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RESEARCH ACTIVITIES AND PRIORITIES OF THE INSTITUTE OF NUTRITION OF CENTRAL AMERICA AND PANAMA (INCAP)

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INSTITUTE OF NUTRITION OF CENTRAL AMERICA AND PANAMA (INCAP)

I. BACKGROUND

Since 1949, when INCAP was created, it carries out research activities in the areas of nutrition and health, and food science and technology. In recent years it has also begun research activities in the area of utilization of appropriate technology and evaluation of interventions, both in the fields of nutrition and health, and food science and technology. The following is a summary of the activities carried out in the different areas.

A. NUTRITION AND HEALTH

In the area of nutrition and health, INCAP has carried out research in Clinical Nutrition: pathophysiology, diagnosis and rehabilitation of children with severe protein-energy undernutrition and in the management of infections in undernourished children. Such research has resulted in publications which have formed the basis for: the treatment of malnourished children in hospitals; the early detection and ambulatory recuperation of the undernourished child in the community; the application of different kinds of diets in the recovery of the undernourished child; and, the use of physical exercise in the recovery of such children.

Also, important research has been done in other aspects summarized as follows:

In Physiology and Basic Nutrition: The establishment of protein and energy requirements in preschool children; requirements of essential amino acids in such children; nutrition and productivity in the adult, etc.

In Nutrition and Infection: Studies of the interrelationship between nutrition and infection; studies on the immune response of undernourished children.

In Epidemiology: Studies on the nutritional situation of the six countries in the area; longitudinal studies on growth and development; and the influence of infections on growth, morbidity and mortality in the infant and preschool child.

Evaluation of Health Interventions: Studies on the immune response to measles vaccine and its impact on mortality; evaluation of oral rehydration in diminishing mortality due to diarrhea; studies on the impact of salt iodization programs and those of vitamin A fortification of sugar.
Development of field methodologies for anthropometric and biochemical studies at the population level. Development of methodology and field evaluation for the enrichment of sugar with vitamin A and iron.

Evaluations on delivery systems in health and nutrition services.

Studies on breastfeeding.

Evaluation of educational interventions in health and nutrition.

B. FOOD SCIENCE AND TECHNOLOGY

Since 1949, when INCAP began its research on nutrition and health, the need to study the nutrient contents of the food consumed by the population became apparent. The effect of food preparation practices both at the household and industrial levels on nutrient stability was an unknown area which also needed research. In this sense, emphasis began and has continued on nutrients directly or indirectly associated to nutrition and health problems. This special interest gave origin to the area of food science and technology research.

Research began, therefore, with the more basic aspect, which was the knowledge of the nutrient contents of foods; the first nutrient composition table of foods for Central America, which later was expanded to become the food composition table for use in Latin America, was thus produced.

The knowledge generated in health and nutrition at INCAP and Latin America gave origin to the expansion of activities dealing with food both at the primary level, as well as in processed products, based on indigenous basic foods. Research has been performed in various aspects of the food chain, from environmental experiments on production up to the level of the consumer. In this area, INCAP has provided and is producing useful knowledge in particular on bean crops and technology. The protein/calory problem of the population and the need for alternatives to animal food products (including milk) in its solution gave origin to another area of important research which was the development and evaluation of food mixtures available today as high-nutritive value, low-cost foods. In this area, INCAP developed the first prototypes such as INCAPARINA and MAISOY, both commercially produced at present. These models have served for the development of similar products in other parts of the world. This activity also led to the pursuit of other sources of nutrients of local availability and which would fulfill nutritive, toxicological and bacteriological specifications for human consumption. Of special interest was the utilization of cottonseed flower for human consumption. The economic demands of the countries, the tendencies for the increase in population, the costs involved in food preparation, the changes from the highly rural to a progressively urban population, and changes in food consumption have been factors which in one way or another have spurred the
research in food science and technology. The following are some examples of the results of this research: Corn and wheat supplementation for the production of tortilla, bread and pasta; bean processing to increase its availability and extend its acceptability; new types of high-nutritive value foods from nonconventional sources.

As research progressed in these lines, it became evident that the need existed for: a) an association with national agricultural centers; b) the transference of information to support practical systems; c) the study of postharvest problems; and d) the formalization of tutorial training together with research in food science and technology, by the establishment of a graduate academic course. Thus, the food research aspects undertaken by the Institute have continually expanded in order to respond to the needs presented by the member countries including activities in animal nutrition, encompassing: analysis of forages, their biological evaluation and practical utilization and the improvement of production systems of domestic animals which are the mainstay of many rural and periurban populations (of special interest in this field was the development of the first nutrient composition table of pastures and forages for Central America); the utilization of coffee pulp in animal nutrition; artificial feeding in the breeding of calves, making more milk available for human consumption; and practical systems for the feeding of the autochthonous pig. From INCAP's association with national agricultural centers arose the spreading cultivation of the high-nutritive value Nutricia corn in Central America. Among the technological transfer programs, the following are interesting examples: The establishment of agro-industrial units for dehydration of vegetables and processing coffee pulp; new postharvest technology which is in the process of being widely applied. The graduate program in food science and technology has already 54 graduates which work throughout Latin America (from Mexico, to Argentina and Chile) and the Caribbean. The potential for this activity as support to health and nutrition programs cannot be overestimated.

II. OBJECTIVES AND PROGRAMS

As a result of evaluations carried out during the period 1980-1982, INCAP redefined its objectives and priorities. These are described below.

A. GENERAL OBJECTIVES

The Institute of Nutrition of Central America and Panama (INCAP) is a scientific entity for technical cooperation, whose general objective is to contribute to the development of the science of nutrition, the promotion of its practical application and the strengthening of the technical capability of the Central American Countries and Panama to enable them to solve their food and nutrition problems.
B. PRIORITIES

To reach the general objective INCAP will conduct activities in the fields of:

1. Human resources formation and development.
2. Technical cooperation.
3. Research.

C. PROGRAM AREAS

To comply with the general and specific objectives INCAP works based on the following program areas:

1. Human resources formation and development.
2. Technical cooperation.
3. Research.
4. Administrative development

1. Research Program Area

a) Objectives

i) Collaborate with member countries in implementing operational research to allow the development and transfer of appropriate technologies in nutrition and their application to health programs, particularly at the level of primary care.

ii) To study appropriate technologies for basic foods and other food technology aspects in the countries of the subregion.

iii) Collaborate with member countries in evaluative research of field programs in food and nutrition, including their process and impact.

iv) Develop research in the countries of the subregion aimed at finding new alternatives for the solution of their food and nutrition problems, such as, new sources of nutrients, new food technologies, infection-nutrition interactions, control of specific nutritional deficiencies and other pertinent studies.
b) Programs

i) Health and nutrition.

ii) Agricultural and food sciences.

iii) Development and evaluation of intervention with nutritional impact.

iv) Dissemination and exchange of scientific-technical information.

III. CRITERIA FOR THE ESTABLISHMENT OF RESEARCH PRIORITIES IN HEALTH AND NUTRITION, AND IN FOOD SCIENCE AND TECHNOLOGY

1. Magnitude and consequences of existing problems to be investigated in the countries of the subregion.

2. Search for adequate solutions considering their feasibility of application in the countries of the subregion.

3. Technical and financial capacity of the Institute to carry out such research.

4. Identification of specific researchable problems by the countries themselves.

5. PAHO/WHO research priorities and policies.

IV. PRESENT RESEARCH PRIORITIES

A. Nutrition and Health Area

1. Food and nutrition within the strategy of primary care: Research on appropriate methodology for the control and growth of children, nutrition evaluation of the mother, studies on knowledge, attitudes and practices related to health and nutrition, and use of health services; research on adequate methodologies for health and nutrition education; studies on breastfeeding.

2. Nutrition-infection: Continue the studies in the area of nutrition and immunology, diarrheal diseases and respiratory infections.

3. Research on health and food nutrition education: Continue the studies on knowledge, attitudes and practices in relation to health and nutrition and to the use of health services; evaluations of the process and impact of educational programs in health and nutrition.
4. Food and nutrition surveillance: Methodological development and evaluation of simplified indicators.

5. Other diseases related with nutrition: Obesity, diabetes, arterial hypertension, and cardiovascular diseases which are becoming progressively important problems in various countries in the area, including those less developed.

6. Nutritional requirements: Continue the studies on requirements in particular those of micronutrients.

7. Training and development of human resources in health and nutrition.

B. FOOD SCIENCE AND TECHNOLOGY

1. Basic foods: Among these, priority is given to the studies of corn, rice and grain legumes such as comon beans. Grain legumes are receiving increasing attention because of their ample use and increased potential in nutrition.

2. New sources: Includes work on food grains and vegetables among which the following can be mentioned: triticale, amaranth, "winged-beans", cannavaalia, cow-pea, soy and "gandul."

3. Postharvest effect: Includes activities for the development of practical storage systems and the effects which these have in the stability and acceptability of the products. In view of the significant losses which the countries have in storage of beans, greater attention has been given to this problem than to cereal storage, although attention is also given to this last aspect.

4. Industrial and agricultural byproducts. These have been studied to increase their use particularly in animal production systems. The use of harvest refuse and coffee pulp are examples of products under study.

5. Training in food science and technology.

C. EVALUATION OF INTERVENTIONS

1. Impact of agricultural policies on nutritional status.

2. Evaluation of the nutritional effects of changes in salaries and food prices.

3. Evaluation of interventions in the economic field in relation with health and nutrition, etc.
The dissemination of appropriate technical and scientific information is also considered an important priority. INCAP has organized a program of technical-scientific dissemination which publishes periodical bulletins and bibliography lists and which responds to the demands from users in the member countries. The transfer of technology is also achieved through the training and development of human resources and through technical assistance to the countries.

V. ONGOING PROJECTS

A. HEALTH AND NUTRITION

1. Determination of the energy cost of activities by children of different ages and with different patterns of physical activity.

2. Determination of body composition of individuals of different ages and with different nutritional background.

3. Exploration of the absorption and bioavailability of minor elements such as zinc, ingested with foods or in therapeutic preparations.

4. Development of a model for the introduction of foods usually available in the household in the diet of infants (below one year of age).

5. Research on the influence of food intake on the course of diarrheal episodes and on the nutritional status of individuals suffering from diarrhea.

6. Evaluation of the clinical and metabolic importance of malabsorption and/or intolerance to cow's milk.

7. Analysis of the growth patterns and of other indicators of nutritional recovery of children treated for severe undernutrition at INCAP's Clinical Center.

8. Acute respiratory infection in children: a) epidemiology; b) etiology.

9. Factors which affect the incidence and severity of acute diarrhea, its persistence and chronicity, in children younger than two years of age.
B. FOOD SCIENCE AND TECHNOLOGY

1. Improvement of the nutritive value of beans.

2. Factors which influence the acceptability of beans by the consumer.

3. Basic knowledge on the amaranth seed and products development from it.

4. The use of solid fermentation to improve the nutritive value of coffee pulp.

5. The relationship between the bacteriology of vegetables and diarrhea.

6. Improvement of the productivity of the autochthonous pig.

C. EVALUATION OF INTERVENTIONS

1. Evaluation of agricultural diversification systems for the small farmer in the Guatemalan highlands.

2. Evaluation of a training and promotion program on food, health and nutrition undergoing in Santiago Sacatepequez, Guatemala.

3. Application and evaluation of new nonformal education methodologies for adults, covering food and nutrition at the community level.

4. Nutritional effects of improvement of the minimum wage in coffee farms.

5. Studies on the reliability of income and expenditure data.


8. Nutritional impact of the introduction of Opaque-2 corn varieties in rural areas of Guatemala.

9. Research in support of the development of food and nutritional surveillance systems:

   a) The validity of height measurements of school children carried out by school teachers in Guatemala.
b) Comparison of two forms of presentation of anthropometric information.

c) Relationship between the prevalences of height retardation in school and preschool children in various districts.

d) Case studies for the identification of basic steps and procedures necessary to orient the design of information systems in food and nutrition: El Salvador and Guatemala.

e) Case studies: Health seeking behavior of the population.