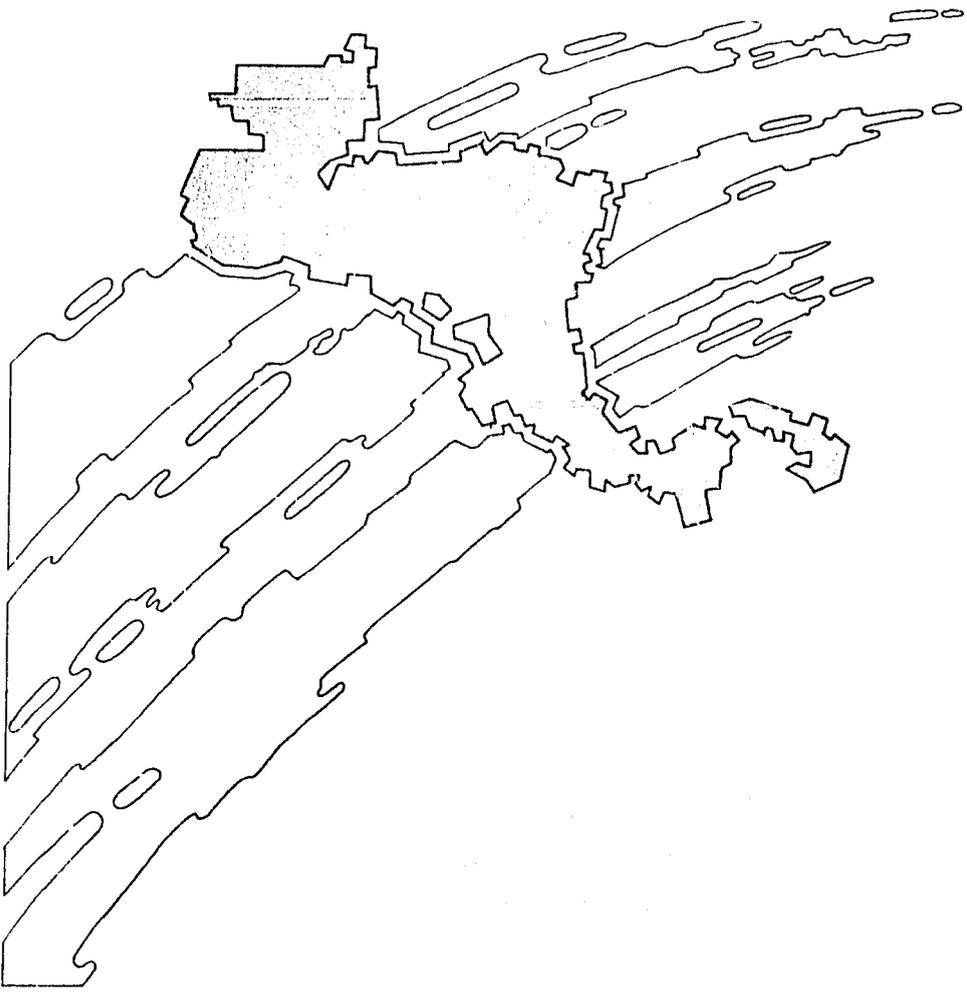


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INSTITUTE OF NUTRITION OF CENTRAL AMERICA AND PANAMA



INCAP



ANNUAL REPORT 1990

The Institute of Nutrition of Central America and Panama (INCAP) was created in 1949 with the purpose of contributing to the development of the nutritional sciences, encourage its practical application and strengthen the technical capacity of the countries of Central America and Panama to solve their food and nutrition problems. To achieve this purpose it develops activities related to its four basic functions: Research, Technical Cooperation, Formal Education and Training, and Information and Communication.

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*INCAP, conscious of its responsibility, eagerly promotes
the welfare of future citizens of its seven
Member Countries: Belize, Costa Rica, El Salvador, Guatemala,
Honduras, Nicaragua and Panama*



DIRECTING COUNCIL 1990

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Costa Rica

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Minister of Health

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Minister of Public Health and Social Welfare

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Institute of Nutrition of Central America and Panama

Dr. Hernán L. Delgado
Director, Secretary *Ex-officio*

INTRODUCTION

INCAP's Institutional Strategic Plan for 1991 - 2000 was approved during its Directing Council Annual Meeting, held in Belize in September 1990. This plan proposes among others, functional adjustments of the Institute and the strengthening of actions of the countries of Central America, through the decentralization and deconcentration of some activities that were previously concentrated at Headquarters. The plan's approval initiated an orderly process of decentralization and deconcentration that has led to the integration of Basic Technical Groups in each of the seven Member Countries of the region. These multidisciplinary teams are at present cooperating technically with counterparts of different sectors at the public, as well as at the private level. By the end of 1990 the Basic Technical Groups, although still in the process of consolidation, were already cooperating with 120 Central American institutions, which represents an increase of more than 50% as compared to previous institutional contacts. In addition, the technical cooperation being provided is more integrated and is aimed at strengthening the capacity of the public, as well as the private sector. During the first six months of 1991, these Groups were composed of a permanent staff of 45, including professional, technical and support personnel. To these resources we must add the local contracts and officials stationed at headquarters, which constitute the most clear expression of INCAP's genuine desire to give priority, during this decade, to the strengthening of the technical capacity of national institutions, and the transfer of methodologies, technologies and guidelines, as well as to the promotion and motivation of technicians and politicians for the solution of the food and nutrition problems.

Nevertheless, INCAP's decentralization is still in its initial phase. It needs, among others: the improvement of the planning, programming, follow-up and evaluation systems of technical cooperation; the consolidation of the communication system and managerial information; the strengthening of the Continuous Education Program for its personnel; the simplification of administrative and managerial processes, including the delegation of responsibilities. In spite of this, much progress has been attained in such a relatively short time.

The strengthening of actions at the countries' level, accompanied by the intensification of inter-programmatic coordination and concertation of efforts with multiple cooperative, bilateral, regional, and international agencies, have necessarily led us, to analyze the Institute's work. Thus, INCAP has directed its strategic orientations of technical cooperation towards actions aimed at solving priority problems affecting high-risk groups, evoking collaborative efforts among countries in the areas of development and mobilization of its resources, dissemination of information with emphasis on its application and the use of social communication, as well as the promotion of adequate food and nutrition for the population. The technical areas of action will include the promotion of integrated systems of production in support of food and nutrition security at the community and family level; development and transfer of food and nutrition technology; food consumption and control of food innocuity and quality control; control of specific nutritional deficiencies; mother and child health and nutrition; promotion of healthy food and nutrition lifestyles; food and nutrition education, and food and nutrition surveillance policies and plans, with emphasis on food and nutrition socioeconomic aspects. INCAP will be forming special groups in each of these areas who at present are already defining working plans and activities, as well as identifying local technical groups with whom collaborative actions can be carried out. All of the above is leading to a contraction of headquarters, which will have as its fundamental object, the generation of knowledge related to food and nutrition, the assessment of

the magnitude and distribution of these problems in each region, and the search of solutions that will lead to the development of technologies, methodologies and guidelines that will provide the basis for their control. Additionally, headquarters will operate at a specialized level by training human resources, providing specific technical assistance, developing communication and information, and conducting research. At a more operational level, the Basic Technical Groups will support the training of human resources, integrate the technical cooperation provided to the countries, and support the communication and applied research actions, with emphasis on their application. These Groups will also support the transfer of knowledge to the reality of each country. Thus, the strengthening between the headquarter's regional programs and the countries' programs will assure us that during 1992, the regional and national food and nutrition goals will respond to the urgent needs of our Member Countries.



Hernán L. Delgado
Director

Guatemala, August, 1991.

An analysis of the food and nutrition situation of the Central American region

The food and nutrition situation of the population is the result of complex interactions between social and biological processes. The analytical causal framework of malnutrition identifies two socioeconomic and biological factors directly responsible: energy and nutrient intake from food consumption, and the biological utilization of ingested foods. Obviously, each of these factors is conditioned by various elements, all of which have poverty as one of their main determinants.

For this reason, a complete analysis of the food and nutrition situation in the region must consider two of the most important events of the last decade: the worsening of poverty and the generalization of social conflicts. At the end of the last decade, 60 percent of the Central American population lived in conditions of poverty, many living in extreme poverty, especially those in rural areas. Approximately two-thirds of the poor did not have sufficient resources to assure an adequate daily food intake. In addition, existing social conflicts produced on the one hand, an increase in the militarization of social groups, and on the other, the displacement of large population groups due to war. The possibility of providing social services has also been severely affected by armed aggression, and has been threatened by the reduction or lack of increase in public expenditure for social agencies.

Thus, in economic and social terms, the decade of the eighties is considered a lost decade for Central America specifically, as well as for Latin America in general.

With respect to food availability, regional agricultural production decreased during the last decade, in contrast to the boom observed since the 1950s. In several countries, the production of export crops such as cotton, bananas, sugar cane, and coffee has fallen, as has the per capita production of staples, which increased at a slower rate than population growth. However, the subsector most affected by the crisis has been cattle raising. Thus, during the last ten years, with the exception of poultry and eggs, the per capita food production has decreased remarkably. A partial explanation for the regional agricultural crisis can be attributed to structural problems, basically the uneven distribution of productive agricultural resources and the sector's lack of income-generating capability, which explain the lack of investment and scarce support provided to the agricultural sector.

As a result of the economic crisis and social conflicts, food aid to Central America has increased. In spite of the extent of this aid, the countries of the region lack reliable data on quantities, destination and cost of these foodstuffs. Nevertheless, it is a well-known fact that for the period between 1980 - 1987, the food aid from the United States Government to the countries of the region increased from 43,500 to 772,700 metric tons. Other food donors include the World Food Program (WFP) and the European Economic Community (EEC), as well as the government of Germany, and occasionally, other countries such as Canada, Italy, Argentina, Cuba and Japan.

Food access was affected by the deterioration of the purchasing power of actual salaries, especially in recent years, as well as by an increase in unemployment and underemployment rates. Pertaining to food availability at a national level, energy and other nutrient deficits have been recorded, which influence energy malnutrition in the region. On the other hand, protein intake is not a generalized problem. Nevertheless, information on availability and apparent consumption expressed as national averages, disguises the existing gap among population groups with different acquisition capacity. Several countries (Guatemala, El Salvador, Honduras and Nicaragua) have a lack of basic grains (beans, maize, rice) availability, and the variability in the magnitude of the deficit by country and by grains is considerable. However, when the real consumption figures are compared with the nutritional recommendations, the lack of basic grains does not seem to be serious. Therefore, it seems possible that the apparent discrepancy between availability and intake is due to unavailability of information regarding local production.

Lastly, limited data is available regarding the relationship between income, consumption patterns and nutrient intake. This information is essential to understand consumption phenomena. Existing data in the region allow us to conclude that bean demand and consumption does not vary according to purchasing capacity; however, dairy products and meat demands vary proportionally according to income levels. Conversely, maize consumption, changes in inverse relation to income. These conclusions, however, must be considered as tentative, since the lack of information is extensive.

Food intake has multiple interactions with an individual's health: on the one hand, illness affects the biological utilization of foods, and on the other hand, food consumption affects the health status. Thus, in the northern countries of Central America, infectious-contagious diseases and protein-energy malnutrition are more frequent. In Panama and Costa Rica, obesity as well as chronic and degenerative illnesses prevail. In the case of Guatemala, El Salvador, Honduras and Nicaragua, diarrheal, respiratory and immuno-preventable diseases are responsible, to a great extent, for the low biological utilization of consumed foods, which in any case, are frequently consumed in insufficient quantity. For Costa Rica and Panama, the dominant pathology is attributed to the population's eating patterns and lifestyles.

The changes that occurred in the region between 1966-1967 and the 1980s, pertaining to protein-energy malnutrition and specific deficiencies have been erratic. At the regional level, a moderate reduction in anthropometric indicators of malnutrition (weight-for-age, height-for-age and weight-for-height) have been demonstrated, but the decrease has been lower than the population growth, so that the absolute number of malnourished individuals has increased. On the other hand, there exists considerable variability in the nature and extent of protein-energy malnutrition among countries, and even within a country. At present, Costa Rica is the country with the lowest incidence of nutrition problems.

With respect to iodine and vitamin A deficiencies, initially there were important reductions in countries where salt (iodine) and sugar (vitamin A) fortification programs were implemented. Nevertheless, the inadequate management of the food fortification programs was responsible for an increase in the prevalence of goiter and hypovitaminosis A in several countries. At the present time, measures to correct this situation are being carried out. Finally, there are no updated data on iron deficiency, nor national programs to control it. For this reason, we estimate that it is still an important problem in the region.

With regard to overfeeding problems, Costa Rica and Panama have reported an increase in obesity in the adult population --especially among women--, between 1965-1967 and the beginning of the 1980s.

Evaluation of the priority area: improvement of the food and nutrition situation in Central America and Panama

The regional projects prepared by the Central American countries in collaboration with INCAP were aimed at improving the consumption and biological utilization of foods, as well as developing the capacity of national institutions to face existing problems. In the area of consumption, INCAP provided support to improve food and nutrition education, increase food availability, quality, and fortification, and gave technical support to food aid programs. Activities oriented towards the improvement of the biological utilization of foods were also included in the nutrition component of the primary health care project. Strengthening of institutional capacity was supported by training and development of human resources projects. Support was also provided to food and nutrition surveillance systems.

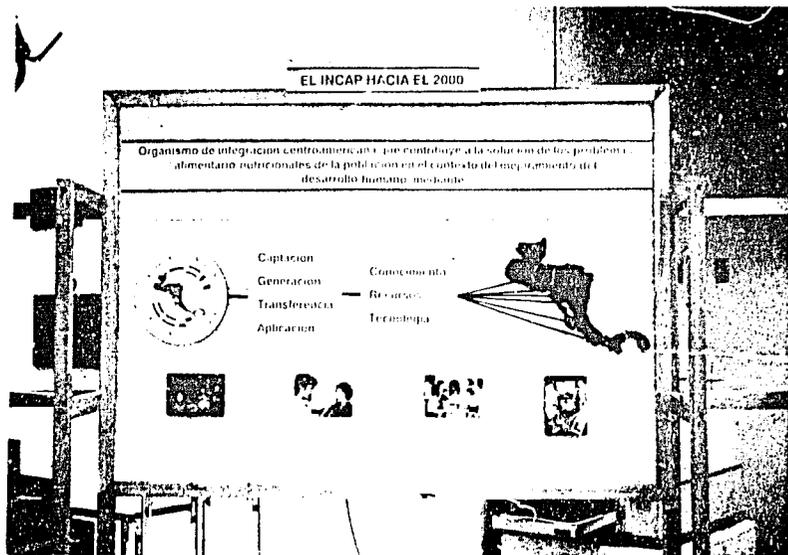
These projects were funded by the Governments of the United States, France, Sweden and Switzerland, as well as the Institute's funds. They contributed significantly to the update of knowledge on food and nutrition problems in the region and to the transfer of methodologies and technologies previously developed by INCAP or prepared as part of these regional projects. During the 1985 - 1990 period, activities related to technical assistance, training and development of human resources, research, and communication and dissemination of INCAP's scientific and technical information were strengthened. A decentralization process from headquarters to the countries, and from the central level to local health systems in the countries was initiated. Since many aspects of the regional projects are still not in operation, INCAP, in response to the Directing Council's mandate, has formed multidisciplinary technical groups in each country, in charge of promoting the technical cooperation provided to the national counterparts at all levels.

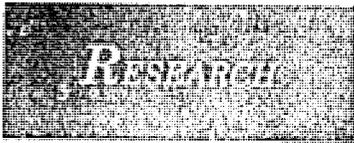
The information gathered and analyzed during the implementation of the regional projects include: 1) changes in the food and nutrition situation, and 2) changes in the socioeconomic and political environment. The Institute and the countries' experience have guided INCAP in the design of a Strategic Plan, which defines its work for the 1991 - 2000 decade.

As part of the plan and in order to accomplish INCAP's mission of "generating, transferring and applying knowledge, technologies and resources which contribute to the solution of the food and nutrition problems affecting the population of its Member Countries within the context of human development," the Institute carries out activities according to its basic functions:

- Training and Development of Human Resources
- Technical Cooperation
- Research
- Information and Communication

A description of the activities developed in each of these programmatic areas follows.





During 1990, the Institute continued to support development of applied research directed at solving the food and nutrition problems of the Central American region. The activities carried out had as their main objectives: 1) to strengthen the research capacity of each country, and 2) to increase the productivity of INCAP's scientists. To comply with the first purpose of strengthening national research capacity, the Institute continued to collaborate with national groups in the processing and analysis of data obtained from operational research carried out in Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama. Likewise, the Institute provided technical support to studies carried out in El Salvador, Costa Rica and Panama on disorders caused by iodine deficiency. It also collaborated in the implementation of a multicenter study related to the dietary management of the child with diarrhea. In addition, national government counterparts from Belize were guided in the preparation of their first national food and nutrition survey protocol. The Mother-Child Health Research Center (CENISMI) of the Dominican Republic received INCAP's assistance in the review of applied research protocols and in the design of strategies to strengthen health and nutrition research in the Dominican Republic.

During 1990, short courses on statistical methods were also given to different governmental, non-governmental and teaching institutions, and consultancy was provided in study designs, survey sample collection, as well as processing, analyzing and interpreting data. Among the institutions that received this assistance, the following can be mentioned: the School of Chemical Sciences and Pharmacy of the University of San Carlos of Guatemala, the Guatemalan Social Security Institute (IGSS), Project Hope and the School of Medical Sciences of the Central University of Ecuador.

To increase the scientific productivity, during 1990 four basic courses were given regarding statistical computer programs (SAS and EPIINFO). The purpose was to strengthen the scientists' self-sufficiency in statistical data analysis.

On the other hand, the design of INCAP's Information System was supported in its scientific and technical aspects and the Scientific Microcomputer Center was established to provide assistance in data processing and analysis, hence, channeling all institutional needs. This Microcomputer Center will maintain an information database of the studies carried out at the Institute, as well as of the food, nutrition and health situation surveys developed in the Central American region.

As part of its support to epidemiological research, the Institute strengthened its Field Studies Unit, which initially provided centralized cooperation to other technical divisions. Later, the transfer of human and technical resources to each of the units was carried out. The Statistics Unit was also strengthened and decentralized in favor of the technical divisions.

Lastly, the Information Bulletin of the Research Coordination was published, and participation of the Institute's scientists in food and nutrition national and international meetings was promoted.

During 1990, a significant increase was observed in the design and implementation of INCAP's research studies. This is evidenced by the number of projects that are presented in the following pages, as well as by the number of publications on scientific issues.

AGRICULTURE AND FOOD SCIENCES

During 1990, INCAP's efforts were aimed towards the improvement of the quantity and quality of basic foods in the diets consumed by the populations of the Central American region, using the food and nutrition chain as the reference point. The food and nutrition chain is defined as the sequence of events that occur in relation to food, from its production to its consumption and biological utilization. The above has as its basis the recognition that a balanced and adequate food intake and nutritional utilization constitute an important component in the individual's nutrition and health status.

For some time it has been known that the main nutritional limitations of the diet consumed in Central America relate to energy, proteins, vitamins and minerals. This situation has been aggravated recently by the socioeconomic crisis, and the possible adverse effects of the stabilization and structural adjustment measures that all the countries are implementing at present. The quantitative and qualitative deterioration of the diet could be one of the aspects most affected by these measures. As discussed previously, these measures could have a significant effect on the production of basic grains, the overall result of which is a decrease in the availability and physical and economic access to foods.

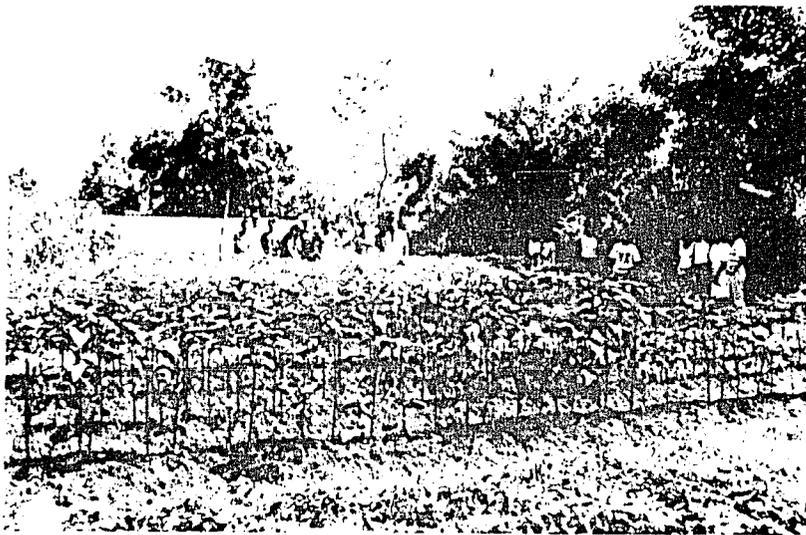
Based on the above, the measures that INCAP adopted during 1990 and that will be developed in the future are oriented towards contributing, in collaboration with agricultural institutions of the Central American countries, and with bilateral and international cooperation and funding agencies, to the increase of productivity, decrease of postharvest losses, stimulation of the development of agroindustries, increase in production and utilization of staple foods, more efficient utilization of food aid, and improvement of small-scale agriculture commercialization systems and consumer orientation.

The different studies carried out by INCAP during 1990 on the diverse aspects of the food and nutrition chain are presented in the following paragraphs.

Food production

During recent years, the Central American governments have shown great interest in the promotion of food and nutrition security among their people, which implies the improvement of food availability and access, as well as the nutritional status of the population. With the purpose of improving agricultural productivity, access and utilization of foods by applying adequate production systems, postharvest management, processing and consumption, the "Centro Universitario de Occidente" (Western University Center) of El Salvador and INCAP initiated an integrated food project in Sonsonate and Santa Ana. In the planning of this project, previous experiences of the above-mentioned University and INCAP were taken into consideration, as well as theoretical estimates for food production, processing and supplementation, different production alternatives and food consumption, and income generation at a household level. This information was used to design plant

and animal origin food production units which in their initial phase, were developed in agricultural institutions of El Salvador. This experience allowed a group of professionals and students to become familiar with the development of food production models which will fulfill the nutritional requirements of the rural population of El Salvador and that will also contribute to income generation. The 1990 experience is promising, considering the preliminary results of yield, nutrient production, production costs and income generation. Therefore, this experience will be extended to other localities in 1991.



Students participating in experimental plots of the amaranth introductory program and mixed harvesting systems

In the area of agricultural production, the Institute initiated a project on agriculture, forestry and grazing systems for small farms located in dry areas of Guatemala, in coordination with the "Centro Agronómico Tropical de Investigación y Enseñanza" (Tropical Agronomic Center for Research and Teaching) (CATIE). This project, generated by CATIE, considers several agricultural, animal husbandry and forestry interventions in areas of scarce rainfall. Among these are the increase of crop variety, the improvement of agriculture and animal husbandry productivity, and the conservation of natural resources.

In addition, INCAP has been supporting interventions related to food access, availability, management and intake, as well as the nutritional status of families. During 1990, activities began in 28 experimental farms in communities in the Department of Jutiapa, Guatemala. The initial areas of action include food production, management, preparation and consumption at household level; enhancement of the availability of animal-origin foods through better fodder and animal feed management, studies on economic, social and cultural aspects of the food and nutrition system, as well as the nutritional status of the participating families. This project has a duration of four years and will be extended in 1991-92 to Honduras, Nicaragua and Panama.

Family and community vegetable gardens were developed as an alternative to encourage food production and to enhance food and nutrition education in groups of families in the Department of Totonicapán, Guatemala. As part of this project,

a diagnosis of existing systems and harvesting practices was carried out. Small-scale crops aimed at increasing the availability of iron and vitamin A, were also designed and tested. Based on this experience, harvesting systems that included the production of carrots and amaranth as a source of vitamin A precursors, and of spinach, chard and amaranth as sources of iron were established. The implementation of the generated systems will be promoted, and the effects of food preparation and nutrient stability will be evaluated before measuring the biological utilization of these nutrients.

*INCAP's
Experimental
Farm*



Studies on food production were also carried out at INCAP's Experimental Farm in Guatemala. Among these, the following can be outlined: those that evaluate the effect of different fertilizers on the technological and nutritional quality of beans, and the testing of production technologies for small animal species and basic grains production systems. Additionally, material for the nationwide collection of beans was increased, providing a source of genetic material in programs concerned with the nutritional and technological improvement of beans. The amaranth collection was also increased, in order to assure the maintenance of the germplasm bank for the conservation of genetic amaranth resources. The Experimental Farm also served as headquarters for the International Workshop on Food Drying Procedures, and to test food management manuals.



*Participants of
the International
Workshop
on Food Drying
Procedures,
carried out at
INCAP's
Experimental
Farm*

Among the collaborative activities of the "Instituto de Ciencia y Tecnología Agrícola" (Institute of Agricultural Science and Technology) ICTA-INCAP Agreement in Guatemala, research was carried out on: 1) the effect of two alkaline treatments on the nutritional value of lemon grass tea (*Cymbopogon citratus* spp.) pressed pulp for animal feeding; 2) the agronomic and nutritional evaluation of sugar cane (*Saccharum officinarum*) varieties and sorghum (*Sorghum* spp.) forages in the southern coast of Guatemala; 3) the chemical characterization of 19 cultivars (varieties) of sweet potato (*Ipomaea batatas* L. Lam), agronomically evaluated in San Jerónimo, Alta Verapaz; 4) the preliminary evaluation of the agronomic characteristics and protein yield of nine advanced lines of common beans (*Phaseolus vulgaris*), resistant to golden mosaic virus in Monjas, Jalapa, and 5) the effect of the frequency of trimming and levels of nitrogen fertilization on the yield and nutritive quality of the white mulberry tree (*Morus* spp) in Escuintla.

In El Salvador, studies were carried out on the harvesting of amaranth grain, based on previous research related to the nutritional quality of the leaves and seeds of that plant, as well as its residue's potential in animal feeding. In order to estimate the adaptation of amaranth in El Salvador, evaluate grain yield and its eventual commercialization, 10 varieties of amaranth were selected. The field study was carried out in six experimental units in El Salvador, using a randomized block experimental design. Results confirm the feasibility of producing amaranth seeds in El Salvador from the production point of view. The yield was 24 and 70% higher than that obtained from sorghum and maize, respectively. Amaranth also proved to be better than maize and sorghum in fat and protein yield per 0.84 ha. This trait gives this crop good prospects for the future.

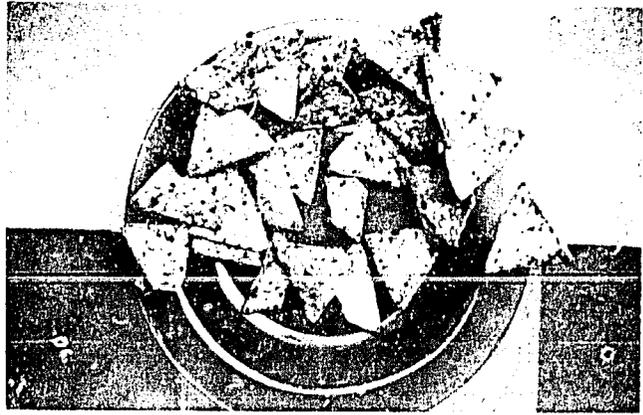
Basic foods

During 1990, studies were carried out on basic foods (cereals, food grains, legumes, vegetables and fruits) since these are important sources of nutrients for the population in general.

Regarding cereals, research was carried out on maize and sorghum. With respect to maize, it should be remembered that the technology to improve its protein quality was discovered 25 years ago, when it was found that the gene Opaque-2 induced significant increases in lysine and tryptophan content, essential amino acids in which common maize is deficient. After genetic and agronomic research, it became possible to develop varieties of maize with high nutritive value (QPM), approximately 90% of the nutritive value of milk. One of the varieties experimentally produced in Guatemala is Nutrieta, with either white or yellow grains. Both are hard-endosperm varieties and their protein quality with respect to casein fluctuates between 80 and 85%.

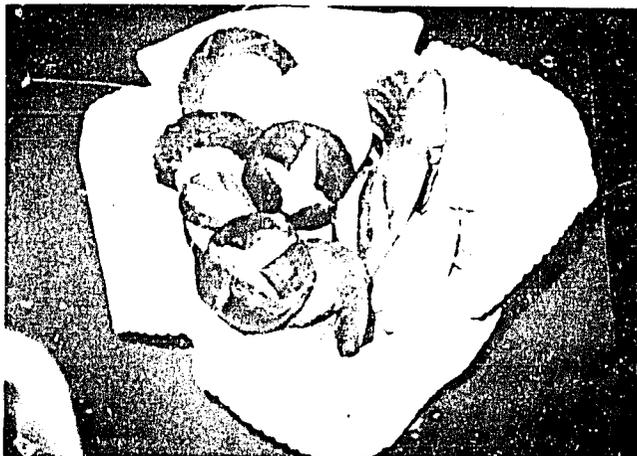
Based on previous studies regarding the utilization of these nutritionally improved maize varieties, research was carried out to determine the possibility of developing other products, such as "extended" milk. Therefore, seven diets were prepared for each maize variety in which the protein distribution varied between 100 and 0% of non-fat milk and maize, respectively. The diets were offered to rats for biological studies on protein quality. Results showed that the nutritional quality of the "extended" milk was the same as in the mixture where cow's milk provided from 60 to 80% protein. With these results, mixtures were prepared which had the same quality, digestibility and energy content (but different protein content), that may be used in food and nutrition programs. Other QPM maize products have been developed, such as fried corn chips.

*Fried corn
chips
("Nachos")
prepared with
quality protein
maize (QPM)*



Since sorghum is considered to be a relatively high production cereal in the dry and hot zones of eastern Guatemala, southern Honduras and northern El Salvador and Nicaragua, research was carried out with extended sorghum to prepare foods of high nutritive quality. Specifically, a food simulating "alboroto" was prepared, using extended sorghum, fortified with nutritionally improved supplementary protein and energy. This product contains popped sorghum, precooked whole soybeans, sesame seeds and brown sugar with twice the protein and oil contents of the commercial product, while enjoying a level of acceptance comparable to the traditional product. Complementary analyses are presently being made on this product.

Studies on amaranth consisted of the nutritional evaluation of bread in which wheat flour was substituted by popped amaranth flour. Product acceptability was also determined. Popped amaranth flour was used, and four mixtures were prepared with wheat flour, with contents ranging from 0 to 30% amaranth flour, with which breads were prepared using conventional bread-making technology. Biological studies indicated an increase in protein quality resulting from the addition of 10% amaranth flour. Protein quality did not improve when amaranth flour levels increased. Protein digestibility decreased when the percentage of amaranth flour increased in the mixture. With regard to preferences, the wheat bread had a score of 7 which decreased to 6 for the bread with a 10% amaranth substitution, and to 5 when more amaranth was added. These results indicate the need to continue seeking ways to improve the sensory characteristics of amaranth flours since, from the biological and economic points of view, its utilization would be useful in bread production.



*Bread prepared
at INCAP with
extended wheat
flour and
amaranth grain
flour*

Other studies with amaranth were carried out to determine the effects of different processing methods such as pressure cooking, flaking, roasting and expansion on dietetic fiber of several grain species. Results show that there are significant differences in the dietetic fiber content among species: *A. cruentus* showed a value of 7.1%, while *A. hypochondriacus* and *A. caudatus* had values of 12.5 and 13.5%, respectively. All the processing methods increased dietetic fiber content, but not in a consistent way.



Yield trials of different amaranth varieties at INCAP's Experimental Farm

Considering the importance of **legumes** as a source of protein for the Central American inhabitants, a series of studies was carried out in 1990, mainly on common beans (*Phaseolus vulgaris*). These studies are justifiable, because in spite of the relatively high protein content, the nutritional quality of legume seeds is decreased by factors such as low protein digestibility, low sulfur amino acid content and the presence of antinutritional or toxic substances. Among these substances, the most studied are the trypsin inhibitors, proteins that form estequimetric complexes with the enzyme competitively inhibiting its catalytic function. Treatments that could destroy the effect of one or more of the factors mentioned could immediately improve the nutritional quality of the seed. Among others, the cooking process seems to increase protein digestibility and destroy the activity of trypsin inhibitors and other antiphsiological factors.

The purpose of this research is to isolate and purify trypsin inhibitors present in common beans (*Phaseolus vulgaris*) by chromatographic methods and to evaluate thermic stability by the chromatic dyeing method. In the study, four bands of trypsin inhibitors in raw beans were identified in the Tamazulapa variety, which disappeared in the cooked beans. This indicates that thorough cooking inactivates trypsin inhibitors. This information is useful for genetic plant breeders, and in the processing of beans for consumption.

Postharvest bean losses caused by insects, particularly *Zebrotus*, continues to be a problem in the Americas. Even though there are methods that reduce or eliminate the problem, such as chemical products, most of these products are expensive and are not available to the small producer and grain merchant. Nevertheless, it has been found that variability exists in relation to the resistance of bean varieties to insects during storage. Complete resistance in wild bean varieties has

be detected, where it was found that arceline protein was responsible for this substance. Arceline is a potent inhibitor of proteases. It is unknown whether it is completely destroyed or inactivated during the process used in the preparation of beans. Also, it is worthwhile mentioning that it has been possible to transfer the genes that produce arceline in wild beans to commercial varieties. The purpose of this study, which was carried out jointly with the International Center for Tropical Agriculture (CIAT) was to evaluate the protein quality of beans containing arceline versus other bean selections. Results confirmed that bean varieties containing arceline require the same cooking time as the beans without arceline and one common commercial bean. Furthermore, it was found that its nutritive value is similar to that of beans of the control group and did not present antiphenological problems in experimental animals fed large amounts of this food.

With regard to bean acceptability, the attributes characterizing the flavor of black beans have been identified: bean flavor, residual flavor and bitter flavor. These flavors are associated with specific chemical compounds and their reaction products. Research was carried out to associate some chemical compounds with bean acceptability flavors. In one group of bean samples with different degrees of acceptability, tannin content, biologically active tannins, raffinose, stachiose and sacchrose were determined. Results indicate that bean flavor is more strongly associated with the contents of saccharose and raffinose; stachiose and tannins are related to the residual flavor of beans, and stachiose is also associated with the bitter flavor. These chemical compounds did not explain the variability found in the samples studied. Therefore, further studies on this issue will be carried out.

Hardening of the common bean during storage is also recognized as an important factor in bean grains acceptability. INCAP has thoroughly studied a series of mechanisms that partially explain the hardening of the seed. With the purpose of testing alternate aspects that could give more information on this subject, a study was developed consisting of the sequential physical division of layers of the grain and its characterization in terms of yield, partial chemical composition, functional properties and nutritive value. This study (still in progress), could be applied to the development of food products such as legume flours. Also, pertaining to bean cooking time, the effect of altitude over sea level on the cooking time, chemical composition and nutritive value was evaluated. It was concluded that the factor inversely influencing cooking time without affecting other parameters is atmospheric pressure; therefore, cooking time is significantly shorter at sea level.

The hardening of the stored bean, as well as the evaluation of its nutritional losses, continued to be of interest at INCAP. With regard to the effect of storage of this grain under farming conditions, the effect of storage was monthly evaluated with respect to cooking time, grain humidity, methionine, cistine, soluble nitrogen, and starch content, as well as protein quality and digestibility. Findings revealed a significant increase in cooking time for the native bean, and for an improved variety that had been stored for under six months. Protein and starch content did not change during that period. Sulfur amino acids decreased, as well as protein quality and digestibility.

Other studies related to bean storage were carried out to determine the existing relationship between enzymatic and non-enzymatic browning reaction and the hardening process of the bean. Therefore, samples of raw and treated beans, with low and high humidity were stored at different temperatures packed in high density polyethylene bags. Results showed that beans thermally treated hardened at a slower rate than the ones that had not received thermic treatment. This was interpreted as an indicator that enzymatic reactions play an important role in the hardening process of the bean. On the other hand, reducing sugars decreased as a result of storage and the non-enzymatic browning increased in stored samples. Based on the above, the preliminary conclusions were that non-enzymatic browning and non-enzymatic reactions influence hardening of the bean.

Lastly, with the purpose of proposing a methodology to classify and select stored bean grains of good quality, changes in the physical and chemical characteristics of beans were analyzed. One of the important conclusions reached in this study was that color index of soaking waters and solids in soaking waters presented highly significant correlations with the cooking time of stored beans, and therefore, could become valid indicators to consider selecting bean grains during storage.

Research on the bioavailability of protein and iron in black beans was also carried out in 1990. It is well known that tannins that form a link with protein, decrease protein digestibility. Previous studies carried out at INCAP and other centers showed a drop in the content of tannins when beans are cooked, and some authors explain this as a change in the solubility and chemical activity of beans. Recent studies have confirmed that cooking and heating condense tannins and polyphenol concentration, helping in the understanding of the mechanisms that interfere with the nutritive value of beans. Available results regarding bioavailability of iron in beans indicate that the process, as well as the color, affect its bioavailability.

Other legume grains studied were: 1) cowpea, for which a dehulling process was developed in response to Panama's request for a technology to prepare a nutritionally improved cream, 2) pigeon pea to use in the food agroindustry in the form of a processed flour with rice flour, and 3) unripe canavalia to determine its nutritive quality.

As mentioned before, one of the nutritional problems of the Central American populations is hypovitaminosis A. This problem has been addressed through different actions. One of these is the promotion of the harvesting and consumption of several vegetables that have proven to be high in beta-carotenes. Among these, and to which the Guatemalan population has easy access, are leafy greens, such as amaranth (*Amaranthus sp.*), "chipilín" (*Crotalaria longirostrata*), spinach (*Spinacea oleracea*) and "macuy" (*Solanum nigrum L.*). With the purpose of determining the carotene content of these vegetables, diets were analyzed using conventional methods, liquid chromatography at high pressure and *in vivo* digestibility studies. We expect to continue these studies on different plant sources to evaluate carotene digestibility and bioavailability.

Studies on oleaginous seeds

Since the first national surveys on food and nutrition, carried out between 1965 and 1967, energy deficiency has been recognized among the populations' diet, especially in rural areas. This deficiency could be partially corrected by an increase in oil intake. Unfortunately, there is little opportunity for consumption of fats and oils in the populations that are mostly affected by malnutrition, and the cost of these products is high. Thereby, it is important to develop ways of utilizing new local oil sources. Along these lines, INCAP carried out a pilot project of technological development for the extraction of sunflower seed oil that later on could be transferred to cottage industries in rural areas. The technology used consisted of a device to dehull seeds and a manual press with a capacity for seven kg of seed per batch. The technological evaluation revealed an efficiency of 80% dehulling at 1,217 rpm, and an oil efficiency extraction of 54%. The evaluation of crude oil quality indicates promising possibilities for its use in human feeding, given its acceptability in sensory tests. Furthermore, a preliminary cost analysis showed its feasibility for its transfer to the rural population.

The technological adaptation of the conventional process for the production of peanut butter was also developed at the request of a non-governmental institution from Guatemala. The problems solved with this technological development were the elimination of the hull and film surrounding the kernel of the peanut and the separation of the oil. Modifications to the process contributed to improve the quality of the product, production quantity and its commercialization to new markets.

Other food resources

In the field of animal feeding, the Institute carried out studies on the chemical composition, cellular fractioning and *in vitro* digestibility of fruits from tropical trees and legumes. Fruits from trees on which studies were carried out during 1989 - 1990 period include the following: "conacaste" (*Enterolobium cyclocarpum*), "cencero" (*Gallandra saman*), "caulote" (*Guacima ulnifolin*), "amate" (*Ficus sp.*) and "ramón" (*Brosimum alicastrum*). Legume grains studied were canavalia (*Canavalia ensiformis*), velvet beans (*Stizolobium deeringianum*), pigeon peas (*Cajanus cajan*) and two varieties of cowpeas (*Vigna unguiculata*). According to results, the fruits have high potential as animal feeding sources, since their protein content is similar to that of most of the forages, they have low fiber content and their *in vitro* digestibility is high, except for the "caulote". With regard to legume grains, results indicate that they are of great value because of their chemical composition and nutritive value, their protein content and *in vitro* digestibility are high, and their fiber content is low.

Transfer of food technology

In response to requests from Panama, Nicaragua and El Salvador during 1990, INCAP collaborated in the transfer of technology for the production of the nutritionally improved cookie. In the case of Panama, activities were carried out in support of the production of a high nutritive value cream for schoolchildren and breastfeeding mothers (equivalent to Incaparina), and of studies on the acceptability of the cookies and the nutritionally improved cream with primary schoolchildren. In addition, new cookie preparations were developed and tested using different materials, such as mixtures of oleaginous seeds and wheat, maize, soybean and sesame seed flours, as well as mixtures with animal protein (skim milk) and with animal and vegetable protein (non-fat milk and amaranth flour).



A professional from the Food Technology Transfer Program, conducting acceptability tests of the nutritionally improved cream in schoolchildren of Panama

Support was also given to El Salvador for the preparation of weaning foods, and in Guatemala, the Institute continued to provide technical assistance for the quality control of the nutritionally improved cookie that is provided to more than 1,200,000 schoolchildren. Furthermore, training of industrial and cottage industry bakers responsible for its production continued during the year.

Finally, in response to requests made by food production companies, cooperative groups and artisan producers, INCAP has been studying and transferring other food technologies, such as fruit preserves, dried fruits and vegetables, and animal protein extension for vegetable protein (such as chilibeans), among others.

NUTRITION AND HEALTH

Specific Nutritional Deficiencies

One of the strategies for the control of vitamin A deficiency is an increase in the dietary intake of carotene and other vitamin A precursors. With this purpose, a study was carried out to determine physical characteristics and carotene concentration of two varieties of carrot harvested in four types of soil. The two varieties studied include: the one that is commonly grown in Guatemala, and a new variety that is particularly rich in beta-carotenes (known as "super-carrot"). Currently, the results of this study are being analyzed.

On the other hand, an analysis was made of the acceptability and stability of sugar fortified with both vitamin A and chelated iron with amino acids. This study is justified by the existence of vitamin A deficiency in the diet of wide sectors of the Central American population. Likewise, anemia caused by inadequate iron intake has been documented as one of the region's specific nutritional deficiencies. In the past, a strategy used to control vitamin A deficiency has been sugar fortification. The study carried out during 1990-91 had as its objective the dual fortification of sugar with vitamin A and iron. Available results indicate that doubly fortified sugar with vitamin A and iron, used to prepare fried plantain, "magdalena" (pound cake), "horchata" (beverage made with rice), and lemonade, does not affect the flavor of these foods; however, it causes the products to acquire brown coloring, a fact that could jeopardize its acceptability. Stability studies will be developed during the first semester of 1991 exposing samples of doubly fortified sugar to four different environmental conditions prevalent in Guatemala.

Regarding iodine and fluoride deficiencies, in 1990 support was provided to the governments of El Salvador and Panama to update information on goiter prevalence and to determine iodine and fluoride levels in schoolchildren. Preliminary results obtained in Panama indicate that goiter prevalence in schoolchildren has increased from 6% at the beginning of the 70s to 18% nationally at present, while in the Azuero Province, prevalence has reached 22%.

In El Salvador, goiter prevalence at the national level was 25%, which is lower than that found in the previous survey (48% in 1965); nevertheless, the study indicates that iodine deficiency is still an important public health problem in El Salvador.

Dietary management and breastfeeding practices

Dietary management of the child with diarrhea

Acute diarrhea continues to be an important cause of morbidity and mortality, mainly in the less developed countries of Central America. Besides death, dehydration and malnutrition are its two main consequences. Controversy still exists regarding the most effective dietary management during episodes of acute diarrhea. For children under six months of age who are fed formulas, no consensus exists as yet on what degree of formula dilution should be used in feeding infants after rehydration. For this reason, the Institute initiated a study to evaluate the clinical response of children under six months of age with acute diarrhea when they are fed a formula at normal dilution, as compared to using a more diluted formula and gradually increasing its concentration. The study will be completed during the first six months of 1991.

Along these lines, a pilot study was developed to determine whether children under five months with acute diarrhea can adequately absorb rice nutrients in a formula made with rice and milk. In this study, rice enriched with C-13 was used. Results of the study indicated that infants of this age with acute diarrhea adequately tolerate an isoenergetic mixture made of milk and rice. Furthermore, total nitrogen and energy absorption in the diet, as well as of the nutrients in the C-13 rice, was relatively good during the diarrheal phase and very good during the convalescent period (two weeks after diarrhea ceased).

During 1990, a study was also undertaken to determine if liquid vegetable formulas (Incaparina and sugar; maize-whole soybean with sugar; maize-dehulled soybean with sugar) with high energy density, used as a complement to a mixed diet, would prevent or reduce nutritional damage to children with acute diarrhea without increasing the severity and duration of the disease. The study ascertained that none of the experimental formulations worsened the course of diarrhea; in fact, duration of the disease was shorter with these formulas than with a formula based on soybean protein isolate that was used as control. On the other hand, growth of children that did not have persistent diarrhea, fed either the three experimental formulations or the control formula, was the same or better than that of similar children without diarrhea who consumed the same mixed diet and liquids customarily used in the locality of the study (skimmed milk or very diluted Incaparina). The formulas used (80 Kcal/dl), provided from 56 to 62% of the total energy intake of the patients.

During this year, a community level study was also initiated on the dietary management of children with persistent diarrhea, using locally accepted common foods. This project (that will conclude in 1991) is exploring whether a diet based on Incaparina atole and maize and beans porridges or supplementation of the home diet with high energy/high protein cookies would affect the nutritional status of children with acute and persistent diarrhea, or the duration of diarrhea. In addition, a methodology was developed to study the appetite of children at home with acute and persistent diarrhea, and the mother's behavior in regard to feeding them.

Results of previous studies undertaken by INCAP and other institutions have found: 1) a reduction in the food intake of children during diarrheal episodes; 2) a greater effect of food supplementation on growth of children with diarrhea, and 3) a positive effect of the intake of staple foods during diarrheal episodes. Based on these findings, a study was initiated to design an education intervention to promote adequate dietary management of children with diarrhea at the community level, using culturally acceptable food preparations, that are economically feasible and whose preparation and administration to the child take into consideration the mother's time limitations. The study, initiated in 1990, uses formative research which combines anthropological and epidemiological methodological elements, behavioral sciences, social marketing and communication techniques.



*A home visit to develop an educational program
on feeding the child with diarrhea*

Furthermore, as will be described with more detail in a later section of this report, a multicenter study was begun on dietary management of the child with acute diarrhea, which involves scientists from Guatemala, El Salvador, Costa Rica and Panama.

Breastfeeding

As part of the research on the effect of nutritional supplementation of mothers on the amount of breastmilk produced, a randomized double-blind study of two groups of 55 mothers was concluded during 1990. One group received a supplement with 500 Kcal/day and a second received a supplement of 140 Kcal/day.



*Milk extraction
from a mother
who participated
in the study of
the effect of
nutritional
supplementation
on the amount
of milk produced*

Results indicated that supplementation increased the amount of mother's milk during the time that the intervention lasted, reaching a maximum impact at the 20th week, which coincides with the greatest nutritional demand during lactation. Differences in the quantity of milk production at the 5th, 10th, 20th and 25th weeks of lactation were 5, 27, 47 and 38 ml/day, respectively. Results at the 20th and 25th weeks were statistically significant. On the other hand, when comparing effects among two groups of women with different nutritional status, it was found that the supplementation impact was greater in the mothers with highest degrees of malnutrition. The nutritional status of mothers was determined based on calf circumference (classified as either above or below the median at the beginning of supplementation). Growth of infants whose mothers received high supplementation was 67 g greater during the 5th to the 25th week. A higher percentage of children of the highly-supplemented group of mothers was fed only breastmilk during the 10th week.

Another mother
who participated in
the study



Results of the randomized double-blind study carried out during the stage of greatest nutritional demand during breastfeeding, revealed differences that had never been reported in other non-randomized studies. The supplementation impact is reflected not only in the amount of milk produced by the mothers, but also in the feeding patterns of the child.

Immunological studies related to breastfeeding which were begun during 1990 were intended to investigate the relationship between the consumption of cow's milk and soybean milk by nursing mothers and antibody levels in their milk, as well as the effect of anti-cow's milk or anti-soybean antibodies on the lactating children. Furthermore, during the year a study was carried out on the effect that intestinal infections of nursing mothers have on their milk antibodies. Findings indicated that the mothers who had suffered infections caused by *Shigella spp.* and *Giardia* had a decrease in specific antibody levels.

In addition, research based on an animal model was carried out to study the effects of foods proposed as galactagogues. The study was conducted in rats, comparing the weights of litters whose dams had received an oral dose of metoclopramide and another group that had been fed extracts or infusions of the weed "ixbut". Results revealed that metoclopramide increased milk production, as

determined by the litters weight gain. In the case of "ixbut", rats presented a larger mammary area than either the control rats or than those fed metoclopramide, and blood levels of prolactin were comparable to that of the animals treated with metoclopramide and significantly higher than the control group.

Diseases that affect nutritional status

During 1990, data analyses of the longitudinal study regarding the epidemiology of persistent diarrhea carried out in Santa María de Jesús, Guatemala continued. Data indicate that local children that are 0 - 3 years old have, on the average, eight episodes of diarrhea per year. The highest incidence was found in infants 6 - 23 months of age, males suffering more diarrhea than females. Eleven percent of all the diarrheal episodes lasted more than 13 days, with children 0 - 5 months of age being the most affected by persistent diarrhea. Even though there is no general pattern of association between enteropathogens and persistent diarrhea, there are pathogens (adherent *Escherichia coli*, *Cryptosporidium* sp., *Campylobacter jejuni*) associated with persistent diarrhea at different ages.

In order to have more information on the etiologic agents of acute and persistent diarrhea, and to learn more about pathogenicity factors, genetic analyses continued of enteroadherent *E. coli* and of *Campylobacter jejuni*.

As part of the studies on the determinants of diarrheal disease, a study was carried out during 1990 on fecal contamination of water and foods consumed in a Guatemalan rural Indian population. Samples of foods already prepared for consumption and water stored in clay or plastic vessels for food preparation and drinking, were collected in households in Santa María de Jesús. All samples were investigated to detect fecal coliforms and *E. coli* as indicators of fecal contamination, using the technique of the most probable number (MPN) according to established methods. Fecal contamination was found in all the water samples and in 58% of the foods examined, in varying concentrations. Foods such as beans, coffee and tortillas represented 75% of the samples collected, since they were the foods available in most households. Forty-four percent of beans presented fecal contamination, and 38% of coffee and tortilla samples.

In view of the importance that water has on diarrheal diseases, during 1990 an evaluation of the introduction of piped water in rural homes, including behaviors related to water use and diarrheal rates continued. An education intervention was also designed to intensify its impact. The longitudinal study is being carried out in Santa María de Jesús, where in 1988 a water pipe system was installed that supplies water to about half of the homes. The first phase studied a specific behavior which was potentially important in the use of water for consumption or hygiene, and its effects on diarrheal rates of children under three years of age. This phase combined epidemiological methodologies (active surveillance to identify diarrheal rates and potential confounding variables) with anthropological methods (two innovative techniques of structured observation), specifically developed for this type of study. Data analysis indicated inadequate hygienic practices and a significant association of five specific behaviors with higher diarrheal rates. Of these, two are related to the use of water: 1) the mother's visibly dirty hands (indicator of little or infrequent handwashing), and 2) the presence in the households of uncovered vessels filled with water (indicator of inadequate water handling).



*A conversation
between an educator
in Santa María
de Jesús and
a mother of the
community*

Based on the results obtained in the first phase, an educational intervention was designed with the general goal of reducing diarrhea-related morbidity by 25% in the intervention group formed by 200 children under three years of age. A proposal was made to increase correct handwashing before touching foods that the child under three years eats (correct handwashing is understood as the use of clean, running water, soap and a clean cloth to dry the hands). Furthermore, the use of the "tippy-tap" to help wash hands correctly was recommended (an appropriate device for handwashing that uses a minimum amount of water). During 1991 an intervention will be carried out and a study initiated to evaluate the intervention. During the intervention and afterwards, diarrheal rates will be measured and the behavior of the families will be observed, using the same methodologies applied in the first phase.

*Use of appropri-
ate technology
for handwashing
to prevent
diarrhea*



Management of diarrheal diseases

Antimicrobial resistance

Antimicrobial resistance of isolated strains of *Salmonella enteritidis* and *Shigella spp.* among children in the Persistent Diarrhea Epidemiologic Study carried out in Santa María de Jesús was determined, in cases of diarrhea, as well as in healthy controls. The following antimicrobial drugs were evaluated using the Bauer and Kirby Method: ampicillin (Am), trimethoprim-sulfamethoxazole (TMP-SMX), chloramphenicol (Cl), cephalotine (CE), nalidixic acid (AN), gentamicin (Ge) and tetracycline (Te).

Strains of *S. enteritidis* presented a resistance of 0% for AN, 1% for CE and Cl, 2.1% for AM, 3.1% for TMP-SMX, 8.2% for Ge and 16.7% for Te.

Shigella spp. showed an average resistance during the three years that the study lasted of 92% for Te, followed by 39% for AM, 26% for Cl, 15% for TMP-SMX, 3.5% for CE, 0.5% for AN and 0.26% for Ge.

The resistance of *Shigella spp.* to TMP-SMX (the drug of choice for treatment of shigellosis in children) was analyzed in depth. Findings revealed that this resistance is caused by *in vitro* and *in vivo* self-transferable genes, and that the transference degree increases significantly in the drug's presence. Three years after the study began, shigellosis incidence decreased, but the resistance to TMP-SMX increased from 0% during the first year of study to 25% in the third, with a medium of 15% for the three years of surveillance. This information indicates that TMP-SMX must be used prudently and cautiously. If not, the effectiveness of this drug will be seriously decreased, a fact that is worrisome since there is no alternate treatment that is as effective as TMP-SMX.

The antibiotic resistance of *Shigella spp.* was also analyzed from the molecular point of view. For this purpose, plasmid profiles were prepared with strains of *Shigella spp.* that had the same antimicrobial resistance: 12 strains of *Shigella flexneri 6* that are resistant to ampicillin, chloramphenicol and tetracycline showed a high molecular plasmid weight (60 megadaltons) in 10/12 strains analyzed. The profiles are not similar, hence, a common contamination source cannot be identified.

In regard to the use of antimicrobials to treat persistent diarrhea at the community level, the study on the use of gentamicin and trimethoprim-sulfamethoxazole in cases of persistent diarrhea was completed in 1990. Results indicate that gentamicin, in the dosage and conditions used, does not offer any advantage in the treatment of persistent diarrhea at the community level, and also suggest that the use of trimethoprim-sulfamethoxazole is not a good solution.

On the other hand, medical literature has recently reported the effects of vitamin A supplementation on the reduction of infant mortality. Based on this information, in 1990, a study was carried out on infant mortality during the period in which 200,000 IU doses of vitamin A were distributed to children six months to five years of age. Using the longitudinal study in Santa María de Jesús, an analysis was made of the morbidity of children during the semester following the vitamin A campaign, dividing the children according to the vitamin megadosis intake. Findings revealed that the children who took vitamin A were older and had suffered greater morbidity before the distribution than those children who did not receive vitamin A. Analyses to date have not shown effects on diarrhea or respiratory ailments during the six months following the vitamin A intake.

Vaccine preventable diseases

During 1990 INCAP's Reference Laboratory continued its function in the diagnosis of poliomyelitis for the Eradication of Polio in the Americas Program.

A total of 765 stool samples were processed during 1990 for polio diagnosis. In comparison, during the years 1988 and 1989, 222 and 482 samples, respectively, were processed. Samples analyzed during 1990 came from 271 cases of flaccid acute paralysis and 232 contacts from the Central American countries and Mexico. The isolation rate using rhabdomyosarcoma (RD) cells and HeLa was 35.0%, being higher for contacts (50.4%) than for cases (28.3%).

From the total number of isolates, 33 (12.3%) were identified as poliovirus, the others were reported as non-polio enterovirus and adenovirus. Three of the polio viruses isolated were identified by the Center for Diseases Control (CDC, in Atlanta, Georgia, USA) as wild polio 3, using ADN probes, a polimerase chain reaction (PCR), and nucleoid sequence on part of the viral genome. Two of these isolates were stool samples of contacts from the areas of Totonicapán and San Juan Sacatepéquez, and one case from Chimaltenango, all in the Republic of Guatemala. The other isolates were shown to be poliovirus that came from the vaccine. It is expected that for 1991, the Reference Laboratory can make intratypical differentiations from polioviruses isolates, applying the ADN probes, thus making the service to the Central American Countries more efficient and rapid.

With regard to measles, during the year a study was conducted on serum antibodies against measles among the Guatemalan population. Because of the measles epidemic that has affected this population since 1989, the "Hospital de Infectología" (Hospital for Infectious Diseases) requested collaboration from the "Dr. Leonardo Mata" Laboratory of the Infection, Nutrition and Immunology Program, for the viral diagnosis of measles. Samples of nasopharyngeal aspirates obtained from patients diagnosed with measles that had been admitted to "Hospital de Infectología" were received. It was impossible to isolate the aspirates; however, clinical diagnosis of measles was confirmed through immunofluorescence in 55% of the cases.

Furthermore, and with the purpose of determining prevalence of measles antibodies in the Guatemalan population, serum was taken and analyzed from the following: sick children admitted to the "Hospital de Infectología"; children who consulted the Cuilapa, Santa Rosa Hospital; children seen at the Growth and Development Clinic of the Roosevelt Hospital; and of blood from the umbilical cord, during the acute phase of the disease. Of the population studied, 26% had antibodies against the measles virus.

In children under age one and in serum samples of the umbilical cord, antibodies were detected in 10% of the specimens analyzed. On the other hand, of the children vaccinated in Cuilapa, 69% presented detectable levels of antibodies against measles, while 39% of children that had not been vaccinated were positive.

Lastly, as regards to the immune response of Guatemalan children to vaccination against *Haemophilus influenzae* type B, the immune response of Indian children to the conjugated vaccine was compared to that of "ladinos" (non-indigenous Spanish-speaking person) 18-24 months old. No differences were found in the immune response of the two groups, although it was determined that the levels reached by the Guatemalan children were lower than those of Anglo-Saxons and similar to other native-american populations.

Dengue in Guatemala

During 1990 the "Servicio Nacional de Erradicación de la Malaria" (SNEM) (National Malaria Eradication Service) of the Ministry of Public Health and Social Welfare, requested INCAP's collaboration for the diagnosis of dengue in Guatemala. The Microbiology Laboratory at INCAP has its own cellular lines that are appropriate for virus isolation (mosquito (*Aedes albopictus*) cells, clone C6/36 of Igarashi and monkey kidney cells LLC-MK₂), therefore it was decided to evaluate them in terms of their usefulness in the diagnosis of this disease.

A total of 51 serum samples from patients in different areas of the country was received. The samples were inoculated into mosquito monostrate cells (C6/36), incubated at 32°C and observed daily for fourteen days, with a blind passage at seven days. In those samples where a cytopathic effect was observed, suggesting the presence of the dengue virus, identification was made of the four dengue serotypes using the immunofluorescence technique with monoclonal antibodies. Unfortunately, a crossed reaction was observed with the antisera; identification is pending.

Protein-energy malnutrition

Early malnutrition and its effects in adolescence and adulthood

INCAP carried out a longitudinal growth and development study in four communities of western Guatemala (among ladino subjects) during the 1969 - 1977 period. The purpose of the study was to document the effects of food supplementation on growth and development of infants and preschoolers.

Two of the communities, randomly selected, received a supplement (atole) with high energy and protein content. The other two communities received a supplement ("fresco" - beverage) low in energy and without protein. Both supplements contained similar amounts of vitamins and minerals. The supplements were provided *ad libitum* to children under seven years of age, and to pregnant and lactating mothers during the eight years that the study lasted. Supplement intake was recorded daily. Besides food supplementation, the four communities received the benefits of a Primary Health Care Program. Around 2,000 children participated in the study.

Published results have demonstrated important effects on the growth of children who received the atole supplement and an increase in weight gain among children of mothers who received the supplement during pregnancy. Minor, but significant effects have also been demonstrated in some areas of psychomotor development.

A cross sectional study was carried out during 1988 and 1989, to evaluate the nutritional status of persons who had participated in the food supplementation program, whose ages at the time of the study ranged from 11 to 26. This follow-up study was a joint effort of scientists from the Universities of Stanford in Davis, California, Cornell in Ithaca, New York, and INCAP.

The results of the follow-up study indicate that the supplementation effects on children's physical growth were maintained, although somewhat attenuated, during adolescence and the teen years. The males in the communities that received atole had greater work capacity than those of similar age in the communities that received refreshment, even after controlling for differences in body size. There were no significant differences in bone maturity among the subjects from the communi-

ties that received atole and those that received the beverage. When considering scholastic achievement, it was found that the subjects from the communities that received atole had better results than those that received "fresco" in mathematical, reading and general knowledge tests.

Findings also demonstrate a current deficit in height among three year old children which is related to reduced body size and body composition, reduced work capacity, increase in obstetric risk and lower scores in intelligence tests taken by adolescents and adults, as indicated previously.

Health and nutrition in the transition phenomena

In order to measure the effects of the present economic crisis at the family level, an exploratory multicenter study was carried out on the possible effects of the economic crisis on food consumption patterns and use of health resources among disadvantaged social groups. It was postulated that changes in food consumption patterns and access to health services by the marginal-urban population groups in Central America occurred in 1990 as a consequence of this crisis.

Changes in consumption or in strategies for income generation at the family level as a result of the structural adjustment were studied in nine marginal-urban communities in the capital cities of Guatemala, Costa Rica and Panama. The study used focus group discussions among mothers of children under five years of age, and interviews of key informants. Results show that basic foods are available in the communities, but given a marked increase in the costs of some items, prices are too high to incorporate them regularly in the daily diet.

The mothers studied mentioned the following changes in the family diet:

- ◇ Decreased frequency in the consumption of meat, vegetables, fruit, milk and cheese.
- ◇ Substitution of expensive foods by cheaper ones (whole beans by strained beans, meat by eggs or sausages, oil by margarine, chicken by chicken giblets, milk by coffee, oats by Incaparina, and black beans by noodles).
- ◇ Dilution of atoles, purees, soups, coffee or tea.
- ◇ Fewer number of meals.
- ◇ Limitation of milk intake by children under five years of age.
- ◇ Purchase of smaller amounts of food (smaller tortillas, 12-ounce "pounds") and less frequent daily purchases than before.
- ◇ Longer breastfeeding periods.
- ◇ Women resort to hospitals for childbirth more frequently.
- ◇ Traditional medicine and self-medication is widespread.

Options mentioned by women to produce more income include hourly employment in the informal sector, such as washing and ironing, as well as participation in their husbands' work in the field and in sales. Women state that this represents greater physical activity and consequently, less time for sleeping and for caring their children.

In order to identify some determinants of obesity in preschoolers, a study was carried out to evaluate physical activity and food intake of obese and normal preschool children, exploring the role that physical activity and food intake play, as well as the food habits that lead to obesity among preschool children of low socioeconomic level in Costa Rica.

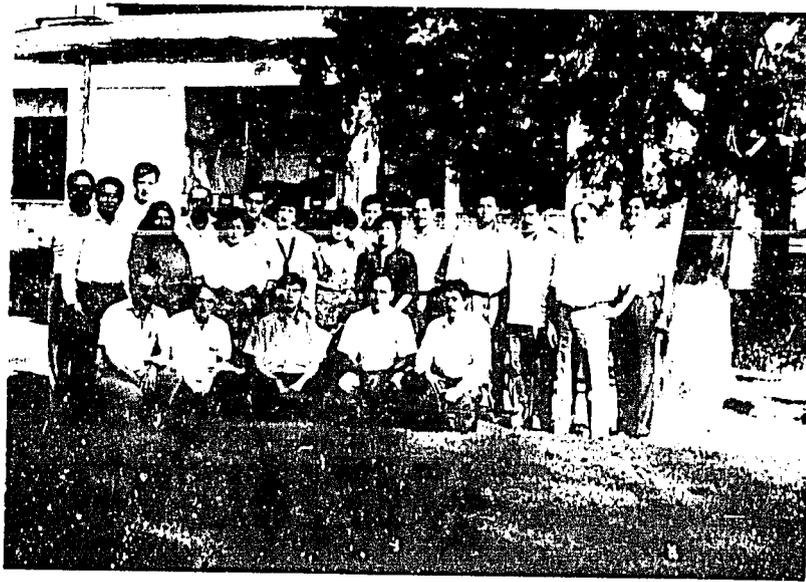
Study results indicated that the pattern of activities among obese and non-obese children was similar, as well as estimates of total energy expenditure (measured by movement-time observations and continued monitoring of heart rates). It was also found that total energy intake and the number of times foods or snacks are consumed are greater in obese than non-obese children.

Mother-child health and nutrition

In the field of mother-child health and nutrition, INCAP developed a series of applied research studies aimed at providing services to the most disadvantaged groups. In terms of methodological development, low birth-weight risk indicators were tested using the mothers' anthropometric measurements. The measurements that best predicted low birth-weight babies were the following: calf perimeter, brachial perimeter, height and cephalic perimeters.

Along these lines, validation studies were carried out on appropriate technologies for fetal growth monitoring at different levels of the health-care systems, using mothers' weight, uterine height and fetal echography. The purpose of this study was to establish normal patterns for fetal growth monitoring through periodic evaluation of maternal anthropometry, uterine height and fetal echographic anthropometry. Fifty-two healthy pregnancies were studied from the 12th week of gestation to term, excluding cases with pathological background (retardation in intra-uterine growth, low birth weight, prematurity, multiple births, early adolescence, previous stillbirths, etc.). Likewise, curves were designed for the distribution of the diameters of: the cerebellum, biparietal, occipitofrontal, transverse abdomen, and anteroposterior abdomen and cefalic, tofacic, abdominal and brachial perimeters. Reference patterns were also designed for femoral length and for the fetus' foot. Preliminary results indicate that the biparietal diameter is more useful than the transversal diameter of the cerebellum. Results also showed that only the medium fetal abdominal perimeter was significantly greater than other measurements in developing countries.

On the basis of the aforementioned results, a multicenter study was initiated in 1990 to investigate whether and how a risk approach could be used to more efficiently allocate available resources for prenatal health attention to those malnourished mothers with greatest risk of having newborns with inadequate intrauterine growth. At the same time, the study will help strengthen the operational research capacity of health personnel in Central America.



Participants of the Seminar-Workshop of the High Risk Low Birth Weight Multicenter Project

Another study initiated during 1990, focuses on using community resources to reduce neonatal, intrapartum and early post-natal mortality in a traditional rural community.

Interventions applied as part of this project are based on diagnostic studies carried out previously in Santa María de Jesús on infant morbidity and mortality during the birth process and the first few months of life. Most intrapartum mortality is associated with a relatively small number of obstetric problems (mainly, abnormal presentations, prolonged labor, prolonged membrane rupture) or to inappropriate obstetric practices of empirical midwives (mainly, the use of oxytocin during labor).

During the first three months of life, most of the mortality is due to infections (not tetanus), mainly sepsis and respiratory infections. Orientation to families and midwives on the symptoms of these infections, together with immediate evaluation and initial treatment in the community and referrals to hospitals, resulted in a significant decrease of neonatal mortality in the community during the diagnostic study. Reduction of neonatal mortality was in the order of 39 per 1,000 to 6 per 1,000 live births. The current project incorporates these findings into an intervention to improve the capability of empirical midwives and auxiliary nurses in the detection and management of those cases that most often result in mortality.

In the first four months, this intervention has had the following effects:

1. A 250% increase in visits to local community clinics for prenatal care.
2. A significant improvement in the appropriate management of obstetric events: for which the empirical midwives had been trained (from 16% before to 70% afterwards).

3. A significant decrease in oxytocin use.
4. A significant decrease of intrapartum mortality associated with obstetric events, for which training was provided.



*Closing ceremony of the training given to midwives of
Santa María de Jesús, Guatemala*

Based on the experience of this pilot intervention, local health authorities have requested INCAP's technical assistance to adapt and apply these elements in other communities.

As part of the aforementioned studies, it was found that in more than 50% of the births studied, oxytocin injections are used. It was also found that the use of oxytocin during labor is significantly associated with risk of the infant's death. It was also documented that this drug is sold in pharmacies throughout the country. Based on this fact, a survey was carried out in 1990 on the use of oxytocins and other potentially important practices as part of the development of intervention programs in 12 randomly selected Guatemalan municipalities.

On the other hand, and as part of the World Health Organization multicenter study that is being carried out in seven countries, INCAP is developing a Multicenter Study on Amenorrhea Due to Breastfeeding in Guatemala City, in order to identify the influence of breastfeeding patterns on the duration of postpartum amenorrhea. The importance of this study is based on the use of breastfeeding as a means of spacing pregnancies and, thereby, improving mother-child health.



Group of mothers of the Multicenter Study on Anemia Due to Breastfeeding in an activity carried out at INCAP

At present, the study has completed the first phase of data collection and it is expected to include a sample of 550 mothers by December 1992. The study will end in 1994.

Also, in Quetzaltenango, Guatemala, operational research was carried out during 1990 on mother-child health-care, providing information on operational problems faced at the community, midwives' and health services levels. The main findings at these three levels are the following:

- **At the community level**, more than 70% of parents recognize that there may be risk situations during pregnancy, labor, postpartum period and for the neonate.
- Sixty to seventy percent of the families indicated that physicians and hospitals are good choices to solve risk situations.
- The users opinion of health-care providers is negative.
- Seventy percent know about the oxytocin injections and 41% used them in their last delivery.
- **At the midwives' level**, delivery is seen as the most important event, rather than pregnancy or the postpartum period. An epidemiological concept of risk does not exist. Events occur because of "bad luck", "God's will", etc.
- There are no marked differences between trained and empirical midwives as regards to actual knowledge.
- There is an unsatisfactory relationship between midwives and the health services, characterized by little support from the services.

- Forty-one percent of midwives apply intramuscular oxytocin injections during labor.
- Ninety-one percent of midwives are aware that they must refer their patients to health services.
- Eighty-five percent of midwives recommend breastfeeding.
- Most of the traditional practices are seen by the health personnel as harmful and injurious, even when they are not. This is why they have exchanged some positive traditional practices for harmful modern practices.
- **At the health services' level**, technical knowledge of the health personnel on obstetric and neonatal high-risk situations is low.
- The health services' levels of efficiency are in the order of 50%.
- A reference or counter-reference system does not exist.
- Patients are not classified according to risk category.
- The clinical work-ups that are kept are inadequate for the classification and follow-up of patients.
- Health personnel are aware of the existing problems in their relationship with midwives, and they also know the solutions.

Based on the operational problems detected, as well as studies on perinatal and neonatal mortality, the following information was obtained:

- The principal cause of intrapartum morbidity and mortality during the first day of life is due to asphyxia, mainly caused by poor fetal position.
- The leading cause of neonatal mortality (2nd to 28th day) is sepsis, followed by low birth weight and prematurity.
- Death periods were the following: 43.7% in the intrapartum period and the first day of life, 41.2% in the span between the 2nd and 28th day of life, and 15.1% stillborn. As regards maternal mortality, causes of postpartum death were hemorrhages, puerperal infection and eclampsia.

Furthermore, action plans were developed with the Ministry of Health for an intervention to improve maternal-neonatal care in the Health Area of Quetzaltenango.

The results of the research carried out at INCAP's headquarters have been transferred to Member Countries through the Health and Nutrition in Primary Health Care Program; the program has the following objectives:

1. To strengthen the management of mother-child health services within the framework of the development of local health systems.
2. To support the nutritional and mother-child health component within the provision of services model in INCAP's Member Countries.

3. To develop methodologies, indicators and instruments designed to monitor and evaluate health and nutrition interventions for the mother and child.
4. To contribute to the development and strengthening of nutritional surveillance systems in the health sector.
5. To promote and develop operational research in the health services, as an instrument for the identification and solution of service provision problems.
6. To review and update service technologies, especially in the mother-child area.
7. To promote and support the transfer of health and nutrition technologies, as well as knowledge and methodologies generated at the Institute.

The activities carried out by this program at the countries' level during the reporting year, are described in the Technical Cooperation section.

FOOD AND NUTRITION PLANNING

During 1990, the Division of Food and Nutrition Planning and its technical programs were active in the review of the food and nutrition security plans for Central America and the possible effect that macroeconomic policies, such as stabilization measures and structural adjustment may have. This work was carried out jointly with different multidisciplinary groups of the countries of the region and with officials of cooperation agencies. Subsequently, activities were developed which helped to strengthen food and nutrition surveillance systems, food economy studies, food and nutrition education, and food aid programs.

Regarding food economics and availability actions, within the framework of a scientific cooperation agreement between INCAP and ORSTOM (Institut Français de Recherche Scientifique pour le Développement en Coopération), the study of the general and food-related purchasing power of minimum salaries continued. To date, reports on three countries, Costa Rica, Guatemala and Nicaragua, have been finished in Spanish and French. Studies on the rest of the countries and the regional abstract will be made during 1991. Available data collected in these studies include minimum salaries in urban and rural areas, as well as retail prices for food, beverages and domestic fuels, and consumer price indexes. The central idea is to measure prices in labor hours paid according to the minimum salary necessary to buy a certain amount of food, kilocalories or protein.

The results for Guatemala, presented in the 1989 Annual Report, were updated and widely disseminated at various levels. In August 1990, a month prior to the re-assessment of some minimum salaries, the minimum urban salary (business salary used as reference) had lost half of its general food purchasing power in relation to 1965, the first complete year with an official minimum salary.

As for Costa Rica, the results show that between 1949 and 1988, the minimum agricultural salary was higher than the minimum industrial salary and that the purchasing power of the minimum assured salary had multiplied 4.6 times with respect to the general purchasing power and 4 times with respect to the food purchasing power between 1945 and 1989.

The report on Nicaragua, recently published, shows that between the years 1972 and 1989, the minimum industrial salary lost 99% of its general food purchasing power. For the rest of the monetary salaries, minimum or medium, the decrease in purchasing power was similar. Only the subsidy policy for some basic foods, the consumption by the rural population of its own food production, and the arrival of foreign currency, changed at favorable rates, may explain that the situation had not deteriorated as expected. As was the case for Guatemala and Costa Rica, a series of recommendations were made for Nicaragua in this emergency, one of which was to re-establish the minimum salaries with an acceptable purchasing power.

Moreover, given the economic adjustment situation and the effects that it could have on food consumption and availability, it was deemed important to update the basic food basket as a methodological instrument to reorient macroeconomic and sectoral policies in response to population needs. The updating of the basic food basket was planned for El Salvador, Panama and Honduras. In Nicaragua, there is recent data for the urban sector. For this reason, INCAP collaborated with the Nicaraguan Food Program in the design of a basic rural food basket.

Food aid program support activities were focused on aspects of: technical cooperation, training and development of human resources, and dissemination of scientific and technical information. With respect to training, courses on management of local projects in Guatemala and Honduras were planned, organized and carried out, while in Nicaragua and Panama, training in food management (based on previously prepared manuals) was implemented.

Regarding technical cooperation, in Costa Rica, Honduras and El Salvador, the process of delivering the mother-child and school program evaluations to authorities was completed. The programs were reviewed with counterparts and in high-level technical discussions. In the case of Panama and Nicaragua, procedures were initiated to collaborate in the development of national strategies and policies for the design of food programs and plans, and in support to the food aid projects now under development.

INCAP also cooperated with the Ministries of Health and Social Welfare and the Ministry of Planning (MIPLAN) of El Salvador in the World Food Program (WFP Project No. 2327), that are jointly being carried out in order to prepare a food aid strategy. In Guatemala, support continued to be provided to the school feeding programs and to those carried out by the "Comité de Reconstrucción Nacional" (CRN) (National Reconstruction Committee), and a study was designed to assess community collaboration in the complementary food activity of the Mother-Child Health Program. Finally, in view of the hospitals' critical situation, technical groups from the program continued collaborating in the design of a project aimed at obtaining and providing food to hospitals, and to plan a training process for economists and hospital administrators. This training included the areas of food management and conservation.

Additionally, and at the request of the Ministry of Health of Costa Rica, the technical group collaborated in the implementation of a food bonus program to be managed by the health sector as part of the social compensation program. This program was focused particularly on the extremely poor groups of Costa Rica. INCAP's officials helped to define the methodology to select beneficiaries, the program's logistics and in the design of a community promotion program for the delivery of the food bonus.

With regard to food and nutrition surveillance, the Institute cooperated in the planning of a regional project proposal for surveillance training, aimed at the operational, normative and political-technical decision-making levels, which will be carried out in collaboration with the Ministry of Health of Costa Rica and the "Instituto Costarricense de Investigación y Enseñanza en Nutrición y Salud" (INCIENSA) (Costa Rican Institute of Research and Teaching in Health and Nutrition). With FAO's support, a regional proposal to train officials in the agricultural and planning sectors with a normative scope, was presented jointly with INCIENSA; this project will be developed during 1991.

With the purpose of establishing closer ties with other technical agencies that carry out food and nutrition surveillance activities, technical and coordination meetings were held. The organizations contacted include the "Comité de Acción de Apoyo Económico y Social de Centroamérica" (CADESCA) (Central American Economic and Social Support Action Committee), the "Instituto Interamericano de Cooperación para la Agricultura" (IICA) (Interamerican Institute for Cooperation in Agriculture), FAO, UNICEF and PAHO/WHO.

Regarding food and nutrition education, activities were developed within Regional Education and the Training and Development of Human Resources Projects, funded by the governments of France and Switzerland, respectively. In 1990, we hosted an observation team from the Government of France during which time plans were discussed for the continuation of the project after its fifth year of operation (1991). During this visit the activities developed during previous years and the specific ones for 1990 were reviewed. The most outstanding ones were the dissemination of technical and scientific information, studies on chronic diseases, and the determination of the population's food behavior patterns. As for the studies on the last two topics, it is worthwhile to mention the technical review made and the technical guidelines developed for the food and nutrition treatment of the following chronic diseases: atherosclerosis, nutritional anemia, gastrointestinal diseases, diabetes, hypertension and obesity. These guidelines are addressed to the health-care providers of Costa Rica and Panama, because these are the countries where chronic diseases pose a significant health problem.

Qualitative studies were also developed on food habits and on the rural population's health in the Departments of Totonicapán and Quiché, Guatemala. In these studies, a methodology was followed that included the promoter, the extensionist, and community members' participation in the collection and analysis of information on behavior patterns, determinants and alternatives to change food availability and consumption in the case of diseases (diarrhea and acute respiratory infections) and in growth and development programs. Based on these data, and as part of the INCAP-MINDES-COGAAT Agreement, educational material was prepared, tested, reproduced and distributed. With regard to technical and scientific information dissemination, a series of information sheets known as CADENA (updated contents of food and nutrition) were designed and reviewed, and an annotated bibliography on Legumes was prepared, as well as a Bibliographical Compilation on Chronic Diseases.

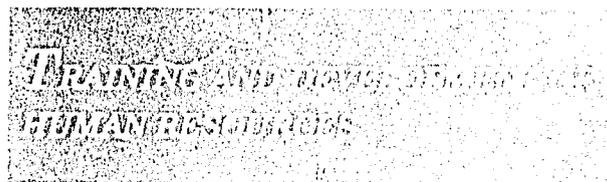
Regarding the Member Countries, support was given in Guatemala to three integrated food and nutrition education processes, as well as to community participation in rural and in urban-marginal areas. In El Salvador, collaboration was given in the review of kindergarten, primary and secondary study programs, as well as to the implementation of the Mother-Child Health Program and "SILOGUIA". In Honduras, support was given to: the training of health promoters in community management of priority diseases, and agricultural cooperatives in agriculture techniques. Moreover, assistance was provided to social and educational participation processes in the development of "SILOS" (local health systems), with emphasis on Regions II, III, IV and V. Nicaragua received support in the design, testing and editing of basic modules for squad groups, religious and community leaders, as well as in training workshops. In Costa Rica and Panama, the Institute collaborated in preventive nutrition activities of the national program, and in hypertension control. Costa Rica also received support in the definition and production of food guidelines for healthy and sick populations and in the program for promoting adequate food and nutrition habits through mass media communication. In Panama, the national counterparts were supported in the development of the "Programa de Educación Alimentario-Nutricional y de Supervivencia Infantil (PEDALINSI) (Food and Nutrition Education and Child Survival Program), that is being developed in Chiriquí. During 1990, the Program received INCAP's assistance in the production of written and audio materials to train officials of various sectors in community participation and in food and nutrition issues.

On the other hand, in 1990 the Regional Training and Development of Human Resources Project reached its fourth year of activities. Its general purpose has been to support the development of human resources in the field of food and nutrition, aimed at contributing to the improvement of the population's nutritional status in each of the countries. In 1990, support was provided to the primary, secondary, technical and university levels (graduate and postgraduate) in food and nutrition training, in the understanding that training reinforcement will later on have a positive effect on work performance and in the adequate delivery of services to the community.

In all the countries of the region, support was given to teachers updating programs and to planning activities, as well as to food and nutrition curricular review. Educational material was also provided. The counterparts contributed with educators and human welfare resources from the agriculture, education, health, labor, planning and training schools, such as universities, technical and professional schools, public health schools and others. With regard to food and nutrition training activities, the labor force of the sectors mentioned above were supported by updating the in-service personnel and with provision of food and nutrition education materials. In these activities 5,911 persons from the countries have participated.

Emphasis must be placed on the significant advance attained in education in the agricultural sector of El Salvador, where the incorporation of the food and nutrition content in the training of all agricultural regions was achieved. In Guatemala, the processes supported in the agricultural sector were consolidated in training schools, as well as in in-service training. Assistance also continued to incorporate the food and nutrition contents and objectives into the schools' curricula and strengthening of Region VI. The food and nutrition subgroup of the National Commission of Health and Human Resources of Honduras deserves special mention. This subgroup jointly with the Institute played an active role in the food and nutrition field. In Nicaragua, as well as in Panama, the university and technical career programs, were significantly favored with the incorporation of food and nutrition contents and objectives into the schools' curricula.

In general, we may conclude that the advances reached in food and nutrition education through the regional projects developed by the Institute have been positive. INCAP's support has contributed to create awareness among the institutions that they must give priority to the review, critical analysis, search for relevance and strengthening of food and nutrition education.



During 1990, the efforts of INCAP in the Training and Development of Human Resources Programmatic Area were directed towards the development of the following activities:

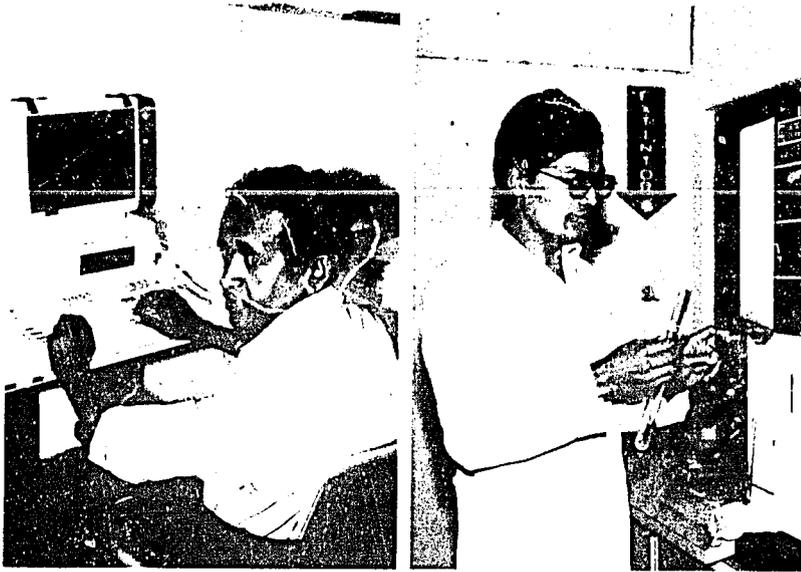
- Postgraduate Courses in Food and Nutrition in Health and in Food Science and Technology.
- Advanced Tutorial Training of the United Nations University Program and INCAP (UNU/INCAP).
- Tutorial Training in Specific Methodologies.
- Education and Training of Personnel at Member Countries' Level.
- Continuous Education aimed at INCAP's personnel.

In 1990, five students from Costa Rica, Guatemala, Nicaragua, Brazil and Peru graduated from the Postgraduate Course in Food and Nutrition in Health; five students began their graduation thesis and seven, from previous years, continued theirs. This year, due to the evaluation process of the Postgraduate Program and its redesign, there were no new admissions. In this regard, planning meetings took place to prepare the profile of the new program which was presented at the XLI Annual Meeting of the Directing Council, carried out in Belize in September, 1990. The academic-administrative process is expected to conclude in 1991, so that the new Postgraduate Program can initiate its activities, with the previous approval of PAHO and of the University of San Carlos of Guatemala.

In the Postgraduate Course in Food Science and Technology, a Guatemalan student graduated, seven students finished their second year of studies, four started the course and two continued working on their thesis.

Within the UNU/INCAP Program, applications sent by the University with the proposal of candidates to be trained at INCAP were examined. One participant from Sri Lanka and one from Nepal were admitted and began their training activities. Likewise, the admission of two candidates from Chile, one from Ecuador and one from Bangladesh were approved to begin the program in 1991.

In regards to Tutorial Training in Specific Methodologies, in 1990, INCAP accepted a total of 60 students from the Member Countries and other geographical areas, who were trained in field methods and in techniques to be applied to the food and nutrition programs.



Students of the Advanced Tutorial Training Program of the United Nations University (UNU/INCAP)

Tutorial Training covers the following areas:

- Food Science and Technology
- Food Quality Control
- Biology and Nutritional Biochemistry
- Assessment of Nutritional Status; Design, Implementation and Evaluation of Nutrition Interventions:
 - * Studies on the interaction between infection and nutrition
 - * Food and nutrition education
 - * Incorporation of food and nutrition contents in the curricula of different health related professions and in primary and secondary level education



Students receiving tutorial training on Specific Methodologies regarding Food Drying Procedures

An important part of the human resources activities carried out during 1990 refers to training events that were planned for officials of the countries and for the institution's personnel at headquarters. These events were aimed at incorporating new technologies and theoretical knowledge contributing to the excellence required by the Institute. Thus, training was provided in areas such as computerized programs applied to research and secretarial work. Additionally, training on the new computerized administrative-financial accounting system was offered to the administrative assistants in the Member Countries, and to support personnel, as well as to administrative assistants at headquarters. This system will be in operation in 1991. The aforementioned activities are part of the Continuous Education Program provided for INCAP's personnel.

The following Table shows the number of students that participated in the postgraduate courses and tutorial training during 1990.

**NUMBER OF STUDENTS THAT PARTICIPATED IN THE
POSTGRADUATE COURSES AND IN TUTORIAL TRAINING,
BY COUNTRY, IN 1990**

Country	Nutrition and Health	Agricultural Sciences	Tutorial	Total
<u>CENTRAL AMERICA</u>				
Costa Rica	1	.	-	1
El Salvador	-	2	4	6
Guatemala	8	8	45	61
Honduras	1	1	1	3
Nicaragua	2	-	2	4
Panama	-	-	1	1
<u>SOUTH AMERICA</u>				
Brazil	1	1	-	2
Chile	1	-	-	1
Ecuador	1	-	-	1
Peru	1	-	-	1
<u>OTHER COUNTRIES</u>				
United States	1	-	3	4
France	-	-	1	1
The Netherlands	-	-	1	1
Nepal	-	-	1	1
Dominican Republic	-	2	-	2
Sri Lanka	-	-	1	1
TOTAL	17	14	60	91

Training in epidemiology

With the financial support of the PAHO/WHO Representation in Guatemala, a National Epidemiologic Training Course began in August, 1990. Its purpose was to train public health professionals so that they can adequately conduct epidemiologic functions in each of the country's health regions. Expected outcomes of the courses are such that the participants at the end of the Course will be able to:

- a) Analyze the health and disease situation of the region under their responsibility and determine the factors conditioning it, including the analysis of programs and services.
- b) Establish priorities for prevention, control and eradication of the health problems found in their region.
- c) Participate with local teams in the planning, implementation and evaluation of health interventions in their region.
- d) Develop an adequate and functional epidemiological surveillance system for their region.

The course had a very practical orientation and was adjusted to the services' needs. It also established a training relationship between the physician and the work team, which creates the necessary conditions for future development. Actions were coordinated with the Ministry of Public Health and Social Welfare, the School of Medical Sciences of the University of San Carlos of Guatemala and the National Institute of Health Project.

Twenty-eight students registered in the course, whereby: 24 came from the health areas, two from the central level of the Ministry of Health, one from Belize's health services, and one professor from the School of Medical Sciences. This Course will last until June 30, 1991.

Training of area teams

Parallel to the Course, an at-distance training activity was carried out for the other area teams, through the provision of bibliographic material. The issues covered refer to: epidemiological coverage and use at the local level, analysis of the health situation, importance of the population study in the analysis of the health situation, and presentation of the most pertinent health indicators.

The material was periodically distributed. Furthermore, discussion meetings pertaining to the materials received and preparation of the "Análisis de la Situación en Salud" (ASIS) (Health Situation Analysis) were carried out in the health area. Results of the discussions on ASIS will be helpful in the future to strengthen the teams' training. Evaluation of impact was done by eliciting opinions on the materials provided.

The first at-distance training experience will conclude June 30, 1991. The physicians trained will be responsible for continuing the process with the district teams and other personnel, using the revised material.

TECHNICAL COOPERATION

During 1990, INCAP provided technical cooperation to its seven Member Countries to strengthen the management of national plans, programs and projects, thus improving the food and nutrition situation of their populations. The Institute continued its emphasis on training and development of human resources, direct technical assistance, and the development of operational research.

During this reporting year, support at the national level was given to programs aimed at the prevention of specific nutritional deficiencies, and to the incorporation of a food and nutrition component in the curricula of the the social sciences careers. Cooperation in implementing health and nutrition activities within the context of the local health systems also continued.

It may be useful to outline the institutional actions related to the implementation of INCAP's strategy to decentralize management of technical cooperation in the countries of Central America, Panama and Belize. Within this context and during the last four months of 1990, decision-making and management of financial resources was transferred to the Basic Technical Groups, improving the efficiency and effectiveness of the INCAP's technology transfer to its Member Countries.

Technical cooperation was developed in the following Programmatic Areas as approved by its Directing Council:

- ➡ General Coordination
- ➡ Food and Nutrition in Mother-Child Health Programs
- ➡ Food and Nutrition in School Programs
- ➡ Food and Nutrition in Chronic Diseases Programs
- ➡ Food and Nutrition in Institutions
- ➡ Food Fortification
- ➡ Food and Nutrition in Training and Development of Human Resources and Continuous Education Programs
- ➡ Increase in Food Quality and Availability
- ➡ Food and Nutrition in Programs for Displaced Persons and in Emergency Situations

In the following paragraphs, we present the results obtained, which are product of Technical Cooperation provided by INCAP to each of its seven Member Countries.

Belize

General Coordination

In compliance with Resolution 1 of the XII Directing Council's Meeting which took place in Belize City in 1990, INCAP initiated joint actions with Belize's national authorities and the PAHO/WHO Representation, in order to formalize initiation of the Institute's technical cooperation program during the last trimester of 1990 and the first semester of 1991.

Within this context and as part of the implementation of INCAP's decentralization process, in January 1991 the Institute partially funded the contracting of a nutrition advisor stationed at the PAHO/WHO Representation in Belize City. Her main responsibilities are the coordination, planning, implementation and evaluation of the technical cooperation process.

During that period, INCAP's professionals visited national authorities at technical and political levels in order to discuss the scope of the Institute's technical cooperation. It includes policies, strategies and priority lines of action as the starting point of INCAP's technical cooperation with Belize.

Food and Nutrition in Mother-Child Programs

The Institute provided technical assistance for the evaluation of Belize's Child Survival Plan, in instrument design, data collection and processing, and analysis for the preparation of the final report.

National authorities have identified INCAP's technical and financial support to planning and implementation of the national nutrition survey process as a priority. During the last trimester of 1990, the design of the survey's protocol began, as well as the design of instruments for each of the components, including definition of the sample frame and size.

During 1991, national authorities initiated actions to obtain funding for the implementation of the survey. The Institute is collaborating with Belize in this sense. The survey is expected to begin during the last semester of 1991, having established as the first steps: testing and modifying survey instruments, and training officials in data collection, analysis and processing.

Food and Nutrition in School Programs

During the first trimester of 1991, INCAP contacted the Ministries of Education and Agriculture, to analyze the feasibility of transferring high-quality food technology (e.g., the nutritionally improved cookie). It is expected that the cookie may serve as a nutritional supplement in a future food and nutrition school program. To initiate an acceptability study of the product, INCAP sent Belize a batch of the cookies.

Food Security

At the end of 1990, INCAP began a comparative analysis of the evaluation of minimum salaries and costs of the principal foods and domestic fuels in Belize. This forms part of a study being carried out jointly with ORSTOM to implement a food policy in Central America that includes: collection, analysis, interpretation and critical review of macroeconomic data. This study is expected to conclude during the first semester of 1991, and it will be presented to the authorities to strengthen policy decision-making related to food and nutrition.

Costa Rica

General Coordination

The Basic Technical Group (GTB)-Costa Rica participated during the first months of the year with officials of the technical levels of different sectors, in a series of commissions that the new government formed to discuss political and strategic guidelines of the Government's Plan for 1990-1995. Special attention was given to those issues related to the Social Compensation Programs, Training and Development of Human Resources, Curricular Review of the Study Plan of the Ministry of Education, Planning of the Preventive Health and Chronic Diseases Program, and Institutional Development Programs, among others.

Other activities developed by the GTB concerned planning, programming, supervision and evaluation of technical cooperation.

Food and Nutrition in Mother-Child Health Programs

Cooperation was provided to the Ministry of Health in the regionalization of the permanent training process, through support given to the development of a training workshop on mother-child attention norms, with the participation of teaching personnel from the Teaching Reference Center (CARIT Maternity). Likewise, training in academic activities to said personnel was carried out in aspects concerning teaching, management and research methodology. Within this same context, the regional and local health teams of the Pediatric Reference Teaching Center were trained in mother-child health-care aspects.

At the regional, as well as the Basic Technical Councils level, INCAP cooperated in the development of managerial training activities, nutrition education, and use of information in the local health systems and in the "Centro de Educación Nutricional-Centro Integral de Nutrición y Alimentación Infantil" (CEN-CINAI) (Nutritional Education Center-Integrated Food and Nutrition Child Center). A total of 40 persons participated, among them social workers, technicians in nutrition and community leaders.

Support was given to joint training activities of the health centers' personnel and of the "Caja Costarricense del Seguro Social" at local and regional levels to strengthen the decentralization of both institutions. Within this framework, the First National Workshop of the Permanent Training Program in Mother-Child Health was carried out with the participation of 63 officials: physicians, nurses, social workers, psychologists and national hospital directors.

In the Nutrition Department, assistance was provided in the training of: 38 directors of the CEN-CINAI who had recently started working in the integrated care program, and 10 nutritionists. Training for the directors was focused on administrative and technical management of the program; the nutritionists were involved with aspects concerning preventive nutrition. In the field of dissemination of information and on recently updated norms of the nutrition program, support was given to the publication of 32,500 copies on Child Growth and Development. The group also participated in the design, development, data analysis and publication of results derived from operational research in the mother-child food aid programs, including the food and nutrition bonus that was presented to authorities of the Ministry, as described further on.

Food and Nutrition in School Programs

During the first months of the year and in joint cooperation with officials from the Ministry of Education, evaluation of operational research was planned and implemented for the Food Aid Programs that included the programs of the Ministries of Health and Education. Results obtained in these studies were presented in a meeting on "Food Aid Programs, Situation and Projections." The past and present second vice-president of the Republic attended, as well as past ministers and vice-ministers. Also present were health, education and labor authorities and their respective directors, the Ministries of Planning (MIDEPLAN), of Agriculture and ministry advisors. Results of this meeting permitted the continuity of the process that began in 1987 as regards the implementation of some identified solutions derived from operational research.

Cooperation was provided jointly with the Ministry of Education in the review of the food and nutrition contents at preschool, primary and second general cycle of basic education, which included the development of methodologies and strategies for the implementation of the food and nutrition program. Moreover, assistance in the evaluation process of the information system of the "Programa de Alimentación y Nutrición del Escolar y Adolescente" (PANEA) (Food and Nutrition of the Schoolchild and Adolescent Program) was also provided. A national resource was contracted to develop this activity.

For the implementation of the solutions identified in the operational research of the Food Aid Programs, several actions were carried out to put the managerial model of PANEA into practice. Likewise, 774 members of school associations were trained, especially in the administrative-accounting aspects, program organization, and promotion of community participation. Cooperation was also given in the training of domestic workers (20), school soda shop managers (20), general advisors in food and nutrition (20) and agricultural advisors (20). These efforts were targeted towards the strengthening of the technical and administrative management of the program.

Food and Nutrition in Chronic Diseases Programs

The GTB worked with the Minister of Health and the "Caja Costarricense del Seguro Social" in order to technically and financially support the technical cooperation oriented towards the establishment of a preventive nutrition program.

The most outstanding results are:

- ◆ Support to interinstitutional coordination, through the preparation of an integrated education, nutrition and health plan.
- ◆ Support was given in the review of the general guidelines of the preventive nutrition program for the control of chronic non-transmissible diseases, through the development of a multisectoral workshop that included the participation of the Ministries of Health, Education, Agriculture, of the "Instituto Costarricense de Investigación y Enseñanza en Nutrición y Salud" (INCIENSA) (Costa Rican Institute of Research and Teaching in Health and Nutrition), of the "Caja Costarricense del Seguro Social" and of the University of Costa Rica.
- ◆ Support was given to the planning of a Preventive Nutrition Program and to the legislative decree for the interinstitutional coordination of the program. Its implementation is planned for the first trimester of 1991.

INCAP also collaborated with the "Caja Costarricense del Seguro Social" in the definition of food guidelines targeted towards the country's healthy, as well as to sick, populations.

Food and Nutrition in Institutions

The Institute continued cooperating with the Nutrition Section of the "Caja Costarricense del Seguro Social" in the diagnosis of the nutrition services of that institution, and in the final phase of the design of the food and nutrition information system. It will be put into effect the following year in one or two general hospitals of the metropolitan area.

Food Fortification

The Nutrition Department of the Ministry of Health continued receiving assistance from INCAP in the development of the III National Survey on Goiter and Salt Iodization carried out on schoolchildren, and in the I National Survey of Salt Iodization that began during the last four months of 1989. The analysis of the survey was concluded during 1990, and the report of the results was written.

Food and Nutrition in the Training and Development of Human Resources and Permanent Education Programs

Within the context of teaching-assisting integration, collaboration was given to officials of the University of Costa Rica in the conceptual review of integrated teaching-assisting strategies, popular education and work-study to unify criteria on the mentioned aspects. Likewise, collaboration was given to incorporate monitoring and evaluation in the teaching activities of the different sectors: (Ministry of Health (MH), Ministry of Public Education (MPE), Ministry of Agriculture (MA), "Centro de Investigaciones en Tecnología de Alimentos" (CITA) (Food Technology Research Center), and in the Schools of Nutrition.

INCAP also contributed with university-level Nutrition studies in the following working areas:

- ▶ Updating of professionals in the problem of preventive nutrition.
- ▶ Acquisition of references for the improvement of teaching capacity.

Likewise, support was provided to the School of Education of the University of Costa Rica through the following activities:

- ▶ Curricular analysis regarding the degree of food and nutrition development in the present plans and programs.
- ▶ Performance of university community work for lay training in food and nutrition, which incorporated students of the different disciplines in research and implementation of solutions.
- ▶ Development of research on food and nutrition education at the layman's level.

In the School of Agriculture, support was provided in the incorporation of food and nutrition contents into the teaching and training programs. Furthermore, a socio-productive model was developed to organize agricultural production in the Alfaro Ruiz District.

Lastly, collaboration was lent for the organization of the First Introductory Course in Food Technology, Nutrition and Community Development in which 30 agriculture technicians were trained in updated issues on increase and diversification of food production.

Food Security

INCAP assisted the Ministry of Health in the development of activities directed at planning and implementation of the food and nutrition bonus, within the social compensation programs in the following fields:

- ▶ Instrument design for the selection of beneficiaries.
- ▶ Registry of the beneficiaries characteristics, and analysis of their socioeconomic profiles.
- ▶ Methodologies for the food delivery logistics.
- ▶ Design and implementation of the community participation program.

Technical and financial collaboration was also provided in the development of methods of analyses and in the presentation of nutrition information in the "Sistemas Locales de Salud" (SILOS) (Local Health Systems), especially in the data processing of the 1989 Schoolchildren's Height Census. With this support and with that of the Ministry of Health, the "Sistema de Información Nutricional/Dirección de Desarrollo Social y Asignaciones Familiares" (SIN/DESAF) (Nutrition Information System/Office of Social Development and Family Allowances), clearing and codification of approximately 91,000 forms was concluded. Sixty percent of the total forms was also processed and partial analysis of the results was begun.

Likewise, INCAP cooperated in the organization and planning process of the "Programa Regional de Vigilancia Alimentaria-Nutricional" (PROSVAN) (Food and Nutrition Surveillance Regional Program), thus supporting the preparation of the strategic work plan. It also collaborated in the preparation of a proposal to the United Nations Children's Fund (UNICEF) and to the United Nations Food and Agriculture Organization (FAO) to begin training of INCIENSA's human resources on surveillance issues. Also, in support to the "Sistema de Vigilancia Alimentaria Nutricional" (SISVAN) (Food and Nutrition Surveillance System), Costa Rica made an analysis of the activities carried out at the SILOS level and an example was drawn up for the use of the information. This model was used to train approximately 200 leaders of the Pérez de Zeledón community in SISVAN's aspects.

Support was also given to DESAF in the implementation of the information system, emphasizing the establishment of a graphic database on in-depth relationships in each of the country's districts. Furthermore, collaboration was given to implement a personnel training plan on food and nutrition topics.

The Ministry of Agriculture received cooperation in the development of a Training Workshop related to participatory research and project management. Likewise, technical and executive officials from the local SISVAN were trained in food and nutrition security.

The Institute continued to work with the Ministries of Health and Agriculture, and the First Vicepresident of the Republic, as regards the need to conclude efforts initiated in 1989 to define a food and nutrition policy. This activity is expected to conclude during 1991.

The GTB-Costa Rica also cooperated with the Mother-Child Department and other branches of the Ministry of Health in the installation of a computer program known as the Mapping System "SIMAP", as a contribution to the presentation of data generated by the health information system. Consequently, officials from the Ministry of Health and of the "Caja Costarricense del Seguro Social" were trained in the use of SIMAP. In 1991, SIMAP will be used to establish databases on the mother-child unit in the children's and adolescents' health section, in the branches mentioned.

Support was also given for the development of a Course on SIMAP where 14 officials of the agriculture, education and health sectors, as well as from the "Caja del Seguro Social", DESAF, MIDEPLAN and INCIENSA participated with the purpose of presenting and analyzing the information generated by these institutions.

Finally, the GTB-Costa Rica cooperated with the Ministry of Planning "Secretaría General de la Comisión Social" (General Secretariat of the Social Commission) in the design and implementation of a subsystem for the registration, monitoring and evaluation of beneficiaries of the social programs in Costa Rica. Support was also provided in aspects related to logistics for the delivery of foods of social programs, using the results of the "Investigación Operacional de Programas de Alimentación a Grupos" (IOPAG) (Operational Research of the Food Aid Programs). Collaboration was also given in the logistic and funding aspects for the observation visit made by officials of the Ministry of Planning to the Food for Work Program in Colombia.

El Salvador

General Coordination

The GTB-El Salvador was active in the negotiation and redefinition of the technical cooperation activities with the new government authorities, collaborating with the work commissions formed by said authorities, especially in the food and nutrition security aspects. Likewise, it participated in the programming and evaluation process of the technical cooperation, trying to combine the efforts of the different sectors involved in the food and nutrition problems and in the development of interventions of intersectoral nature.

Food and Nutrition in Mother-Child Health Programs

During 1990, INCAP cooperated with the authorities of the Ministry of Health in the preparation of certain areas of the national health plan. This will serve as a reference framework for the implementation of interventions at the different levels of the system.

Collaboration was also given in the preparation of the National Integrated Mother-Child Health Program, which included adjustments and review of technical norms of each of the programmatic components. Within this context, cooperation continued in the epidemiological surveillance process through the identification and classification of suspicious polio cases at the Institute's specialized laboratory. Similarly, quality control of oral rehydration salts continued.

INCAP also provided support to the Intersectoral Child Surveillance Committee in carrying out the action plan for the "Control de Enfermedades Diarreicas y Rehidratación Oral" (CEDRO) (Control of Diarrheal Diseases and Oral Rehydration) projects, having obtained the following results:

- ✓ Preparation and implementation of the operation plan of the CEDRO project.
- ✓ Training of 836 persons from 20 institutions, non-governmental organizations (NGO) and others, in supervision and management abilities pertaining to CEDRO.
- ✓ Training of 154 officials from the Ministry of Health at regional and local levels in supervision, management and institutional management of children with diarrhea (in the Bloom Hospital).

Cooperation was given to the Nutrition Department in carrying out three studies: 1) food management of the child with diarrhea; 2) food and nutrition education, and 3) development of food mixtures to feed the child during the weaning period. The protocol was prepared and the instruments were tested for the first study mentioned; it is estimated that it will end during 1991. With regard to the food and nutrition education study, during the first four months of 1991 the profile adjustment will be concluded and the study will be proposed for funding. Regarding the food mixture study, it is now at profile level and during the coming year the feasibility study and the search for funding will begin.

The study on intra-household management of donated foods that began at the end of 1989 was also concluded. The final report was written and the results disseminated at a meeting attended by 72 national officials. Plans have been made to continue supporting the Nutrition Department in the implementation of the solutions identified in the corresponding report concerning use of food aid programs. Collaboration was also provided in the preparation, testing and implementation of food and nutrition education methodologies. Plans have been made to continue with the testing process during 1991.

In collaboration with the Mother-Child Department, a preliminary design for the follow-up and evaluation system of the food program was prepared, which will be implemented during the first four months of the following year.

The Institute continued supporting the Teaching for Health Unit and the Hygiene Training School in the development of the education process. The results obtained are the following:

- ✓ Incorporation of regional units into the at-distance teaching system using the teaching methodology of the Modules of Education and Community Health Participation "SILOGUIA".
- ✓ Training of 50 tutors and 476 local officials in the methodological process of "SILOGUIA".
- ✓ Preparation of the methodological and administrative guidelines for the local at-distance teaching process.
- ✓ Training of 60 national officials from the ministries in the use of SIMAP, in coordination with the Ministries of Health, Education, Agriculture, Labor and Planning, and INCAP.

Lastly, it supported the "Instituto Salvadoreño de Seguridad Social" (ISSS) (Social Security Institute of El Salvador) in the preparation of education norms and teacher's attributes. Likewise, 99 educators and local personnel were trained in the basic course on the preparation of health educators.

Food and Nutrition in School Programs

The Institute collaborated with the Ministry of Education in the revision of the health, food and nutrition components of the kindergarten schools and first basic cycle education. Twenty-five education and health officials of the central, regional and local levels were trained in curricular and methodological development of the integrated teaching units.

In coordination with the Ministries of Education and Planning, INCAP collaborated in the preparation of the project of the nutritionally improved cookie.

Food Fortification

The Institute cooperated with the Nutrition Department of the Ministry of Health in the design and implementation of the study on goiter prevalence in schoolchildren in five health regions of the country. Plans have been made to continue with the analysis and preparation of the final report of the study during 1991. Support is also programmed for the implementation measures to control goiter and salt iodization.

Similarly, INCAP continued collaborating with the Ministry of Health to implement the vitamin A sugar fortification process that began during 1989. During 1990 it cooperated in the installation of the equipment for the production of the premix, and personnel from the sugar mills in charge of that technological process received appropriate training.

Food and Nutrition in Permanent Education Programs

INCAP collaborated in the process of curricular changes of the different careers offered at the University of El Salvador. Within this context, implementation of the curricular change proposal began for the nursing, nutrition, health education, mother-child health, and chemistry careers. A total of 200 officials, among them, teachers, students and in-service personnel were trained in issues such as food, nutrition, research and administration. This process will continue during 1991 in aspects related with the revision of the food and nutrition component of the different careers.

The Institute also provided training at Master's degree level for two students from the Central American University "José Simeón Cañas".

Support continued to be given to the "Centro Universitario de Occidente" (CUO) (Western University Center) in the process related with the integrated production systems. During the year 1990, two demonstration plots of integrated cultivars were sown and managed. Within this context, 40 teachers and students of agriculture, as well as mothers and home economics educators, were trained.

INCAP also assisted the National Agriculture School in the curricular revision and planning process for the training of farmers. Within this framework, profiles, objectives and food and nutrition contents of the different current study plans were determined during 1990. Likewise, 30 teachers were trained in fields related to food and nutrition. A training plan addressed to teachers will also be prepared, and curricular review will continue.

Lastly, cooperation was given to the "Oficina Sectorial de Planificación Agropecuaria (OSPA) (Sectoral Office for Agricultural Planning) in the integration of the food and nutrition component of the Regional Training Programs. Needs were detected and plans were made and implemented to train personnel at the operative level. Three hundred technicians from the regional and local extension areas of permanent education, food and nutrition, agriculture and animal husbandry were trained.

Food Security

In coordination with the Ministries of Planning and Health, the Institute collaborated in the preparation of the food and nutrition plan. During 1991, it will be discussed and presented to the ministries mentioned for approval. Within this context, the Nutrition Department was supported in the design of the follow-up and evaluation systems of the projects that the department develops, in order to determine its feasibility within the overall plan of food and nutrition. A specific study was also made of the effectiveness of the food aid programs that will allow their reorientation at short, medium and long term.

Guatemala

General Coordination

Among the activities carried out, the organization of the mult disciplinary GTB-Guatemala may be underlined. This entity was responsible for the programming, implementation, evaluation and technical cooperation provided to the country.

Food and Nutrition in Mother-Child Health Programs

With regard to training and development of human resources in the Mother-Child area, at-distance education courses on growth monitoring were developed for 1,000 physicians (School of Physicians) and 100 nurses (Southwest Branch). Likewise, training was given to 1,010 officials from the Ministry of Health in the "Módulos Integrados de Supervivencia Infantil" (MISI) (Integrated Child Survival Modules). This activity was evaluated in terms of participant's performance.

Furthermore, the following courses on mother-child issues were developed for different groups of health personnel: supervision training for 36 officials of the General Hospital of San Marcos, and Control of Diarrheal Diseases (CED) to 28 pediatricians of the "Instituto Guatemalteco de Seguridad Social" (IGSS) (Guatemalan Social Security Institute). Also, 78 "Representantes del Programa Integrado de Salud" (REPROINSA) (Representatives of the Integrated Health Program) of the urban-marginal areas of the city were trained in mother-child health-care, and formation of providers for the training of community groups was carried out. These activities were jointly coordinated with the "Consejo Intersectorial para la Atención de la Población de las Areas Precarias" (COINAP) (Intersectoral Council for the Attention of Populations in Precarious Areas) and UNICEF.

Preparation and production of teaching materials on mother-child health was also developed for home economics teachers and rural health technicians of the Departments of Totonicapán and Quiché, in coordination with the "Ministerio de Desarrollo Urbano y Rural/Cooperación Guatemalteca Alemana Alimentos por Trabajo" (MINDES/COGAAT) (Ministry of Urban and Rural Development/Food for Work, Guatemalan German Cooperation).

Teaching materials on CED and oral rehydration therapy (ORT) were also prepared in the Mayan language for mothers participating in Project HOPE in Quetzaltenango. Furthermore, a manual on care during pregnancy was prepared in the Quiché language and distributed for training of Chichicastenango midwives.

With regard to technical assistance, a professional from the GTB-Guatemala permanently assisted the Breastfeeding Commission in the revision of its structure, as well as in the dissemination projects of the Commission.

At the hospital level, support was given in the implementation and evaluation of the Community Health Program of the "Hospital Pedro de Bethancourt" of Antigua Guatemala. Assistance was also provided to the Gyneco-Obstetric Department of the "Hospital General San Juan de Dios," in the preparation of intra-hospital obstetric care norms, and of an integrated perinatal record with an at-risk approach. Likewise, assistance was provided in the design of a database, and two physicians were trained in its use. INCAP also participated in the preparation of the general gyneco-obstetric norms of the "Hospital General de Occidente" in Quetzaltenango. Furthermore, collaboration was given to the General Office of Health Services in the preparation of an Action Plan on CED at a national level, and 149 cases were analyzed for identification of wild poliovirus. In addition, INCAP was active in the preparation of an institutional development project profile for the Nutrition Department of the Office of Attention to Persons of the Ministry of Public Health and Social Welfare of Guatemala, and in another project on food management.

In support to the decentralization actions of the health sector, the Institute participated in the preparation of integrated area and region operational plans for Region VI. At a community level, meetings were held for the exchange of experiences on community participation, and food and nutrition issues. Referring to the health district of Quetzaltenango, and with the purpose of developing local health planning, assistance was provided to the Regional Development Council of Quetzaltenango in the design of a database (SIMAP) for the identification of at-risk areas. Likewise, personnel was trained in the use of SIMAP.

On the other hand, INCAP collaborated in a series of epidemiological studies on: 1) monitoring and evaluation of the mother-child program in Quetzaltenango and Totonicapán; 2) lost opportunities for vaccination; 3) personal hygiene habits, and 4) anemias caused by iron and vitamin A deficiencies in pregnant women and adolescents of Escuintla. Furthermore, support was given in the preparation of study protocols on community participation in the mother-child food supplementation programs of Totonicapán, on food management of the child with acute diarrhea (as part of the regional multicenter study), and breastfeeding.

An interinstitutional proposal was also prepared on improvement of high-risk obstetric care in Quetzaltenango.

Regarding documentation, the Institute collaborated in the assessment study of the documentation centers of the 24 health areas. Personnel of the centers was trained, and bibliographic materials provided. Teaching materials were also prepared and distributed, as well as the bulletins entitled *Mother and Child*, *Diarrhea Dialogue*, and *IRA News*.

On the other hand, INCAP supported the organization and development of the XLII National Congress of Medicine, as well as the Regional Congress of Nutrition. It also collaborated with FUNDABIEM in the television program on food and nutrition problems and their control.

Food and Nutrition in School Programs

The Institute provided training to bakers of 92 cottage industry bakeries who participate in the preparation of the nutritionally improved cookie for school snacks. It also gave support to the "Departamento de Alimentación y Nutrición Escolar" (DANE) (Department of School Food and Nutrition) in the design of a methodology for the evaluation of schoolchildren's nutritional status.

The GTB also collaborated in the supervision of the preparation of the nutritionally improved cookie, and quality control was also carried out in 95% of the bakeries that provide the school snack.

Likewise, the GTB was active in the preparation of the managerial model of the "Programa de Alimentación y Nutrición Escolar" (PANE) (School Food and Nutrition Program) in order to establish the work bases of the program at local, regional and central levels.

Food Fortification

INCAP gave support to the Department of Food Control in the supervision and quality control of the premix to be used in the Vitamin A Sugar Fortification Program, as well as in the efforts for control of salt fortification with iodine.

Food and Nutrition in Permanent Education Programs

In support to the School of Agriculture of the University of San Carlos of Guatemala, the Institute collaborated in the revision of the Research Plan and Economic Geography Course whose object was to integrate the food and nutrition component. A seminar was carried out on food balance sheets with students of the "Ejercicio Práctico Supervisado" (EPS) (Supervised Practical Exercise).

In the School of Medicine attached to the "Centro Universitario de Occidente" (CUNOC) (Western University Center), an Integrated Child Care Program was developed for students in their fifth year of Medicine. Also at CUNOC, a panel on community participation, and methods of participatory food and nutrition education was held for students of the social services career.

In the Schools of Agricultural Training of the Ministry of Agriculture, a meat and sausage processing course was developed. Support was also given to the preparation of projects on swine and rabbit breeding, and integrated production systems were implemented.

In the Schools of Nursing, a course on epidemiological research was developed for 10 teachers and in-service personnel, and a post-basic course was provided for nurses involved in infant care. Likewise, training in anthropometry was given to teaching personnel of the School of Nursing and to the "Hospital General de Occidente" (Western General Hospital).

INCAP also supported the participation of an official of the Ministry of Health in the International Workshop on Iodine Deficiency held in Ecuador. Likewise, INCAP funded the participation of officials of the agriculture sector in the Course on Food Science and Technology, which they attended in order to obtain a Master degree.

Furthermore, the Institute provided assistance for the development of a proposal for preschool integrated care practices, for students of different careers of the CUNOC.

In the School of Biological Chemistry of the University of San Carlos of Guatemala, two officials were trained in the preparation process and quality control of antiserums for the diagnosis of enteropathogen *Escherichia coli* and *Shigella sp.*

The new monitoring system and evaluation of the curricular review process was designed, and teachers were updated on issues related to food and nutrition.

Likewise, support was given to the development of the seminar-workshop for the analysis of the role that the "Unidad Sectorial de Planificación Agrícola y Desarrollo Agropecuario" (USPADA) (Sectoral Planning Unit for Agriculture and Animal Husbandry Development) plays in regard to food and nutrition within the national plan of production and commercialization of basic foods in Regions IV and VI.

Additionally, INCAP collaborated in the assessment needs of support personnel of the hospitals of the Departments of El Progreso, Zacapa, Sololá and Retalhuleu. Training was also given to the multidisciplinary groups of the same hospitals. Likewise, 30 officials of the "Hospital General San Juan de Dios" of Guatemala City received training in biostatistics.

In coordination with PAHO/WHO and the University of San Carlos of Guatemala, we developed the first phase of the National Course on Epidemiology for physicians, with 32 participants, among them: the Ministry of Health, an NGO, the School of Medicine and IGSS.

Lastly, the GTB provided the School of Nursing of Quetzaltenango, and the teaching personnel of the practice area of the fifth year of Medicine of CUNOC with bibliographic material.

Food Security

At the community level, training activities related to food projects management and harvesting vegetable gardens were carried out aimed at groups of Chiquimula health promoters and agricultural groups of Sololá, respectively. The GTB also supported the development of a workshop on agriculture, food and nutrition, addressed to seven NGO's integrated to the "Servicios Jurídicos Industriales" (SERJUS) (Industrial Legal Services). Thirty officials from different institutions for implementation of food aid projects were also trained in the management and quality control of donated foods.

The Institute also provided technical assistance to the School of Agricultural Training of Sololá, so that the school in turn, could train a community group in the preparation of a new project on food and nutrition. Support was also given to a group of women of "Ciudad Peronia" in the organization and functioning of a community store. Jointly with SERJUS, the GTB coordinated the establishment of a Technical Council of an NGO of the Highlands, for the management of community projects on food and nutrition.

Transfer of technology to a group of sugar mill workers was carried out in order to produce the nutritionally improved cookie. Likewise, support was provided to the "Comité de Reconstrucción Nacional" (CRN) (National Reconstruction Committee) in the design and development of an information system to improve food aid management. Personnel was also trained in its use. Another activity was the review of norms and technical manuals to improve food aid management. A profile was also developed for a feasibility study to establish a cookie plant in that institution.

On the other hand, the GTB participated in the preparation of a food aid project to alleviate the hospital emergency caused by the current financial crisis.

Finally, the Institute supported the implementation of SIMAP in different sectors of Region VI, and users were trained. During the year, training in SIMAP was also provided to national, public and private institutions.

Honduras

General Coordination

The GTB-Honduras was active in the promotion of effective coordination between the Mother-Child Division and the Office of Nutrition for the implementation of interventions derived from the food and nutrition plan, which are aimed at improving the situation of the most marginated populations.

Likewise, the GTB developed actions for planning, programming, implementation and evaluation of technical cooperation.

Food and Nutrition in Mother-Child Health Programs

The emphasis that the Government placed on the food security area, motivated the Ministry of Health, and specifically the Office of Nutrition to prepare a food and nutrition plan, oriented towards assisting population areas with severe nutritional problems, an activity in which INCAP cooperated actively.

The country has 10 departments, however, it was agreed to place emphasis only on the activities of four of them, located in the Health Regions IV and V. By initiative of the Ministry of Health, local representatives of the agriculture, planning, education and health sectors met in both regions with the purpose of preparing a unique plan, designed to approach the nutritional problem in an integrated manner. Results of these meetings allowed the identification of participants, of available resources, and of the activities that each institution is carrying out. A work plan was also prepared that will allow the development of joint activities.

One of the problems that the Ministry of Health faced was the lack of intrasectoral coordination. The GTB members also gave support to the Ministry in their efforts to promote a higher degree of coordination among the different institutions who are participating in the plan. With regard to achievements, the work carried out by the Office of Development Systems has been important, since it has contributed to the understanding of the concept of SILOS and its social participation, which responds to personnel needs at a local level. In the Division of Human Resources, collaboration was provided to training activities at the local level, participatory methodologies and in-service education.

The Mother-Child Division and the Office of Nutrition are supporters of the saying "learning by doing" and also of classic normalization activities. Hence, they promoted local multisectoral participation in the design of intervention plans directed at solving priority problems, without imposing preconceived methodologies. As regards the Office of Nutrition, INCAP supported the design and implementation of a food and nutrition education plan targeted towards the priority population areas.

Collaboration provided by the Institute to this action was oriented, by request of the Ministry of Health authorities, to the preparation of the projects included in the "Plan de Prioridades de Salud en Centroamérica y Panamá" (PPS/CAP) (Health Priority Plans for Central America and Panama). Within these are the food security and the mother-child projects. This activity was carried out in December, 1990.

Within the Mother-Child Area, activities were included that supported the preparation and implementation of norms to control acute respiratory infections (ARI), review of CED, growth and development, and norms for the management of the malnourished child. These activities concluded at the end of the year and included the design and implementation of an infant care card for use in the "Instituto Hondureño de Seguridad Social" (IHSS) (Social Security Institute of Honduras). Also, an at-a-distance course on the management of the malnourished child addressed to pediatricians had been programmed, but only the first step was fulfilled; that is the selection of the coordinating institution (the Pediatric Association), identification of possible beneficiaries and the readaptation of the first module of the course, regarding the nutritional situation of Honduras.

Furthermore, INCAP supported the Health Information System and progressed in the implementation of SIMAP by training eight officials that are in charge of data processing in the Mother-Child Division, in the Office of Nutrition and in the Statistics Department. SIMAP is already being used in the Statistics Department and in the Office of Nutrition. By request of AID Mission in Honduras, in 1991, the Institute will support the implementation of SIMAP's information system. Based upon requests, we can affirm that in 1991-92 there will be a broader use of the system in other institutions aside from the Ministry of Health.

Additionally, INCAP collaborated in the implementation of the network of documentation centers of the health regions. At the end of the year, it initiated training of personnel that is responsible for those centers, the central documentation center and the PAHO/WHO Representation. The regional centers are equipped with specific and sufficient trained personnel, and, in several of them, with adequate equipment including fax, microcomputers and photocopy machines. On the other hand, the technical and organizational capacity of the documentation center at the central level has been strengthened. According to plans, this center should serve as a focal point.

Support was also given to operational research activities. The data process was completed and an analysis began of two studies on: "Reference systems on ARI children" and "Management of ARI children" carried out by the School of Medical Sciences and the Metropolitan Health Region. Both studies should end during the first four months of 1991.

The Institute collaborated in the training of an NGO: "Consejo de Desarrollo Integral de la Mujer Campesina" (CODIMCA) (Integral Development Council for the Rural Woman), and the "Federación de Mujeres Campesinas" (FEMUC) (Rural Women's Federation) for the development of activities related to health, agriculture and animal husbandry of organized community groups. The results obtained can only be measured at present in terms of number of activities developed. Achievement regarding food production and improved lifestyles of these groups could only be obtained with a greater concentration of multi-institutional resources, and with a closer follow-up. The basic orientation of this program is to unite the activities of these groups with other institutions with similar objectives that receive support from INCAP in the areas of permanent education, institutional planning, food and nutrition education, food aid programs, mother-child, etc. The Institute has proposed to the different institutions that for the year 1991 they select only one geographic area (space-population) for the development of an integrated plan.

Food and Nutrition in School Programs

Support continued to be provided to the education sector in the incorporation of objectives, processes and educational contents in the nutrition area to improve teaching in this field.

Furthermore, it cooperated in the integrated evaluation of the School Lunch Program, which allowed the national authorities to perform significant changes in the management of the program.

Food and Nutrition in Institutions

With INCAP's support and by initiative of the Office of Nutrition, jointly with the Office of Hospitals of the Ministry of Health, a definition of the educational profile for the dietetics' assistant personnel of state hospitals was made. This activity is a preliminary step for the training process that will begin in 1991.

Food and Nutrition in Permanent Education Programs

In the field of academics, INCAP continued the process of incorporation and development of objectives on food and nutrition in the Nursing Career of the National University.

Most of the training activities were accomplished in in-service institutions linked with the review of the occupational and educational profile of personnel from the agriculture, health and education sectors. This has favored the fulfillment of the purpose to institutionalize training processes with a permanent approach, and its ties with food production and food and nutrition education activities for the population. When we proposed the idea of selecting only one geographical area to concentrate multiinstitutional resources to the institutions, it was accepted from a technical point of view. During 1991, we will place emphasis on the use of this strategy.

A summary of the processes supported in this working area is presented as follows:

- ➡ Review and curricular planning directed at medium and high level training schools (normal, technical, agriculture, nursing and assistant nursing schools).
- ➡ Incorporation of the food and nutrition contents in the study plans of the normal and technical schools (Ministry of Education).
- ➡ Incorporation of the food and nutrition contents in the study plans of the nursing schools and of the National University.
- ➡ Preparation and review of the food and nutrition components of the permanent education programs in education, agriculture and health sector institutions.
- ➡ Reactivation of permanent education activities at the "Instituto de Formación Profesional" (INFOP) (Institute of Professional Training), the Ministry of Natural Resources, the National Agrarian Institute, and the Ministry of Health.
- ➡ Incorporation of the food and nutrition contents in the training plans.

Food Security

With INCAP's support, a protocol was prepared to update the basic food basket. Likewise, the data collection plan is ready for its implementation during 1991.

Also, the final report on the Food Consumption Survey was written. The survey was carried out by the Science and Technology Unit and the Office of Nutrition of the Ministry of Health.

Furthermore, INCAP gave support to the Ministry of Education in the design of the protocol for the II Schoolchildren's Height Survey, which is ready to begin data collection in February, 1991.

Finally, the Institute cooperated with the Ministry of Health, the National Council of Social Welfare, and the Ministry of Labor in the planning and implementation of evaluation of the mother-child feeding programs, developed by these institutions. The evaluation was concluded and the results were presented to the political and technical authorities, with the purpose of putting into practice the identified solutions foreseen for 1991, with INCAP's support.

Nicaragua

General Coordination

As a result of the changing processes that occurred in the country, at the political, economic, health and institutional level, certain factors were combined which affected the delivery of technical cooperation. Among these, the following can be mentioned:

- > The concentration of efforts during the first months of 1990 to define the governments' strategic lines of actions in the field of rural development, caused a reduction in the intensity of the Children's Life Protection Campaign.
- > The considerable increase in the size of the population that needs food aid programs, imposes technical and administrative demands which are difficult for the regional system to satisfy, even though the Office of Nutrition improved its technical projection at the regional level. Within this context, during the first semester of 1990, a food aid program idea was presented: crude family portions for 20,000 demobilized contras, as well as for 6,000 repatriated persons and their families. This is the first of a series of efforts and initiatives in the area of food and nutrition.
- > A progressive and permanent deterioration of the food services at the hospital level is perceived. Due to the present budget deficit, Nicaragua lacks the necessary funds to invest in infrastructure services. This negatively influences the efforts directed to the strengthening of food services.

Food and Nutrition in Mother-Child Health Programs

The Institute continued supporting actions related to the Children's Life Protection Campaign, providing the following activities:

- > Training of health officials working at the local level of Regions III and IV, in aspects related to growth monitoring and development, nutritional surveillance systems and food supplementation.
- > Support to the edition of 1,000 bulletins entitled "Sistema de Vigilancia en Nutrición" (SVEN) (Nutrition Surveillance System).
- > Implementation of the "Sistema de Vigilancia Alimentaria-Nutricional" (SVAN) (Food and Nutrition Surveillance System) in three districts of Region III, one area of Region IV and all of Region V.
- > With INCAP's direct technical assistance, a Training Course in Pediatric Food and Nutrition was developed for the health personnel of Region I, with the participation of 15 officials from that region.
- > Cooperation was given to the community movement in the design and testing of a module on food and nutrition addressed to squad groups and community leaders.

The Institute also cooperated with the Nutrition Department in the preparation and implementation of a national plan on breastfeeding. The actions carried out within this context are the following:

- > Training activities on breastfeeding at the national and regional level (Regions II, III, IV, V), with the participation of 800 officials of the community movement, the health sector, different associations, and the School of Medicine.
- > Contracting a national official to coordinate the national plan in its first implementation phase (sensitization, promotion and definition of a baseline).
- > Preparation of a monitoring and evaluation system for the plan, which at present is being implemented.
- > Development of a breastfeeding dissemination program through mass media communication. As part of this activity, 500 calendars were distributed, two television spots were shown and four radio jingles were broadcasted.
- > Updating the knowledge, attitudes and practices of health providers. Data was collected and will be analyzed during the first trimester of 1991.

Likewise, INCAP cooperated with the "Facultad de Medicina de la Universidad Nacional Autónoma de Nicaragua" (UNAN)-León (School of Medicine of the National Autonomous University of Nicaragua) in the development of the operational research project "Value of community actions to increase the use of oral rehydration salts, and decrease infant mortality caused by diarrhea". The study was concluded and the intervention plan was prepared. These will be implemented in the coming year.

Food and Nutrition in School Programs

At the Ministry of Education, the Institute initiated a series of actions oriented to sensitize national authorities to support the process of nutritional surveillance of schoolchildren. Within this context, we continued supporting the process that began in 1989 regarding the Schoolchildren's Height Survey. During

the present year, data processing and analyses were carried out. This process is planned to conclude during the first four months of 1991, which will enable the prioritization of geographic areas at municipal levels.

Food Fortification

The GTB cooperated with the Nutrition Department in the preparation of the final report of the Survey on Goiter Prevalence in Schoolchildren. Also, regional workshops were carried out presenting and discussing the results of the survey with the joint participation of officials from the Ministries of Education and Health in the six regions located on the Pacific coast. With the information obtained, necessary interinstitutional contacts were made to reactivate control of salt iodization.

Likewise, it collaborated in the preparation of a profile for a five-year program on iodine deficiency control. At present, the institutional capacity is being documented to seek funding for its implementation.

INCAP also continued cooperating in the strengthening of the salt iodization program, and within this context, the following actions were planned:

- ➔ Training of personnel that works in the salt mines of the Regions II, III and IV, in iodization norms and quality control. As a result of this activity, the salt workers have requested from the Government the materials for iodine salt fortification.
- ➔ Review, update and editing of norms for the control of salt iodization. This action was determinant for the Ministry of Industry to emit a decree that prohibits the expenditure of non-iodized salt.

Food and Nutrition in Institutions

During 1990, the Institute continued cooperating in the evaluation of the PMA/2537 Project (Food Aid Program at Hospital Level), and an assessment of the present program's situation was made. This elicited improvement of its organization, as well as the definition of operations, and institutional supervision. Within this context, two manuals were prepared: Hospital Food Services, and Milk Banks. Likewise, the Manual for Hospital Diets was updated.

Additionally, training activities related to the improvement of knowledge and pediatric care for the malnourished child, as well as the unification of criteria in the use and interpretation of measures and anthropometric indicators were carried out.

Food and Nutrition in Permanent Education Programs

The GTB continued to support the process of introduction of the food and nutrition component in the health, education and agriculture training plans.

Results of the technical cooperation provided in this field were:

- ➔ Training of teaching personnel of the "Universidad Nacional Agraria" (UNA) (National Agrarian University), Animal and Vegetable Production Schools, the School of Dentistry and the School of Zootechny of the UNA, on methods and techniques for the process of curricular changes, through the review of the food and nutrition contents of the courses. In the field of Agronomy the courses on animal nutrition and vegetable production were also reviewed in order to incorporate the food and nutrition component.

- ➔ Cooperation was also given in the revision of the study plans of the food technologist in order to incorporate the food and nutrition component. At present, a progress of 70% in the program of Biochemistry I has been attained. Also, a review of practical study-work activities within the teaching-assistance framework was initiated.
- ➔ A review of the present program of study-work practices of the School of Medicine was also carried out with the purpose of introducing the food and nutrition component.
- ➔ In the School of Medicine of Managua, cooperation was given in the review of the following courses: Physiology (1st. and 2nd. year), Biochemistry (1st. and 2nd. year) and Patient Care Techniques (1st. year), where food and nutrition issues were also included.
- ➔ Collaboration was given to personnel in charge of the work-study program of the School of Medicine in León in the preparation of guidelines to plan activities on food and nutrition.
- ➔ With INCAP's support, the food and nutrition component was incorporated into the hygienic module of the "Centro de Investigación en Salud" (CIES) (Health Research Center).

Likewise, the Institute continued cooperating in the development of permanent education programs in food and nutrition with an integrated and multisectoral approach. Within this context, 200 medical and nursing personnel were trained in the teaching as well as in the assistance sectors, in educational issues related to: pediatric emergencies, obstetric and neonatal high-risk cases, food and nutrition, etc.

In the Ministry of Education and with INCAP's support, teachers working at the different regional schools were trained in the use of the Manual for Vegetable Gardens. It also collaborated in the design, preparation and testing of manuals on food and nutrition and on basic grains.

In support to the "Escuelas Rurales de Estudio-Trabajo" (ERET) (Rural Schools for Work-Study), the process of curricular changes continued, reaching 50% of its goal during this year. This process is expected to conclude in 1991.

Within the teaching-assistance integration process, activities of technical cooperation were also carried out. The results were the following:

- ➔ Training of officials (nutritionists, nurses, physicians, librarians and hospital managers) of Regions II, III and IV in the promotion and utilization of food and nutrition information.
- ➔ Support was also given to the technical review of the Education Technology Manual to strengthen the teaching-learning process in the "Centros Docentes de Referencia" (CDR) (Teaching Reference Centers) and the "Unidades Docentes Regionales (UDR) (Regional Teaching Units).



Food Security

The GTB gave support to the "Programa Alimentario Nicaragüense" (PAN) (Nicaraguan Food Program) in the development of a proposal of contents and of a methodology to prepare the National Food and Nutrition Security Plan.

Strengthening of PAN's relationships with other institutions was also promoted through meetings held with specific objectives of joint planning. Within the intersectoral working approach and coordination, design of initiatives and social compensation measures began in order to counteract the negative consequences of structural adjustment. The project design, framed within the plan's main policies, was also initiated.

Furthermore, INCAP collaborated with the Nutrition Department in the evaluation of the Food Aid Project PMA/2536, carried out in the clinics and health centers of the system. As a product of this evaluation, it was important to set up a managerial information system for the project to attain higher efficiency levels. Likewise, a national course was developed on control of food losses in the food aid projects, addressed to 34 regional warehouse keepers, food hygiene technicians, chemical engineers, and nutritionists. The analysis and discussion of the problems that arose during the course, pointed out the need to carry out an assessment of storing conditions at the regional and local warehouses. This study will take place during the first four months of 1991.

In coordination with Region I and the Nutrition Department officials, implementation of the community surveillance project within the same region was supported. Results obtained include the preparation of a document and implementation of the system; a research performance plan; a training and follow-up plan, which was concluded, and reproduction of teaching materials. The project is strengthening the present coordination among hospitals, health centers and clinics, specifically through joint decisions to organize the reference and counter-reference system.

Finally, INCAP supported the design of the methodology of the basic rural food basket. PAN authorities have initiated actions to seek external funding for the development of the corresponding basal survey.

Panama

General Coordination

During 1990, INCAP provided technical cooperation to Panama through the GTB-Panama, who temporarily contracted local professionals and through personnel from Headquarters, who assisted the Ministries of Health, Education, Planning and Agricultural Development in the nutrition, mother-child health, food control, animal surveillance and oral health programs. Collaboration was also furnished to the "Caja del Seguro Social", the University of Panama, the Nutritionist Association and food producing enterprises.

At a national level, members of the GTB participated in the preliminary assessment and in the design of a national strategy for food and nutrition security. This activity deserves high priority in view of the recent economic indicators, such as the decrease of the gross internal product, the weakening of capital formation, the low-exchange currency income and the low-banking solvency, factors that have improved somewhat as compared to 1989, although they are still below comparable data for the years 1986-1987.

The national economic situation obviously affected the most marginalized groups, especially in regards to food and nutrition. According to available information derived from the 1980 survey, it was determined that the high-income groups consume 112% of the recommended energy intake. This survey also highlights the existing discrepancy between extreme rural poverty, which affected 51% of the population, and the extreme urban poverty, limited to 23% of the population. The national authorities concern was perceived in their request to support the Ministry of Planning to review the basic food basket to obtain information that relates economic indicators with those of basic food availability and access.

Under the conditions of socioeconomic changes, the food and nutrition surveillance process is essential to identify the most marginalized groups and the most affected by the economic policies. To identify the groups at greater risk and their geographical location, INCAP transferred the computerized software SIMAP to the national and regional counterparts. This software enables the allocation of the provinces and regions on maps at a national level, as well as of information on health, food, nutrition and other allied fields. At present, the computer program is available in several sectors of Panama and in international and bilateral organizations.

Food and Nutrition in Mother-Child Health Programs

In this field, the GTB-Panama supported the implementation of the supervision system designed by the nutritionists of the Ministry of Health and of the "Caja del Seguro Social". The Nutrition Department of both institutions participated in this activity, as well as the Nutritionist Association. One of the results obtained was the design of a supervision system and use of instruments for its application. Training was also given to regional nutritionists on their use.

Likewise, INCAP collaborated in the training of health personnel at a national level in the use of nutritional teaching materials, more specifically in San Miguelito and the Metropolitan Region. Health personnel was also trained in the use of the Clinical Perinatal History to improve the perinatal information subsystem and obstetric-pediatric care.

In the education sector, more than 1,250 teachers of primary schools at a national level were trained in food and nutrition teaching techniques and methods. In the National University of Panama, collaboration was given to the "Comité Multidisciplinario de Alimentación y Nutrición" (COMAN) (Multidisciplinary Food and Nutrition Committee) and to the School of Nursing to motivate and train teachers, as well as to promote the incorporation of food and nutrition contents in the curricula. The university also received assistance in the preparation of audiovisual materials, and strengthening of its library, including other technical resources.

Lastly, and in support to direct activities related to community education, during 1990 cooperation continued to be provided to the "Programa de Educación Alimentaria y Nutricional y Supervivencia Infantil" (PEDAL/INSI) (Food and Nutrition Education and Child Survival Program), that is being developed in the Chiriquí Province, and at present is being implemented in Coclé. The program consists of a multisectoral effort (health, education, agriculture and university) including community participation, to improve the food and nutrition situation, as well as to promote health. During the year, the multisectoral training aimed at providers of services continued, as well as teaching and productive activities in the organized community. A seminar was also carried out on communication and participatory research with the participation of more than 25 officials from the different sectors from Chiriquí. Mass communication activities were also initiated in health, food and nutrition for the population in general.

In regards to the biological utilization of foods and the effect of diarrheal diseases, the Institute collaborated technically and financially in the development of operational research regarding knowledge, attitudes and practices as regards the use of oral rehydration salts and food management of the child with acute diarrheal disease. This study was carried out through structural surveys with health personnel and mothers of the communities of Bocas del Toro, Darién, San Blas, Panama City and San Miguelito.

Also, in relation to diarrheal disease, the Institute provided technical and financial support to the multicenter study on food management of the child with diarrhea, which is currently being carried out in children under three years of age in the urban and rural populations of the Chiriquí Province. Both studies will provide useful information for health personnel involved in reviewing norms for the clinical management of the child with diarrhea, identifying adequate and acceptable nutritional diets at a community level, and preparing educational messages for the population.

With regard to the strengthening of the country's capacity to carry out food and nutrition research, collaboration was given to carry out a study related to obesity and its risk factors in two health centers and two polyclinics of Panama City.

Other specific cooperation activities provided by INCAP through its GTB included the presentation of the food and nutrition situation in Central America at the regional seminar, organized by the "Programa Regional de Empleo para América Latina" (PREALC) (Regional Program for Employment in Latin America). Assistance was also given to the Ministry of Health on the utilization of the resources of the Gorgas Laboratory in order to provide technical cooperation and carry out research on tropical medicine in Central America.

Food and Nutrition in School Programs

The Institute collaborated with the Ministry of Education and the private sector in the transfer of technology of mixed flours (i.e., "Panacrema" and the Nutritious Cookie) that will be used in the School Feeding Program. Transfer was concluded during the year, and acceptability tests were carried out in the schools that are included in the program. Production activities will begin during 1991 and collaboration for product quality control will be provided.

The Ministry of Education and INCAP carried out joint training activities aimed at officials responsible of the School Feeding Program in the management and conservation of foods. Collaboration was also provided in the review and incorporation of the food and nutrition contents in teaching schools, to professionals with a BS in agriculture, dietitian aids and of the Normal School students from the first cycle of the "Alto de Piedra" School, the Professional School, the "Centro de Resocialización de Tocumen", the Professional Institute, and technicians of the agriculture sector.

Food Fortification

The GTB also provided assistance for the reactivation of the salt iodization surveillance system and to the programming of iodated salt use by high-risk groups. This activity was carried out in support to the Food Control and Veterinary Surveillance Program of the Ministry of Health, and responded to the identification of endemic goiter in schoolchildren, as revealed by the National Survey carried out with the support of the Institute, in a sample obtained from Panama's schools. The data obtained and the training given were fundamental factors for the reactivation of salt iodization control activities.

Food Security

INCAP provided collaboration in the production of the non-conventional seeds' program for the small farmer, of which the Seed Committee of the Ministry of Agriculture is in charge. The purpose of this program is to promote basic grains artisan seed industries, and to improve production of the small subsistence farmer sector, thus favoring the use of improved seeds. During 1990 the production of "poroto" seed and bean grain received support. With this purpose in mind, agriculture technicians were trained and experimental plots were planted.

INCAP also collaborated technically and financially in an anthropological study carried out by the School of Nursing of the University of Panama, in the urban-marginal population of Panama City. The main purpose of this research was to determine the impact of the present economic crisis of the country, and identify the mechanisms and behaviors that women and their families are adopting to assure their survival under limited income conditions. These studies are fundamental to recognize the effect that macroeconomic policies may have on food and nutrition security of families of low income.

Based on the aforementioned situation on food management in emergency situations, health officials and others participated in the review of guidelines initially prepared by the Institute and that were used to train multisectoral personnel of Panama. This activity complements the other activities previously carried out by INCAP in support to the Food Aid Programs.

Relationships with national and multilateral institutions

With the purpose of posing a coherent solution to the food and nutrition problem in the Central American region, the Directing Council gave the Institute instructions regarding the decentralized teams of INCAP --Basic Technical Groups (GTB for its Spanish abbreviation)-- aimed at establishing a cooperative relationship with national entities of the public and private sectors that carry out food and nutrition actions. In compliance with the above, the Basic Technical Groups strengthened their contacts with counterparts of the Ministries of Education, Agriculture and Planning, as well as with universities and non-governmental organizations. The extension of technical cooperation to other sectors and the increase of health actions is evident in the cooperation reports made by the countries. In this aspect, particular attention was given to the strengthening of the managerial capacity of national institutions responsible for the planning and implementation of activities. Also targeted were local health systems, and the transfer and application of technologies, methodologies and guidelines developed by the Institute.

As instructed by the Directing Council, in 1990 multiple contacts were made with technical cooperation, financing, bilateral and international agencies that work in the field of food and nutrition. Thus, at the Central American level, specific coordination meetings were held and in some cases, collaborative projects were planned with the following institutions: the Interamerican Institute for Cooperation in Agriculture (IICA), the Tropical Agronomic Center for Research and Teaching (CATIE), the Latin American School of Social Sciences (FLACSO), the Higher Council of Central American Universities (CSUCA), the Permanent Secretariat for Central American Economic Integration (SIECA), the Regional Program of Employment for Latin America (PREALC), the Central American Economic and Social Support Action Committee (CADESCA), the Central American Institute of Public Administration (ICAP), the Central American Institute of Business Administration (INCAE), the Central American Institute for Research and Industry Technology (ICAITI), the Interinstitutional Group for the Agricultural Sector (GISA), the Central American, Dominican Republic and Mexican Regional Agriculture Cooperation Committee (CORECA) and other organizations of Central American integration. The coordination relationship continued with the United Nations Children's Fund (UNICEF), the Economic Commission for Latin America (CEPAL), the United Nations Food and Agriculture Organization (FAO) and the World Food Program (WFP) in Central America and with the representations of the United Nations Development Program (UNDP) in the countries. Additionally, the relationship with PAHO/WHO programs such as Mother-Child, Food Control, Adult Health and Food and Nutrition was broadened.

We also maintained a cordial and close relationship with donating agencies and countries: the Agency for International Development (AID)/the Regional Office for Central America and Panama (ROCAP), the Ministries of Foreign Affairs of France and Switzerland, the Agency for International Development of Sweden, and we initiated or reinitiated contacts with the Governments of Norway, Canada and with the European Economic Community (EEC).

At the same time, INCAP actively participated in international meetings that took place in the Central American region. These events were related to scientific and technological integration efforts which respond to the social problems of the region. The meetings in which the Institute had active participation include:

* The XXXVI Annual Meeting of the Central American Cooperative Program for Food Crops Improvement (PCCMCA), which took place in San Salvador, El Salvador, March 26-30. At this meeting, emphasis was given to agriculture and livestock development for Latin America and the Caribbean, and technical issues of interest to Central America were discussed.

* The VII Latin American and the Caribbean Seminar of Food Science and Technology: "Food for Peace", organized by the Latin American and the Caribbean Association of Science and Technology (ALCCTA) held in San José, Costa Rica, April 2-7. During this Seminar, topics of interest were discussed, including the development of intermediate humidity foods; possibilities and limitations of food radiation in Latin America and the Caribbean; the Latin American data system in food composition and its application to food science and technology; the convenience and perspectives of the meat industry in Latin America and the Caribbean; the regional importance for the integration of food laws; opportunities and the need to integrate efforts in food biotechnology; the promotion of rural agroindustrial development; the relationship between market, production and research in food technology, and needs and possibilities of food packing and baling in Latin America and the Caribbean. The Institute presented technical papers and participated in the discussions of the above-mentioned topics.

* On May 21-25, a meeting of the Food and Nutrition Program of PAHO/WHO personnel and the representatives of the Regional Operative Network of Food and Nutrition Institutions (RORIAN) was held. Aside from the review of technical matters related to food availability and consumption, especially within the context of food and nutrition security at the family level, guidelines for the strengthening of the network were established. INCAP was named Executive Secretariat of RORIAN for the period 1990 - 1992.

* in collaboration with UNDP, the World Bank (WB), PAHO/WHO and INCAP, a seminar-workshop on the Effects of Socioeconomic Policies on the Food and Nutrition Situation, took place at the Institute on May 29-31. The meeting was attended by officials of health, education, agriculture, planning and related institutions from Bolivia, Costa Rica, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, Panama, Peru and the Dominican Republic, as well as from technical cooperation and funding agencies, including the German Technical Cooperation Agency, WB, CADESCA, the Cooperative for American Release Everywhere (CARE), CATIE, EEC, CEPAL, FAO, the Finnish International Development Agency (FINIDA), the International Development Research Centre of Canada (IRC), the International Food Policy Research Institute (IFPRI), Management Sciences for Health (MSH), WHO, PAHO, ORSTOM, WFP, UNDP, ROCAP/AID, the Technical Secretariat of the Ad-hoc Child Surveillance Committee and SIECA. In this seminar-workshop, exchange of information regarding the social effects of structural adjustment policies between countries was promoted. Hence, possible solutions oriented towards the reduction of the effects of these policies on economically and socially deprived population groups were also defined. The project profiles prepared in the seminar-workshop were later reviewed in the countries, adjusted and submitted to funding agencies.

- * In support of the International Science and Technology Institute (ISTI), AID and other cooperation agencies --UNICEF, FAO, PAHO/WHO--, a regional workshop was held at INCAP on Strategies to Improve the Vitamin A Status in Latin America and the Caribbean. At this meeting which took place on June 5-7, the problem of hypovitaminosis A and its control in 12 countries of the American region were reviewed, and also an action plan for technical and funding cooperation was defined for each country.
- * On June 20-22, the XIII Ordinary Meeting of GISA took place at the Institute's headquarters. The following regional organizations are part of GISA: the Central American Bank for Economic Integration (BCIE), CADESCA, CATIE, the International Center for Agricultural Preinvestment (CIPREDA), CORECA, FAO, IICA, the International Organization of Agriculture and Animal Husbandry Hygiene (OIRSA), the Latin American Organization of Fishing Development (OLDEPESCA), UNDP, the Regional Unit for Technical Assistance (RUTA), SIECA and INCAP. In this meeting, preliminary work was prepared for the Sectoral Meeting, which was held in October 1990, with cooperating agencies. Additionally, the project portfolio that will be presented to the donors was prepared.
- * On August 6-8, at the Institute's headquarters, the Central American Seminar related to Food Drying took place, in collaboration with the Intermediate Technology Development Group of England. In this seminar, officials from Central America, the Dominican Republic and Cuba participated. As part of this activity, theoretical and practical knowledge related to the drying, marketing and commercialization of dehydrated products was presented.
- * On October 1-5, the International Workshop on Street Food Sales was also held at headquarters. The event was organized jointly with FAO with the participation of officials from Bolivia, Colombia, Peru, the Dominican Republic, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Panama, FAO and INCAP. During this meeting the problem was reviewed and actions were presented for the improvement and control of street food sales. The CODEX Coordination Committee for Latin America and the Caribbean also proposed recommendations to the Code of Hygienic Practices for food preparation and street food sales.

Finally, INCAP actively participated at meetings and activities of the United Nations Economic Plan for Central America (PEC) with CADESCA, whereby the Institute participated in the formulation of the Regional Program for the Training of Human Resources in Agroindustry. This program was jointly prepared with CATIE, national counterparts and officials from the Ministry of Hydraulic Resources of Mexico. INCAP also actively participated in the preparation of the Subregional Program of Planning and Promotion of Projects for the Agroindustrial Sector, with BCIE, IICA and the Governments of Venezuela and Ecuador.



The Institute's work regarding dissemination of scientific and technical information was reviewed during 1990, identifying the need to create the Coordination of Information and Communication, enabling INCAP's actions to be developed in this field. It was determined that the mission of this Coordination was the strengthening, promotion, coordination and monitoring of work related to information and communication in food and nutrition issues.

Its objectives are:

1. To increase the demand for scientific and technical information related to food and nutrition, strengthening the capacity of the Member Countries and INCAP on its use and availability.
2. To disseminate scientific and technical information available or produced at the Institute, aimed at contributing to the development of research, direct assistance to the countries and training of personnel.
3. To strengthen the capacity of the Member Countries and INCAP to plan, develop and evaluate communication processes designed to introduce and enhance desirable behaviors that will positively contribute to the health, food and nutrition status of the Central American population.

In order to fulfill these objectives, the main activities developed during 1990 refer to:

1. Information collection and management.
2. Editorial work and dissemination of scientific and technical information.
3. Design of an information system.

1. Information collection and management

The Library was directly responsible for the collection and processing of scientific and technical information and continued to develop its ongoing activities, which included the identification, cataloguing and indexation of scientific and technical information in food and nutrition.

The donation program also continued, whereby periodical publications, books, thesis and articles were distributed to universities and documentation centers from the Ministries of Health of Honduras, Guatemala and Nicaragua.

Activities of direct technical assistance were carried out in Guatemala, El Salvador, Honduras and Nicaragua, providing support to detect the present situation of the information units of the Ministries of Health. Based on the detected situation, training courses were developed on the management of documentation centers (Table 1).

TABLE 1
COURSES ON TECHNICAL INFORMATION PROCESSES DURING
1990,
BY COUNTRY AND NUMBER OF PARTICIPANTS

Country	Name of the course	Number of participants
Guatemala	Workshop on the management of local documentation units	11
	Workshop on technical information processes	12
Honduras	Workshop on the management and organization of regional documentation health centers	07
Nicaragua	Workshop on library techniques: Preparation of summaries, use of thesaurus, indexation of documents	07
	Workshop on dissemination of specialized information on food and nutrition	21
	Seminar on the promotion and utilization of specialized information on food and nutrition	28

At present, the Institute has incorporated to its library holdings optical disc CD-ROMS, such as LILACS, MEDLINE and POPLINE. This technology represents a speedy and valuable resource to locate information. Additionally, widespread promotion of existing resources available at INCAP was carried out. These include the audiovisual collection, the CD-Roms and publications of the Institute.

The services provided during 1990 include the support given to bibliographic research (approximately 8,000) and consultations (20,000). Also, a total of 2,500 requests of document reproduction were attended to, and 80 on-line and CD-ROM searches were carried out. Finally, Table 2 presents the dissemination services offered, Table 3 presents the circulation services provided and Table 4 the reference services given.

TABLE 2
DISSEMINATION SERVICE

Distribution of Dissemination Material

Year	Literature review bulletin	Bibliography received	Journals received	Titles of processed publications
1989	6,000	1,800	480	44
1990	6,000	1,650	320	1,440

TABLE 3
CIRCULATION SERVICES

Circulation Loan Services

Year	Pamphlets and reprints	Journals	Books	Audiovisuals	Total
1989	3,653	5,517	8,346	542	18,058
1990	3,117	5,299	6,968	1,251	16,635

TABLE 4
REFERENCE SERVICE

Year	Frequency of users		Bibliographic research		Consultations	
	INCAP personnel	Others	INCAP personnel	Others	INCAP personnel	Others
1989	18,873	16,053	1,629	6,322	4,141	12,510
1990	17,569	12,833	2,346	5,640	5,357	13,930

2. Editorial work

During 1990, a total of 245 documents were registered, of these 47 were published as scientific articles in Spanish; 17 in English; 33 as collaborative works; 5 books and 3 classified as miscellaneous.

We also published:

- ▶▶▶▶ Volume 39 (3) of "*Archivos Latinoamericanos de Nutrición*", which was dedicated to the commemoration of INCAP's XL Anniversary and has 20 articles written by the Institute's professional personnel.
- ▶▶▶▶ *Proceedings of the Scientific Meeting: "Alimentación y Nutrición en Centroamérica y Panamá: Análisis y Estrategias para su Desarrollo."* This publication contains 12 articles written by INCAP's professional staff.

Additional activities carried out during 1990 refer to:

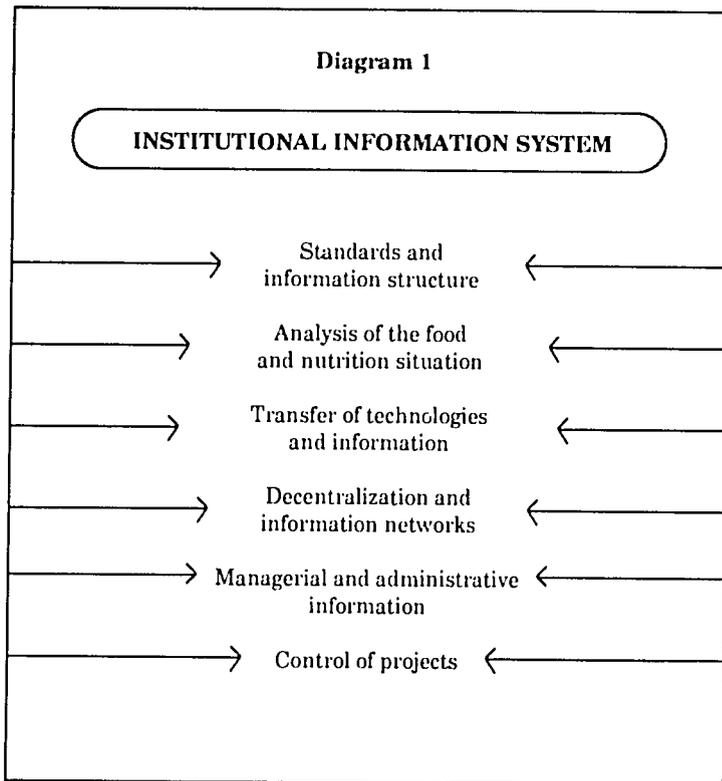
- ▶▶▶▶ Editorial work and review of galley proofs of manuscripts and documents.
- ▶▶▶▶ Text writing, formatting, review and editing of the following bulletins: "**INCAPalabras**" (3) and "**Avances en Alimentación y Nutrición**" (1). The first is aimed at facilitating internal communication, and the second to promote within the region, INCAP's work on issues related to food and nutrition.
- ▶▶▶▶ Translation of documents from English into Spanish and viceversa (n=21).
- ▶▶▶▶ Distribution of the Volume XXIX of the Series of Compilations of INCAP's Scientific Articles, which included 45 papers regarding the Institute's work during the year (n=28).
- ▶▶▶▶ Reply to requests for publications from INCAP (n=873).

3. Information system

Based on external consultancies and internal working groups, during 1990 the need to design an Institutional Information System which integrates management, administration, scientific and technical information subsystems was identified. Previously these were developed separately (Diagram 1). With this in mind, an action plan for 1991 was prepared, allowing the strengthening of each of the different subsystems identified. As part of this plan, activities regarding the design and implementation of the following databases were initiated:

- ▶ Assessment of the existing equipment and computer programs available within the Institute.
- ▶ Database on the health, food and nutrition situation of Central America and Panama, including the training of personnel for its management.
- ▶ Design of a database of institutions involved in food and nutrition.
- ▶ Design of a database of human resources involved in food and nutrition.

Diagram 1

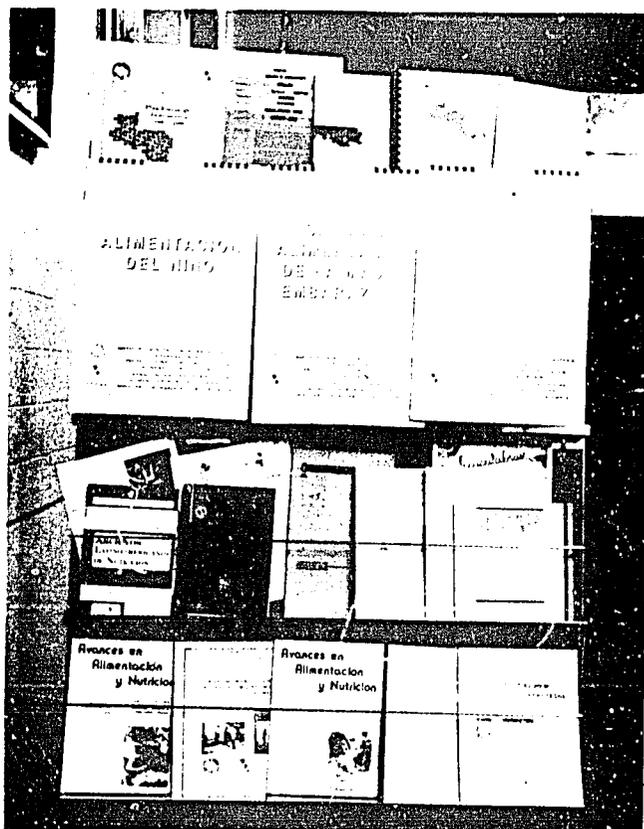


As part of the food and nutrition situation information subsystem, the following activities were carried out:

- ▶ Development and implementation of a database on mother and child health. Table 5 shows the number of available indicators by country, and Table 6 presents the training performed in the region for the transfer of this technology.
- ▶ With regard to SIMAP, a software for the mapping of the countries, a function which enables the comparison of two or more variables for a geographical area was incorporated. Furthermore, the "Lísteme" module was developed, facilitating the search, using commands similar to those of natural language. A new program called "The Map Maker" was designed, aimed at drawing maps on the computer to be used with SIMAP. With this program, the maps of Chile, Colombia, Cuba and Ecuador were drawn and registered in SIMAP. Later on, a copy of SIMAP was sent to each of these countries, containing the respective maps.
- ▶ INCAP, jointly with Futures Group, developed a screening module based on the population.
- ▶ Support was also given to computer presentations directed to decision-makers (ministers and viceministers).

▶ Visits: during August to October, INCAP participated in two activities which were carried out in Washington, D.C., U.S.A. The first visit (four weeks duration) was made to the Center for International Health Information (CIHI), with the purpose of observing and receiving training on different methodologies used by CIHI in relation to information technology issues. Collaboration was also given for the translation of documents into Spanish, and review of forms as well as of documents on the health situation of Guatemala, El Salvador and Honduras. This review consisted of the evaluation of methods used by the countries to report their mortality and morbidity rates.

▶ The second visit (three weeks duration) was made to the Food and Nutrition Program of PAHO (HPN), in order to support the revision of an information system on food and nutrition, as well as to develop a database on iodine deficiencies, and to provide training in the use of SIMAP to HPN professionals.



Through a constant flow of scientific publications, reports and documents, the Institute promotes its research findings, as well as results of other works carried out in the field of food, nutrition and allied fields

TABLE 5
NUMBER OF INDICATORS* IN THE SIMAP DATABASE
BY COUNTRY

Number of indicators	Country
12	Belize
179	Costa Rica
197	El Salvador
310	Honduras
1,024	Guatemala
55	Nicaragua
389	Panama
1,649	Central American region
108	Americas

* Indicators are from different sources and from publications of special studies.

TABLE 6
USERS TRAINED IN
MAPPING INFORMATION SYSTEM - SIMAP

Country	Number of users	
Guatemala	19	Institutions
	4	Embassies
	Region VI	
	26	Institutions
	53	Persons
El Salvador	13	Institutions
	58	Persons
Honduras	6	Institutions
	13	Persons
Costa Rica	14	Institutions
	19	Persons
Panama	4	Institutions
	9	Persons
Total	82	Institutions
	4	Embassies
	208	Persons

1990 Publications

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- C-236
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Guía para el Manejo Nutricional del Niño con Sarampión. Guatemala, INCAP, febrero de 1990, 6 p.
- C-241
Ministerio de Salud Pública y Asistencia Social de Guatemala/Instituto de Nutrición de Centro América y Panamá
Normas de Atención en Monitoreo del Crecimiento Físico (MCF). Guatemala, INCAP, marzo de 1990, 24 p.
- C-242
Ministerio de Salud Pública y Asistencia Social de Guatemala/Instituto de Nutrición de Centro América y Panamá
Manual de Apoyo a la Capacitación Complementaria en Monitoreo del Crecimiento Físico. Guatemala, INCAP, marzo de 1990, 18 p. + 4 anexes.
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Laure, Joseph (con la colaboración de Jorge A. Alarcón, Jacques Arnauld, Rosario Batres de Bonilla y Maarten D. Immink
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- C-252
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Caracterización de los Niveles Operativos de los Programas Maternoinfantiles. Tomo II. Honduras, Ministerio de Salud Pública, marzo de 1990, 210 p.

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- E-1337
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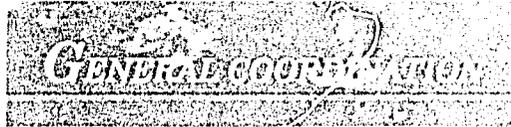
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PLANNING AND DEVELOPMENT UNIT

The Planning and Development Unit, as a support unit to the Director of INCAP, continued to carry out activities related to the strengthening of the institutional planning process, and external relations. As regards to the Institutional Strategic Plan 1991 - 2000 and its strengthening, review and edition of the document was completed, and the basic action processes and strategies for the short, medium and long term were defined. Support was also provided to define the Institutional Plan for Food and Nutrition Security. Furthermore, support was given for the definition of decentralized management, as well as supervision and evaluation guidelines of the Institute's Technical Cooperation. Regarding the second line of action, related to the external relations, support was provided to the Institutional Commission for the Central American Integration. The Unit represented INCAP in: the Economic Action Plan and the Economic Cooperation for Central America; in the Central American Commission of Science and Technology, and in the preparation of the Social Compensation Program for Structural Adjustment.

ADMINISTRATION

During 1990 a series of processes that the Administration Division had been carrying out since 1988, was strengthened, mainly those related to finance and accounting. Among the most important achievements, the following can be mentioned:

1. Completion of account-clearing processes (debtors and creditors).
2. Establishment of an adequate policy for institutional resources management.
3. Effective administration of the cost centers, reflected not only in terms of self-financing, but also in terms of renewal of vehicles and equipment.
4. Design of a new administrative, financial and accounting system.
5. Studies and presentations of well-documented financial reports to donating agencies.
6. Active participation in the review of project proposals to be presented to donors.
7. Adjustment and follow-up of the new Personnel Statutes' proposal. Presently it is being reviewed and is awaiting PAHO's approval.
8. Development of an Institutional In-Service Training Program.
9. Study of Posts' Classification.

10. Social insurance benefits increase for INCAP's staff.
11. Implementation of an infrastructure improvement and expansion program.
12. Installation of an administrative computer network.
13. Support to the administrative decentralization process.
14. Continuation of the development of the Annual Operational Budget by Program (APB).

Financial and accounting area

Given unsolved past problems, most efforts and resources were allocated to this area. Thus, the main achievements attained include:

1. Completion of the clearing and depuration process of unpaid bills.
2. Balancing of income and expenditures through the application of a healthy policy designed to manage resources. This has enabled the Institute to close its financial operations without a budgetary deficit for a second consecutive year.
3. Self-financing cost centers by establishing competitive prices and efficient provision of goods and services requested.
4. Development of an administrative, financial and accounting system appropriate to INCAP's institutional needs, operating through a computer network with distributed criteria. This system will be operating in 1991, and will integrate programmed activities with assigned financial resources. This process will allow an active interaction between the users and the system, enabling them to enter their data, make inquiries and follow-up on their transactions.
5. Preparation of satisfactory financial reports presented to donating agencies during auditing visits in order to render accounts. All of these reports were approved.
6. Active participation in the review of proposals sent to possible donor agencies, with the purpose of analyzing budget structure and conditions imposed by agencies, so as to guarantee that the resources being requested are sufficient to carry out programmed activities, and to assure that the requirements are complied by the Institute.

Personnel

The accomplishments refer to:

1. Presentation of a proposal of the revised Statutes for Appointed Personnel, which includes a series of additional economic and non-economic personnel benefits to be implemented at INCAP. This proposal will be reviewed at PAHO's headquarters in Washington, D.C. and will be submitted for its final approval to PAHO's Director during 1991.
2. Initiation of an Institutional Continuous Education In-Service Program aimed at INCAP's personnel, including professional and support staff. The areas covered include secretarial techniques, computer systems, nutrition, statistics, etc.

3. Development of a Study of Posts' Classification, including the development of the methodology to evaluate positions on a regular basis.
4. Greater health insurance coverage available to the worker, as well as their dependants, without additional costs. Furthermore, the health insurance coverage was broadened to include employees who have reached the retirement age, and wish to continue participating.

Equipment and infrastructure

The main achievements refer to:

1. Development and implementation of the remodeling and improvement of the present infrastructure program. Thus, meeting rooms were reconditioned and the parking lot was completed. Also, two facilities of INCAP VII were built to include classrooms, and filing space for passive documents. Likewise, security reinforcement of the external walls, protection of the installations against atmospheric discharges, and remodeling and equipping of several physical spaces, were carried out.
2. Installation of a Novell administrative computer network and provision of 50 work stations for the new financial and accounting system, previously mentioned, will start operating in 1991.

Technical Cooperation decentralization process

During the second semester of 1990, INCAP's Director placed great emphasis to the development and implementation of the Technical Cooperation decentralization process. Thus, the Administration Division was responsible to provide administrative and financial support. A computer model complementary to the budget system that PAHO's Representations use was designed and implemented. Its purpose is to control in detail, movement of resources assigned to the GTB's in the countries. Collaboration was also given in the preparation of norms and procedures for the decentralization process.

Annual operative budget by programs (APB)

During 1990 work continued, mainly on programmatic openings. Currently, INCAP is trying to institutionalize APB. The Four Month Work-Plan (PTC) operative integration of the APB into the new financial and accounting system has not yet been accomplished. It is expected that during 1991 this issue can be resolved.

Financial resources

Financial resources assigned and spent during 1990, distributed by divisions and fund sources are presented in the following Table. Different trends can be observed between the use of basic funds, mainly P3 and PA, and extra-budgetary funds corresponding to projects; the former were spent almost totally, whereas approximately 60% of the latter were spent.

BUDGET STATUS BY UNITS AND SOURCE OF FUNDS

TO DECEMBER 31, 1990

(IN US\$ THOUSANDS)

Abbreviations	Source Units	P3		PA		PN & PM		Total	
		Allocated	% Execution	Allocated	% Execution	Allocated	% Execution	Allocated	% Execution
AD	Administration	160.7	100.0	413.7	100.0	34.0	0.0	608.4	94.4
CA	Agriculture and Food Sciences	202.0	100.0	147.9	100.0	299.3	61.7	649.2	82.5
CT	Coordination of Technical Cooperation	113.6	100.0	5.4	100.0	902.2	38.8	1,021.2	46.0
DI	Office of the Director	87.8	68.7	4.7	100.0	211.9	43.2	304.4	51.5
BI	Coordination of Information and Communication	45.6	100.0	---	---	51.9	53.8	97.5	76.4
CI	Coordination of Research	139.9	100.0	---	---	21.4	79.0	161.2	97.2
NS	Nutrition and Health	246.6	100.0	---	---	2,677.8	68.9	2,924.4	71.5
PL	Food and Nutrition Planning	62.7	100.0	70.4	100.0	1,649.3	61.7	1,782.4	64.7
RH	Coordination of Human Resources	70.7	100.0	7.9	100.0	1,065.6	63.6	1,144.1	67.9
UP	Planning and Development Unit	39.9	100.0	---	---	135.9	43.3	175.8	56.2
LU	LUCAM	---	---	---	---	100.2	75.8	100.2	75.8
	Total	1,169.5	98.2	650.0	100.0	7,149.4	60.9	8,968.9	68.6

ABBREVIATIONS

AID	-	Agency for International Development
ALCCTA*	-	Latin American and the Caribbean Association of Food Science and Technology
APB	-	Annual Operative Budget by Program (INCAP)
ASIS*	-	Health Situation Analysis
BCIE*	-	Central American Bank for Economic Integration
CADESCA*	-	Central American Economic and Social Support Action Committee
CARE	-	Cooperative for American Release Everywhere
CATIE*	-	Tropical Agronomic Center for Research and Teaching
CDR*	-	Teaching Reference Centers (Nicaragua)
CED*	-	Control of Diarrheal Diseases
CEDRO*	-	Control of Diarrheal Diseases and Oral Rehydration (El Salvador)
CEN-CINAI*	-	Nutritional Education Center - Integrated Food and Nutrition Child Center (Costa Rica)
CENISMI*	-	Mother-Child Health Research Center (Dominican Republic)
CEPAL*	-	Economic Commission for Latin America
CIAT*	-	International Center for Tropical Agriculture
CIES*	-	Health Research Center (Nicaragua)
CIHI	-	Center for International Health Information (U.S.A.)
CIPREDA	-	International Center for Agricultural Preinvestment
CITA*	-	Food Technology Research Center (Costa Rica)
CODIMCA*	-	Integral Development Council for the Rural Woman (Honduras)
COGAAT*	-	Food for Work, Guatemalan German Cooperation
COINAP*	-	Intersectoral Council for the Attention of Populations in Precarious Areas (Guatemala)
COMAN*	-	Multidisciplinary Food and Nutrition Committee (Panama)

* *For its Spanish abbreviation*

CORECA*	-	Central American, Dominican Republic and Mexican Regional Agriculture Cooperation Committee
CRN*	-	National Reconstruction Committee (Guatemala)
CSUCA*	-	Higher Council of Central American Universities
CUNOC*	-	Western University Center (Guatemala)
CUO*	-	Western University Center (El Salvador)
DANE*	-	Department of School Food and Nutrition (Guatemala)
DESAF*	-	Office of Social Development and Family Allowances (Costa Rica)
EEC	-	European Economic Community
EPS*	-	Supervised Practical Exercise (Guatemala)
ERET*	-	Rural Schools for Work-Study (Nicaragua)
FAO	-	United Nations Food and Agriculture Organization
FEMUC*	-	Rural Women's Federation (Honduras)
FINIDA	-	Finnish International Development Agency
FLACSO*	-	Latin American School of Social Sciences
GISA*	-	Interinstitutional Group for the Agricultural Sector
GTB*	-	Basic Technical Group (INCAP)
ICAITI*	-	Central American Institute for Research and Industry Technology
ICAP*	-	Central American Institute of Public Administration
ICTA*	-	Institute of Agricultural Science and Technology
IDRC	-	International Development Research Centre (Canada)
IFPRI	-	International Food Policy Research Institute (U.S.A.)
IGSS*	-	Guatemalan Social Security Institute
IHSS*	-	Social Security Institute of Honduras
IICA*	-	Interamerican Institute for Cooperation in Agriculture
INCAE*	-	Central American Institute of Business Administration
INCIENSA*	-	Costa Rican Institute of Research and Teaching in Health and Nutrition
INFOP*	-	Institute of Professional Training (Honduras)
IOPAG*	-	Operational Research of the Food Aid Programs (Costa Rica)

* *For its Spanish abbreviation*

ISSS*	-	Social Security Institute of El Salvador
ISTI	-	International Science and Technology Institute
MA	-	Ministry of Agriculture (Costa Rica)
MH	-	Ministry of Health (Costa Rica)
MIDEPLAN*	-	Ministry of Planning (Costa Rica)
MINDES*	-	Ministry of Urban and Rural Development (Guatemala)
MIPLAN*	-	Ministry of Planning (El Salvador)
MISI*	-	Integrated Child Survival Modules (Guatemala)
MPE*	-	Ministry of Public Education (Costa Rica)
MSH	-	Management Sciences for Health (U.S.A.)
NGO	-	Non-Governmental Organizations
OIRSA*	-	International Organization of Agriculture and Animal Husbandry Hygiene
OLDEPESCA*	-	Latin American Organization of Fishing Development
ORSTOM	-	Institut Français de Recherche Scientifique pour le Développement en Coopération
ORT	-	Oral Rehydration Therapy
OSPA*	-	Sectoral Office for Agricultural Planning (El Salvador)
PAHO	-	Pan American Health Organization
PAN*	-	Nicaraguan Food Program
PANE*	-	School Food and Nutrition Program (Guatemala)
PANEA*	-	Food and Nutrition of the Schoolchild and Adolescent Program (Costa Rica)
PCCMCA*	-	Central American Cooperative Program for Food Crops Improvement
PEC*	-	United Nations Economic Plan for Central America
PEDALINSI*	-	Food and Nutrition Education and Child Survival Program (Panama)
PPS/CAP*	-	Health Priorities Plan for Central America and Panama
PREALC*	-	Regional Program of Employment for Latin America
PROSVAN*	-	Food and Nutrition Surveillance Regional Program (Costa Rica)
PTC*	-	Four-Month Work Plan (INCAP)
REPROINSA*	-	Representatives of the Integrated Health Program (Guatemala)

* *For its Spanish abbreviation*

ROCAP	-	Regional Office for Central America and Panama
RORIAN*	-	Regional Operative Network of Food and Nutrition Institutions
RUTA	-	Regional Unit for Technical Assistance
SERJUS*	-	Industrial Legal Services (Guatemala)
SIECA*	-	Permanent Secretariat for Central American Economic Integration
SILOGUIA*	-	Modules of Education and Community Health Participation (El Salvador)
SILOS*	-	Local Health Systems
SIMAP*	-	Mapping System (INCAP)
SIN*	-	Nutrition Information System (Costa Rica)
SISVAN*	-	Food and Nutrition Surveillance System (Costa Rica)
SNEM*	-	National Malaria Eradication Service of the Ministry of Public Health and Social Welfare (Guatemala)
SVAN*	-	Food and Nutrition Surveillance System (Nicaragua)
SVEN*	-	Nutrition Surveillance System (Nicaragua)
UDR*	-	Regional Teaching Units (Nicaragua)
UNA*	-	National Agrarian University (Nicaragua)
UNAN*	-	National Autonomous University of Nicaragua
UNDP	-	United Nations Development Program
UNICEF	-	United Nations Children's Fund
UNU	-	United Nations University
USPADA*	-	Sectoral Planning Unit for Agriculture and Animal Husbandry Development (Guatemala)
WB	-	World Bank
WFP	-	World Food Program
WHO	-	World Health Organization

* *For its Spanish abbreviation*



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