level last year included a course of five lectures. Nutrition education at the Teachers School in Varamin was also offered (37 lectures). Cooking demonstrations and house visiting was carried out in Gorg Tappeh, Moussiabad, and Kheirabad.

Besides many meetings arranged by the Institute, five symposia were held on the premises.

1. Seminar on Nutrition for the School of Social Work in May 1965.
2. Seminar on Favism from July 4-7, 1965.
3. Seminar on Diabetes in September, 1965.
4. Symposium on Food Science, Hygiene, and Technology in May 1966.
5. Symposium on Wheat and Bread in December, 1967.

Three of the seminars were attended by international scientists and authorities.

SURVEYS

According to a program of systematic sample surveys, Household Food Consumption Surveys have been undertaken in 9 board regions of the country consisting of 13 provinces. Thirteen surveys were completed from 1963 to 1967 in 7 regions of 9 provinces, covering 1,340 households of 7,810 persons in 132 villages and 38 urban

"mohallah." The villages were sampled in collaboration with the Iranian Statistical Center. The households were selected by systematic random sampling and the survey was carried out by weighing all foods brought to the households for five consecutive days.

The results showed that the average intake of 2,500 to 3,100 calories and 66 to 90 grams in rural and 2 to 7 grams in urban households. Excluding four provinces, the intakes of vitamin A, riboflavin, and vitamin C were deficient.

Medical examination for clinical signs of nutritional deficiency disease were carried out by medical nutritionists of the Institute in the same selected households. A total of 8,010 persons have been examined for assessment of nutritional status in the twelve surveys carried out in the nine provinces.

At the end of each survey, a report is submitted to the government, recommending measures necessary for the amelioration of the problems uncovered by the surveys in the region. So far, ten reports have been submitted to the government. Statements are submitted to the Planning Organization regarding the production requirements of livestock and other protein-rich foods for incorporation in the Fourth Plan. Attempts are being made, in cooperation with UNICEF and FAO, to initiate a pilot applied nutrition program in a selected area.

NUTRITION IMPROVEMENT PROJECTS

Gorg Tappeh Village Demonstration and Training Center - To impart practical training to the student trainees of the Institute, as well as to demonstrate village development work, a village demonstration and training center was established in 1964 in a group of six villages surrounding the village Gorg Tappeh. The presence of six schools, of which one is secondary, the agricultural training school of the Ministry of Agriculture, and home and health agents near the area, offers an excellent opportunity of developing rural development projects. A clinic for mothers and children has been commissioned. A Nutrition Instructor is instructing mothers in the selection of their diets for their children and for themselves. An agronomist, under a French Technical Assistance Program, is demonstrating fruit and vegetable gardening in the agricultural development work. The present program also includes routine

clinical examination of the infants and children, household food consumption and clinical surveys in random sampled household, and the construction of a deep tube well to help alleviate the water difficulties.

Applied Nutrition Program - The second Addendum to the Plan of Operation of the Food and Nutrition Institute, for the establishment of a broad-based applied nutrition program in Gorg Tappeh village groups, has been signed by the government, FAO, WHO, and UNICEF. The plan of action is now being prepared. The objectives are the development of a nutrition demonstration area where an Applied Nutrition Project can be established to contribute directly or indirectly to the improvement of nutrition, and to stimulate interest among the government departments in order to note the practical value of nutrition programs. Broadly, the Program includes: Food and Nutrition Surveys for assessing the base line data of food habits and nutritional status, which will be used as field training for the trainees of the Institute; applied nutrition training by establishing a demonstration training center for the fourth year students of the Institute; the establishment of a Nutrition Unit for mothers and preschool children. This maternal and child health unit shall serve as a demonstration and training center for medical and nursing health personnel.

Project on Lysine Fortification of Wheat - The Iran-Holland Project on the lysine fortification of wheat is now in the advanced stage of implementation. This project has been initiated by the active cooperation and material assistance from the Agricultural Products Division of Dutch States Mines, Heerlen, Holland. It has been decided that this experimentation will be carried out in the six to twelve year old school children by giving lunch to those who are deficient in the lysine content of their normal diets.

The project will commence shortly after preliminary Food Consumption and Nutrition Surveys. The project will be carried out in six schools in a group of six villages in the Varamin area of Tehran Province. The lunch will be given for six months and will be prepared in each school. One group will receive bread fortified with lysine and the other will be a control group, without added lysine in bread. The other food items will be practically free from lysine. The lunch will provide one-third of the daily nutritional requirements for the children. About 350 school children will be fed by this program. The lysine content will be 0.2 percent in the final mixture of wheat flour, from which the bread will

be prepared. The students will be examined periodically for growth, nutritional status, and clinical state by the Medical and Nutrition Research team of the Institute.

Pulse Improvement Project - In cooperation with the International Pulse Improvement Project, 800 samples of beans, pulses, and legumes of Iranian origin, were analyzed for moisture, protein, and lysine contents. Palatability tests, after cooking, were made. A publication of results is under way.

Food Standards - In collaboration with the Standard Institute of Iran, analyses of foods in connection with the establishment of standards was carried out. In this connection a large number of shortening samples manufactured in Iran and abroad was studied. The sterols were also determined by the thin layer chromatographic method, as well as by the spectographic method.

Food Additives - Considerable work was done on the detection of added color in foodstuffs. By using the two dimensional chromatographic method, it was possible to identify the added color as well as to estimate the quantities by the spectrophotographic method. The work on the detection and estimation of preservatives, particularly benzoic acids and benzoates, boric acid, and sorbic acid, have been investigated.

School Feeding Program - A school feeding program has been undertaken by the Iranian National Committee for the Protection of Children. This school feeding program was initiated in the schools of Tehran and Isfahan. The responsibility of the Institute was to check regularly the height and weight of the children. A pack of food containing 30 grams of powdered whole milk, 25 grams of butter, and 240 grams of bread is given to the six to twelve years age group.

Among the school girls, 25 percent had goiter. Haemoglobin concentration was higher than 13.7 g/100 ml in 90 percent of the girls and was 10-13 g/100 ml in 10 percent of them. Serum protein was 6-7 g/100 ml. The results of clinical examination at the xerosis reduced from 54 to 11 percent; mosaci skin reduced from 22.5 to 4.5 percent; follicular hyperkeratosis reduced from 70 to 43 percent; cheilosis reduced from 41 to 21 percent; angular stomatitis reduced from 20 to 5 percent; swelling gum reduced from 15 to 5 percent; bleeding gums reduced from 9 to 3 percent; pigeon chest

remained the same, 11 percent; dental caries remained the same, 86 percent.

Medical Programs - Medical attention is offered to the villagers free of charge with some medicine being offered as available, also free of charge. A consulting pediatrician attends once a week offering well-baby attention, especially in relation to the research in growth and development of children. School children receive a check-up once a year and children from 0 to 2 years old are examined every month and from 2 to 5 years every three months. A special dietician attempts to avert malnutrition by treating and following up the course of the more undernourished children. There is an environmental health clinic (garbage, drinking water, excreta disposal, fly control). A massive vaccination against diphtheria and tetanus has been performed in six villages for children under fourteen years of age. Free milk is given (skimmed milk powder) to the preschool children more evidently in need of supplementary feeding.

Extension and Community Development - Vegetable gardens as demonstrations have been set up in four villages. The vegetable gardens at the home level have been tried somewhat unsuccessfully. The lack of water is the limiting factor in the development of these activities. Some fruit trees have been planted (about 300), as well as grapevines (1000) and pomegranate (1000). Shade trees against wind erosion and for the protection of water ditches have been planted (10,000). School gardens in three schools have been set up. The collaboration of the Ministry of Agriculture has been obtained for all the above stated activities.

An effort has been made to constitute a committee to study socio-economic rural problems. This committee (CEDRI) was created in March 1966. Its objective is to promote cooperation between the different ministries which provide services used in village development.

This Committee is composed of the Council for Administration and seven working groups (Health and Nutrition, Community Development and Education, Agrarian Reform and Credit, Water and Trees, Agricultural Production, Animal Production and Commerce, and Cooperativism). The villagers form part of these working committees which are headed by a governmental official. The committee that

has more consistently made efforts for regular meetings is the Health and Nutrition Committee.

The Center for Rural Nutrition, Education, and Research has been involved in most of the activities contemplated in an Applied Nutrition Program. After defining the baseline we can implement the practical measures at the village level to correct the nutritional status of the population. Trying out different measures, studying the difficulties that arise in their practical application at the village level, determining their cost and the personnel needed for their management is the next task for the Institute. This next phase involves, therefore, the establishment of normative criteria which can be applied with reasonable success to a much wider area and eventually to a national basis.

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REVIEW OF THE PRESENT COUNTRY PROGRAMME IN THE FIELD OF NUTRITION IN PAKISTAN

BY

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The Government of Pakistan has long been aware of the importance of nutrition as a basis for continuing good health of people. Little progress was made to define our problems in the field of nutrition until the year 1958. Limited scale food consumption surveys had been undertaken in pre-independence days and several localised studies of nutritional status were made earlier. These studies made evident the fact that proper evaluation of the nutritional status of our population was extremely necessary. So the government planned to conduct a nationwide nutrition survey through its Directorate of Nutrition Survey and Research to evaluate the nutritional status of the country's population.

ACTIVITIES CONDUCTED BY THE DIRECTORATE OF NUTRITION SURVEY AND RESEARCH, ISLAMABAD

The first phase of a nationwide nutrition survey has been completed in both East and West Pakistan. The re-survey is going on a limited scale for starting pilot projects for control of malnutrition among mothers and children in the country.

Studies are in progress to study seasonal variation on food consumption and its effect on nutritional status.

Studies are in progress to find out the norms of growth curve of Pakistani children.

Analysis of Pakistani foods for various nutrients in various forms - raw, cooked and processed - is being conducted in the Nutrition Research Laboratory.

Laboratory study on evaluation of Pakistani diets and analysis of composite diets is in progress.

A pilot public health nutrition project for controlling malnutrition in infants, children and mothers has been initiated.

The government is planning to establish a National Nutrition Institute to undertake specialised and systematic nutrition studies. These studies will be undertaken to investigate the malnutrition problems of special nature, fix priority of the problems to experiment, develop supplementary foods and food mixture, and to start feeding programmes for different vulnerable groups. The Institute will develop nutrition education programmes, organize and implement training programmes to provide a cadre of workers at all levels, in the relevant services with adequate motivation, background and deeper insight into the nutritional needs, problems and approaches for effective applied nutrition programmes in their basic services.

In addition to the programmes followed by the National Nutrition Organizations at the federal level, the following organizations in both provinces of Pakistan are conducting nutrition programmes in their specific fields on a limited scale.

Biochemistry Department of Dacca University

This department has collaborated in our national nutrition survey in East Pakistan. They are now engaged in several research projects and studies relating to nutritional biochemistry and general education, such as: 1) research on iron and calcium metabolism; 2) studies of different oils upon growth and calcium metabolism; 3) research on allyl isothiocyanate and its effect on growth, thyroid weight, blood clotting time, liver and kidney enzymes; and 4) studies on the dietary intake of residential halls and college hostels of Dacca University.

Department of Biochemistry, Jinnah Postgraduate Medical Center, Karachi

This Department is conducting research on oxaluria and urolithiasis and kidney disease. In addition much of the research work in this centre has some nutritional implications, such as study of anaemia in severe protein deficiency, relation of rheumatic disease to nutritional status, effect of severe protein calorie deficiency disease in young children on their mental development.

Pakistan Council of Scientific and Industrial Research Laboratories, Dacca and Lahore

These laboratories have food technology sections and are engaged in exploring the possibilities of finding cheap protein foods from indigenous food materials available from the materials so far unexploited. The Lahore and the Dacca Laboratories of this Council have progressed considerably in finding cheap protein food formulae and the formulae for supplementary feeding of infants and children.

Agricultural University, Lyallpur, West Pakistan

This university under the guidance of its Department of Nutrition undertakes work on food technology and food enrichment. In addition to this work this department also has undertaken studies on human nutrition within the faculty of animal husbandry.

Model Child Welfare Centre, Lahore

Under Professor S. M. K. Wasti, a longitudinal study of child growth and health from birth onwards is in progress which will provide most valuable information relevant to child nutrition in Pakistan.

FEEDING PROGRAMMES IN WEST PAKISTAN

For the prevention of malnutrition among the preschool children, West Pakistan is largely dependent on feeding programmes aided by various philanthropic organizations. This is done through health centres where milk and other diet supplements are distributed.

The care and feeding programmes of mothers and preschool children are carried out through the Maternity and Child Welfare Centres. The number of MCW Centres in 1965-66 was 734, Maternity Health Centres 67, Primary Health Centres and School Health Centres 25, throughout West Pakistan. The number of beneficiaries at each centre was estimated at 600 persons per annum. All the centres combined are estimated to benefit some 420,000 persons annually.

Some feeding programmes for the school children have been undertaken but these are carried out by the Education Department without any assistance of the health authorities. School feeding programmes which can have a real impact on the health of school children are altogether lacking. Nutritional programmes for the preschool child cannot be regarded as adequate at this time.

The feeding programmes for infants and children in East Pakistan are operated also through M.C.H. centres and M.C.H. units of the rural health centres where skimmed milk, diet supplements and vitamin tablets are distributed which are supplied by UNICEF and CARE. This is very insignificant and cannot be taken as very effective considering the magnitude of the problem of meeting the nutritional needs of the preschool children in that province and the number of children who are benefitted by this programme is also very insignificant considering the total number of children of the preschool age group in the province. In all there are 88 M.C.H. centres functioning in the Province of East Pakistan.

The workers who look after the health and nutrition of expectant and nursing mothers, infants and children in the Maternity Child Welfare Centres are Lady Health Visitors. These Health Visitors are trained in five Public Health Schools located at Peshawar, Lahore, Hyderabad, Quetta, and Karachi in West Pakistan; and Dacca, Chittagong and Raj Shahi in East Pakistan. More than 200 Lady Health Visitors are trained every year in these schools and the training period is two and one-fourth years. The syllabus of Lady Health Visitors includes twenty lectures on food and nutrition related to mothers and children and some practical demonstrations. Therefore the Health Visitors are prepared for this job while training in the schools.

There are 734 Maternity and Child Welfare Centres and 85 Rural Health Centres with their sub-centres through which UNICEF milk is provided to deserving expectant and nursing mothers and their children in West Pakistan.

TREATMENT CENTRES FOR TREATING MALNUTRITION CASES OF PRESCHOOL CHILDREN

There is no special centre for treating the malnutrition cases of infants and children in the country. They are treated in the country's hospitals and dispensaries and the Paediatric Units of twelve Medical College Hospitals in different cities of both wings of the country. In the rural areas the treatment facilities are provided to them through Maternal and Child Health Centres, and rural Health Centres and sub-centres. More than 200 rural Health Centres have so far been established in the country.

It is contemplated that the nutrition activities of the different organizations in the country will be coordinated by a central body. There is an Inter-Departmental Committee on Nutrition organized by the Ministry of Health which is an advisory body. In this Committee the Ministries of Food, Agriculture, Education, Commerce and Information etc. are represented.

In its last meeting this Inter-Departmental Committee on Nutrition considered the Nutrition Survey Report of East Pakistan and made the following recommendations:

1. As it has been established that there is a shortage of protein intake in East Pakistani population, production of the foods of animal origin should be increased in the following manner: a) increase of fish production, b) development of duck farms, c) improvement of poultry industry; and d) development of cattle and goat breeding.
2. To make up the deficiency of fats in East Pakistani diets, cultivation of oil yielding seeds and plantation of coconut trees shall be undertaken on a large scale.
3. Production of legumes and pulses should be encouraged so as to increase the supply of the inexpensive and popular protein foods.

4. Proper education materials on nutrition should be included in text books for primary and secondary schools, and the subject of nutrition and hygiene should be one of the important subjects in Teachers' Training Curriculum.
5. School gardening programmes should be taken up as pilot projects in schools situated in rural areas.
6. Cooking classes and school kitchens should be organized in all girls schools.
7. The industrialists should be encouraged to provide subsidized meals to their workers.
8. Large Municipal Boards and other educational inspectorates should have dieticians on their staff so that the nutritive value of foods prepared in hotels is in accordance with nutrition standards.

There is a growing awareness in the government to step up the food production in the country on the basis of the requirements for a balanced diet. The National Agricultural Commission has recommended the following five measures: a) use of better seeds, b) use of better fertilizers, c) better plant protection, d) use of better cultivation methods, e) provision of short and medium credits to the farmers.

The National Third Five Year Development Plan (1965-70) envisages all possible measures for improvement of the national nutrition status through Agricultural, Irrigation, Industrial, Health and Education Schemes.

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PRESENT COUNTRY PROGRAMS AND ACTIVITIES IN TURKEY DESIGNED TO COMBAT MALNUTRITION

BY

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INTRODUCTION

Malnutrition problems are the concern of many disciplines and their solutions require coordinated, well planned actions. Any plan for combating malnutrition must involve long-term action as well as short-term activities, such as food aids to vulnerable groups of populations. Long-term planning involves coordinated activities in the area of education, health and agriculture. Thus a multifrontal attack can be made on the various causes of malnutrition.

EDUCATIONAL PROGRAMS

The following activities are carried out by the Ministry of Health and Social Welfare.

1. Maternal and Child Health (MCH) Organization of Ministry of Health - This organization was established to improve the health status of mother and child. The MCH service carries out two types of activities: to train mother in the area of child care and feeding; to take care of the mothers and the children in the case of delivery and illness.

At the present time, there are 39 MCH centers functioning in the larger cities, 42 subcenters in smaller cities and 550 stations in the villages. In these centers, there are 155 doctors, 58 nurses,

99 midwifery nurses, 73 sanitarians, 328 village midwives and 50 assistants to the nurses. During 1966, 132,320 mothers and 360,352 children, age 0 to 6 years, consulted the centers. Nurses and midwives visit the families at least once a month after the child is born. During 1966, 195,101 home visits were made, 425,586 children were vaccinated. In the centers and on home visits demonstrations were given regarding child feeding and child care.

In general, the activities of the organization are intensified in the cities and the villages close to the cities. The organization reaches relatively small numbers of the families. Most of the centers lack trained personnel, especially nurses. Because of the lack of trained nurses some of the centers carry out only routine clinical examinations; their educational activities are very small.

2. General health services - There are two types of health services regarding preventive medicine in Turkey. In the old system, a health officer (medical doctor) was employed in a county. A county consists of a town with a population of 5,000 to 40,000 and from 20 to 100 villages. Health centers are located in towns. In big counties, although there is more than one medical doctor working in the health center, all of the work related to preventive medicine is carried out by the health officer. The health officer and the other doctors are allowed to practice private medicine. Under the health officer a certain number of sanitarians and midwives are employed to carry out public health services. A 1966 activity report states that 681 health officers, 2,149 sanitarians and 2,258 midwives are working in the counties (including the villages).¹ Because health officers spend most of the time in their private offices and have no training in public health education including nutrition, they are not able to carry out the leadership responsibility. Sanitarians and midwives in the villages are left to their own initiative and resources. In most cases midwives, who are the principal persons that help mothers in the area of child health, do not carry out the work expected from them. The main reason for this is that midwives lack the knowledge and skill related to child health, supervision and guidance. She thinks that her job is helping mother in child birth when she is called for. Villagers usually call midwives in the case of complicated birth but not for normal birth.

Until 1960 professional education of midwives consisted of a year of practical training in a maternity hospital after five years

of elementary school. When the importance of utilizing midwives in the area of public health education was recognized the training program was changed. The new three year midwife training program covers subjects such as nutrition and foods, child care and development, clothing as well as delivery and maternity care. However, including the subject matter in the curriculum does not mean much when there is no trained person to teach it. In our survey it was found that there was no difference among old and new midwives in respect to knowledge and activities in the area of foods and nutrition. Furthermore, effectiveness of the midwives in the area of nutrition education depends on good supervision and guidance as well as knowledge and skills. Now emphasis is given to the training of personnel and preparation of textbooks and teaching material in foods and nutrition for the midwives and nursing schools.

In the new health services system, emphasis is given to preventive medicine. The objectives of the service is to improve the health status of the people. For the organization of the service, in each residential unit with 5,000 to 10,000 inhabitants a health center is located. In the center there is a health officer as a leader of the team. Members of the team consist of a sanitarian, a public health nurse, a midwife, a secretary, and a driver. For each 2,000 inhabitants one midwife is employed. One health center may have 3 to 6 midwives. A midwife who lives in a village away from the health center is provided with a house and necessary equipment for maternity care and first aid. Nurses and the midwives working in the health centers and the villages are supervised by the health officer of the center. For inservice training of the nurses and the midwives in the area of maternity and child health, a pediatrician and one or two public health nurses are employed for the provinces. One province has from 20 to 90 health centers. The responsibility of this team is to train and guide the midwives and nurses working in the health centers and villages. According to the activity report, in 1956 this system covered 17 provinces in eastern Turkey, and 561 health centers have been functioning. In these health centers around 370 doctors, 175 nurses, 600 sanitarians and 1,000 midwives are working.

This nationalized health service system is the long range health plan of the government. This system will cover the whole country by 1978. Implementation of the system encounters several difficulties, such as finding trained personnel, building and operating health centers where roads, water and electricity are not available.

Especially in the eastern part of the country where this system is initiated, living conditions are very difficult. In the long winter months health centers in the rural areas may be isolated from the town. At present nearly half of the rural health centers do not have doctors. In those places sanitarians and midwives are the only persons to help the people. Therefore, their knowledge, skills and attitudes are very important in carrying out health education programs including nutrition. It has been observed that if sanitarians and midwives are well equipped with knowledge and skill and wish to help the people they can accomplish many things, such as helping the people to raise vegetable gardens, to build sanitary toilets, to take care of their children, to have clean houses, etc. These types of the work which are essential for improvement of health in children are better done when there is a well trained, health officer as a leader of the team in health centers.

A program is being developed for health officers who are going to be employed in the health center giving them public health training before starting to work. At the same time, inservice training programs are being carried out for doctors, midwives and nurses. Each year a certain number of sanitarians are trained in the area of health education and employed in the provinces. These health educators are being equipped with teaching materials. Health educators help the midwives and teachers and have group meetings with the people. However, at present, the number of trained health educators are relatively small and reach relatively small numbers of people.

3. Family planning activities - The law which passed the National Assembly in 1965 requires the Ministry of Health to organize services for family planning. In 1967 there were 286 family planning clinics and 21 mobile teams. Beside clinics, doctors in health centers are also helping family planning. Nurses, sanitarians and midwives are being trained to help the people to recognize the importance of family planning and where to go and what to do when they wish birth control assistance. By 1967, 42 health directors, 450 physicians, 828 nurses, 2,061 sanitarians and 2,716 midwives were trained in family planning.

The applied methods of birth control are intra-uterine devices (IUD), pills, vaginal tablets, and jellies. The government supplies IUD. At the present, 82,000 women use IUD, as a means of birth control. The number of women using pills is 120,000, and 500,000 use other methods.

4. Control of infectious diseases - The vaccination program to control infectious disease is quite successful. Vaccinations for smallpox is compulsory and carried out well in every part of the country. Besides this, preschool children are vaccinated for BCG, polio, whooping cough, diphtheria and tetanus. The vaccination program covers most of the preschool children in the whole country.

Infection and malnutrition go hand in hand. Vaccination may prevent some of the infections to some extent. However, gastro-enteritis and diarrhea are the principal secondary infections which kill small children. Mortality is not the only problem in child health. Retardation in physical and mental development caused by malnutrition is very important for the future manpower of the country. For this reason it is recognized that unless the nutritional status of children is improved of mortality of children cannot be prevented.

ACTIVITIES OF MINISTRY OF EDUCATION

Realization of the importance of training women in home and family care led to the establishment of vocational schools for girls in Turkey. At the present time there are various levels of vocational training programs for women. The following table shows the numbers of various types of the vocational schools and the number of students attending them.

<u>Types of the School</u>	<u>Number of Schools</u>	<u>Training Period (years)</u>	<u>Number of Students</u>
1. Girls Institutes (after 5 years elementary school)	126	6	9,686
2. Night Vocational Schools	249	2	52,901
3. Village Mobile Courses	834	1 to 2	22,267
4. Technical Teachers College (after Girls Institute)	1	4	875
5. Teachers School for Village Mobile Courses (after Girls Institute)	4	1	545

Girls Institutes and Night Vocational Schools are located in urban areas. Only the Village Mobile Courses are available for villages.

At the beginning, although the main purpose of the Girls Institutes was to train homemakers, the teaching program did not cover the subject matters important for family health. Until recently these institutions taught mainly clothing, fancy and time consuming subjects, such as artificial flower making, embroidery, pastry, all of which are not needed in the average home and family conditions and are of little economical value. The most needed subject matters for an average homemaker and to learn a profession were ignored. Now the Girls Institutes are trying to improve their teaching program so that their graduates can find a job. The teaching program of the Village Mobile Courses also has been directed to the urgent and important needs of the village community. Mobile Course Teachers are required to teach foods and nutrition, child care, sanitation, reading and writing beside clothing and embroidery. A well trained teacher with initiative could make the people recognize the needs of village women. Since Mobile teachers stay in a village at least seven months they can be of real help in educating the village woman to use the family resources efficiently to feed the child properly.

The night vocational schools' training program consists of courses in clothing, embroidery, artificial flower making and cooking. The principles of nutrition, especially nutritional needs of children, and nutritive value of various food could be included in the curriculum. However, difficulty in finding trained teachers in nutrition would be the barrier. At present, the curriculum of the Girls Technical Teachers Colleges, which supply teachers for the Girls Institutes and Night Vocational Schools, is being developed. In the new curriculum, vocational school teachers will have better training in nutrition, but then the other problem will be who will train the teachers in the teachers college?

The other educational institutions related to training of women in child feeding are the elementary schools. The contribution of the elementary schools activity to nutrition education can be in two ways: the elementary school teacher may be the only educated person available in a village. In this case, if the teacher is well trained, has initiative and is willing to help the people, he could be of a real leader and advisor and help combat various problems. Villagers will listen to him and ask for advice on various problems. The elementary school is the only education for the majority of village girls. Training of girls in elementary school influences her later role as a mother.

The importance of training elementary school teachers in foods and nutrition was recognized after the school feeding program was started with UNICEF aid. Since 1953, 1,234 supervisors for elementary schools and 116 nutrition educators were trained for the purpose of advising elementary school teachers in teaching nutrition.

To train elementary school teachers in nutrition, courses are included in the curriculum of the teachers training schools. However, including nutrition in the curriculum does not mean much when there are no qualified teachers to teach the courses.

ACTIVITIES OF THE MINISTRY OF AGRICULTURE

The activities of the Ministry of Agriculture regarding education of village families are carried out by the Agricultural and Home Economics Extension Service. The main objective of this service is to help farm families to utilize their resources efficiently for better living. While the agricultural extension workers help men and boys to learn new techniques in agriculture and animal husbandry, home economists work with the farm woman.

In most parts of Turkey women work on the farm as well as at home. Raising small animals, milking cows and gardening are usually womens' jobs. Therefore the home economics extension service becomes very important for improvement of the nutritional status. The Home Economics Training Center was established in 1954 to train home economists. In this center 165 Girls Institute graduates were trained for nine months until 1963. In 1963, the Home Economics Training Center was converted into a three year home economics school and the students were selected from the graduates of technical agriculture and horticulture schools. Farm boys and girls are trained in technical agriculture and horticulture schools for three years after a five year elementary education. Thus home economists who work with farm families come from the village and are trained in agriculture and home economics.

Home economists work at the county level. They stay in the county center which is a town and go to the villages to give demonstrations. They usually select three or five villages and visit them two to four times a month. At present around 175 home economists are working in the extension service. Lack of transportation facilities and traveling difficulties in the winter months

hinder the work of the home economists. Although home economists working in the western part of the country are quite helpful in teaching, especially food preservation and preparation, home economists employed in the eastern part of the country where malnutrition is a more common problem offer little help to overcome this problem. If home economists and vocational teachers in these areas work closely with health centers they could make a good team to help village families.

NUTRITION EDUCATION AT THE UNIVERSITIES

A home economics major was established in the Faculty of Agriculture to train home economists at the university level in 1961. At present, around 25 university graduates holding home economics degrees are working in the extension service and home economics schools. The trial plan for training home economists at the Faculty of Agriculture was not successful. The reason is that the Faculty of Agriculture gives degrees in Agricultural Engineering to all students regardless of their major. Since agricultural engineers are paid more than home economists nobody wants to work as a home economist. Even when they are employed in the home economics field they do not want to go to the villages. Furthermore they do not know what to do even when they go to the villages because of lack of practical training.

Dietetic training began at Hacettepe University in 1962. In the beginning the purpose of the training was to train dietitians for the hospitals. The first two years' graduates of the Dietetic Department of Hacettepe University are now working in the Hacettepe Medical Center. In order to enlarge the training program, some of the first graduates are being sent to the United States for graduate study. According to the new plan these fields were added: Nutrition and Dietetics, Child Care and Development, Family Economics and Home Management. A graduate course in nutrition and food science was opened. Thus graduates of the Department of Nutrition and Dietetics will have an opportunity to work as a public health nutritionists, teachers and researchers as well as hospital dietitians.

FOOD AID AND FEEDING PROGRAMS

At present a feeding program is carried out with the aid of international organizations such as UNICEF, WEP and CARE. Feeding

programs cover three groups: preschool children, pregnant and lactating women, elementary school children and some workers. In the first two groups the feeding program is administered by the MCH service of the Ministry of Health and Social Welfare. MCH centers distribute powdered milk, vegetable oil and vitamin A and D to the mothers registered to the center. Yearly around 22,000 pregnant women, 18,000 lactating women and 168,000 preschool children take advantages of this aid. In the last groups, the feeding program is administered by the Ministry of Education and some industrial establishments. In 1967, around 344,6886 children were enrolled in the elementary schools and the feeding program covers 80 percent of these.

DEVELOPMENT OF INFANT FOOD MIXTURES

As described in the first report poor quality infant food mixtures are being used extensively in Turkey. In order to guide the industry in improving the quality of infant food and to assist public health workers in their recommendations, certain specifications for nutritive value, production and packaging of infant foods were laid down. Every 100 calories should not contain less than the following amount of nutrients:

Protein 2 gm. (at reference protein value or NDP Cal. %8)	Thiamin - 0.06 mg.
Vitamin A - 200 - 400 IU	Riboflavin - 0.06 mg.
Vitamin D - 50 - 100 IU	Niasin - 0.90 mg.
Calcium - 70.00 mg.	Vitamin B - 0.05 mg.
Iron - 1.00 mg.	Vitamin C ⁶ - 4.00 mg.

One hundred grams of a mixture will not supply less than 350 calories. These specifications were approved by the court and are being put in effect at present. However, laying down specifications and regulations was only the first step. The second step was to develop a less expensive mixture that has high nutritive value. A few prepared formulas were tested for a small number of infants. A large scale acceptability test of a high nutritive value but inexpensive food mixture is being planned. The first trials indicate that children and families would accept such a mixture. The planned formula mainly consists of wheat flour, soybean flour, chickpea flour, powdered milk and sugar and would be supplemented with minerals and vitamins if needed to meet the specifications. Several

food plants already in the business of producing food mixtures or those intending to produce them are asking for advice on formulation of mixtures. Nutrition and food laboratories at the School of Public Health will continue to carry out necessary research concerning development of various mixtures and will help the producers by testing and analyzing the produced mixture.

The School of Public Health also is interested in training personnel for nutrition education at various levels and preparation of teaching materials. This year a nine months nutrition and dietetic course was opened with the purpose of training technicians for food services. At the school, nutrition is one of the subjects in the training program of public health doctors and other personnel. Public health workers are helpful in training people to use better quality infant foods.

COORDINATION OF THE NUTRITION PROGRAM AT THE NATIONAL LEVEL

In order to coordinate the activities of various agencies in the area of nutrition and foods, a Nutrition Advisory Council was set up several years ago within Ministry of Agriculture. This Council has become inactive. This year new efforts are being made to coordinate foods and nutrition programs at the level of the Prime Ministry. According to the proposed plan a High Coordination Council will be established. This Council will consist of Under Secretaries of various Ministries related to nutrition and foods and will be connected to the Prime Ministry or Ministry of Health. An expert committee attached to this Council will assist in the planning and carrying out the activities related to area of foods and nutrition. A Foods and Nutrition Research and Training Institute has recently been established by the Ministry of Health and Social Welfare. This Institute will cooperate with the other research and training institutions in the country to supply necessary data to the expert committee.

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THE DEVELOPMENT OF FOOD RESOURCES IN IRAN

BY

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With the constant growth of world population, the food problem has become international and the more progressive countries have devoted much thought and money to this field. By using the research of the Food and Nutrition Institute of Iran and other scientific centers in the world, we will attempt to find a practical way of solving the problem of food deficiency in our country. My report will give some recent statistics. It is divided into three main parts.

The Deficiency of Food as Indicated by the Nutrition Institute in Iran

During the last six years, surveys have been done by the Nutrition Institute in Iran, examining the general population, school children, infants, and pregnant women. The results have been published in Persian, English, and French under the supervision of Dr. Hedayat, Executive Director of the Institute.

From the calories and total protein point of view there is no great deficiency, but from the animal protein point of view a considerable deficiency is detected. The report by Dr. Emami of the Institute of Food and Nutrition and his assistants, shows that a deficit of vitamins A, B, C, D, and riboflavin has been observed in some parts of the country. The institute has also made a careful study of 300 children in eight primary schools, evaluating weight, height, symptoms of malnutrition, total protein, and hemoglobin and hematocrit. The published results indicate the following: 90.2 percent of the children had a hemoglobin level higher than 13.7 and 9.8 percent between the ages of 10 and 13.

Moreover, further studies have shown a deficiency of calcium only by careful calculation of food intake by the individuals not including water calcium, but not so great to be detected by clinical symptoms. In some areas where water lacks iodine, goiter is prevalent. The study of P. B. I. in blood has supported this deficiency.

Special mention should be made of anemia. So far the real cause is unknown. It may be caused by parasites or a lack of animal protein and iron in the body.

Statistics Showing the Production of Essential Foods in Iran

The area of the country is about 164,000,000 hectares. Ten percent is gardens, orchards, and cultivated land; 11 percent is natural forests; and 6 percent is grazing land; 20 percent is still wild but productive if irrigated.

Given below are the approximate quantities of different foods produced during 1965.

Wheat	3,650,000 tons
Barley	950,000 tons
Rice	700,000 tons
Beans	12,000 tons
Potatoes	200,000 tons
Oil seeds	320,000 tons
Melon and vegetables	1,107,000 tons

Compared to the produce statistics of 1960, there has been an increase from one to three percent. From 1965 the percentage is even greater. The production of wheat in Iran increased from 2.8 million tons in 1961, to 3.9 million tons in 1965-66, and the production is now on the increase. This has reduced the import requirements and should reduce the caloric shortage in all the regions. It is estimated that in 1966 a total production of 634,600 m. tons, or 155,000 m. tons more than the 1960 production, was required to meet the deficiencies.

In recent years in addition to the cotton seed and sesame, which have always been cultivated in Iran, soybeans, safflower, peanuts, and sunflower seeds have been introduced. In addition to the oil extracted from the seeds, a considerable quantity of

meal has been obtained which is being used only as animal food or fertilizer.

There are forty seed oil factories, nine of which are of major importance. The quantity of different oil seeds used in these factories is about 220,000 tons.

Other food industries also have made great progress in Iran. About 10,000 tons of fish are prepared for the market in the northern fisheries. Besides the fish canneries, there are factories for meat and vegetables in Iran.

In the north one factory produces 1,000,000 cans of meat per year, each can weighing 800 grams; 1,000,000 cans of mixed meat per year, each weighing 370 to 580 grams. Vegetables are canned in the same factories.

The annual fish catch in the south is from 10,000 to 15,000 tons. Before 1965 the production was only 250,000 cans weighing 115 to 100 grams. Now the same factory produces 1,700,000 cans yearly. Besides meat and fish the total production of preserved food is 2,500,000 cans.

Summary of annual dairy produce

Yoghurt	4,500 tons (pasteurized)
Butter	800 tons
Doogh	200,000 liters

There is also a quantity of Kashk which is rich in protein.

Our food processing plants have expanded during the last year. Given below are the factories presently operating in our country.

Pasteurized milk factories	7
Mixed meat canning	2
Meat canning	1
Sausage making factories	3
Fruit canning and jam making	14
Dried fruit factories	42

There are numerous public and private cold storages in the country. There are six large cold storages which are government

owned and two more, with a capacity of 500 and 200 tons, respectively, are under construction.

By benefitting from the above points, there are two practical ways of compensating for food deficiency which are in practice in my country. 1) The protein deficit, especially the lack of animal protein, can be compensated for by the use of fish in food, either as frozen or fish powders. Our country is giving particular attention to this point, and production now is seven times what it was in the past. With the new plans in view, the production will become even greater. Unfortunately, fish powder has not been popular so far due to its odor. 2) The second method is the use of meal. Today's production is 80,000 tons. The possibilities of increasing the quantity are great since the agricultural institutions are seriously studying the problem.

The capacity of our factories is promising, and we can double the production with the existing capacity. A study of the Food and Nutrition Institute shows also that the staple food of our people is bread and that 70 percent of their total food intake consists of bread. Authorities have thus turned their attention towards the enrichment of bread by mixing kashk, meal, and fish powder with it. But there are some difficulties that have to be removed before these means are met.

1. The gossipol must be removed from cotton meal by a solution of acetone, the protein thus obtained must be pure and rich.
2. The odor must be removed from fish powder before using it. A study of bread containing meal must be made for its amino acid content after the bread is baked.
3. Experiments should be made by mixing the different kinds of meal until a good balance is obtained from protein and amino acid.

Research Programs

A table has been published by the Food and Nutrition Institute of Iran indicating food factors, especially vitamins, in vegetables. We can encourage the cultivation of vegetables rich in vitamins in the villages. They can be consumed raw or preserved in small factories established in some villages.

To compensate for the lack of iodine, the Institute has given iodized salt to the people of goiter-prevalent areas. After a year, the test of P. B. I. of the blood showed an improvement in the condition of patients, and a considerable decrease in the rate of goiter. This method of treatment will therefore be put into practice in all the areas of my country where goiter is prevalent.

The investigation on the vitamin C content of Iranian honey, which was found to be very high, was continued by spectrophotographic and thin layer chromatographic methods. A publication will be made soon. These products are now being experimented biologically with guinea pigs in the newly set up Animal House. If the potency is verified by biological experimentation, the result will be proved beyond doubt.

The nutritional quality of Iranian caviar, particularly protein and fat contents, and experiments on stability were carried out in large numbers of samples received from the Fishery Department.

Concentrated tomato puree is preserved in almost all Iranian houses. The loss of vitamin C due to sun drying and the changes in the carotene contents were the subject of intensive studies. It was noticed that there was considerable destruction of vitamin C due to sun drying but the beta-carotene content increased, due perhaps to conversion of other carotenoids to beta-carotene. This point is being further investigated.

Proposed Development Project: Production and Utilization of Protein-rich Weaning Foods

In Iran, undernutrition of children, particularly during the weaning and preschool period, is acute. Thirty to thirty-five percent of the children are suffering from protein-calorie deficiencies and other deficiency diseases. The growth of the children is low and in many regions infant mortality due to nutritional deficiency disease is appreciable.

The nutrition problems of the children are mainly due to four causes: 1) mothers, during prenatal and postnatal periods, do not eat the proper foods (those containing sufficient amounts of high biological protein). No special food besides the family diet is given either to them or to the infants and children. 2) The mothers don't know how to make the best uses of the available

foodstuffs, or the diet is too high in starchy food. The child must eat the adult food from infancy. 3) There is protein malnutrition because of the insufficient protein foods that are available in comparison to the high amounts that are required at the preschool age. There is often a poor distribution of the food items in the households. The adults take the best proteins of the family diet without consideration for the children.

The objective is therefore to plan and develop a food technology project to prepare a cheap protein-rich food chiefly with the raw materials available in the country. Such a product is to be made available to all parts of the country at low cost.

With these factors in mind, the basic aim of our program would be:

1. To make an intensive study of the available resources of the country which are rich in protein, such as oil seed cakes, wheat products, beans and pulses, fishes and eggs;
2. To produce a palatable protein-mixture food, on a pilot scale;
3. To expand animal experimentation and toxicological studies with the prepared product;
4. To conduct feeding trials with infants and children of preschool age, studying their growth, efficiency, and clinical status;
5. To work out cost and marketing possibilities for use at the family level; and
6. To encourage mass feeding of children on a national scale.

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AGRICULTURAL RESOURCES PRESENT AND POTENTIAL FOR PROVIDING FOOD MATERIAL USEFUL FOR COMBATING MALNUTRITION AND PROVIDING RAW MATERIALS FOR PRESCHOOL PROTEIN FOODS

BY

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INTRODUCTION

The problem of malnutrition in the developing countries is really serious, assuming a great magnitude in the case of the vulnerable groups of the population, which warrants immediate attention for short and long-term planning at the national and international levels.

Preschool children constitute about 18 percent of the total population in Pakistan and are severely affected because of under-nutrition and malnutrition (due to deficiency of either protein and or calories) causing irreversible damage to mental and physical health. With the tremendous increase in population the problem becomes all the more important and may become a major deterrent to future social and economic development of the country. The inadequate nutrition of such an important group is associated with suboptimal living and consequently leads to a chain of events, i. e. stunted growth, lowered resistance to disease, reduced mental and physical performance, increased mortality and lower life expectancy of the survivors. The most common effect of malnutrition in this group is exhibited in the form of kwashiorkor if protein intake is defective and marasmus when only caloric consumption falls short of the requirements. Besides conditions like measles, respiratory diseases (due to lowered resistance),

xerophthalmia, keratomalacia (avitaminosis A), endemic goiter (deficiency or unavailability of iodine), anaemias (lack of proteins), beriberi, scurvy, pellagra and ariboflavinosis (lack of thiamine, vitamin C, niasin and riboflavine) are widely prevalent. The child population of East Pakistan is experiencing at present a great deal of this type of malnutrition. Every case of acute kwashiorkor in East Pakistan is accompanied by about 100 cases of sub-acute intensity showing thereby that a large part of this group is starving.

NUTRITIONAL REQUIREMENTS

In Pakistan, the problems of meeting protein requirements arise from the system of consuming food largely composed of cereals. Food habits, in a large segment of the population, within the household also cause malnutrition in children and women because the best part of food is always reserved for male adults who happen to be the wage earners of the family. When food supplies are limited in quantity or variety such practices exert still more adverse influences. Hence in assessing or devising nutritional requirements for children and other vulnerable groups of population, it becomes essential to make people aware of the consequences of existing food patterns. The needs for micronutrients particularly for thiamine, riboflavine and niacin are related to caloric intakes. In East Pakistan since rice is the principal source of calories, vitamin A, C and riboflavine deficiencies are commonly encountered.

The population of children from 0-4 or 5 years will continue to form about 18 to 23 percent of the total population which is expected to double itself by 1985 if the present fertility rates persist. The caloric needs of the population will increase by 118 to 146 percent while the protein requirements, according to FAO reference protein of NPU, 60 (a blend of vegetable and animal proteins in 100:40 percent ratio) will have to be increased by about 200 percent or even more, if similar foods are consumed in Pakistan and no drastic modifications in food patterns are affected for two or three decades to come.

SOURCES OF MAJOR NUTRIENTS

Conventional Sources

In Pakistan the dietary sources of proteins and calories are classified into two groups.

Animal source

- Meats comprise beef, buffalo, mutton, goat and poultry meat. They form about 56, 11, 9, 13 and 11 percent of the total meat. The meat is generally consumed immediately after slaughter as there is no facility for storage, etc. Meat is either cooked with vegetables or roasted.
- Milk is obtained principally from the buffalo, cow and a small amount from ewes and goats (56, 36 and 8 percent). The milk is consumed as fluid milk, clarified butter or ghee and dairy products like cream and curds in about the same amounts (one third of each form).
- Eggs comprising 72 percent hen eggs and 28 percent from ducks are consumed in various forms other than egg powder.
- Fish and prawns are consumed.

Vegetable sources

- Cereals of which wheat and rice make about 87 percent of the total staple diet. Wheat is eaten as chapati or roti and the rice is boiled or cooked in sweet or salty dishes in addition to confectionery and sweet meats industry.
- Millet and maize are consumed in many forms.
- Pulses and peas account for 84 percent of the total pulses. These are eaten after cooking alone or with meats.
- Fruits: citrus, mango, pomes, grapes, bananas, and others are eaten raw and are preserved as jams, squashes, marmalades, etc.
- Vegetables: These are tomatoes, potatoes, carrots, turnips, radish, cabbage, spinach, many others. They are also eaten raw or cooked and preserved as pickles, etc.

The comparative nutritive value of major items of foods from animal and vegetable sources particularly those supplying proteins show that all the food stuffs of animal origin, pulses and legumes contain enough of all the essential amino acids while the cereals like wheat, oats, rice and sorghum are deficient in lysine. The maize lacks in tryptophan while barley falls short of methionine in addition to lysine.

PRODUCTION

The production of foodstuffs of both animal and vegetable origin is short of national requirements particularly from the standpoint of good quality protein foods. Of the total food supply of 32,835 million tons from conventional sources, 28.4 percent is derived from animal origin and 71.6 percent from vegetable sources. After accounting for the losses during preparation and cooking (about 10%), the foodstuffs left offer only 45.7 grams of protein composed of 34.6 grams per day per capita of vegetable origin and 11.2 grams of animal origin. The availability of protein per day per person found in surveys is 61.9, 53.7 and 8.2 respectively and figures given by U.S.A. experts in 1965 stand at 55.7, 44.3 and 10.7 grams per day per person. Any figure put up by any national or international agency, will decidedly show that animal protein sources need to be increased tremendously to meet the requirements of the nation for her most vulnerable group, the children.

Non-Conventional Sources

There are great possibilities for manufacturing proteins from such sources since the raw materials are abundantly available at quite compatible rates in Pakistan. The proteins prepared from these unconventional sources have already found their way into the diets of all segments of the population including the most vulnerable groups in many countries of the world. Such proteins include:

- oil seed proteins derived commonly from soyabeans, cotton seed, groundnuts, sesame seed, coconut and sunflower seeds,
- fish proteins obtained from many varieties including shirk fins,
- single cell proteins (yeasts); and

- proteins from leaves and algae of many species.

Supplementation of human diet which is deficient in quantity and quality of proteins, with such vegetable proteins viz. oil seed or leaf proteins, becomes quite relevant and desirable because no competition for their consumption normally exists. The same also applies to fish proteins which because of abundant supplies can become a cheaper source of protein for children and older people alike.

The protein flours are generally prepared from the milling residues or suitably treated beans, with or without fortification by micronutrients. They are fed to children to make up the protein deficiency when on cereal diets. These flours when mixed with cereals (protein food) are cheap in price, palatable in taste and high in protein content and can give a desirable assortment of essential amino acids which are the basic needs for child growth and mental development. The protein concentrates and isolates are obtained from fish and oil seed residues. These contain as much as 70 to 80 percent proteins. These are suitable for feeding invalids, children and older people.

As far as single cell proteins and those from the microbes and algae are concerned, there seem to be many problems and hazards connected with toxicity and nutritional value. However some of the protein foods produced and consumed in certain foreign countries are listed below to serve as a guideline for manufacturing on a short-term basis for the millions of children in Pakistan.

SUGGESTIONS

It is imperative to adopt concrete steps to check the present deterioration of national health and to save further progressive retardation of physical and mental growth of children. It seems that it may not be possible to fill the gaps of lacking nutrients by increasing the conventional foodstuffs by the end of the current century to meet adequately the needs of double the population of today. All sources including non-conventional ones will have to be tapped. In this national campaign all the international, national and individual efforts will be pooled to achieve economic development and national stability. The main steps in this massive programme should include:

- increase in yield of animals and land through introduction of modern technology particularly by using hybrid vigour among animals and plants
- prevent huge losses or minimize them, sustained at the present on the animal and vegetable products occurring during harvest, transportation, storage and preparation including plate wastes.

SOME OF THE POPULAR PROTEIN FOODS

<u>Food</u>	<u>Country</u>	<u>Protein</u>	<u>Main Ingredients</u>
Multipurpose food	U. S. A.	50	Soya
Proflo	U. S. A.	55	Cottonseed corn
Pronutro	U. S. A.	22	Groundnut,soya, corn, fish
Promine D	U. S. A.	98	Soya
Lypro	U. K.	65	Groundnut
Soyolk	U. K.	40	Soya
Cottonseed flour	Italy	56	Cottonseed
Protea	Mexico	50	Soya
M. P. Feed	Mexico	50	Soya
M. P. Feed	Brazil	50	Soya, corn
Fortifex	Brazil	30	Soya, corn
M. P. Feed	India	42	Groundnut, gram
Groundnut flour	India	42	Groundnut
Cetri protein isolate	India	97	Groundnut
Saridale	Indonesia	18	Soya
Incaprina	Colombia,) Panama,) Venezuela, etc.)	27	Cotton seed, soya, yellow corn
Arlac	Nigeria	42	Groundnut, skim milk
Ladylac	Senegal	20	Groundnut, millet, skim milk
Peruvita	Peru	35	Cottonseed, quinoa, milk
Nutresco	Rhodesia	18	Soya, maize, fish, skim milk

As regards the individual food items more important are the steps taken towards increasing availability of animal produce because the present gap of protein is mostly due to low quality animals. Normally the proteins obtained from conventional sources of animal origin present better amino acid assortment and contain all the essential amino acids in abundance. Possible measures to increase these products are listed below:

Milk - Milk animals should be raised by modern scientific methods to obtain high milk yields through hybridization, by an extended use of artificial insemination and well designed milk rations. Cheap milk replaces are needed for feeding growing calves and save maximum milk for children. Large dairy operations should be established near large towns to ensure uniform supplies of milk at lower rates. Milk marketing boards should be set up in the provinces to ensure year-round supply of milk.

Meat - The present livestock and poultry population of Pakistan (81 and 41 million respectively) cannot meet the nation's requirement due solely to the underdeveloped state of animal production and inadequate disease control measures. The inadequacy is aggravated by the absence of special breeds of beef and mutton animals. The losses of meat during various phases of its production also need attention. Measures to check losses and to increase production from animals and poultry through hybrid vigour and efficient and economical feeding of these animals on agricultural wastes viz. residues from food grains, gin wastes, meat and bone scraps and other slaughter house by-products, should be given priority. A broiler industry should be developed extensively all over the country near the large consuming areas.

Eggs - Although 41 million poultry are presently in the country egg production is too small to cover the needs of a rapidly increasing population. This has to be multiplied several-fold by modern methods of breeding, feeding and management in addition to effective disease control measures. Losses of eggs during any phase of their production should be minimized. Suitable rations based on agricultural wastes should be designed to ensure cheap production of eggs.

Fish - There is a tremendous potential for obtaining good quality protein from the long coasts along the Arabian Sea and Bay of Bengal. Fresh water fishery also shows great promise. In the face of limitations of livestock multiplication, fish sources have to be exploited.

Expansion and modernization of fishing vessels and methods should be studied. Cold storage and efficient transport means should be developed to minimize the losses. Inland fish farming areas should be developed by opening fish catching and processing industries in the rural areas and introducing genetically improved fish. The hydroelectric projects and irrigated areas including paddy fields, ponds, and lakes can be used as fish developing areas.

Wild animals and game - In addition to the development of domestic animals, poultry and fish, steps should also be taken to improve wild animals and game birds. Forest areas should be managed in a way that they may provide animal proteins for human consumption.

Pulses and grams - Annual acreage and production of these food items should be increased because they represent a large proportion of the good quality proteins (22 to 26 percent) and are consumed at all levels of the population all the year round. Good varieties containing higher levels of proteins, viz. grams, pigeon beans, soya-beans and lima beans should be raised. Large scale measures to check the losses should be taken.

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PRESENT AND POTENTIAL CAPACITY OF TURKEY TO PROVIDE FOOD MATERIALS FOR COMBATING MALNUTRITION AND PROTEIN RICH MATERIALS FOR SPECIAL PRESCHOOL CHILDREN'S FOODS

BY

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BACKGROUND

Proteins are food products containing nitrogen. They are especially required for children and other people in the growing stage, and for pregnant or nursing mothers. It is an accepted fact that animal proteins are of a higher quality than proteins in cereals and pulses. Half of the daily protein intake of a person should be provided through animal proteins like meat, fish, milk, and eggs, and the other half through cereals and pulses. In case of pregnancy or nursing of a baby the protein need of the mother is increased considerably. Children especially should be given foods with high protein contents.

POPULATION AND FOOD PRODUCTION

I would like to analyze the relation between population growth and food production in Turkey. Nutrition of preschool children being a part of the total nutrition programs, it would be useful to indicate the general nutrition situation.

Table 1 below shows the population, and total and per capita food production by years.

TABLE 1
POPULATION AND FOOD PRODUCTION

Year	Total Population (1000)	I n d e x 1950 - 54 = 100		
		Population	Total Food Production	Per Capita Food Production
1948	20,056	90	74	82
1949	20,497	92	63	68
1950	20,947	94	83	88
1951	21,634	97	96	99
1952	22,219	100	107	107
1953	22,818	102	118	116
1954	23,433	105	96	91
1955	24,085	108	104	96
1956	24,771	112	114	102
1957	25,498	115	112	97
1958	26,247	118	121	102
1959	27,017	122	124	102
1960	27,755	125	125	100
1961	28,602	126	125	99
1962	29,418	129	127	98
1963	30,256	133	138	104
1964	31,118	136	138	101
1965	31,391	139	139	100
1966	32,160	144	151	105

Source: "Progress in Turkish Agriculture" (Agricultural Statistics, 1938-66). Agricultural Planning and Economic Research Organization, Ministry of Agriculture, Ankara, 1968.

In spite of a considerable increase in the total food production during 1948-66, the food production per person has not improved accordingly, due to a 2.9 percent annual growth of the population. (The growth rate of population was 2.6 in the 1965 census.) So, Turkey must increase her total food production at a higher rate than that of today. Also, birth control measures to prevent the increase of population in Turkey would slow the rate of population growth and lead to an improvement in the food situation; both types of measures will help to increase per capita food production.

Preschool Population

When we say preschool population in Turkey, we mean the children in the age of 0-6. In Turkey, a population census is taken every five years. The results of the last two censuses are presented in Table 2 to give an idea of the composition and number of preschool age population and its ratio to the total population.

It is evident from the table that almost 22 percent of the total population in 1960 and 1965 was preschool children. That is, the preschool population has increased approximately by 7 to 800,000 annually in each population census. Consequently, it is estimated that this will reach a total of 7.5 million in the 1970 census.

CALORIE AND PROTEIN INTAKE PER PERSON IN TURKEY

The daily protein intake per person in Turkey is 97.5 grams. This figure is on a level with that in highly developed countries of the world. For example, the daily protein intake per person in France is 100.8 grams, in Italy 83.0 grams, in West Germany 80.2 grams, in England 88.8 grams, and in United States of America 92.0 grams. However, the deficiency in protein consumption in Turkey is in the sources of protein. A very large portion of the protein intake in Turkey is provided from cereals. We have already mentioned above that half of it should come from animal products. Table 3 shows the sources for protein and calorie consumption in Turkey.

The Second Five Year Plan indicates that the daily calorie intake per person in Turkey ranges between 2750 and 2900. This is slightly less than the total daily calorie intake, 3110 per person indicated in Table 3. So, the daily calorie intake per person in Turkey appears to be somewhere around 2750 to 3110.

PROTEINS, CARBOHYDRATES AND FATS IN VARIOUS FOODS

Our subject is mainly related to the food products rich in proteins. However, it would also be useful to indicate at this point the proportion of carbohydrates and fats in the foods that are rich in proteins. Table 4 shows these ratios.

TABLE 2

POPULATION IN THE AGES OF 0-6 IN THE CENSUS OF 1960 AND 1965

Years	1 9 6 0			1 9 6 5		
	Male	Female	Total	Total	Male	Female
under 1	422,105	388,234	810,339	801,903	408,627	393,276
1	396,427	368,893	765,320	982,904	398,333	384,571
2	468,879	449,314	918,193	991,921	507,947	483,964
3	449,175	446,614	895,789	1,032,554	518,582	513,972
4	443,569	422,651	866,220	1,015,968	522,786	493,182
5	492,549	464,394	956,943	1,102,108	554,714	547,394
6	427,201	408,779	835,980	936,982	475,819	460,963
Total	3,099,905	2,994,879	6,048,784	6,864,340	3,386,818	3,277,322
Total Population			27,754,820	31,391,000		
Percent age 0-6 years in total			21.8	21.9		

TABLE 3

SOURCES OF PROTEIN AND CALORIE INTAKE PER DAY

	Cereals	Starches	Sugar & Pulses		Vege-		Meat	Eggs	Fish	Total		TOTAL	
			Sweets	& Nuts	tables	Fruits				Fats &	Animal		
										Milk	Oils	Protein	
Calorie	2133	73	194	138	63	105	59	7	7	138	191	-	3110
Protein (grams)	68.5	1.8	-	7.0	2.9	1.4	4.9	0.5	0.9	9.6	-	15.9	97.5

Source: Production Yearbook, Vol. 29, FAO, Rome, 1966

TABLE 4

PROTEINS, CARBOHYDRATES, AND FATS AND OILS IN
100 GRAMS OF VARIOUS FOOD PRODUCTS

Foods	Protein	Carbo- hydrates	Foods	Protein	Carbo- hydrates
Wheat	11.7	74.3	Beef	18.7	18.2
Rice	6.7	78.9	Lamb	17.0	21.0
Sugar	-	99.5	Goat meat	18.4	9.2
Brcad beans	25.0	53.7	Chicken	19.0	8.0
Dry beans	22.6	55.9	Turkey	13.5	13.5
Chick peas	19.2	56.7	Brains	10.3	8.6
Lentils	23.7	57.4	Liver	20.0	4.0
Peas	22.5	61.6	Eggs	12.8	11.5
Ground nuts	25.5	18.8	Fish	19.0	8.0
Soy beans	37.9	-	Milk	3.5	3.0
			Cheese	27.0	31.7
			Powdered milk	26.0	27.0
			(whole)		
			Powdered milk	36.0	1.0
			(non-fat)		

Source: Dr. O. Köksal, Dr. A. Baysal; "Food Composition Table." 1966.

PRODUCTION AND PROJECTIONS OF PROTEIN RICH FOODS

Animal Products and Sea Foods

Animal proteins play an important role in general nutrition and especially in the nutrition of children. I would like to analyze here the production of eggs, milk, meat and total seafoods, and the production projections to be achieved by 1972, which is the end of the Second Five Year Plan.

Table 5 shows the total production between 1963-67, and the projections for 1968 and 1972.

The per capita increase in specific foods from 1967 to 1972 is expected to be 15 percent for meat, 8 percent for milk, 32 percent for eggs, and 36 percent for sea food products.

TABLE 5

ANIMAL AND SEAFOOD PRODUCTS

Year	Population (1000)	Meat prod.		Milk prod.		Egg prod.		Sea food prod.	
		Total 1000 MT	Per cap. Kilo	Total 1000 MT	Per cap. Kilo	Total 1000 MT	Per cap. Kilo	Total 1000 MT	Per cap. Kilo
1963	30,256	475	15.7	3,384	112	73.4	2.4	130	4.3
1964	31,118	490	15.7	3,481	112	74.7	2.4	122	4.9
1965	31,391	505	16.1	3,585	114	81.6	2.5	137	4.4
1966	32,160	527	16.3	3,117	96	76.0	2.4	145	4.5
1967	32,934	544	16.4	3,235	98	82.0	2.5	155	4.7
1968	33,811	566	16.7	3,383	100	88.3	2.6	160	4.7
1972	37,409	709	18.9	4,040	107	123.0	3.3	240	6.4

Source: State Planning Organization

Among dairy products, powdered milk is an important source of animal proteins. (There are 26 grams of protein in 100 grams of whole powdered milk, and 36 grams in non-fat powdered milk.) However, the dairy processing industry has not been developed in Turkey. For example, the production of powdered milk was 300 tons in 1965, 500 tons in both 1966 and 1967, and the projected production for 1968 is 700 tons, and 865 tons for 1972. Considering the fact that additional dairy plants are being established, the production of powdered milk can also be expected to increase in the future.

The rate of increase of these products, both animal and seafood products as indicated above is far from providing the necessary level of animal protein requirements of the Turkish people. At present, only 16.3 percent of the daily protein intake is provided through animal sources. Improvement of this low production can only be through a long-term program with drastic measures.

The price of animal products is high due to the short supply. So, the low income families that constitute the majority of our population has a very low consumption of these products. This implies that the majority of the Turkish population will continue to depend on proteins from cereals for a long time yet.

Cereals

In Turkey, 70.3 percent of the total protein intake is provided through cereals. Wheat especially is the most commonly consumed product. Table 6 shows the production figures of wheat, corn and rice for 1963-67, and the projected productions for 1968 and 1972.

TABLE 6

CEREALS PRODUCTS

Year	Population (1000) (millions)	Wheat Prod.		Rice Prod.		Corn Prod.	
		Total 1000 MT	Per cap. Kilo	Total 1000 MT	Per cap. Kilo	Total 1000 MT	Per cap. Kilo
1963	30,256	10,000	330	130	4.3	990	33
1964	31,118	8,300	267	100	3.2	1,000	32
1965	31,391	8,500	271	170	4.1	945	30
1966	32,160	8,400	261	150	4.6	1,000	31
1967	32,984	8,881	269	140	4.2	1,080	33
1968	33,811	8,625	255	197	5.8	1,096	33
1972	37,409	9,200	246	208	5.5	1,760	47

Source: State Institute of Statistics. State Planning Organization.

The per capita figures for wheat do not represent the actual human consumption amounts, since some of the production is used otherwise. The annual per capita wheat consumption is estimated to be 186 kilograms in the Second Five Year Plan.

The production of rice and corn is increasing. Although these products are not rich in proteins, they are very rich in carbohydrates, and are widely used in infants' foods.

Pulses and Nuts

In Turkey, 7.2 percent of the total protein intake per capita is provided through pulses and nuts. These are mainly chick peas, beans, lentils, ground nuts and hazel nuts. Pulses are rich both in proteins and carbohydrates. Ground nuts and hazel nuts are relatively rich in protein content.

Table 7 shows the production of pulses and nuts for 1963 to 1967, and the production projections for 1968 and 1972.

TABLE 7
 PRODUCTION OF PULSES AND NUTS
 (1000 M. T.)

Year	Broad beans	Peas	Chick peas	Dry beans	Lentils	Kidney beans	Soy- beans	Peanuts
1963	53	2.5	87	133	103	2.5	5.5	23
1964	44	4.0	90	140	90	2.4	5.0	23
1965	45	6.0	89	140	90	2.0	5.0	30
1966	43	5.0	89	135	100	3.0	4.7	27
1967	40	5.0	100	140	118	3.0	5.5	30
1968	54	3.6	107	175	105	2.2	11.0	38
1972	61	5.0	120	206	122	2.5	21.3	50

By 1972, highly significant increases are expected in the production of these products. Soybeans are very important due to their richness in protein content. It would be economical for the low income people, which form the majority of the population, to consume pulses instead of the animal products which are more expensive. Hazelnut production fluctuates every year widely, because of its production cycle. For instance, the production in 1966 was 190,000 MT, but was only 70,000 MT in 1967. So, we have not even tried to make any future projections for this product.

SUGAR AND VEGETABLE OILS

Along with proteins, sugars and fats play an important part in human nutrition. Since the information about animal fats is not complete, the analysis will be confined to vegetable oils only. Sugar and vegetable oils are widely used in infants' and children's foods.

Table 8 shows the production figures for sugar and vegetable oils in 1963-67, and the production projections for 1968 and 1972.

TABLE 8

PRODUCTION OF SUGAR AND VEGETABLE OILS

Year	Population (1000)	Sugar Production		Vegetable oil Production*	
		Total (1000 MT)	Per Capita (Kilograms)	Total (1000 MT)	Per capita (Kilograms)
1963	30,256	472	15.6	262	8.7
1964	31,118	731	23.5	302	9.7
1965	31,391	522	16.6	175	5.5
1966	32,160	645	20.1	226	7.0
1967	32,984	620	18.8	265	8.0
1968	33,811	600	17.7	227	6.7
1972	37,409	860	23.0	295	7.9

* Excludes olive oil.

The production of sugar is increasing in line with the increasing demand for this product.

In this report, vegetable oils include margarin but not olive oil. There is a considerable shortage of vegetable oils in Turkey, which indicates the need to increase and stabilize the production of oil seeds. Sunflower and cottonseed production constitute 87.2 percent of the total oil seed production. To meet the demand for vegetable oils, the Second Five Year Plan emphasizes the total oil seed production must be increased by 33.1 percent. This calls for both an increase in area sown and in yields.

CONCLUSIONS

In comparison with many countries of the world, the per capita daily calories and protein intake in Turkey is not low, but most of it is provided through cereals. As mentioned earlier in the report, the per capita production and consumption of animal derived foods have been projected to increase through 1972. Even if these projections are realized, a significant improvement in diet in respect to animal derived foods cannot be provided. As a matter of fact, there was an increase of one percent in the per capita meat consumption during the First Five Year Plan.

The cereal consumption in Turkey is very high. It is estimated that the per capita annual cereal consumption in rural areas reaches 270 kilograms, while in the cities it is only 140 kilograms. However, the Second Five Year Plan includes a slight decrease in the per capita cereal consumption in rural areas.

Pulses are very important as protein sources and a sizeable improvement is expected in their production in the Second Five Year Plan period. There is a shortage of animal products. Also their prices are too high for the low income people. For this reason, pulses are regarded as a cheap protein sources for the rural people.

The production of vegetable oils in Turkey is not sufficient for the country's needs. The Second Five Year Plan emphasizes increases in oilseed production to meet this shortage.

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PROCESSING AND MARKETING OF INFANTS' AND CHILDREN'S FOOD IN TURKEY

BY

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There are about 7 million preschool (1 to 6 years of age) children in Turkey. This makes about 22 percent of the total population, and 1.5 million of these are nursing children, that is children under 2 years of age.

However, I must say that until recent years no attention was given by the government either to the production, processing or marketing of baby food in the country. Even until three weeks ago there was no regulation whatsoever to control the manufacture, import and sale of baby food. No regulation was in force to determine the kind and the amount of the food material or the calorie, mineral and vitamin content that such baby food should contain.

The new regulation which will be effective on April 24, 1968, in Turkey, concerning baby food, contains the following information regarding production and marketing.

Definition of Baby Food

The food mixture prepared and sold with the objective of feeding children and nursing babies is called "BABY FOOD."

- a. BABY FOODS are to be prepared in installations authorized by the Ministry of Health and Social Welfare.

- b. BABY FOODS are put on the market with the permission of the said Ministry.
- c. BABY FOODS have to correspond to the daily need of calories and consumption intake of a baby of six months.
- d. BABY FOODS must bear the below mentioned qualities:
 - 1. The Food put on sale must contain in each 100 grams the beneficial (useful) amount of at least 350 calories.
 - 2. The quantity of BABY FOOD providing 100 calories must contain at least 2 grams of proteins (Reference in protein value). The amount of calories to be derived from the beneficial protein contained in the baby food should not be less than 8 percent (N. D. P. calcs. at least 8%).
 - 3. It is necessary that the amount of calories, protein, fats, carbohydrates, celluloses, vitamins and minerals, the kinds and quantity of substances used in baby food mixtures as well as the quantity of preserving and taste-giving substances and again the use according to the child's age, be written on the packing of the BABY FOODS and, if possible, even inside the packing as an attached instruction leaflet easy to read.
 - 4. It is obligatory to pack these BABY FOODS in such a way as to prevent light from harming them.
 - 5. It is forbidden to use the definition "BABY FOOD" or put BABY IMAGES on packings of alimentary substances which are not specifically baby foods.
 - 6. It is obligatory to write clearly on the packing of BABY FOODS and DIET FOODS the net amount contained in it, as well as the name, trademark, address of manufacturer, serial number and date of production with the date and number of the authorization of the Ministry of Health and Social Welfare.
 - 7. This Regulation will be put in force in two months following the approval of the Government on February 24, 1968, that is on 24th April, 1968.

Nevertheless, because of the increase in demand for protein rich foods, primarily because of the increase in purchasing power, almost all well-known brands of baby food processed in Europe have flooded the local market in recent years. At present one can buy such baby foods in drugstores throughout the country. These foods have been either imported ready-made under the name of "food for babies" or "for baby diet," thus qualifying as a drug or chemical compound for import. Production of many of these foods has been started locally under the patent license of well-known foreign baby food firms. But the price is so high that only high income families can afford to buy them to feed their children. For example, the price of a 250 gram can of protein-rich baby food in the retail market costs over \$2.00. The cheapest Turkish baby food "PARO," which is made largely of rice starch and sugar, costs about 90 ¢ a kilogram or about 2.00 TL. to provide sufficient calories for a child a day. It is obvious that low or even medium income families cannot afford to feed their children even with this lower cost food at such prices, let alone the protein-rich food with higher prices.

The main reason for the high prices of baby food in Turkey is that the price of milk powder used in such food is very expensive, amounting to about 14.00 TL. a kilogram or about \$1.50.

At present there are several pharmaceutical firms, mostly in Istanbul, involved in formulating baby food under foreign patents. Only one of them has a small milk powder installation, the rest use their facilities for making pharmaceutical products as well. Altogether there are 14 firms in Turkey engaged substantially in production of baby food.

The total annual baby food production capacity of all these firms is estimated at 3,350 tons, however only 1,100 tons of all the brands of baby food were produced and sold in the market last year. Of this total only 70 tons were protein-rich food with minerals and vitamins for nursing babies. The remaining 1,000 tons plus were carbohydrates, that is starch and sugar with some vitamins.

From this information it is obvious that there is an urgent need for a low priced protein-rich baby food in the country. It is estimated that the high death rate of about 20 percent among children before the age of five has been due to undernourishment or malnutrition. This in turn has been due to the high prices for baby

food and the low purchasing power on the one hand, and to the lack of knowledge by the families on the other.

This brings us to the main part of our topic, which is the possibility of an expansion in the production of baby food. I think it is appropriate to take up this question in three parts: 1) available raw materials to be used in the production of the protein-rich infant food; 2) the need for the establishment of plants to process these food materials; 3) marketing of these foods to lower income families.

RAW MATERIALS

We all know that the main foods required for a balanced diet of infants and children are protein, fat and oil, sugar, starch, mineral and vitamin. A brief look at each of these is appropriate.

Milk - Among the protein sources for infant food, milk is considered the most important one. According to the statistics the production of milk in Turkey in 1966 was over 4 million metric tons of which about 2 million metric tons was cow milk. At present most of the milk used in feeding the children is not pasteurized, but boiled before use. In fact pasteurized milk can only be found in the cities of Istanbul, Ankara and Izmir. The total pasteurized milk processing capacity of the dairy plants in these three cities is not more than 100 to 125 tons a day. This is a small part of the total milk marketed. The price is around 20 to 25 cents per liter. The bulk of fresh milk in the cities and towns throughout the country is sold by peddlers with very little or no public control of quality. Much of it is adulterated with water and sodium bicarbonate.

Another milk product widely used in the country, especially in the rural areas, for the feeding of children is yoghurt. It is made of boiled milk fermented with bacteria known as bacterium yoghurt. This product provides the main source of protein and fat to the children.

Milk powder - At present there are five installations producing milk powder in the country. However, the total annual capacity of these installations is not more than 300 tons and their equipment is out-dated. The Turkish Milk Industry Association of the Ministry of Agriculture has underway an ambitious program for the develop-

ment of the dairy industry in the country. At present four dairy plants are under construction; these are in the cities of Istanbul, Izmir, Adana and Kars. The latter will also produce about three tons of milk powder a day. Each of these plants has the capacity to pasteurize about 100 to 150 tons of milk a day. It is certain that after the completion of these plants sufficient quantities of milk powder for use in nursing food will be available. It is difficult to give an exact figure at the moment for the price of milk powder produced by the Kars plant, but I am sure that the price will be much lower than the present milk powder prices on the market. It is expected that these four dairy plants will be in operation before this fall. It is programmed to establish 11 more dairy plants in cities having a population of over 100 thousand. However, the realization of this dairy manufacturing program largely depends upon the success of the first four plants. Therefore special attention is being given to their efficient operation.

Fruits and vegetables - Turkey is known as the paradise of fruit and vegetables of the world. Many kinds and varieties of high quality fruits and vegetables, which are excellent for use in mixed baby food are available in abundance and at relatively low price.

Cereals and pulses - Many kinds of cereals and pulses which can be used in baby food are also available in abundance. They are of a very good quality and their price is also reasonable.

Meat and fish - Meat including mutton, lamb, beef, poultry and fish are available all year, but fish meal is not of quality adequate for baby food at present. The Meat and Fish Office, a state owned enterprise, owns and operates meat packing and fish oil and fish meal processing plants. No problem exists in providing the required amount of meat or fish for the baby food industry.

Fats and oils - About 60 to 80 thousand tons of butter are produced a year. However, the consumption of butter is not as high as in other European countries because of the high price. Margarine is used very extensively because the price is rather low compared to butter and has remained stable for the last 8 to 10 years. Cotton and sunflower seed provide about 90 percent of the oil used in the vegetable oil industry. There is a soybean plant with an yearly capacity of 10,000 tons of soybeans. Thus, there is available a domestic source of soybean cake which is considered a good source of protein for baby food. Oil cake is

largely exported. About 80 to 160 thousand metric tons of olive oil is produced.

Vitamins - At present there is no domestic production of vitamins for use in baby food manufacture, thus they are imported. In summary it is evident that there are available adequate domestic raw materials for production of high protein food for infants and children.

Before the end of my speech mention should be made of the agreement which has already been reached between the Turkish Government and FAO, WHO and UNICEF regarding the manufacture of food for infants and children in Turkey. The Ministry of Agriculture through the Turkish Milk Industry Association will be in charge of this project. This infant food plant will be established in Istanbul next to the dairy plant. Thus a protein-rich baby food will be produced at low cost from domestic raw materials.

It is planned that the factory will produce at least 1,000 tons of supplementary baby food. This food will be sold at a price within the purchasing power of families of medium income. This will be distributed through the commercial channels including drugstores and food stores. Also a good part of the food will be distributed free of charge to the poor urban and rural families. This distribution is planned through the control of the organization of the Ministry of Health. UNICEF will provide equipment and technical assistance totalling 300 thousand dollars. UNICEF will also help with the realization of the project both in construction, operation of the plant and marketing of the food. It is believed that this will be a leavening agent in Turkey in stimulating private enterprise to include the manufacture of baby food in future expansion. It is fortunate that Turkey has finally established a policy regarding the necessary measures to provide cheap protein-rich food for all preschool and school aged children. This has been largely due to the continuous efforts of the various United Nations Organization and the timely efforts of CENTO.

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IMPORTANCE OF CHILD NUTRITION PROGRAMMES TO FAMILY PLANNING BY THEIR CONTRIBUTION TO FAMILY VIABILITY

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The health of a nation largely depends on the nutritional state of its citizens. A balanced nutritive diet has special significance for mothers and the growing children, as on their health hinges the welfare of the future generations.

The factors that influence a mother's and a child's nutrition are many and varied. Non-availability of adequate food can be due to poverty, but it can also be due to lack of knowledge about or appreciation of the value of proper nutritive diet. Similarly, various gastrointestinal troubles may cause insufficient absorption of food, resulting in improper utilization of food and may also cause malnutrition. Another important factor which influences the nutritional status of mother and infant is too frequent pregnancies or very short intervals between pregnancies, allowing no time to the mother's body to rest and recover.

No one will deny the importance of proper diet for the maintenance of good health. There are many diseases which a person can overcome easily if he is properly nourished and has enough resistance. If we look into the history of maternal and child health programmes in developed countries like the U.S.A. and most of the European countries, it is seen that when the M.C.H. programme started the main emphasis was laid on nutrition programmes. In those early days, maternal and child health conferences were

primarily concerned with the encouragement of breast feeding and the provision of a safe supply of cow's milk. Milk depots were established to prevent contamination and adulteration; and the workers were especially trained to distribute safe milk and to teach mothers the correct milk formula.

There is increasing evidence that prenatal health and care of the mother has a direct effect on the health and survival of the infant. In 1941, Ebbs and his co-workers in Toronto studied groups of women with poor diets and with good diets. It was found that 6 percent of those on a poor diet had miscarriages, in contrast to 0.8 percent of those on a good diet. The corresponding figures for still births were 3.4 and 0.4 percent, and for premature births 8.0 and 2.7 percent, respectively. These findings have been confirmed by Balfore, (1944), Burke and others in 1943.

In 1945, Stuart and his group in Boston found that there was a direct relationship between the weight of the new born infant and the quality of mother's diet during pregnancy. Thus, over 90 percent of the mothers who had a good or an excellent diet produced children weighing over seven pounds, while only 23 percent of the mothers who had poor to very poor diet produced babies below this weight.

During the siege of Leningrad in 1942, an increase in the incidence of premature births was observed by Antonov. Particularly severe hunger during the first half of the year witnessed a premature birth rate of 41.2 percent of all live births.

The approximate figures for infant mortality in Pakistan are 110 to 130 per thousand live births. In other words, about 400,000 children die every year before completing their first year of life. This extremely high infant mortality is an index of the prevalence of malnutrition in the country.

The prevalence of various nutritional deficiencies in East Pakistan has been shown by a survey of 15,000 persons conducted in the province. According to the Survey, 40 percent of the families surveyed belonged to the income group of 100 rupees or less. Among this group, the caloric intake was 1950 calories per person per day, the minimum requirement being 2230 calories per day. Protein deficiency was even more widespread, seventy-eight percent of all families studied whose income was under 200 rupees per month, did not meet the minimum requirements for proteins.

The overall mean percentage of calories coming from fats in the diet was 7 percent as compared to 40 percent in some Western countries. Studies have demonstrated that severe protein/calorie malnutrition in children less than five years old is accompanied by retardation both in physical growth and mental development.

Vitamin A deficiency was also commonly seen in East Pakistan as only 40 percent of the recommended allowance for vitamin A was being met. The most deficient segment of the population was the growing boys. Females were more deficient during pregnancy and lactation; successive cycles of pregnancy and lactation were so frequent that women of child bearing age are not able to replenish body stores of vitamin A.

Anaemia is widespread and is a severe problem in Pakistan. Again, the most anaemic strata of the population are women of child-bearing age and the growing children.

A nutritional survey comparing West Pakistan to East Pakistan has not been conducted. However, reports are available on selected studies. These studies demonstrate that a considerable number of people in the western wing also suffer from various types of nutritional diseases.

Nutritional programmes for children, to disseminate information about balanced diet, distribution of milk, an antenatal programme, and special projects for supplementary feeding are needed to reduce the prevailing morbidity and mortality conditions and to promote physical and mental health.

We have both high infant mortality and rapid population growth. The population of Pakistan in 1901 was 46 million, 76 million in 1951 and 94 million in 1961. During this period of 50 years, the population increased by 30 million, whereas during 1951-1961 decade the increase was 18 million. According to the estimates of the Planning Commission, the population of Pakistan in 1961 was 102 million and 115 million in 1965, with an annual growth rate of over 3 percent. If the present rate of increase continues, the population of the country will double in 20 to 24 years.

The pace of economic development in Pakistan has been appreciable and is one of the highest among the developing countries; but the the phenomenal increase in population is nullifying the economic

gains, keeping the per capita daily income at less than one rupee for the last decade. Forty-four percent of the population is under 15 years old and only 6 percent is in an older age group. This adversely affects the capital requirements for industrialization as the resources are being absorbed in meeting the current consumption needs. The dependency ratio in Pakistan is considered to be very high as compared to a dependency ratio of only 25 percent in advanced countries.

One of the most important causes of infant malnutrition is the successive pregnancies of the mother. It is well known that protein deficiency begins with early weaning caused by a new pregnancy. The word "Kwashiorkor" which denotes protein deficiency, originates from the West African dialect Ga and literally means "first-second, that is to say "the sickness of the first child when the second is on the way" or "the sickness of the deposed child," and occurs almost exclusively between the time of weaning and five years age. For a child who is early and suddenly weaned, the new pregnancy means not only the loss of a protein of high biological quality, necessary for proper growth and development, but also less attention on the part of the mother at an age when the child is in need of affection and great protection and care in regard to feeding and other physical, psychological and biological environment.

Recent studies by Gravioto and colleagues on the Latin American population of low socio-economic background and identical racial composition show clearly that children with low growth rates measured by weight increase in the first years of life, belong to families of five to eight members, whereas children showing adequate weight gain come from families of only three or four. The group of retarded children was also associated with the above pattern of feeding, frequency and duration of infectious disease, family income, housing conditions and educational levels of the parents.

The uncontrolled population growth and high dependency burden in Pakistan has resulted in an unfortunate chain of events. It has brought in its wake poverty, deficient nutrition, lowered resistance to disease, high infant and maternal mortality. Deficient nutrition leads to lower energy output resulting in lower production, yielding lower income which in turn affects the upbringing, health, and education of the children.

For socio-economic development and for improvement of the health of mothers and children, it is essential to break the vicious

circle of poverty, ignorance and disease by regulating the uncontrolled population growth. Recognizing the urgency and magnitude of the problem of the rapid growth of population, which is nullifying the efforts made on the developmental fronts, the Government of Pakistan has launched a comprehensive Family Planning Programme, costing 284 million rupees during the Third Five Year Plan (1965-70).

The objective of the programme is to reduce the birth rate from 50 per thousand to 40 per thousand so that increase in population can be effectively checked and does not exceed 2.5 percent. The programme proposes to cover all the estimated 20 million fertile couples in the country by 1970 and at least prevent 5 to 6 million during the plan period.

The present effort lays great emphasis on motivation and education of people by individual contact, group discussions, publicity, monetary incentives and provision of supplies and services at the doorstep of the people to help facilitate adoption of family planning as a way of life. The programme which is pragmatic in approach is considered an administrative activity and has been fully integrated with the normal administrative functions of the district with active association of medical personnel at all levels. Cognizance has been given to the fact that a programme of this nature, where social habits have to be changed and prejudices dispelled, can best be administered by a single autonomous body, since a purely governmental programme would not provide enough flexibility in administration to adapt the approach to suit the rapid changes. The programme has been integrated with the district and provincial administration and has maintained autonomy in the execution of the action programme. This was made possible by creating a Pakistan Family Planning Council responsible for over-all implementation, coordination, evaluation and research; two Provincial Family Planning Boards and a District Family Planning Board for each programme-district are charged with the responsibility of implementation of the programme.

Performance

At the half way mark, December 31, 1967, of the current Five Year Plan, the number of IUDs inserted is about 12 million and the monthly insertion level is 65,000.

The monthly sales of conventional contraceptives fluctuated around four million units during the first year of operation. The

supply position improved during the second year and sales rose to 13 million last September. This represents a great improvement over the previous years.

Tubeligitations and vasectomies averaged about 300 per month during the first year of the programme. However, beginning in May 1967, the number of vasectomies performed in East Pakistan rose and reached 30 thousand in November, 1967. This gives an estimated total of 180,000 sterilized individuals by December 31, 1967. It is a remarkable achievement since very little importance was originally given to sterilization in the programme.

The Family Planning Scheme accepts the estimate that in 1970 there will be about 20 million fertile couples in the country. The target set for the Scheme is that by 1970 one fourth of these should be practising family planning. After two and one-half years of operation the evidence indicates that about 1.2 million IUD insertions have been made, and an estimated 2 million couples are using conventional contraceptives; 180,000 have undergone sterilization and 50,000 or more are using oral contraceptives. This makes nearly 2.3 million couple who are actively practicing family planning out of a projected goal of 5 million by 1970.

As has been stated above, the current family planning programme envisages to prevent 5 to 6 million births by 1970. An important feature of the programme is education of the masses. It is stipulated that all the estimated 20 million fertile couples will be brought within the ambit of this educational effort. It is also anticipated that these educational activities will help create among the couples an appreciation of proper spacing of children and a reasonable interval between the pregnancies. This in turn will enable the mothers to improve their nutritional status and withstand the demands of the next pregnancy without damaging their health. Suitable intervals between births will also help enable mothers to feed their babies adequately and to provide them with proper care.

One of the high fertility motives in Pakistan is the health of the new born, on which depends his survival. It is observed that one of the obstacles in acceptance of family planning by some couples is the prevalent high infant and child mortality in the country. The fear that all the children born may not live longer prompts couples to have many more children in order to assure

the survival of a few children. This assurance is vital in our culture as the children are still considered a source of security to the parents in their old age. Since several studies have proved that there is a close relationship between the high infant and child mortality and the nutritional status of mother and the child, it is important that nutritional programmes for the mothers and the children be given a place of importance specially in all programmes which are directed to promote the health and welfare of our coming generations. Our efforts in the field of nutrition will undoubtedly increase the life expectancy of the child and it will conversely help motivate the mothers to respond positively to the idea of family planning with confidence and without any fear of having no surviving child unless large numbers are reared.

Since any nutritional programme will involve change in or adjustment of dietary habits, some people believe that it will be difficult to educate our masses in this behalf. It is felt that any idea of introducing protein supplement for feeding the child will meet with resistance. However, our experience in this regard is quite different. At some of the IUD clinics the clients received vitamin, Fe and Ca for one week and powdered milk for their babies, which they accepted most gratefully. In fact most of the village mothers admitted that they received these nutritive food supplements/ medicines for the first time in their lives. It has also been observed that at the clinics where these good supplements were given the attendance appreciably increased.

Some of these medicines have been provided to the family Planning Programme by the UNICEF. These medicines are not only given to the women attending the Family Planning Clinics but also are being distributed through the M. C. H. Centres and registered doctors under the supervision of District Family Planning Boards. Since the workers of the Family Planning Department reach the mothers in every village of the programme districts more frequently than any other department, the Family Planning Council will be glad to help any agency interested and willing to initiate a nutritional programme. We will be glad to receive medicines and food supplements for distribution to mothers participating in the Family Planning Programme. Such a programme will increase the participation of clients in the Family Planning Programme and will improve the health of mothers who may be suffering from nutritional disorders.

The ultimate benefit of this programme will reach children who comprise a large percentage of our population. In fact, it is now

time that we should ponder upon having an effective child nutrition programme in the country to ensure development of proper physical and psychological health of our children. Unless we promote the health and well being of the child from all fronts it will not be possible for these children to discharge effectively future national responsibilities likely to devolve on them.

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PROTEIN-CALORIE MALNUTRITION AND DIARRHEA IN 0-4 YEAR OLD CHILDREN IN EAST PAKISTAN

BY

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Malnutrition and diarrhea are the two most important medical problems of the children in the tropical and subtropical countries. East Pakistan is no exception where the primitive state of agriculture, pressure of population, riverine nature of the country and the warm climate favour the "twin scourge" of malnutrition and diarrhea. It has been suggested by various investigators that these two diseases are closely interrelated. The present paper will discuss the importance and magnitude of the problem as found in East Pakistan and will also attempt to show the relationship between diarrhea and malnutrition.

East Pakistan is a little over 55,000 square miles in area (one-third of that of West Pakistan) and has a population of over 63.3 million estimated in 1965. This gives a density of population of over 1,100 per square mile, which is one of the highest in the world. The breakdown in the age of the population is shown in Table 1.

TABLE 1
POPULATION DISTRIBUTION OF EAST PAKISTANI
(According to age, 1965 estimate)

	<u>Number</u>	<u>Percent</u>
All ages	63.3 million	100
Below 15 years	31.7 million	50.4
Between 6-10 years	9.3 million	14.7
Below 6 years	14.6 million	23.1
Below 10 years	23.9 million	37.8

It is obvious that the preschool child population of 15 million constituting 23 percent of the total population is a huge number to care for by any government with very limited resources at its disposal as is the case with East Pakistan. Without proper care it is likely that a large proportion of these children will never attain the full potential of their growth and development. In fact many will die and many more will be stunted both physically and mentally due to the effect of malnutrition on the growth of somatic and nervous tissues.

The infant mortality in East Pakistan has been estimated to vary from 80 to 170 per thousand live births and fairly reflects the gross inadequacy of the health measures prevalent in the country (Mackay 1965, Nutrition Survey Report, 1966, Aziz et al 1967). Among other factors the mortality of the age group 1 to 4 reflects the state of nutrition of the preschool child population in a country. The children at this age, because of rapid growth, belong to the so called vulnerable group. They are often displaced from the breast by a new arrival in the family and not being mature enough to look after themselves have to depend on others for proper feeding and care. Therefore this age group in particular suffers from malnutrition and the demand for growth puts them into this special category. Very few statistics are available on the mortality of this age group. Mackay (1965) in a closely supervised tea plantation labour population found that the overall mortality from 1946-63 was 47 per thousand live births and 41 percent of the deaths were due to malnutrition and diarrhea. The Sylhet tea gardens where the study was carried out maintain a fairly efficient system of medical care compared to most other parts of the country. In all probability, the mortality is higher in the whole country. Mosley (unpublished) from Pakistan-SEATO Cholera Research Laboratory found that mortality due to diarrhea and gastro-enteritis in a rural area under daily surveillance was almost 25 percent (97/367) of the total deaths in 1 to 4 year age group. This area also is covered by a hospital which treats all cases of acute diarrhea.

RELATIONSHIP OF DIARRHEA AND MALNUTRITION

There is still some controversy on the exact relationship between diarrhea and malnutrition, as it is not sure which is the primary cause. A large percentage of malnourished children admitted to any hospital suffer from diarrhea suggesting that

malnutrition itself may be responsible for diarrhea, because rarely are any enteropathogenic organisms found in these children. However, diarrhea probably is more important in causing malnutrition in children. Table 2, (taken from Nutrition Survey Report of 1964), shows the frequency of diarrhea in the child population.

TABLE 2

INCIDENCE OF DIARRHEA FOUND IN THE CHILD POPULATION
OF EAST PAKISTAN
(from the Nutrition Survey, 1964)

<u>Diarrhea</u>	<u>Male</u>	<u>Female</u>
Current	31.8	29.5
Recent	21.3	19.6
Recurrent	28.6	34.2

Approximately one-third of the children examined were suffering from diarrhea at the time of the examination and 20 percent had a history of recent attack. These figures represent over 50 percent of the children examined. This 50 percent figure no doubt seems extremely high. The rate of diarrheal attack in East Pakistan varies with the season, the disease being more common in the rainy months of the year and the high figure mentioned probably had something to do with the season.

Studies carried out at the Pakistan-SEATO Cholera Research Laboratory (Lindenbaum, 1965) show that an attack of diarrhea causes intestinal malabsorption for a varying length of time even when the disease is no longer present. This results in a loss of nutrients. In addition, the cultural habit of not allowing a diarrheal child to have access to food as long as the disease lasts is usually enough to push a child with border line nutrition to a state of frank malnutrition. I have seen this to be true in cases of vitamin A deficiency causing keratomalacia and the process probably holds for protein-calorie deficiency as well.

INFECTON AND MALNUTRITION

Any kind of infection is dangerous to a child living in a state of chronic undernutrition. However, the presence of gross malnu-

trition increases the risk of mortality many times. Table 3 shows the effect of malnutrition in the overall mortality in children admitted to the Pakistan-SEATO Cholera laboratory.

TABLE 3

ADMISSION AND MORTALITY RATE IN CHOLERA, NON-CHOLERA
AND SEVERE MALNUTRITION CASES 0-4 YEARS
(December 1961 to December 1966)

	Admitted		Died	
	No.	%	No.	%
Total	1511	100.0	43	2.8
Cholera	876	57.9	12	1.4
Non-cholera	653	42.1	31	4.9
Severe Malnutrition	60	4.0	15	25.0

This laboratory admits any child with diarrhea. As can be seen the overall mortality in 0 to 4 year old children with cholera was only 1.4 percent of the total admission. The mortality was higher in non-cholera cases giving an overall rate of 5 percent. A retrospective study of the records and postmortem notes covering a period of five years from December 1961 to December 1966 showed that a large number of the children who died had been suffering from severe malnutrition. There was a total of 60 children who were recorded as suffering from severe malnutrition of whom 15 died. This gave a mortality rate of 25 percent.

It is clear that malnutrition is associated with an increased risk of mortality in diarrhea and possibly in most other infections in a young child. How this is brought about is a subject of intense research throughout the world. Some investigators (Metcoff et al 1966) suggest that an enzymatic block at the cellular level is responsible for this high mortality. Yet others think that change in the cellular composition particularly the excess of Na^+ and deficiency of K^+ may be more important. Whatever mechanism may be responsible for this, it is obvious that better nutrition of the preschool children will greatly help in the reduction of the high rate of mortality. As it seems the children in East Pakistan are destined to live with diarrhea and other infections for a considerable length of time in the future, a better state of nutrition will certainly make these diseases more bearable with less risk to their life and will ensure an optimal rate of development for a large proportion of the preschool children population.

REVIEW OF AVAILABLE FACILITIES OF FOOD PROCESSING IN PAKISTAN

BY

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During the last two decades a considerable amount of research work has been made on human diet and nutrition. The results of this research have indicated the need for effective steps to increase the production of energy-yielding, protein rich foods to make up the dietary deficiency. Pakistan's major concern is the production of adequate food for its population. Efforts have been made to increase food production and to provide better storage and transport facilities and to develop food science to effect better utilization and conservation of available and existing food resources. To meet this end steady progress has been made to develop various food processing industries.

The principal food crops in Pakistan are rice and wheat. The two industrial crops - cotton and jute - are the next largest users of land. Sugar cane is also grown in large quantities in both wings of the country and Pakistan has almost become self-sufficient in sugar. In recent years sugar-beet production has been added in West Pakistan. The production of maize has also increased and the use of new varieties promises that maize will become an important food grain.

With the favourable combination of the climate, many parts of the country can raise two or even three crops of fruit and vegetables. These crops are produced in abundance and at the

peak of each crop season there is a large surplus available in the country. While major programme for increased food production must be concentrated on cereal crops the government recognizes that fruits and vegetables and in turn processed foods will not only assist in feeding the people but also increase their living and nutritional standard.

FOOD PROCESSING INDUSTRY

When Pakistan became independent there were very few plants for processing or manufacturing of any kind of food. Traditionally the area of the sub-continent which is now Pakistan was the producer of raw materials which were in turn processed by industrial centres outside the border of what is now Pakistan. The first effort had to be concentrated in the industries serving the basic food needs of the people. It was necessary to establish rice milling facilities and wheat mills to serve the immediate requirements. The sugar industry was developed and at a later stage edible oil facilities were provided. The preparation of processed food in cans and bottles took second priority to the preparation of basic food.

Even today under the Third Five Year Plan Pakistan is still making headway with the processing of agricultural products to meet the basic needs of the people. Wheat milling and preparation of wheat for domestic use has kept pace with the accelerated production of wheat and has been able to process imported wheat as well to meet the requirements of Pakistan. New varieties of wheat and improved agricultural methods including water use, irrigation, pest control and liberal use of fertilizer is expected to make the country self-sufficient in wheat by 1970. Production of rice has equally kept pace with the needs of the population. Sugar production now meets the domestic requirements and it is hoped that self-sufficiency in this commodity will be achieved. Maize has become a useful crop in recent years and there is growing interest in the establishment of more processing plants for this crop. The edible oil industry developed more slowly than the wheat and rice but the production has risen rapidly in recent years. Solvent extraction plants for cotton seed oil have been installed and will help to increase the yield of oil. Ground-nuts are being more extensively planted and will supplement the edible oil supply of the country.

PRESERVED AND CANNED FOODS

Fruits and vegetable production has grown at a faster pace than the production of other commodities. The diverse geographical conditions of Pakistan are suited to the cultivation of tropical and sub-tropical and a few temperate fruits. The total area under fruits in Pakistan was 477,900 acres in 1957-58 with an estimated annual production of 1.8 million tons.¹

Fruits are a rich source of nutritive and protective food and some of them have a medicinal value as well. The importance of fruits as a necessary constituent of a balanced diet is recognized throughout the world. An average human body requires about three ounces of fruit every day. The average daily consumption of fruit per capita in Pakistan is much less than the average requirement.

With new knowledge on nutritional value and information on great variability in the chemical composition of food crops the consumption of fresh fruits in our daily diet is on the increase. The shortage of cereal foods has been to some extent responsible for higher consumption of fruit and vegetables.

Today there are more than 20 registered and sanctioned factories and concerns processing and canning fruit and vegetables. This excludes a large number of producers engaged in preservation of fruit and vegetables on small scale. In addition to preparing food for domestic use the industry has been able to offer some quantity for export also. Export of preserved fruits and vegetable was at 4.45 lacs rupees in 1964-65.

A large amount of fruits and nuts are sun dried, although recently modern dehydration facilities have been introduced. Drying is probably the oldest technique of food preservation and with suitable climatic conditions and appropriate skill, every kind of food can be dried. The government is considering the scheme of establishing a date-curing and processing factory in West Pakistan, with a capacity to cure about 7,000 pounds of dates per day.

Experiments have also been made in freezing and accelerated freeze drying of fruits, various foods, fish, and vegetables. While this industry is still in its infancy it is expected that it will expand

1. Land and Crop Statistics of Pakistan (Fact Series III).

and will be very good source for preserving foods, especially for export.

The Third Five Year Plan sanctions an expenditure of 276 million rupees for processing, canning and preservation of fruits and vegetables.

Dairy farming and dairy products have been extensively developed and there are milk processing plants in Pakistan preparing powder milk, butter, ice cream and other frozen dairy desserts. The milk industry is engaged in the preparation of fresh and sterilized milk for home use and processed milk food that can be stored.

The Industrial Investment Schedule for the Third Five Year Plan provides an allocation of 391 lacs rupees for the dairy industry, and 280 lacs rupees for the development of miscellaneous processed foods.²

In addition a provision of 130 lacs rupees has been made for canning and preservation of meat in line with the modernization of slaughter houses. The sea food industry plans an expenditure of 318 lacs rupees. A provision for 155 lacs rupees has been made for poultry farming and poultry product. This will cover the establishment of poultry farms, frozen poultry, dried egg powder and frozen eggs.

PROBLEM AREAS

The per capita income in Pakistan and in particular of rural population is too low for mass marketing of preserved and processed foods. It is however, hoped that with the rising standard of living and industrialization, the demand for such food, will increase. The government is concerned with the waste now prevalent in production, transportation, marketing and the storage of different foods. The cost of transporting processed food by rail or road is high. Cold storage facilities are being developed but they are limited in number and usually not carefully controlled. Tin plate is entirely imported into the country resulting in a big loss in foreign exchange. The quality of local glass container needs improvement. The container in many cases costs more than the material packed in them. This makes the price of the processed

2. Industrial Investment Schedule for Third Five Year Plan Period (1965-70).

food out of reach for the average family. Production equipment for processed food must be imported into Pakistan. The country is gradually making a portion of the equipment which will be needed in food processing, and this will lower the cost of foreign exchange requirements for the establishment of such enterprises. The government is encouraging quality control in production but this aspect of food processing will have to receive greater emphasis in the future particularly when processed foods are offered for export.

FUTURE OF THE FOOD PROCESSING INDUSTRY IN PAKISTAN

While the amount of processed food available in the domestic market today is quite small, a foundation has been laid by the establishment of many processing plants since the time that Pakistan became a nation in 1947. The industry has been successful in processing almost every kind of food that can be found in any other country. The processed food industry is in a position to gradually expand activity and to produce goods in a much larger volume. This volume, however, will depend upon the increasing purchasing power of the people which has been vigorously supported and encouraged by the Government of Pakistan. To overcome some of the basic problems faced by the industry, the following courses are suggested.

1. A well organized statistical bureau to supply accurate figures of acreage, production and market reports should be created.
2. Qualified inspectorate staff should be appointed to check the quality of the finished products.
3. A Central Technological Research Institute should be established for continuous research on the process of canning, dehydration and freezing of various foods and fruits.
4. Tariff protection and subsidy should be given on the purchase of sugar and tin containers.
5. The growth of cottage industry should be encouraged by providing easy credit facilities, tax holiday and free technical advice.

The approximate production of proteinous food stuffs in Pakistan is 32 million tons. There is about 10 percent loss of the total production of proteinous food stuffs during processing, storage and marketing. These losses should be avoided by improving techniques and marketing systems.

So far there has been limited success by commercial food companies to combat the problem of protein malnutrition of infants and preschool children in developing countries. One reason that can be attributed for this lack of commercial interest is that this variety of infant food is not rated as a promising and profitable market in these areas. To produce protein rich food at low cost, production must be based to a great extent on locally available ingredients. Even within the country the requirements of protein will differ in many specific areas or between different segments of the population. Particular characteristics of the area and the people, economic level, food habits and customs should be given careful thought by the planners before embarking on any specific programme. The programme should also lay stress on expansion and development of fisheries, poultry, milk production and growing of more legumes and fruits. These products must be priced so as to be within the economic resources of low income groups. To further combat malnutrition the use of regular advertising and promotional campaigns similar to those utilized for other food products, will be a big help. A suitable programme will require coordinated national efforts and it should not be the responsibility of any single Ministry or Department. This programme must have at least sympathy if not the active support of all other departments of the Government. This industry should be in the hands of industrialists imbued with human feelings - those who will take up this for the love of humanity and will make their millions elsewhere. Liberal help may be given for the establishment and support of research and training facilities to further the development of protein rich food based on indigenous resources and in accordance with the local dietary habits.

Financial assistance may be advanced to processors who are qualified and willing to prepare protein rich food. Joint ventures on the part of the private food industry in the developed countries with those in the developing countries will have a beneficial effect. The import of protein rich food should be restricted as this is likely to hamper the efforts of developing countries to solve their problems through their own resources.

SUMMARY AND CONCLUSIONS

1. A Central Technological Research Institute should be established for research on different aspects of foods and food products.
2. Sugar and tinplate should be supplied in adequate quantities and at reasonable prices.
3. Industry should be provided with easy credit facilities, tax holiday and technical advice.
4. Imports of plant and machinery should be liberalized.
5. Efforts should be made to establish a common market among the R. C. D. Countries on the lines of the European Common Market.
6. Waste and losses should be avoided by improving processing and marketing systems.
7. Cold storage facilities for fish, fruits and milk products, should be increased, and also provision of refrigerated vans for transportation of these commodities.
8. Encourage growing of oilcrops such as groundnuts, sunflower, olive and soybeans.
9. Provide facilities for broiler and egg production in the cities and free range poultry production in the villages, and explore new fishing grounds to determine the extent and character of the available fish.
10. Improve milk yield of cattle through selective breeding.
11. Make efforts to intensify manufacture of palatable proteins on commercial scale.

*

APPENDIX I

LIST OF PARTICIPANTS

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10. Dr. Habibur Rahman
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12. Dr. Ziaur Rahman
13. Dr. (Mrs.) Jamila Rana
14. Dr. Batul Raza
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17. Dr. S.M.K. Wasti

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Mr. F. F. Smithwick
Acting UNICEF Representative
in Pakistan

APPENDIX II

CONFERENCE PROGRAM

MONDAY
March 18,
Morning

OPENING SESSIN

- Opening Remarks - Miss S. E. E. Buchanan
CENTO Secretariat
- Welcome Address - Brigadier C. K. Hasan
Director General of Health
Government of Pakistan
- Inaugural Address - Colonel M. K. Afridi
Advisor to the Ministry of Health
Government of Pakistan

Statement by Leaders of Country Delegations

- Iran - Dr. Habib Hedayat
Pakistan - Lt. Col. S. M. H. Bokhari
Turkey - Dr. Recep Heybeli
U. K. - Dr. G. R. Aykroyd
U. S. - Dr. Martin Forman

- Statement - Mr. E. M. Gilbert
Office of the United States
Economic Coordinator for
CENTO Affairs

Election of Chairman

Tea Break

- Keynote Address - Dr. Henry Sebrell
Professor of Nutrition
Columbia University
New York

Afternoon

Visit to National Health Laboratories

TUESDAY
March 19,
Morning

PLENARY SESSION

Summaries of Country Reports on malnutrition in infants and preschool children.

Iran
Pakistan
Turkey

Summaries of Country Reports on programs to overcome malnutrition in infants and preschool children

Iran
Pakistan
Turkey

Afternoon

PANEL DISCUSSIONS

Group I - HEALTH AND TRAINING

Subject: Basic Requirements for Nutrition Programs

Panel: Iran - Dr. Habib Hedayat
Pakistan - Dr. Kamaluddin Ahmed, Chairman
Turkey - Dr. Ayşe Baysal
U. S. - Dr. Henry Sebrell
Rapporteur - Mr. A. D. Dominguez

Group II - PLANNING AND DEVELOPMENT

Subject: (a) Nutrition in National Plans
(b) Responsibility of National Planning Organizations for Coordination

Panel: Iran - Dr. Shariat, Chairman
Pakistan - Col. S. M. H. Bokhari
Turkey - Dr. Fikret Akdoğan
U. S. - Dr. Ogden Johnson
Rapporteur - Eng. Mohamad Bagher Namazi

WEDNESDAY

March 20

Morning

PLENARY SESSION

Summaries of Country Reports on Agricultural and Food Processing Resources for Developing Foods for Preschool Children. Iran, Pakistan, Turkey.

Afternoon

Group I - HEALTH AND TRAINING

Subject: Food for Preschool Children

Panel: Iran - Dr. Ghahreman Shams
Pakistan - Dr. S. M. Ali
Turkey - Dr. Ayşe Baysal, Chairman
U. K. - Dr. D. P. Eddy
Rapporteur - Miss Baysan Birgol

Group II - PLANNING AND DEVELOPMENT

Subject: Foods for Preschool Children

Panel: Iran - Eng. Mohamad Bagher Namazi
Pakistan - Mr. Imtiaz Ahmed
Turkey - Dr. Ismail Şener, Chairman
U. S. - Dr. Martin Forman
Rapporteur - Dr. Atuar Rahman

THURSDAY

March 21,

Morning

Group I - HEALTH AND TRAINING

Subject: Designing Nutrition Programs to Feed the Preschool Child

Panel: Iran - Dr. Habib Hedayat
Pakistan - Dr. M. H. Rahman
Turkey - Miss Baysan Birgol
U. K. - Dr. W. R. Aykroyd, Chairman
Rapporteur - Dr. M. M. Rahman

Panel: Iran - Eng. Mohamad Bagher Namazi,
Chairman
Pakistan - Dr. A. S. Chowdhury
Turkey - Dr. Fikret Akdoğan
U. S. - Dr. Willard Boynton
Rapporteur - Mr. Charles R. Gurney

Afternoon

Trip to Taxila

FRIDAY
March 22,
Morning

Group I - HEALTH AND TRAINING

Subject: Development of Guidelines and
Recommendations for the Health and
Educational Aspects of Coordinated
National Nutrition Programs to Combat
Malnutrition in Preschool Children

Panel: Iran - Dr. Habib Hedayat
Pakistan - Dr. S. M. K. Wasti
Turkey - Dr. Ayşe Baysal
U. S. - Henry Sebrell, Chairman
Rapporteur - Mr. John Raber

Group II - PLANNING AND DEVELOPMENT

Subject: Development of Guidelines and
Recommendations for Planning and
Coordinating at the National Level
Programs to Combat Malnutrition in
Preschool Children

Panel: Iran - Dr. Bagher Shariat
Pakistan - Dr. Sahmsun Nahar, Chairman
Turkey - Dr. Fikret Akdoğan
U. S. - Dr. Martin Forman
Rapporteur - Dr. Ogden Johnson

Afternoon

Presentation and Acceptance of
Summary Conference Report

CLOSING SESSION

*

CENTO PUBLICATIONS

- *Minerals, December 1959*
- *Development Programming, June 1960*
- *Chrome Ore, September 1960*
- *Teaching of Preventive Medicine, May 1961*
- *Industrial Development Banking, June 1961*
- *Coal, December 1961*
 - *Progress Report, "Coordinating U.S. Action for CENTO" 1959-1960*
- *Progress Report, "Coordinating U.S. Action for CENTO" 1961-1962*
- *Agricultural Development Banking, April 1962*
 - *Increased Agricultural Production, May 1962*
- *National Income Accounting, May 1962*
 - *National Scientific Organizations, June 1962*
- *Industrial Development Banking(2), June 1962*
- *Development Planning, June 1962*
- *Rocks and Minerals, 1962*
- *Teaching Health Centers, 1962*
 - *Cost and Return Ratios for Major Agricultural Products, 1963*
 - *Teaching of Science, 1963*
- *Rural Development, 1963*
- *Iron Ore, 1963*
- *Consumers' Expenditures, 1963*
 - *Agricultural Development Policy, 1963*
 - *Management Training in Public Administration, 1964*
 - *Nursing Education, 1964*
 - *Hospital Administration, 1964*
- *Manpower Needs and Training of Environmental Sanitation Personnel, 1964*
- *Mining Geology and Base Metals, 1964*
 - *Industrial Statistics, 1964*
 - *Scientific and Industrial Research, 1964*
- *Agricultural Credit and Cooperatives, 1965*
- *Tax Administration, 1965*
 - *Fresh Fruit and Vegetable Marketing, 1965*
- *Capital Markets, 1965*
- *Local Government, 1965*
 - *Veterinary Education and Animal Health, 1965*
- *Field Techniques for Mineral Investigation, 1965*
- *Veterinary Pathology, 1965*
- *Progress Report, "Coordinating U.S. Economic Action for CENTO", 1962-1965*
- *Hydrology and Water Resources Development, 1966*
 - *Land Classification for Non-Irrigated Lands, 1966*
 - *Household Surveys, 1966*
 - *Mine Health and Safety, 1967*
 - *Summer Training Program in Geological Mapping, 1966*
 - *Agricultural Extension, 1967*
 - *Processing and Marketing of Fruit and Vegetable Products, 1967*
 - *Engineering Education, 1967*
 - *Summer Training Program in Geological Mapping, 1967*
 - *Conference on National and Regional Agricultural Development Policy, 1967*
 - *Symposium on Agricultural Statistics, 1967*
 - *Traveling Seminar on Livestock and Livestock Products, 1968*
 - *Traveling Seminar on Farm Tools and Implements, 1968*

***Out of print**

The above list includes all publications issued by the Office of the U.S. Economic Coordinator for CENTO Affairs. Most of the older books are now out of print and no longer available. However, copies of those still in stock may be obtained by writing to:

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c/o American Embassy	c/o American Embassy
Karachi, Pakistan	Tehran, Iran