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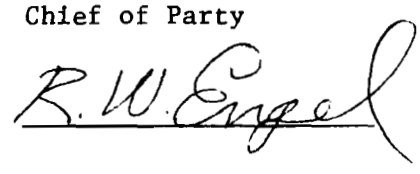

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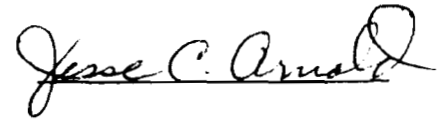

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[1]Although the University now is titled Virginia Polytechnic Institute and State University, reference to the University is abbreviated as shown.

Section A

A Summary of the Events Which Identify the Role of VPI in Nutrition in the Philippines

Summary Statement: Through short-term consultancies, training of Filipino counterparts and professional guidance to USAID Food for Peace and Public Health officials over a period of nearly a decade, VPI had gained considerable experience to qualify for the provision of technical services in support of a Philippine nutrition program. In particular, R. W. Engel, first as head of the Department of Biochemistry and Nutrition and later as Associate Dean of Research in Agriculture and Life Sciences, had maintained a continuing interest and developed firm and productive working relationships with counterparts in Philippine agencies concerned with food and nutrition from 1959 to 1967.

1. In 1959 the Interdepartmental Committee on Nutrition for National Development (ICNND), an inter-agency body of the U.S. Government from USAID, STATE, USDA, HEW, and DOD, invited R. W. Engel, Head, Department of Biochemistry and Nutrition, VPI, to participate in a review and follow-up of a nutrition survey which had been conducted in the Philippines in 1957 with ICNND support through the USAID mission in Manila. Engel had served as consultant to the ICNND in the development of its program of providing technical expertise and equipment to assist developing countries in defining their malnutrition problems. He had also served in the Philippines in W. W. II as Food and Nutrition Officer and had developed some background and understanding of the Philippine culture and its food and nutrition situation. Further, his department at VPI had pioneered, through support from the Williams and Waterman Fund, Research Corporation, N.Y.C., village-level nutritional rehabilitation of children and mother-education in nutrition in the Republic of Haiti. During the 2-month tour in the Philippines in 1959 it was learned that the Philippines, through its Food and Nutrition Research Center, was using the equipment and the trained personnel (gained from the 1957 survey experience) effectively in continuing food and nutrition surveys and had developed plans for completing in a decade, surveys in nine major regions of the country (1959-68).

Much of the 1959 tour by Engel was devoted to consultations with De. Conrado R. Pascual, Director of the Food and Nutrition Research Institute, in developing a machinery or infra-structure through which the nutrition survey data could be disseminated and through which local government units could operate in developing interventions for dealing with the food and nutrition problems evident from the analysis of the survey data.

2. In 1962 Engel was invited to serve as a delegate from VPI to the First Far East Symposium on Nutrition sponsored by ICNND, in cooperation with USAID mission in South Vietnam, and to proceed on a brief visit in Manila for further follow-up on nutrition activities in progress as related to the nutrition surveys assistance and consultancies provided earlier. On this visit Engel learned that the National Coordinating Council on Foods and Nutrition (NCCFN) had been organized in 1960 by the Food and

Nutrition Research Center (later Institute) as the mechanism for disseminating nutrition information, particularly survey results, and for planning local nutrition programs or interventions through regional, provincial, municipal or city and village (Barangay) coordinating councils. This plan had been partially completed during Engel's 1959 tour as a possible mechanism for coordination of nutrition activities.

3. In 1964 the ICNND served as the agency through which PL480 Title II Foods (Food for Peace commodities) could be tested as to their usefulness in child feeding programs. VPI was invited by ICNND to provide the services of Engel as an investigator in a project planned for the Philippines. Engel was to extend technical advisory services 2-4 weeks annually to assist the Philippines in testing the usefulness and acceptability of soy grits, a newly available Food for Peace commodity in elementary school lunch programs. Through this project VPI developed considerable exchange relationships with Philippine scientists in the Food and Nutrition Research Institute and some Philippine universities with biochemistry and nutrition programs. As a result, VPI began training Filipinos at the masters and doctorate level in food, nutrition, and biochemistry. These research activities brought Engel to the Philippines once a year (1964-66) and provided opportunity for review of other nutrition activities, particularly those relating to nutrition surveys and nutrition program implementation following such surveys. During these visits Engel also provided briefings for the USAID Food for Peace and Health offices and for the Mission Director as requested.[1] During these TDY tours, Engel also learned that UNICEF had been invited by the Philippines to assist with the implementation of an Applied Nutrition Program through the Bureau of Public Schools, Department of Education. The program was to develop expertise, through school systems, for implementing activities, at community level, in food production, nutrition education, nutritional rehabilitation and other interventions to solve nutrition problems.

4. In 1964 Engel also participated, by invitation from ICNND, in the Second Far East Symposium on Nutrition in Taipei, Taiwan. At this symposium the Philippines reported in detail the organization of the National Coordinating Council on Foods and Nutrition and how it was facilitating the implementation of the Applied Nutrition Program and serving as the organization for planning and coordinating nutrition activities at all levels.

5. In February, 1967, the Third Far East Symposium on Nutrition was held in Manila. VPI participated with Dr. K. W. King of the Department of Biochemistry and Nutrition, who was invited to describe the Mothercraft Nutrition Center program in Haiti, mentioned above. Engel served as a U.S. delegate to this symposium and also served on a Nutrition Reconnaissance Team for the Philippines. The team was organized by ICNND and the USAID/Washington Office of Nutrition in order to explore, for the Office of War on Hunger, the interest of Philippine public officials in developing a nutrition program with assistance from USAID. There was particular interest in the Office of War on Hunger in developing nutritionally-oriented usages for PL480 Title II food blends which had been developed through participation

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[1]An important development emerged from a chance meeting with Mission Director Wesley Haraldson, in June, 1966 which is described in some detail in Attachment A, Section A.

of the U.S. food industry and made available as food donations in foreign aid programs.

The nutrition reconnaissance team was composed of Dr. A. E. Schaefer and Dr. J. M. May, ICNND, Dr. T. B. Dublin, HB/TCR/AID/W, Mr. Layton E. Allen, Consultant to AID, Dr. D. B. Hand, Cornell University, and Dr. R. W. Engel, VPI. During and following the above mentioned symposium the team held discussions with the Secretaries of the Departments of Health, Education and Agriculture and with the USAID mission to assess interest and feasibility for an AID-supported nutrition program. The team concluded that such interest existed in both the government of the Philippines and the AID mission. At the Third Far East Symposium on Nutrition, Dr. Paulino J. Garcia, Secretary of Health, had identified the high mortality rate among children aged 1-4 years as a specific and urgent signal for the implementation of more extensive nutrition efforts directed toward the most vulnerable persons, namely, infants, pre-school children and women in the reproductive process. Secretary Garcia lauded the on-going Applied Nutrition Program as particularly useful for school-age children but felt more vigorous efforts would be needed to reach pre-schoolers more extensively and more effectively.

The favorable report of the reconnaissance team was concurrently endorsed by the Secretary of Health in a letter to the USAID mission director in Manila requesting that a technical consultant be made available for planning a program. This letter of invitation further contained a policy directive to the effect that such a program should concentrate on alleviation of malnutrition in the pre-school child and infant.

6. In response to a request from the Office on War on Hunger, VPI submitted a project proposal to provide consultant services between August and December, 1967, to assist the Philippines Department of Health in planning a program aimed at pre-schoolers, infants, and pregnant or lactating mothers. Engel resided in the Philippines from 2 August to 8 December, 1967 and engaged in nutrition program planning with USAID mission and Filipino counterparts. TDY consultancies were also provided by Dr. Wilson B. Bell, Dean of the College of Agriculture, and Dr. K. W. King, Professor of Biochemistry and Nutrition. VPI also arranged an administrative visit by President T. Marshall Hahn to Secretary Garcia and the AID mission director in Manila. A five-year program was planned with major focus on initiating rehabilitation centers for pre-schoolers. These centers were to be evolved as adaptations of similar centers operating in Haiti under VPI technical consultancies to the Haitian Health Ministry. The five-year plan identified the Department of Health as the lead agency for project implementation, utilizing the existing National Coordinating Council on Foods and Nutrition as the national coordinating body to evolve the integration of this new thrust at the pre-schooler with the on-going nutrition program activities. To manage and supervise the new program a National Nutrition Program Directorate and Secretariat was established in the Health Department. Dietetic nutritionists were employed to implement the rehabilitation activities. Other aspects of the planned five-year program included development of more plentiful local protein resources, education and training of personnel, and developmental research to improve program operations, in particular, nutritionally-oriented food aid.

7. In May, 1968 the nutrition project agreement between the U.S. and Philippine governments was signed. The USAID mission in Manila requested that VPI provide technical advisory services to the government of the Philippines and assist the mission in the management of the nutrition project.

8. In June, 1968 a contract was negotiated identifying R. W. Engel as the VPI Chief of Party to be located in the USAID/Manila, Public Health Office and with the provision that additional short-term technicians should be made available, as mutually determined by the two governments, through a campus coordinator.

Attachment
Section A

Mycotoxins as a Food Contaminant

In June, 1966, Dr. R. W. Engel, VPI, Head, Department of Biochemistry and Nutrition, attended a social function with the USAID/Manila Mission Director at a Manila hotel where cocktail peanuts were served. Engel was well aware that peanuts were highly susceptible to mycotoxin infestation, particularly under moist warm climatic conditions typical of the Philippines.

A small sample of the roasted nuts was preserved by Engel and was later analyzed for aflatoxins in the biochemistry laboratory at VPI by Dr. T. Colin Campbell, Associate Professor of Biochemistry and Nutrition. This laboratory had been established to assist the Virginia peanut industry with development of a surveillance system to insure that no aflatoxin-contaminated peanuts produced in the state would enter the food chain.

The results of the analysis of the Philippine peanut sample were sent to the mission director in Manila with the caution that the sample contained hazardous levels of aflatoxins and that perhaps it might be useful to assist the Philippine government with a food surveillance system for mycotoxins, particularly in the event that a continuing interest could be developed for a food and nutrition support project.

This incident was possibly a factor which drew the mission director's attention to food and nutrition and which led to the request for the nutrition surveillance team described under sub-section 5 above. The incident, of course, also brought to mind the possibility that there might be need for screening PL480, Title II, donated food commodities for mycotoxin content, particularly if exposed for extended periods to the moist warm storage condition in the warehouses in Manila.

It was mutually agreed that the existing soy grits project, described in sub-section 3 above, should be amended so that laboratory equipment could be made available to the Food and Nutrition Research Institute, Manila, for initiating aflatoxin studies. In 1970, through the nutrition project, the University of the Philippines, Los Banos, was also supported to develop a capability for screening raw agricultural commodities for their aflatoxin content. Through the nutrition program, Dr. T. C. Campbell served on TDY assignments to provide technical back-stopping for these laboratories.

The analytical unit at the Food and Nutrition Research Institute has functioned effectively as a referee laboratory for the U.S. Food and Drug Administration in its global program of insuring uniformity of procedures and analytical accuracy in mycotoxin surveillance programs. The Philippines has made significant contributions toward a better global understanding of mycotoxins as a food hazard. The laboratory at Los Banos has, for example, reported that through genetics corn varieties can be developed whose ears have tightfitting husks, which protect the corn kernels against mold infestation, particularly the molds that produce aflatoxins. Next to rice, corn is the most important cereal in Filipino diets.

The laboratory in Manila has developed circumstantial evidence that there may be a causal relationship between primary liver cancer in the human population and the level of contamination of diets with mycotoxins. These results were presented at the Tenth International Congress on Nutrition, Kyota, Japan, in August,1975.

The initiative provided by VPI technicians thus has led to a major mycotoxin analytical capability in the Philippines, which in turn has contributed new knowledge of mycotoxins as food hazards. The center in Manila has also served as the training site for Indonesian technicians who have since developed mycotoxin surveillance programs in that country as well.

The following publications were also a result of the collaborative studies by the Food and Nutrition Research Institute in Manila and the VPI Department of Biochemistry and Nutrition.

Aflatoxin M_1 in Human Urine. T.C. Campbell, J.P. Caedo, Jr., J. Bulatao-Jayme, L. Salamat, and R. W. Engel. Nature, Vol. 227, p. 403-404, July,25, 1970.

Hepatocarcinogenic material in urine specimens from humans consuming aflatoxin. T.C. Campbell, R.O. Sinnhuber, Donald J. Lee, J.H. Wales, and Lourdes Salamat. Journal of the National Cancer Institute. Vol. 52, No. 5, May,1974.

Section B

A listing of Working Papers and Planning Documents developed by, or under the direction of, the VPI Chief of Party, and their relationship to the evolution of the Philippine Nutrition Program[1]

Summary Statement: By way of a brief summary, this section presents evidence that VPI technical support through planning documents and operational research focused particularly and successfully on malnutrition prevention or rehabilitation in the very young as specified in the contract scope of work. It also attempted to focus on nutritionally-oriented local food production but with less success. In addition to the working papers and planning documents enumerated here, the VPI Chief of Party also presented USAID each month with a 2-3 page typed summary of activities during the time span 11 July,1968 to 15 June,1978. This time-and-activity log is on file in the USAID Nutrition Office and in the VPI home campus coordinator's office. In 1976 an audit was conducted for the U.S. Mission Director on this time-activity log. This audit revealed the following as a reasonable distribution of the work performed by Dr. R. W. Engel, the VPI Chief of Party:

25% - Responding to counterpart agencies for consultancy or advisory services in program planning, supervision, management, etc.

15% - Maintaining project records, drafting project documents and keeping up to date on in-house Nutrition Project activities.

15% - Conducting briefings for congressmen, senators, TDY personnel concerned with nutrition from AID/W or from cooperating institutions (universities, contractees, Vol Ags, etc.).

15% - Consulting with, participating in training, or program planning with U.S. Vol Ags engaged in Title II Food Assistance and Nutrition Activities.

15% - Field visits to Nutrition Program activities.

10% - Handling correspondence, scanning nutrition publications, reviewing reports.

5% - Responding to local educational or professional institutions with lectures, seminars or other types of training activities.

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[1]Only selected papers are included as attachments in this report. Complete sets of these papers are on file in the Nutrition Office, USAID, Manila, and at VPI in the Campus Coordinator's office.

1. The World Food Problem.

Presented at the faculty and graduate students seminar, Department of Food and Science and Nutrition, Philippine Women's University by R. W. Engel, Chief of VPI Party, USAID, Manila, 9 October,1967, ms, 11 pages.

This paper is a summation of the World Food Problem Study, White House, Washington D.C., 1966-67, a study on which the author served. This paper also contained a summary of the projected calorie and protein requirements for the Philippines through 1985, using high and medium projections of population growth. The latter was accomplished in collaboration with the Food and Nutrition Research Institute (FNRI), Manila, the government agency responsible for projecting food needs and nutritional requirements in the Philippines. These projections were presented before the First Philippine Population Conference in fall, 1967 by Dr. Carmen L1.Intengan, Deputy Director, FNRI, and published in the conference proceedings.

2. Eating habits and food costs in the Philippines, November 29, 1968, ms, 6 pages.

A brief discussion is presented of the comparative costs per calorie and per gram of protein from various food groups as consumed in the Philippines, using nutrition survey data collected by the Food and Nutrition Research Institute. The paper was developed mainly to stimulate interest among nutritionists in food economics.

3. Improvement of the protein of rice diets, ms, 9 pages.

This paper was published in the proceedings of a seminar, "Production of Protein-Rich Foods", sponsored by the Centro-Escolar University Research and Development Center, Manila, 23-25, January, 1969. The paper reviews the amino acid profile of milled rice and compares the relative merits, cost and nutrition-wise, of amino acid fortification of rice protein versus use of such local protein resources such as coconut flour, milk powder, fish flour, or legumes. Because of the importance of rice in the diet of Filipinos, a copy of this paper is included as Attachment A.

4. Carrying out a pre-school child action program in nutrition, ms, 20 pages.

Presented at the Nutrition-Week Workshop of the Federation of Nutrition Councils and Related Agencies, Manila, March 7, 1969.

This paper includes a compilation of income, health, food and nutrition statistics from various available Philippine sources with examples of how these can be applied in the formulation of nutrition policies or programs and in the planning and implementation of such programs. A copy of this paper is included as Attachment B. It served as background for later working papers, particularly Paper 28 below.

5. Body weight survey of infants and pre-school children in the Province of Laguna, May-June, 1969, ms, 14 pages.

This operational research was planned by the USAID/Manila Nutrition Office and carried out by the National Nutrition Program Office, Department of Health. The data collected were tabulated, summarized, and interpreted by the AID Nutrition Office for use by the Department of Health. It was given wide coverage in the Manila press. In the survey 7815 children aged 6 months to 71 months were studied. It provided the first extensive data base on a provincial basis for estimating the extent of the malnutrition problem in pre-school children using weight for age as criterion. A one page summary of this research is included as Attachment C.

6. Food, population, and science, ms, 8 pages.

This paper was presented at a seminar sponsored by the National Science Development Board in San Pablo City, Laguna Province on 18 July, 1969, during National Science Week.

The paper is a summation of the global prospects for providing adequate food and nutrition for the burgeoning populations in the developing countries, using Philippine statistics on diet inadequacies, and how these may become worsened if population growth is not brought under control.

7. A new challenge to the dietician, ms, 5 pages.

Presented at the Annual Meeting of the Philippine Dietetic Association, Quezon City, 26 July, 1969.

A summation is presented of the malnutrition problem in preschool children, projecting the Laguna Province data (see No. 5 above) to the national population. The paper also contains a challenge to the members of the Dietetic Association to become more actively involved, by supporting the efforts of the National Nutrition Program, Department of Health in development of ameliorative measures, such as mothercraft centers, mothers education programs, etc.

8. USAID activities in the development of nutritional institutions in SEAMEC countries, ms, 9 pages. (See Attachment D).

A working paper that was presented at the First Seminar on Nutrition under auspices of USAID regional office, Bangkok, and the Asean Ministers for Education and Culture (SEAMEC), Jakarta, Indonesia, 27-31 October, 1969.

The paper contains a summation of the organization of the Nutrition Support Program of USAID in the Philippines, including details of commodity, training, operational research, planning, and other technical advisory services and its relationship to other bilateral and multilateral nutrition support activities.

The seminar marked the inaugural of an AID-supported regional training program in applied nutrition at the University of Indonesia School of Medicine. The seminar was attended by all Asean as well as other Asian countries.

9. Nutrition and National Development, ms, 10 pages.

Presented at the 359th Anniversary Program, University of Santo Tomas (a University which pre-dates Harvard, the first in the U.S.), 29 January, 1970.

The paper contained a summation of current knowledge of the relation of caloric intake to work performance and work efficiency, a limited base which focused mainly on WW II and a few more recent studies as summarized in WHO/FAO publications. The audience of about 800 distinguished alumni, faculty, and students provided opportunity for emphasizing the importance of university involvement in nutrition developmental activities as the mean of strengthening the current weak data base for nutrition, including work-performance relationships. Santo Tomas University later became very actively involved in nutrition research (see Section C, subsection 3).

10. Nutrition in development, ms, 12 pages.

This paper was developed mainly to orient USAID technicians in Food for Peace, rural development, provincial development, agriculture, population, and health and education programs to the need for including nutrition as a component of development planning. The paper was well-received and proved to be popular. It also proved popular among Philippine counterparts. Eventually more than 800 copies of this ms were distributed by the various AID offices and their counterparts. The paper develops a rationale for including nutrition as a basic human need that cannot be ignored in developing the human resource base for effective developmental activities. Because of its wide use, both in and out of the USAID mission, a copy of this paper is shown as Attachment E.

11. Closing the protein gap, ms, 7 pages.

Presented before the Nutrition Program Planning Staff, Province of South Cotabato, April 1, 1970.

This paper included summation of paper 9, above, combined with available Philippine data on dietary habits, nutrient intake, and health and nutrition status, as background material for planning a provincial nutrition program. The Province of South Cotabato, under technical guidance collaboratively planned between the USAID Nutrition and Rural Development/ Provincial Development Offices in Manila, developed a pre-school child nutrition plan which was widely circulated as a model to other provincial development staffs. This paper was extensively used by Mr. Leroy Knutson of the USAID Rural Development staff in working with rural planning groups at provincial or municipal level and assisting such groups with inclusion of nutrition interventions in development planning.

12. The nutrition problem the world over, ms, 7 pages.

Presented at a Project Tulungan Seminar, Community Development Center, University of Philippines, Los Banos, 18 June, 1970.

Project Tulungan (Cooperative endeavor) was organized by Mrs. Imelda Romualdez Marcos with the assistance of the Department of Social Welfare and with USAID support (Nutrition Office). The project represented a first major effort to combine nutrition and basic health services with family planning services, initially in the Manila and other city slums and later extended to rural areas as well.

The subject seminar served as a planning forum. The paper summarized the existing data relating malnutrition to family size, to spacing between babies and, to income as related to family size, as the rationale for promoting integrated health/nutrition/family planning services. It also brought forcefully to mind the paucity of available local data that could be used for planning purposes. (This led to operational research developments in Bulacan Province which appears in paper 15 below.)

13. Changing trends in food and nutrition, ms, 5 pages.

Presented at San Carlos Hospital at the annual meeting of the Regional Coordinating Council for Food and Nutrition, Pangasinan Province, Central Luzon, 26 June, 1970.

The paper is a summation of the growing concern among the citizenry of the malnutrition problem with a speculation that it might be appropriate to plan beyond nutrition, namely, inter-sectorally, using the Tulungan experience (see paper 12 above) as a basis. Emphasized for the regional council members particularly was the need for integrating rural extension education in agriculture and rural home life with nutrition, health, and population education programs as a basis for achieving a more direct linkage between agriculturally based programs (food production and utilization) and nutrition education programs. The success of the U.S. Extension Service in promoting nutrition education and significantly influencing food habits in the nation following W.W. I was recounted as an example of a successful home food production and nutrition education campaign.

14. Some thoughts on nutrition policy based on current knowledge of nutrient intakes, ms, 12 pages, July, 1970.

This working paper, an expansion of paper 2 above, was developed to reveal how food choices or habits in various regions of the Philippines reflect caloric and protein costs. The paper was specifically developed to stimulate research workers in agriculture and nutrition to develop a food economics data base.

15. Guidelines for a Targetted Maternal Child Health (TMCH) Nutrition Program, ms, 16 pages. (Included as Attachment F)[1]

Miss Minda Caedo, Program Specialist, USAID Nutrition Office, Manila, employed by the mission as an assistant to the VPI Chief of Party, was largely responsible for developing these guidelines. Before lauching an extensive child feeding program, targetted to malnourished children, and combining donated Food for Peace nutritious food blends with nutrition education of mothers as to the proper use of such foods to supplement the local diet, it was considered essential to conduct operational research to establish feasibility and costs.

A brief review of the relative costs of Mothercraft centers and TMCH centers is shown in Attachment G.

The USAID Nutrition Office assisted the Catholic Relief Services, a major implementor of food and nutrition programs for USAID in the Philippines, in the development of an operational research plan, to be funded by USAID, TAB/N, AID/W, which was designed to test the feasibility of the TMCH program. This research was conducted between 1968 and 1970 and the results served as the basis for developing these guidelines. Miss Gloria Villareal, Chief Nutritionist, CRS, Philippines, was the major counterpart worker in this endeavor. A summary of this research was also presented at the Western Hemisphere Nutrition Congress, Miami, Fla., 19-22 August, 1974, by Miss Villareal while she was a participant trainee at VPI earning an MS degree in Human Nutrition and Foods. (See paper 33 below.)

These guidelines were also adopted by the National Nutrition Program, Department of Health, and by the National Food and Agricultural Council (NFAC) office of the President, in 1971 when responsibility for nutrition program coordination and management for the Philippines was shifted from the Food and Nutrition Research Institute to NFAC. They are still in effect, in 1978, although some minor modifications have been made. Under these guidelines all agencies combined, cooperating with CRS and also later with CARE, have distributed USAID Food for Peace commodities and nutrition education to an estimated 3 million infants, pregnant or lactating mothers, and malnourished pre-school children.

16. Progress report: Integrated Nutrition Family Planning Program: Province of Bulacan 1971-72, ms, 30 pages. Authored by Miss Minda Caedo (USAID), Victoria B. Santiago (Population), Carmelita Diaz (Population) and R. W. Engel (USAID).

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[1]This paper, together with papers 16, 22, 28, and 29 below, were bound into a 5-chapter volume, USAID, Manila Resource Library, under the title Nutrition Statistics and Guidelines with the illustrated cover shown in Attachment F. It served as the data base for publicizing the priority for nutrition in 1974 when the National Nutrition Council and the Nutrition Center were established.

In 1970, following the initial efforts to integrate nutrition and family planning (see paper 12 above) through a private entity (project Tulungan), the USAID Nutrition Office collaborated with the USAID Population Office in Manila to explore the possibility of delivering family planning services through the Targetted Maternal Child Health Program (see paper 15 above) and through government programs planned at provincial level. The Nutrition Office participated in several planning meetings in 1970 with population and nutrition staffs of the province of Bulacan. An operational research plan was evolved which provided a data base for further evaluation of the effectiveness of TMCH in ameliorating malnutrition. The results clearly revealed that in the 10 municipalities where the integrated program was implemented the family planning acceptor rate was considerably better (50% higher) than in the 14 municipalities operating the same family planning program without a TMCH component. Governor Santiago, impressed with these research results, expanded the integrated program province-wide in 1972. This operational research component was initially funded with USAID Population funds. The operational research also expanded the data base for better planning. For example, it was noted that rapid nutritional deterioration of infants occurred between 6 and 12 months, that increasing numbers of pre-schoolers in any one family, or narrow spacing between babies, intensified the malnutrition problem. The data were derived from statistics gathered on 8941 subjects and analyzed and interpreted by the USAID Nutrition Office staff. The paper is shown as Attachment H. (This paper also appears as a chapter in Nutrition Statistics and Guidelines; see footnote to paper 15 above.)

17. People and food, ms, 9 pages.

Presented before the Makati Rotary Club, Metro-Manila, 26 January, 1971.

The paper presents a summation of the magnitude of the pre-school child malnutrition problem, based on community surveys conducted as the basis for implementing TMCH feeding and education programs. The paper also presented an appeal to the Rotary Club, as a public service agency, to consider extending support to agencies implementing TMCH centers. The presentation was made before about 400 Rotarians. The Makati Club became actively involved and later supported TMCH centers operated by city nutritionists as well as CRS nutritionists.

18. Meeting nutritional needs, a challenge to professional nutritionists, ms, 9 pages.

Presented before the graduating class in Foods and Nutrition, Southwestern University, Cebu City, September 25, 1971.

By direction from the faculty and Dr. Florentino S. Solon, Regional Health Consultant, Department of Health, Cebu City, the presentation was designed to motivate graduating nutritionists and dieticians to consider employment in applied nutrition programs, and in particular, to consider participation as educators in the expanding programs of child feeding and mother-education (TMCH, Mothercraft, etc.). The presentation included a brief description of the major applied nutrition activities currently underway

throughout the country and the various agencies involved. Southwestern University, beginning in 1973, required all nutrition graduates to serve in child feeding centers for one month as a requirement for graduation.

19. High-nutrition low-cost foods, ms, 8 pages.

Presented before the Philippine Chamber of Food Manufacturers, Makati, Metro-Manila, 9 March,1972.

This paper is a summation of possible local food resources (coconuts, fish, legumes) that might be considered by local industry in the development of low-cost weaning foods for serving not only the general market but also the needs of feeding programs generated by the increasing interest in nutrition programs. The proceedings of the AID-sponsored meeting in November,1971 in Singapore, with food industry representatives from Asian countries, was used as background to orient the member companies of the Philippine Chamber of Food Industries on the AID/W program of offering incentive grants to local firms for low-cost, high-nutrition food blend development.

As an outgrowth of these activities, General Milk Company (Carnation International, Philippines) received an incentive grant and is currently in the final stages of safety and wholesomeness testing of a weaning food (ready-to-eat) based on rice flour fortified with mungo bean flour, mini-shrimp powder, milk powder, and accessory nutrients.

20. The economics of malnutrition, ms, 23 pages.

Presented at the Philippine Dietetic Association Annual Meeting, Manila, 28 July,1972.

By request of the Association officers, the paper was to emphasize the relatively low cost of correcting accessory-nutrient deficiencies (vitamin or mineral deficiencies) as contrasted to the high cost of correcting calorie-protein deficiency. Summaries were presented of costs of correcting various nutritional diseases, utilizing mainly available local major food resources. The caloric costs of major diseases afflicting children were also summarized, and income expenditure elasticities for foods as a predictor of food habit changes with changing incomes was also examined. Data on the latter were available from recently initiated research by the National Food and Agriculture Council and the University of the Philippines, at Los Banos. One can speculate that perhaps the earlier efforts in this direction (papers 2 and 14 above) to focus attention on food economics may have had some relationship to the newer interest in expenditure elasticities and other aspects of food economics. When the Secretary of Agriculture was asked to address the Philippine Association of Nutrition annual meeting in 1970,he had made note of the need for nutritionists to pay more attention to food commodity demands as related to income. At any rate the subject paper appeared to be timely and was well received.

21. The Nutribun: A ready-to-eat complete meal, 3 pages. Published in LIFE (League for International Food Education), 1155 16th St., N.W., Washington, D.C. 20036, March,1972, by R. W. Engel (Nutrition) and A.S. Fraleigh (Food for Peace), USAID Mission, Manila (see Attachment I).

This paper summarizes the basis for development of a convenient nutritious ready-to-eat food snack (nutribun) as a supplement in elementary school feeding programs through a cooperative effort involving USAID Nutrition, and Food for Peace, Wheat Associates, Inc., Catholic Relief Services, the School Health Division, Bureau of Public Schools, Department of Education and Culture, Philippines, and local commercial bakeries.

During the 1970-71 school year approximately 200,000 elementary school pupils, grades 1-6,had received the Nutribun in a test program as a snack while in attendance at school (30,000,000 Nutribuns).

The cooperative effort which developed the Nutribun can be summarized briefly as follows: USAID Nutrition was responsible for development of the formula to justify a claim for nutritious snack food; Food for Peace and CARE were responsible for donated food commodities (wheat flour and non-fat dry milk powder). Wheat Associates assisted by instructing local bakeries on the appropriate bakery technology. The local commercial bakeries formulated and blended local and donated ingredients, and baked and delivered the Nutribuns to the schools. The schools reimbursed the bakeries for cost of local ingredients and their services. Pupils were asked (but not forced as a condition of participation) to share these costs.

The Nutribun program was extended to a total of about 1,300,000 elementary school pupils during the '71-'72 school year.

The Nutribun proved to be a convenient commodity for distribution during the disastrous floods in Central Luzon in July-August, 1972. Most of the schools in the area shifted their commodities (schools were closed during the floods) into emergency deliveries of nutribuns to disaster victims under the supervision of the National Disaster Coordinating Center, Manila. The nutribun is an ideal emergency food item for another reason. Usually during disasters the unscrupulous try to hoard essential commodities. The nutribun becomes moldy in 2-3 days and thus cannot very easily be hoarded.

22. Philippine School Nutrition Program Using Food for Peace Commodities: Guidelines, ms, 17 pages. (See Attachment J, also included in NUTRITION STATISTICS AND GUIDELINES, see footnote to paper 15 above.)

These guidelines evolved as a cooperative effort between the AID Nutrition and Food for Peace offices, Manila, during the 1970-71 school year. The guidelines were further tested in the 1971-72 and 1972-73 school years and were adopted by the Bureau of Public Schools for the 1973-74 school years for nationwide use. The guidelines identified criterion for eligibility, namely all pupils who were 90% or less of standard weight for age, a criterion which generally qualified the vast majority of pupils in the public school system. The guidelines also explained in detail how growth charts were to be maintained on each participating pupil, reporting systems and other aspects of the nutribun program.

These guidelines have been further improved by the National Nutrition Council, including height for age as well as weight for age as a measure of nutritional status. The modified nutrition record, beginning with the 1978-79 school year, is recognized as an integral part of the pupil's official scholastic record when he or she enters the public school system as a first grader.

Although the USAID nutrition office recognized VPI's major responsibility was to provide technical and advisory services for the most vulnerable (infants, pre-schoolers, and mothers in the reproductive process),an involvement in school nutrition programs seemed justified in view of the convenience of the schools as a delivery system for either food or knowledge about food (nutrition education broadly). Further, an extensive food donation program was in existence when the Nutribun program was developed,and its total elimination was not acceptable to the government of the Philippines. The development of the nutribun and shifting of emphasis to public schools serving low income families proved acceptable. Thus, a public school nutrition program emerged, serving primarily low-income families, as contrasted with the earlier program, which had served largely private or parochial schools where children of higher income families were in attendance. CARE continued to be the major U.S. voluntary agency managing U.S. Food for Peace commodities in schools as the program was shifted in this manner. Over the 8-year period since the nutribun and the school feeding program were developed,an estimated 10,000,000 elementary school pupils have participated. The AID publication FRONT LINES featured the nutribun in its May 15, 1975,issue.

23. Nutritional policies for national development: General Aspects, ms, 18 pages.

Presented by invitation at the 2nd Asian Congress on Nutrition, 12-19 January,1973, Manila, Philippines.

A summation of UN and USAID conferences, work shops, and symposia was made as the basis for evolving the elements of nutrition policy and program development. Elements of the Philippine Nutrition Program served as examples of methods or approaches to policy development and planning for nutrition. The paper was published in the proceedings of the Congress.

24. Nutrition and infection in Public Health, ms, 15 pages.

Presented at the nutrition course for faculty members, Association of the Philippine Medical Colleges (6 in number), Continuing Education Center, University of Philippines, Los Banos, January 21-27, 1973.

The paper was published in the Philippine Journal of Nutrition, January-March Issue, 1973.

A summation of recent studies in Central America, (INCAP) India, and Africa bearing on the important relationship between nutritional status of infants and pre-school children and their susceptibility to infectious diseases,

emphasizing the synergistic nature of this relationship. The short course for medical college faculties at which this paper was presented was an outgrowth of an AID Nutrition office (VPI) technical advisory service sub-contract with the late Dr. Grace A. Goldsmith, School of Public Health, Tulane University, in response to a request from the Secretary of Health to provide technical services and advice for improving nutrition training in the medical school curriculum.

It is possible that these initial probes into improvement of nutrition training of physicians, generated the interest and momentum that led, in 1976, to the publication of a nutrition manual for physicians by the Nutrition Center of the Philippines and the National Nutrition Council.

25. The Mothercraft concepts applied to Southeast Asia, ms, 19 pages.

The paper, authored by Ma. Minda Caedo, Program Specialist, and R. W. Engel, Nutrition Advisor, was presented by invitation, at the seminar workshop in Singapore, 18-22 June, 1973, entitled, "Nutrition Interventions for the Mekong River Development Project," a project supported by the World Bank and the UNDP and involving Thailand, Laos, Cambodia, and Vietnam. The seminar was conducted by SEADAG (Southeast Asia Development Advisory Group, The Asia Society, N.Y.C.).

The paper contained a detailed description of the operational research conducted in the Philippines which served as the basis for development of the Targetted Maternal Child Health program (TMCH) (See No. 15 above) and a detailed description of how the program was implemented by the various agencies involved. The purpose of the presentation was to determine interest in the countries comprising the Mekong delta in implementing similar programs for reaching malnourished pre-school children. The Asia Society requested permission to reproduce the ms in order to meet the numerous requests for copies in the 12-month period following the seminar. It is included here as Attachment K.

26. Malnutrition in the Philippines, ms, 8 pages.

Presented at the Staff Development Conference for Nutritionists, Catholic Relief Services, Baguio City, 16 July, 1973.

As indicated in No. 15 above, Catholic Relief Services, in cooperation with the Department of Social Services and Development, had provided major leadership for feasibility studies and implementation of the Targetted Maternal Child Health (TMCH) Program. By July, 1973, it had 100 nutritionists in the field implementing the program. The purpose of this seminar was to provide refresher training for field nutritionists who had been in the field for 1-2 years in Northern and Central Luzon. This paper was a review of the child malnutrition problem in the Philippines and the various activities under way to combat the problem. Emphasis was placed on operational research that had been conducted and the valuable data base that had emerged, to make it possible to improve programs and extent-of-outreach to the population in need of nutritional improvement.

Particular emphasis was placed on the need for improving child spacing and reducing family size as effective ways of reducing the magnitude of the malnutrition problem in both mothers and children. The seminar was attended by about 30 nutritionists. The problem of overcoming resistance to effective family planning approaches by some elements within the Catholic Church in the Philippines was freely discussed and the problem was well-known and recognized. No simple solutions were proposed, however; although it was generally the concensus that the rhythm method of birth control was largely ineffective and probably contributed to narrow child spacing, large families, and nutritionally depleted mothers. This particular problem has continued to be of concern not only to nutritionists employed by CRS but also to nutritionists in the public service.

27. Combating nutrition misinformation, ms, 3 pages.

Presented at the College of Education, University of the East, Manila, 8 September,1973.

With the continuing expansion of nutrition activities, a paper was requested which would address certain issues upon which clarification was needed. Among areas proposed for discussion were not merely nutritional quackery but such questions as appropriate growth standards for Filipino children, misunderstandings about the costs of nutritional rehabilitation, and an improvement in medical education training to more preventive services rather than curative, particularly with respect to training of health personnel in nutrition. The paper thus constituted a review of current published documents covering these areas. There was particular interest in growth standards for children. For this reason a detailed review of locally available data was presented, indicating that Filipino infants receiving adequate diet and general health care and residing in a reasonably sanitary environment exhibited growth patterns similar to infants in similar environments in other parts of the world.

28. Rationale for a Philippine Food and Nutrition Program. Autumn,1973, ms, 28 pages. This paper is included as Attachment L. (This paper, along with papers 15, 16, 22, and 29 appear under the title NUTRITION STATISTICS AND GUIDELINES; see footnote to paper 15 above.)

After the National Food and Agricultural Council (NFAC) assumed coordination for nutrition programs in May,1971, it began a series of conferences designed to bring together all government agencies interested in nutrition for planning a 4-year program (1974-77). Simultaneously, with the adoption of the USAID Nutrition and Food for Peace guidelines for pre-school and school feeding programs (see 15, 21, and 22 above), NFAC assigned to USAID the responsibility of drafting a rationale for its planned support to the Philippine Food and Nutrition Program. Joint development of a Nutrition and Food for Peace Project Paper was initiated in the Manila USAID Nutrition and Food for Peace offices in the summer of 1972 and the first draft was reviewed by Dr. Martin J. Forman, Director TAB/N, AID/W, on a visit to Manila in January, 1973, as a delegate to the 2nd Asian Congress on Nutrition. During this review it was mutually agreed that experts from the American Technical Assistance Corporation, (ATAC) Washington, D.C., which was under

contract with USAID to provide technical expertise in inter-sectoral nutrition planning, should be invited for a review, study, and analysis of the USAID Food and Nutrition effort in the Philippines. Thomas Cooke and William Rusch of ATAC were assigned by AID/W for this task.

The rationale described in this paper is thus a synthesis of the original draft contained in the Food and Nutrition Project Paper, an ATAC analysis of the USAID experience, and an overview of the Nutrition Program, including review of related projects in the agricultural sector which might impact on the malnutrition problem.

The rationale, as shown in Attachment L, contained an analysis of the current food supply situation, nutritional deficiencies, age specific for calories and protein, risk groups, magnitude of the target-child population, relationships affecting nutritional status (food production, processing, distribution, income, population growth, taboos, and ignorance). It also reviewed nutrition as a priority in government, and suggested areas, other than targetted food assistance to the malnourished child population, in which USAID could make a contribution, such as intersectoral nutrition planning assistance, potential of local flours as wheat flour extenders, upgrading of coconut processing, leaf protein research, home, school, and community gardening, low-cost weaning foods, and vitamin A fortification of local food resources.

As an addendum to the rationale, a draft of the Philippine Food and Nutrition Program, 1974-77, is also included. It sets forth the policy directions, priorities, activities, and targets, the major activities being nutrition education, supplementary feeding, food production, training, and supporting activities in research and communication.

29. Resource Paper: Workshop on Indigenous Foods: The major Calorie and Protein sources in the Philippines, availability and consumption. Autumn, 1973, 28 pages. This paper is shown as Attachment M. It is included in NUTRITION STATISTICS AND GUIDELINES.[1]

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[1]When the National Nutrition Council was created by Presidential Decree in July, 1974, the USAID Nutrition Office was requested to assemble available nutrition statistics and guidelines in order that the new Council would have a single source from which all nutrition information releases to the public would originate, thus avoiding any risk for releasing conflicting data on the food and nutrition situation, the extent of the malnutrition problem or other aspects of the prevailing or current status of nutrition in the country. In response to this request, the bound volume entitled Nutrition Statistics and Guidelines (Attachments F, H, J, L and M of this report) was assembled in the USAID Nutrition Office in June, 1974.

The Nutrition Statistics and Guidelines was extensively used during July, 1974, National Nutrition Month declared by President Marcos. Over 1000 copies have been distributed to USAID offices in Manila and counterpart agencies in the government and the Philippine private sector since its first release. The volume is regularly requested by the U.N. University on World Hunger, Manila campus, Nutrition Center of the Philippines, for inclusion in the resource packet for their international trainees.

Drawing upon various data sources, namely, dietary surveys by the Food and Nutrition Research Institute, family food purchase surveys by income classes conducted by National Food and Agriculture Council, and the National Food Balance Sheets developed for FAO by the National Economic Development Authority, tabulations were made of the 10-15 most important sources of calories and protein in the diet by individual food items or classes. The tabulations were also extended to show regional differences in food habits. The purpose of this document was primarily to identify possible new protein/or calorie sources and to serve as a resource data base for a newly created committee in the National Food and Agriculture Council to identify wheat flour extenders and assign priorities for any such new resources.

30. Nutrition in the Philippines, ms, 25 pages. Prepared in July-August, 1974.

This paper presents a summation of available data identifying the nature and extent of malnutrition in the Philippine population. The paper was drafted at the request of Dr. Florentino S. Solon. He wanted it in order to have a ready, up-dated source of such information to respond to requests for seminar presentations, public speeches, press releases, and other purposes. He also wanted such a summary to assist in preparing for an up-coming meeting in Thailand. The paper was assembled by updating existing documents summarized herein up to this point in time (Summer, 1974). This paper was edited and revised by Dr. Solon and published in the Yearbook of the Philippines, 1975.

31. Coconut Flour as a Food Resource in the Philippines, 3 pages, published in PAG (WHO/UNICEF/FAO) Bulletin Vol. IV, No. 2, pages 29-32, June, 1974. (Reprint is shown as Attachment N.)

During the second Asian Congress in Nutrition interest was expressed by UN representatives in the plan to incorporate 5 to 10% coconut flour/banana flour blend in the formulation of the Nutribun in the Philippine School Nutrition Program (see 21, 22 above). Accordingly a visit was arranged to the Blue Bar Corporation, desiccated coconut processing plant, Tiong, Quezon Province, where coconut parings were being processed for blending with banana flour. As a result of this visit the USAID Nutrition Office was invited to submit a summary of these developments for publication in the PAG Bulletin. Briefly, it was documented that 16 million Nutribuns containing 3 to 5% coconut parings flour, and an equal amount of banana flour, had been tested in the 1972-73 school year with no evidence of adverse effect on palatability or acceptability. These tests were made possible under a grant from the National Food and Agriculture Council to the Saginco Corporation, a company which had developed the small-scale technology for processing waste bananas into banana flour, which was then blended with coconut parings flour produced for Saginco by the Blue Bar Corporation. These developments were terminated, unfortunately, when a fire in the solvent-extraction unit at the Blue Bar factory destroyed the flour manufacturing facility.

Although this mishap abolished the only available source of coconut flour for blending with wheat flour, interest continues. The National Grain Authority, with some assistance from the Canadian government, has established a training program to orient all bakeries in the country to the necessary changes required in bread-making when non-glutinous ingredients are substituted for wheat flour. The Philippine Coconut Authority is employing Dr. Robert Hagenmaier to continue feasibility studies on processing coconuts. As a part of USAID assistance to the Philippine Nutrition Program, Dr. Hagenmaier, under a Texas A & M University contract, had operated a coconut processing research facility in Cebu City between February,1975 and September,1977, to determine the feasibility of producing high quality protein products as by-products of the wet-processing of coconuts for high quality oil. At the termination of the contract, the Philippine Coconut Authority assumed the continued operation of the facility and expanded its activities to include studies of the feasibility of commercial production of coconut flour.

Miss Candelaria Formacion, Associate Professor of Foods and Nutrition, University of the Philippines, Iloilo City, under a USAID traineeship at VPI, conducted nitrogen balance studies in college students to confirm that coconut-flour-containing nutribuns were nutritionally equal to the regular nutribuns. The results were published as a thesis at VPI and a summation of Miss Formacion's findings was also published in the Philippine Journal of Nutrition.

32. Milk Substitutes for Infants and Pre-school Children, ms, 13 pages.

Prepared as a resource paper for training of the technical staff, Filipro, Philippines (a food-processing firm affiliated with Nestle Corporation), September,1974.

This paper contained a summation of current knowledge concerning the composition and nutritive qualities of cows' milk, bottle milk formulations for infants, and breastmilk. Further, the paper identified availability of legumes in SE Asian countries, their potential as partial substitute for milk protein in weaning foods, availability, and cost of various cereals, root crops, or other energy food sources that could be used in weaning food development.

The paper was also made available to the National Nutrition Council and the Nutrition Center staff,and used as background material in the development of the NUTRIPAK for the Philippine Nutrition Programs (blends of rice flour, cooking oil, and legume or fish powders for treatment of malnourished children).

33. An Applied Nutrition Program among Philippine Pre-School Children, ms, 15 pages. Gloria D. Villareal, Catholic Relief Services, Miss Minda Caedo and R. W. Engel, USAID Nutrition Office, Manila.

A summation of the operational research conducted by Catholic Relief Services to develop a data base for planning the Targetted Maternal Child Health (TMCH) program discussed in 15 above. The data summarized in this publication was presented at the Western Hemisphere Nutrition Congress in Miami, Florida, in August,1974.

34. Food, People, and Nutrition, ms, 8 pages. Presented at a meeting of the All Nation's Women's Club, Manila, August, 1974.

With the establishment of the Nutrition Center of the Philippines by Mrs. Imelda Romualdez Marcos on 2 July, 1974, as the mechanism for mobilizing private resources in support of nutrition programs, there was a considerable demand for information and orientation by many civic-minded groups interested in supporting nutrition activities.

This invitation to address the All Nation's Women's Club provided an opportunity for nutrition program orientation for women from many nationalities, representing many different civic groups or organizations interested in supporting nutrition. The paper therefore summarized the magnitude of the malnutrition problem globally, and then focused on the Philippines to describe in detail the magnitude of the problem of malnutrition among Filipino children. The many activities were enumerated which were in process of implementation since nutrition has been elevated to high priority as a development activity by Presidential Decree. Suggestions were made as to how women's clubs could participate or lend support to the program.

35. Nutrition in SE Asia, ms, 7 pages. August, 1974.

This was a resource paper that was developed for the National Nutrition Council as background material for participation in the conference in Bangkok, Thailand, on Health Problems of SE Asia and sponsored by the Rockefeller Foundation and MAHIDOL University. Dr. Florentino S. Solon, Director, National Nutrition Council, had been invited to present an overview of the Nutritional Problems among SE Asians.

The paper is a summation of nutritional status data available from UN, USAID, and other national or international agencies sponsoring nutrition survey or other nutrition evaluation activities in the SE Asian region.

36. Supplementary Calorie and Protein Requirements for Infants, ms, 19 pages. (Published in the Philippine Journal of Nutrition.) September, 1974. Prepared for the National Nutrition Council and nutrition program implementing agencies (primarily the Home Economics Division, Bureau of Agricultural Extension) concerned with development of programs for malnutrition prevention in infants, using mainly local food resources. (This paper is shown as Attachment O.)

Through the AID Nutrition Office data had been collected by Miss Caedo in Bulacan province indicating that special attention should be given to mothers with infants 6-12 months of age by way of nutrition education and improvement of weaning food formulations (see 16 above). These studies had revealed nutritional deterioration in infants largely occurred during the 6-12 month age period when existing practices of offering diluted rice porridge to the infant as supplement to breast milk simply was not adequate. The Bulacan data had, in the meantime, been fortified with similar data from Batangas province which indicated that the deterioration actually began in some infants as early as 4-5 months of age.

This resource paper was therefore assembled to assist agencies responsible for infant malnutrition prevention programs in the formulation of simple mixtures as weaning foods, based on local commodities as far as possible. The paper summarized costs and composition of the following mixtures (and estimated quantities needed daily by 6-12 month old infants as supplement to breast milk, assuming normal lactation rate): mini-shrimp powder, rice flour, sugar, and oil; mini-shrimp powder, sweet potato meal, sugar, and oil; mini-shrimp powder, mashed banana, sugar, and oil; bean flour, rice flour, skim milk powder, sugar, and oil; skim milk powder, rice flour, sugar, and oil; bean flour, mini-shrimp powder, cassava flour, sugar, oil; bean flour, skim milk powder, gabi, sugar, and oil. In these formulations protein and calorie ratios were maintained to satisfy infant protein and energy needs in conformity with the "Manual on Feeding Infants and Young Children," PAG Document 1.14/26, December,1971.

Two groups that used this document widely should be mentioned specifically, namely Home Management Technicians and the USAID Provincial Development Office.[1]

A guideline for infant malnutrition prevention activities was developed by the Home Economics Division, Bureau of Agricultural Extension, based on operational research, planned by Miss Minda Caedo, AID Nutrition Office, and implemented in cooperation with Home Management Technicians in the province of Batangas. This resource paper provided the basis of weaning food formulations by rural improvement clubs organized by the extension workers. With an initial modest beginning in 1975 with 130 extension technicians, the malnutrition prevention program now has 475 technicians in the field and plans to expand to 2000 by 1982. This project is identified by the National Nutrition Council as one of the high priority activities in its national program for overcoming malnutrition in the infant and pre-school population.

37. Nutrition, Population, and Family Planning, ms, 10 pages, authored by R. W. Engel and Miss Minda Caedo, USAID Nutrition Office, Manila.

Presented at the Nutrition Forum, Los Banos Branch, Philippine Association of Nutrition, Los Banos, Laguna, January 6, 1975. The title of the forum was "Nutrition in National Development." The paper was by invitation and was published in the proceedings of the forum. The paper is shown as Attachment P.

The paper summarizes available data on the relationship between family size, spacing between babies, and malnutrition prevalence in infants and pre-school children. Examples were also presented to show how wider spacing between babies lowers family food budget requirements over a period of time, when compared with narrow spacings. The paper was a further extension of a rationale for integrated Nutrition and Family Planning programs as discussed in paper 16 above.

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[1] Mr. Leroy Knutson, USAID Provincial Development Officer, who had promoted nutrition in provincial development planning (see paper 12 above) assisted the municipality of Bauan, Batangas, with planning a municipal malnutrition prevention program in infants using these infant food formulations.

38. An estimate of calorie and protein intake by infants in the Philippines, ms, 9 pages.

Prepared as background material for a paper to be submitted for presentation at the 10th International Congress on Nutrition, Kyoto, Japan, August 27 - September 2, 1975.

As mentioned in paper 19 above, General Milk Company, Carnation International, Philippines, received an incentive grant from USAID in 1973 to initiate the development of a low-cost weaning food based largely on indigenous food resources. As a component of this project, a survey was conducted for Carnation by Consumer Pulse Inc., to determine the kinds and quantities of foods offered to infants by Filipino mothers, most of whom breast feed their babies. The survey revealed that 85-90% of rural mothers, representing about 70% of the total population, almost exclusively breast feed their infants for the first 3-4 months of life. Permission was obtained from Consumer Pulse and from the General Milk Co. to translate the quantity and frequency of feeding computer print-out food data into nutrient content. The feeding habits of infants were tabulated for age ranges 3-6 months and 6-12 months. The quantity and frequency data and nutrient content data were then used to estimate average daily calorie and protein intakes by infants from supplementary foods.

39. Infant growth and development as related to estimated calorie and protein intakes, ms, 13 pages. Miss Minda Caedo and R. W. Engel, USAID, Nutrition, and Florentino S. Solon, National Nutrition Council, Manila.

Presented at the 10th International Congress on Nutrition, Kyoto, Japan, August 31, 1975.

This paper contained the data collated in 38 above in terms of average daily intake of calories and protein from supplementary sources by infants 3-6 months and 6-12 months of age, together with estimates of lactation rate and average daily nutrient intake from breast milk.

The results, briefly summarized, indicated that between 3 and 6 months of life the average Filipino infant consumed 160 calories from supplementary feeding and 600 calories from breast milk, a total of 760 calories. This is slightly more than sufficient to satisfy estimated requirements of 720 calories per day. The same infants received 3.6 grams of protein daily from supplement and 10.2 grams from breast milk, a total of 13.8 grams compared with an estimated requirement of 13.2 grams. It should be recalled that operational research data, summarized in 16 and 36 above, indicated that, generally, up to 6 months of age, Filipino babies grow normally, on an adequate nutrient intake. Such a conclusion is supported by these estimated average calorie and protein intakes, during the first 6 months of life of the infant.

During the period 6-12 months, however, the estimate of calorie intake daily was only 746 (390 from supplement and 356 from breast milk) or a deficit of 16%, the requirement being 908. Similarly, during the 6-12 month age range, the estimated protein intake was 15.8 grams daily (9.7 from supplement and 6.1 from breast milk),a deficit of 5%, the requirement being 16.6 grams. The 16% deficit in average daily caloric intake by infants 6-12 months of age correlates well with the observed 18-20%

decline in standard weight for age observed in infants in the studies reported in 16 and 36 above.

The average daily caloric deficit of the infant between 6 and 12 months of age was calculated to be 162 calories. The rationale was therefore advanced that the average family can easily divert 162 more calories to the infant without seriously impairing the diet of the rest of the family, as a simple infant malnutrition preventive measure. With an average family of 4 children and 2 adults the daily calorie requirement would be 12,000. The 162 additional calories needed by the 6-12 month old infant thus represents less than 2% of the family diet.

These operational research data and the rationale advanced for achieving better infant nutrition were accepted by the National Research Council as the basis for identifying malnutrition prevention as a high priority intervention in the Philippine Nutrition Program planned for 1978-82. Expansion of the program, nationwide, was discussed briefly in paper 35 above.

40. Nutritional Improvement through the Green Revolution: Background Information, ms, 18 pages.

Prepared for the National Nutrition Council in Fall,1975,for use in planning the 1975-76 Philippine Nutrition Program, the interim one-year plan as prelude to a more comprehensive 5-year plan to be integrated with the overall National Economic Development plan for 1977-82. This paper is shown as Attachment Q.

During the implementation of the 1974-77 four-year Philippine Food and Nutrition Program, which was being organized, administered, and coordinated by the National Food and Agricultural Council, it became increasingly evident that home, community, and school garden programs were not achieving significant results in terms of actual implementation or in terms of volume of product realized. There was particular need for attention to this element of the program because of the heavy reliance upon foreign donated commodities (mostly U.S. Food for Peace donations but also significant World Food Program commodities) in the child feeding programs. These donations were averaging over 25,000 metric tons in food grain and protein concentrate equivalents annually in the mid 1970's. The USAID Nutrition Office therefore began developing background information on vegetable production as commonly practiced, and production under improved cultural practices. It rapidly became evident that only scattered data were available on family garden plots as to size and productivity. To assist with future planning, basic data was assembled for all major cereal crops, root crops, legumes, leafy and green and other vegetables. The estimated daily yields of calories and protein were then calculated for these crops per $10M^2$ of garden plot under average current production conditions and under conditions obtained in experimental trials under optimum agronomic practices (potential yields).

This background paper was also presented at a workshop at the Asian Vegetable Research and Development Center in Taiwan in June,1976.

Plans were also drafted by the USAID Nutrition Office, Manila, to assist Catholic Relief Services in developing a community or parish food production scheme by which Targetted Maternal Child Health (TMCH) centers could begin to substitute locally produced cereals and legumes for the donated cereal and soy flour blends. Catholic Relief Services used these documents as background resource material in development of an Operational Program Grant in support of its child feeding programs.

The AID Nutrition Office also developed curricular instructional materials for the Department of Education and Culture and CARE (Cooperative for American Relief Everywhere) in its program of replacing a portion of the Nutribun with foods produced through school gardens. The curricular material was designed as the text or reference manual for instructing school garden teachers in food production and school home economics teachers on use of such locally produced foods as a supplement to the Nutribun.

Despite these activities, only a small beginning has been made in this important intervention in the Philippine Nutrition Program. Nutritionally oriented food production has therefore been identified as the area to receive major attention in the next 5-year USAID support plan to the Philippine Nutrition Program. The current analysis suggests that the average home garden plot is so restricted in size that it is not reasonable to assume it can make any major contribution toward correcting calorie or protein shortages for an average low income family. However, with focus on the right kinds of crops and proper husbandry,such home garden plots can make major contributions towards correcting the widespread Vitamin A and iron deficiencies present in Filipino children and in pregnant or lactating mothers particularly.

41. The Nutrition, Food Science, Agriculture Interface in Nutritional Goals for Sectoral and National Planning, ms, 4 pages.

An analysis of the estimated total food shortage in the country and suggested means of initiating inter-sectoral planning to alleviate this shortage both through nutritionally oriented production and through food donation from abroad as needed.

The paper was prepared for Dr. Solon, Executive Director, National Nutrition Council as background for a paper he was to present on nutrition planning in February,1977,at a symposium of the International Rice Research Institute, Los Banos. The symposium was organized jointly by the Institute and the UN University on World Hunger and dealt with the need for including nutrition planning in the food and agriculture sector in national development planning. This paper is shown as Attachment R.

42. Coconut Flour for School Feeding, ms, 5 pages.

Presented at the annual symposium on Coconut Food Research, Coconut Food Research Division, Philippine Coconut Authority, 26 May,1977.

This paper summarizes and up-dates USAID interests in promoting improved coconut processing and production of edible by-products, including a review of use of coconut flours in AID supported school feeding programs (see paper 31 above). It was particularly emphasized, before the governments major coconut research staff, that coconut flour could easily be incorporated into bakery products, probably without detection by the consuming public. The school feeding program utilizing Nutribuns based on soy-fortified U.S. Wheat flour was cited as an example. The Nutribun contains 12 grams of soybean flour. The pupils consuming it are not aware that they are consuming soy flour. Yet the consumption of soy flour through the Nutribun results in an annual usage of 6000 metric tons, approximately equal to the total annual production of soybeans in the country.

43. Legumes as protein sources for Asian diets, ms, 10 pages, August,1977.

Prepared for the First International Conference on Mungbeans, Continuing Education Center, University of the Philippines at Los Banos, in August, 1977 and sponsored by the Asian Vegetable Research and Development Center, Tainan, Taiwan and the Southeast Asian Regional Center for Agriculture (SEARCA) University of the Philippines, Los Banos.

The paper summarized current knowledge of the protein and amino acid content of various other legumes as compared with mungbeans. It also included a review of current mungbean and other vegetable legume production in SE Asia and their potential for improving protein nutrition in Asian populations. The relatively high lysine content of mungbeans was pointed as making them an ideal supplement to cereal grains which are in general low in this amino acid. The paper also covered the flatulence promoting substances in legumes and the relatively low level of these substances in mungbeans. Anti-enzyme content of legumes was also reviewed to reveal that generally these substances are absent or present at low levels in mungbeans.

The proceedings of the conference were published in July,1978,and this paper appears as the first paper in the proceedings, the first section of the proceedings dealing with nutritive qualities of mungbeans.

Clearly the Asian Vegetable Research and Development Center is recognizing the nutritional implications of its vegetable breeding program and is including the subjects in the conferences it sponsors in relation to the crops on which it focuses, mungbeans being one of these.

(The following constitute working papers or manuscripts currently in progress:)

44. A new growth table for infants in the Malnutrition Prevention Program. Its evaluation compared with growth charts.

During the implementation of the early phases of the malnutrition prevention program in infants it became increasingly clear that the growth chart used in the Philippine Nutrition Program, and contained in the guidelines in paper 15 above, was difficult to complete accurately by the

field workers and consequently was of doubtful value as a tool for educating mothers in improved infant and child growth. The USAID Nutrition Office therefore devised a growth table. Briefly described, the growth table consists of 18 columns (one for each month from birth to 18 months) of 10 blocks comprising the 10 nutrition levels (see attached Nutrition Statistics and Guidelines for nutrition levels) covering normal weight, level 1, (90% of standard or higher), and levels 2-9, each representing 5 percentage points on the body weight scale in terms of percent of standard, and level 10, representing weights 50% of standard or below. The weights, in 0.1 of a Kilogram, pertaining to each block were inscribed. Thus, at any age between birth and 18 months, the infant's weight could be easily plotted by identifying the block within the appropriate column (age in months) which corresponded to the weight being measured in the presence of the mother. The growth table was adopted by the Extension workers as the most convenient for monitoring infant nutritional status and for mother education. (see Attachment(s)

Beginning in 1976 the USAID Nutrition Office began pointing out to nutrition education institutions and nutrition program-implementing agencies the need for a detailed evaluation of growth charts being used in nutrition programs generally.

In the fall of 1977 Becky Lacuna, graduate student at the University of the Philippines and Nutritionist, Catholic Relief Services, sought advice and consultations in the AID Nutrition Office on a research design for testing growth charts in terms of their ease of completion and their value as educational tools. The concept had been approved as a possible thesis research problem for completion of the M.S. degree requirements in Community Nutrition at the University of the Philippines.

A research design was completed and currently two growth chart designs (one now in use in the Philippine Nutrition Program) and the USAID Infant Growth Table are being evaluated. Practicing Nutritionists, college students majoring in nutrition, and administrative or supervisory level nutrition workers are serving as the test subjects in this evaluation. The USAID Nutrition Office has continued to provide advice and counsel in the research design, and in data collection and interpretation. These studies should be completed in the fall of 1979. The National Nutrition Council has adapted the growth table for use in it's Nutrition Surveillance program.

45. Nutrition Mothercraft centers, and evaluation of their long-term benefits through follow-up studies, ms, 15 pages.

In 1974 the USAID Nutrition Office urged the Dept. of Health Nutrition staff to evaluate its program of mothercraft centers through follow-up studies. USAID nutrition program support between 1968-73 had been extended to the Dept. of Health for the establishment of a nationwide network of Mothercraft Nutrition Centers. Such centers, operated as extensions of rural health units, served to rehabilitate malnourished pre-school children

within their villages as well as to educate mothers through their participation as workers in the centers. In 1974 a pilot follow-up study was planned by the nutritionists in the Health Department with advice from the USAID Nutrition Office. In 1975 a more detailed plan was evolved, extending the collection of follow-up data to over 1000 previous participants in the mothercraft center program. Data collection was completed in 1976 and the USAID Nutrition Office was requested to assist with collation, tabulation, and interpretation of the data. Currently a second draft of a manuscript summarizing these findings is being prepared for publication in the Philippine Journal of Nutrition. The Department of Health recognizes this paper as a joint effort and is proposing that it be published as such. Briefly summarized, the follow-up studies confirm the observations reported on follow-up studies of similar centers in Haiti. The major benefit resides in the mother education phase of the program. Prevalence of malnutrition is considerably reduced in children born to mothers after they have received mothercraft instruction.

46. Preliminary Report, Malnutrition Prevention Project, Home Economics Division, Bureau of Agricultural Extension, ms, 26 pages, February, 1978.

As indicated in paper 36 above, Miss Minda Caedo, USAID Nutrition Office, had been engaged in assisting the Extension Service extensively with a program of malnutrition prevention in infants. Frequent consultations were held with the VPI Chief of Party as well as with the statistician and campus coordinator from VPI to arrive at a method of data collection analysis and interpretation as the basis for monitoring the effectiveness of the program in reducing malnutrition in infants.

The draft referred to here was used for presentation of a progress report on the project before the National Nutrition Council in July 1977 by the project manager in the Bureau of Agricultural Extension. The USAID Nutrition Office is continuing to provide consultant services to bring this manuscript into final form for publication.

47. Measures of Effectiveness of the Targetted Maternal Child Health Program, ms, 14 pages, authored by Gloria Villareal-Boren, Nutrition Program Coordinator, Catholic Relief Services, Manila.

Presented in July, 1977 in preliminary form at the Research Symposium sponsored by the National Nutrition Council.

This paper presented the results of a preliminary review of an internal evaluation of the Targetted Maternal Child Health Program operated by the Social Action Council, Catholic Conference, Philippines, in cooperation with Catholic Relief Services and with the Department of Social Services and Development. The paper also contained a summation of the results of an independent evaluation conducted on the same program in 1974 by the Asia Research Organization, a private consulting firm under contract with USAID/Manila.

The paper was drafted by the author with frequent consultations with the Nutrition Office AID/Manila, and with the request that the latter participate in the completion of the draft for publication.

Section C

A summary of TDY consultant services provided by VPI, in addition to the in-residence advisor, their impact on food and nutrition policy, and the evolution of nutrition policies and programs

Specific areas requiring short-term technical back-stopping were identified in the contract scope of work. These will be summarized in the order of their magnitude. VPI agreed to perform 69 person months of such services as specified in the basic contract and amendments thereto. The contract and amendments further specified that a portion of this service would be more logically provided by Filipino counterpart visitors to the home campus rather than in the Philippines. As shown in this report a total of 74 person months of service was provided, 62 in the Philippines and an estimated 12 person months in support of Philippine visitors on home campus.

As this summary reveals, TDY technicians focused heavily on nutritionally oriented food production. The major impact of this effort has been that of having gained assurance from Philippine counterparts that municipal level food production planning for nutritional self-sufficiency will receive high priority in future nutrition program development. Operational research on linkages with family planning and with other health services that were backstopped with VPI technicians are providing useful information that should enable the National Nutrition Council to strengthen and improve integration of nutrition with other social concerns. Assistance in food preservation has resulted in improved community cannery equipment. Beginnings were also made to streamline the National Nutrition Council's management and information systems through application of computer technology. The home campus has also served as a center for providing visiting Filipinos with briefings, training, and site visits to nutrition projects.

1. Technical services in support of food production interventions in the Philippine Nutrition Program.

During the contract period 1 Sept., 1974 to 31 Aug., 1978, a total of 32 person-months of technical support and advisory services were provided by VPI&SU in this area as follows:

Dr. P. H. Massey, Jr., Horticulturist, Associate Dean for Research, College of Agriculture	2 months
Dr. Ryland E. Webb, Nutritionist, Head, Dept. of Human Nutrition and Foods	1 month
Mr. Jack Dwyer, Research Associate in Horticulture 2 tours of 8 and 7 months respectively	15 months
Mr. John Boren, Research Associate in Horticulture	9 months
Mr. Rick Wackernagel, Research Associate in Horticulture	5 months

Dwyer earned the M.S. degree in Agricultural Economics during the interim between his initial 8 month and final 7 month tours of duty. He, as well as Boren and Wackernagel, were employed by VPI&SU to perform specific services because they had served in the Philippines as Peace Corp Volunteers in food production, were knowledgeable in the local language, and had proved their capability to work amicably, productively, and harmoniously with Filipino counterparts.

Dean Massey's services were utilized primarily to review and evaluate nutrition oriented vegetable seed and vegetable production centers which were operating in support of the Philippine nutrition program at 37 vocational agricultural colleges and high schools (Dec.,1975) and to assist with planning and drafting of the USAID supported Program for Nutrition for 1979-83 in the Philippines. In the latter role he was assisted by Dr. Ryland Webb during October,1977.

Mr. Jack Dwyer served for 7 months in 1974-75 to develop a food production model for the Catholic Relief Services and the Catholic Conference, Philippines, as a mechanism for introducing food production into parishes or communities in which the Targetted Maternal Child Health Centers were operating and U.S. Food for Peace commodities were provided through Catholic Relief Services. Catholic Relief Services made use of this model in the development of a broad program of support for food production activities in nutrition programs in the form of an Operational Program Grant. As a further outgrowth of these technical services, Catholic Relief Services has employed an Agronomist to work in its Targetted Maternal Child Health program. This worker will be engaged in training parish and diocesan social action workers in the Catholic Conference, Philippines, in the mechanics of implementing food production activities for child-feeding programs.

Mr. John Boren was employed for 9 months in 1975-76 to develop a food production model which entailed the provision of up-to-date rice or corn production technology, as well as legume and root crop production technology, to those families enrolled in child nutrition programs who had not yet adopted modern methods of improved cereal production through government supported programs (Masagana 99 and MAIS 99). This model presented communal production schemes among the problem families (families with malnourished pre-school children who received donated foods) who, through increased community effort and more efficient production, could change the food requirements of their nutrition programs from initial complete reliance on donated commodities to complete phase-in or replacement of donated with locally produced nutritionally equivalent foods in 6-8 years. This model was accepted by the National Food and Agriculture Council, the agency responsible for implementing food production schemes in the Philippine Nutrition Program, and currently the model is being tested in communities where farm technicians have been fielded to extend the government's food-production-for-self-sufficiency-programs to include multiple cropping. These technicians have been fielded in areas where there is high potential for increasing annual food production through multiple cropping as well as through inter-cropping.

Mr. Rick Wackernagel was employed for 5 months between February and June,1976 to assist the School Health Division, Bureau of Public Schools,

Department of Education and Culture, and CARE in up-grading the program of instruction for school garden teachers and school home economics teachers. The former are responsible for initiating school gardens and the latter are responsible for developing recipes for utilizing school garden produce as a partial substitute for Nutribuns in the school feeding program supported with U.S. Food-for-Peace-donated wheat flour fortified with soy flour. A school garden planting schedule was developed, together with a harvest schedule, and a schedule of produce-use such that each pupil receiving the Nutribun would be assured a 50 calorie per day filler for the Nutribun from the crops harvested from the school garden. Mr. Wackernagel also participated in field-testing this curricular material as the basis for developing a final edition to be used throughout the school system.

Jack Dwyer served a second TDY tour of 7 months in 1978. During this tour a major share of the work performed related to the finalizing of the AID mission's third 5-year program plan in support of the Philippine Nutrition Program. The Nutrition Office, with assistance from Dean Massey and Dr. Ryland E. Webb, Nutritionist of VPI&SU in October,1977 had completed a preliminary draft of a new project paper. It was proposed that USAID resources, other than donated food, should be heavily concentrated on training and fielding of horticultural technicians. Their function would be that of working directly with rural families whose children were malnourished and either receiving, or in need of, food aid. This program was conceived as an intense effort to improve home gardens (or community gardens for those families without direct access to land) and thereby reduce reliance upon donated food. The mission Nutrition Office clearly recognized as an important issue that it would be difficult to defend home gardening as the most cost-effective means of improving local food production to meet nutritional needs.

In February,1978 a project review team was organized by the Asia Bureau and TAB/N, AID/W, and was composed of experts from AID/W and members of the Committee on International Nutrition, of the Food and Nutrition Board, National Research Council, National Academy of Sciences, Washington, D.C. The team reviewed the preliminary draft and recommended that project objectives should focus on augmentation of local food production but that such efforts should not be primarily through home gardens because of the paucity of data as to their cost or effectiveness and their productivity. The mission Nutrition Office accepted this directive. As a consequence, between March and July,1978 Jack Dwyer worked with Philippine counterparts from the University of the Philippines, agriculturists, and representatives from the National Nutrition and Food and Agriculture Council re-drafting the project paper. The modified proposed USAID assistance does not eliminate home gardening as an intervention but proposes that support should be heavily directed toward assisting municipal development staffs in planning nutritionally oriented food production programs. Through inter-sectoral planning the most cost-effective combinations of home, community, and/or school gardens, or multiple cropping and inter-cropping regimens would be developed as a unified community effort to achieve, eventually, nutritional self-sufficiency through self-help. The 5-year plan proposes further that such local-level planning for nutritional self-sufficiency should initially be concentrated in those communities receiving Food for Peace or World Food Program donations for their nutrition programs and, based on agricultural sector surveys, having the potential for

achieving food-sufficiency through more efficient or more intensive production efforts. Mr. Dwyer also assisted with Operational Research Planning to develop a data base for evaluating the relative cost-effectiveness of various community food production models, including home gardens, as a further important element to be included in food production activities with nutrition goals in the next 5-year program.

Clearly, as identified in the contract scope of work, the major effort of short-term technicians was focused on planning activities which would provide the National Nutrition Council (coordinator) and the National Food and Agriculture Council (implementor) with an improved capacity to achieve orientation of food production toward the inclusion of nutritional objectives, thus reducing, on a planned 5-8 year phase-down schedule, the reliance of the child feeding elements of the Philippine Nutrition Program upon off-shore donations of food.

2. Technical services to identify family planning and nutrition program linkages.

Between 1974-76 Ms. Monica Yamamoto, Public Health Nutritionist, was employed by the USAID Mission, Manila, through Population Services International, Inc. At the request of the Mission Director, in August,1976, she was appointed by VPI&SU as a Research Associate to serve in the Philippines for 12 months. Her specific duties were to continue to identify linkages that could be developed between the Nutrition and Population Support programs, particularly those aspects of the Philippine programs receiving USAID support, and to complete operational research conducted by Ms. Yamamoto at the University of the Philippines (MS degree thesis), involving the nutrition-family planning inter-relationships.

Since most of her work is related to the operational research phase, this will be presented in some detail. The rationale for the operational research was that the Philippine Nutrition Program had an established outreach to families with malnourished young children, who were also priority families for the Population Program. It was deemed important, therefore, to gain some insight into the knowledge, attitudes, and practice (KAP) of family planning by 1159 nutritionists whose duties in the Philippine Nutrition Program brought them into regular contact with mothers of target families (families with malnourished children and therefore also a target for family planning services). The operational research involved not only the nutritionists' KAP of family planning but also their KAP with respect to promotion of family planning in their day-to-day work activities.

The results of the research consisted of an analysis of data compiled from questionnaires completed by the 1159 nutritionists. These included Catholic Relief Services nutritionists, Rural Extensive Home Management Technicians, CARE nutritionists and a few from other agencies. The majority of those responding were from the first two agencies mentioned. The results supported the following conclusions:

(a) Generally, practicing nutritionists in the Philippine Nutrition Program were not very specific as to the family planning promotional activities expected of them and how often they were

expected to perform such promotions. The need for policy direction, specifying types and frequencies of family planning promotional activities by nutritionists, was clearly revealed.

(b) The content and focus of family planning training for practicing nutritionists need to be sharpened in order that the trainee, upon completion of training, will have a clear understanding of promotional activities in family planning to be performed as a regular job function.

(c) In view of the high cost of training programs, it would appear advisable to accomplish some in-service family planning training of nutritionists with self-teaching materials portraying the nutritional implications of family planning or a lack thereof.

(d) An adequate linkage should be developed to insure that nutrition workers are knowledgeable as to the facilities, and services, available in family planning and their location within their areas of responsibility.

The study further revealed that among the factors studied, agency policy or stand with respect to family planning was the most influential single factor accountable for the variance associated with Family Planning Promotions knowledge. It explained 13% of the variance.

A 24 page manuscript summarizing the pertinent findings of this operational research was submitted by Ms. Yamamoto for publication in the Philippine Journal of Nutrition in August, 1977 upon conclusion of these 12 months of services. The manuscript was accepted and should appear in print sometime in 1978.

It should be pointed out that this operational research was critically reviewed during the planning and implementation by the National Nutrition Council and the Nutrition Center technical staff. The results will be used in future program planning of the Family Planning Promotions component of the Philippine Nutrition Program.

The VPI&SU Chief of Party, Manila, served as a member of the University of the Philippines'Examining Committee on the review and critique of the MS Thesis derived from these studies.

3. Statistical consultations and computer services in support of operational research on the cost/benefits of various nutrition/health interventions for protecting the health of infants.

In late 1974, the National Nutrition Council requested the USAID Nutrition Office, Manila, assistance in planning operational research. Particularly desired was a data base for planning the most cost-effective malnutrition prevention programs or projects.

The following 9 months of technical services were provided, in addition to the in-residence VPI Chief of Party:

(a) Dr. Jesse Arnold, Head, Dept. of Statistics, VPI&SU, once each year for one month (4 months) to assist with design of the experimental procedure and data processing, and to assist with coding of data for computer processing, and statistical analysis and interpretation of results.

(b) Dr. Albert Sherdon, Assistant Professor of Statistics, for 2 months to assist with the field testing of the experimental design and with further refinement of the interventions to be tested (education, food assistance, immunizations and sanitation, with emphasis on safe water for the infant).

This project was implemented by a research team in the Medical School, Santo Tomas University, with the Nutrition Center of the Philippines and the National Nutrition Council cooperating in planning, supervision and management.

Data collection on this research project began in 1976. Initially it was assumed that the required number of subjects (30) in each of the 18 participating villages would be available, in the form of new-born infants, within a time period of 18 months. These initial estimates had to be modified in 1977 to extend data collection over a 30 month period. A lower birth rate in the participating villages as a result of more effective outreach of family planning programs was a factor responsible for this adjustment. Additionally, the staff, due to budget limitations, had to be curtailed, which also resulted in some slow-down in the initially planned implementation schedule.

This operational research, initially scheduled for completion by the summer of 1978, is now planned for completion in the fall of 1979.

In planning these technical services, it was specified in the contract scope of work that a portion of the services involving training and orientation of the project manager, Dr. Arcadio Tandez, Santo Tomas University, School of Medicine, would be best accomplished on the home campus. Accordingly, in fall of 1975, Dr. Tandez spent 5 weeks at the Virginia Tech campus in Blacksburg, Va. to receive orientation and training as follows: research project design and the development of survey instruments to measure project impact, development of detailed descriptions of project interventions and the resource materials to be used in delivering these interventions so as to assure uniformity in the orientation of the clientele to be served by the project. Approximately 3 person months of technical services were performed to accomplish the training and the assistance provided in developing the operational research plan, the survey instrument for measuring project accomplishments, and in formulating the computer program for data processing.

Since this project is still in progress, a progress report of significant findings to-date is presented in an attachment.

4. Social science and statistical services in support of operational research on the training and fielding of Barangay Health Aides (village paramedics).

The USAID Nutrition Office provided advisory services for the initial planning of a cooperative effort between the Department of Health, regional office, Cebu City, and the Cebu Institute of Medicine, to study and evaluate the capacity of village volunteers to learn and carry out minimal health services deliveries in villages not accessible to routine medical or health services. It was specifically requested to provide technical services to assist with the development of a baseline data collection document and a social science survey instrument that would be useful in evaluating the effectiveness of the Barangay Health Aide Program. The services of Dr. John Ballweg, Sociologist and Assistant Dean, College of Arts and Sciences, VPI, were made available in Cebu City, Philippines, for one month in 1974 and a similar period in 1975. The first tour was mainly concerned with development of the detailed project design and evaluation instrument while the second tour was concerned with analysis of data derived from computer feed-out in order to arrive at an appropriate data analysis procedure as to depth and components. The project was completed on schedule in 1977. Important project out-puts included a Barangay Health Aide Training Manual which is now an important reference work in resource libraries assembled for training the technicians (health aides) such as the USAID-supported Panay United Services for Health (PUSH) project through which more effective nutrition and health services will be extended to remote, economically depressed rural areas on the island of Panay.

The project also developed a field manual, serving as the reference text for the health aide. It comprised a compilation and detailed descriptions of the tasks to be performed in support of health, nutrition, family planning, and family home food production activities.

Data summary revealed that Barangay Health Aides were very successful in achieving about a 60% reduction in prevalence of second and third degree malnutrition in the barangays (villages) served. They were, however, not successful in reducing birth rate (family planning) or infant mortality. This initial evaluation was completed within one year after the health aides program was introduced. Later impact evaluations are planned.

In planning these technical services it was specified in the contract that a portion of the technical services to be provided by VPI&SU would be performed on home campus and would be directed specifically to training and orientation of the Philippine Project Director Thomas Fernandez, Professor of Medicine, Cebu Institute of Medicine. Training and orientation were provided during a visit to home campus by Dr. Fernandez for four weeks in the spring of 1975. Specific orientation and training included the following: computer programming, contingency and code checks of data, data clean-up in preparation for tabulation, local community health activities of paramedics, actual processing of project data on the VPI&SU computer, and orientation in time series analysis. An estimated four person months of services were provided by VPI&SU statistical, computer science, and social science technicians in this training and project data analysis and interpretation.

5. Food processing advisory services.

Mr. Charles Wood, Professor of Food Science and Technology, VPI&SU, served for two months under the previous contract, AID-EA-37, (VPI) to

explore the possibility of introducing operational research at the College of Agriculture, University of the Philippines, Los Banos on the use of community canneries or school canneries for preserving garden vegetables and fruits. During certain seasons of the year such products or produce appeared on the market in excess and resulted in depressed prices to the producer, and preservation appeared logical as a means of controlling excesses and stabilizing prices for both producer and consumer. As a result of the earlier visit, it was recommended that the small cannery unit proposed to USAID by the Ball Corporation, Muncie, Indiana, for use in developing countries as community or school cannery units, should be field-tested at the University of Los Banos. Professor Wood returned to the Philippines for two months in early 1976 to assist with installation of the cannery unit that had been procured through the USAID mission, Manila, with nutrition project funds. Extensive tests conducted by Professor Wood and his counterparts at the University Food Science Department revealed that certain design features made the units unworkable. As a result of these studies, approximately $325 was spent on accessary parts and labor to modify the cannery unit (acquisition value $2400) so as to accomplish minimum standards of heat penetration and related requirements to satisfy U.S. Food and Drug directions on small cannery unit design. These activities resulted in the manufacturer accepting the suggested modification and this has led to the availability of a more modern cannery unit which has incorporated the features shown to be necessary from the tests conducted under these advisory services.

Professor Wood also assisted the Philippine Women's University in the installation of a similar cannery unit. This university has been identified by the National Nutrition Council as the facility for developing and testing low-cost food processing, village-level technology, and the community cannery will be one of the technologies to be tested. The Philippine Women's University was also selected to explore low-cost extrusion technology.

Thus, VPI&SU has provided very limited technical assistance to advance village level technology for preserving food. The cannery units have thus far not been used in any extensive way to accomplish the first major purpose, namely, to determine their use in providing an outlet for excess production of vegetables and fruits for the fresh produce market. The reason the University of the Philippines food scientists have not been able to develop the cannery units for such purposes is not entirely clear. However, most producer cooperatives apparently have been able to sell all of their produce in the fresh food markets of Metro-Manila at favorable prices and thus the predicted situation of surpluses has actually not occurred.

The cannery unit at Los Banos has, however, been used very extensively for two nutritionally oriented purposes that had not been planned originally. The unit has been used extensively to market test a sterile, bottled soy beverage in the municipalities surrounding Los Banos and more recently in Metro-Manila and all of the towns between Los Banos and Manila. This beverage is produced in the pilot plant of the University at Los Banos using the methodology developed for production of soy milk with minimum beany flavor developed by Cornell University at Los Banos under a USAID/W supported contract. At this stage the market is still expanding and the food scientists at Los Banos are confident that the market will achieve a level in the near future which would make bottled soybean milk production commercially feasible in the Metro-Manila area.

The cannery unit at Los Banos has also served the nutrition program by developing a toned milk composed of carabao milk (9-10% fat) with soybean milk (1-2% fat), the final toned product containing about 4% fat. This toned milk is made available to child feeding centers in the nutrition program as a special project of the Bureau of Animal Industry, Department of Agriculture.

In summary, technical services in food science and technology have resulted in the availability of an improved community cannery unit, and capability has been developed among Philippine food technologists to explore community canneries as food preservers and as supportive activities for nutrition programs.

6. Technical advisory services in support of computer system requirements for servicing the management and information system of the Philippine Nutrition Program, and training of the Nutrition Council and Nutrition Center technical and administrative staff in computer techniques for Management and Information Systems (MIS).

At the request of the Executive Director, National Nutrition Council and Nutrition Center of the Philippines, 2.5 months of technical services were provided in the Philippines by Dr. Thomas C. Wesselkamper, Associate Professor of Computer Science, in the spring and summer of 1978. The first tour, in February-March 1978 was devoted to review and analysis of the current survey instruments in use in the Philippine Nutrition Program, the channel of reporting employed, and end-use utility of the information collected. Systems currently in use by both the public sector (National Nutrition Council) and private sector (Nutrition Center of the Philippines) were examined to determine how improvements could be effected and duplication of effort avoided. After review and analysis of the current MIS system, and suggested modifications were incorporated, a survey was undertaken of the computer services available in the Metro-Manila area as the basis for advising on the most appropriate agency for servicing the computer systems requirements of the Philippine Nutrition Program.

Suggestions were also made as to the type and volume of currently available computer equipment or systems best suited for servicing the requirements of the planned 5-year Philippine Nutrition Program through 1982.

In the summer of 1978, Dr. Wesselkamper returned to the Philippines to conduct a one-month training course for the technical staffs in the Management and Information Services of both the Nutrition Center and the Nutrition Council. This class constituted approximately 30 trainees, including a few from university faculties in the Metro-Manila area with nutrition training programs who requested permission to attend. This training was conducted four days each week. The fifth day of each week was devoted to conducting a senior staff seminar for Nutrition Council and Nutrition Center administrative-level personnel. This training identified the components of a management and information system, its adaptation for computer processing, and the mechanics of information flow generated by the system.

These services constitute an important step towards the training of staff and the up-dating and streamlining of a management and information system.

The importance and critical need for this up-grading is recognized by Dr. Florentino S. Solon, Executive Director of the National Nutrition Council and the Nutrition Center, as the Philippine Nutrition Program interventions increase in volume and magnitude.

7. Technical advisory services in the design of briefing facilities in the Nutrition Center of the Philippines.

At the request of the Director of the Nutrition Center of the Philippines, professional expertise was provided to assist the architects designing the Center building in the planning of a functional set of units to be used in briefing visitors and in training workers for the Philippine Nutrition Program. Since the major function of the Center was to be that of serving as the top information source for orienting the public in nutrition matters, it was most appropriate that adequate attention be given to the design of briefing rooms and briefing equipment that would serve the program under development.

VPI&SU, on the advice of the communications consultant in the AID Mission, Manila, sub-contracted for the services of Dr. G. F. McVey of McVey Media Specialists, Newton, Mass. and Prof. of Educational Facilities, Boston University, to accomplish the following specific tasks: consultations with architectural engineers and other staff of the Nutrition Center to develop an assessment of facility needs, consultations with Population Center personnel and National Media Production Center personnel for an assessment of audiovisual facilities and equipment planned or in place, drafting of recommendations as to the specific audiovisual facilities and equipment requirements of the Nutrition Center, preparation of a program including drawings and specifications for the architectural work to be performed for a central projection facility serving four briefing chambers with audiovisual equipment, and drafting bid specifications for the audiovisual equipment to be purchased and installed. These services were accomplished in the spring of 1975 and when the Nutrition Center was inaugurated in September 1975 all equipment was in place and functional.

8. Technical services to assist in the evaluation of capability of the Food and Nutrition Research Institute for conducting biological evaluation of protein quality of rice and other foods with infants as subjects.

There is considerable interest in the Philippines in the evaluation of protein quality of rice as it may be influenced by genetics, with specific concern about prospects for improving the protein content of this cereal without sacrificing quality.

Preliminary evaluational studies, using human infants 18-24 months of age as subjects, were conducted by the Food and Nutrition Research Institute, Manila, in cooperation with the International Rice Research Institute, Los Banos, Philippines. The Nutrition Office, Technical Assistance Bureau, AID/W supports similar studies in Latin America where subjects are used whose predominant cereal food is corn. There is therefore a need to identify a facility, preferably in Asia, where the preferred cereal is predominantly rice, so as to be able to distinguish if traditional diets influence bioassay results. The Philippine Food and Nutrition Research Institute (FNRI)

had been identified by AID/W as a possible facility for conducting human studies. VPI&SU was requested to employ Dr. William McLean, Johns Hopkins University Biochemist who had been involved in the Latin American bio-assay studies, to conduct an evaluation of the capability of faculty and the adequacy of physical facilities at FNRI for conducting balance studies of high quality and reliability in human subjects, preferably infants, as a basis of considering the Institute as a contractor in Asia to service USAID needs for protein evaluation of cereals and other foods required in nutrition programs. These services were performed in a one-month period in the spring of 1978. In brief, the results of the evaluation were favorable, namely, that the Food and Nutrition Research Institute has an adequate staff, both in quality and numbers, to perform such research and the facility for handling children, now completed, is adequate for housing the subjects and maintaining them comfortably for conduct of the experimental work contemplated.

9. Technical services to the USAID Mission, Manila, during terminal home leave of the Chief of Party for VPI&SU.

Jo Anne Barton, Assistant Professor of Human Nutrition and Foods, served for 2.5 months in the summer of 1978 to provide continuing nutritional advisory services to the mission (during the terminal home leave of the Chief of Party) and to the Philippine Nutrition Program. Since her special area of work interest is in the USDA/State Extension Services Expanded Nutrition Program of the U.S. Government, she is devoting most of her time to a review of the Philippine malnutrition prevention program of the Home Economics Division, Bureau of Agricultural Extension, a program which has many of the features of the U.S. expanded nutrition program. In particular, it has the feature of training village workers to extend nutrition services to families within the village. Ms. Barton has also been requested to assist the Home Economics Division in the development of an adequate administrative management, and supervisory staff in its national office to meet the demands of the planned expanded program involving over 2000 extension workers in the field. Currently the program involves about 400 field workers.

10. Technical services provided in support of visits to the VPI&SU home campus by Philippine Nutrition Program counterpart workers.

As specified in the contract, and as requested by the National Nutrition Council, a portion of the technical services to be provided by the University would be most appropriately accomplished in the form of special short courses, seminars, field site visits, and consultations with Filipinos coming to the United States and having either direct or indirect relationships to the Philippine Nutrition Program.

In sections 3 and 4 above it is stated that 7 person months of such services were arranged for Dr. Arcadio Tandez and Dr. Thomas Fernandez, Filipinos engaged in operational research.

A brief discussion shows that there were provided an estimated additional 5 person months of such services, to 12 Filipinos who where on home campus for varying periods of a few days to a month.

Hilda M. Giron, Giron Foods, Silang, Cavite, Philippines,visited the VPI campus for four days in 1974. She received a briefing on VPI's food science and technology program and brief visits to community canneries in the area.

Ramon Binamira, Director, the Green Revolution Project of the Philippine Nutrition Program,was on campus for ten days in the summer of 1975 for field site visits to nutrition projects and for consultations with horticulturists on home, community, and school gardens.

Bienvenido Castillo, Attorney at Law and Mayor, Bauan, Batangas, was on campus for 21 days in the fall of 1975. Mayor Castillo has been identified in other parts of this report as having accomplished the organization of a municipal nutrition program (with Manila USAID nutrition and community development assistance) in 1974. This program was effectively implemented and essentially eliminated severe malnutrition in infants and pre-school children within two years.

As a result of these accomplishments, Mayor Castillo was appointed as special consultant by the National Nutrition Council in municipal nutrition program planning. His tour on the VPI&SU campus was arranged to include briefings on the organization of county, city, and state programs for nutrition.

Arturo R. Tanco, Secretary of Agriculture, and Chairman, National Nutrition Council,was on home campus 26-30 September,1976 as an invited speaker at the international conference (USAID/IBM/VPI&SU sponsorship), entitled "Conference on International Development: A Working Conference on University Action." Other Filipinos attending this conference were Joseph C. Madamba, Director, Philippine Council for Agriculture Research, Delfina B. Aguillon, Deputy Director, National Nutrition Council, and F. A. Barnardo, Director, Association of Colleges of Agriculture. Special briefings were arranged for Secretary Tanco and his delegation from the Philippines. Mrs. Aguillon was given an overview of the on-campus nutrition research and instruction program and the nutrition program of the state-wide extension service.

Aurora G. Corpuz, Dean of the College of Home Economics, University of the Philippines, was on campus five days in the summer of 1976 for briefings on the instruction, research, and extension programs of VPI&SU and for brief site visits to expanded nutrition programs.

Dr. Cecilia A. Florencio, Head, Dept. of Food and Nutrition, University of the Philippines, Manila, and Salome P. Dominguez, Training Officer, United Nations University on World Hunger, Nutrition Center of the Philippines, Manila, were on campus for three days in the summer of 1977 for briefings on the VPI&SU program of foods and nutrition in research, instruction, and extension. They were particularly interested in food and nutrition program planning and administration, a program currently under development at VPI&SU in the Department of Human Nutrition and Foods.

Mrs. Elena Ocampo, Director of Training Programs, Nutrition Center of the Philippines, was on campus for 30 days in the spring of 1977.

She received training and orientation in the VPI&SU computer program in Foods and Nutrition, which is designed for use in monitoring nutrition activities and in nutritional surveillance. Site visits to training programs for village level workers in the expanded nutrition program of the extension service were also included in her tour.

Dr. Antonio A. Tinio, Population and Nutrition Program Coordinator, Quezon Province, was on home campus for seven days in the fall of 1977 for briefings on the VPI&SU role in support of the Philippine Nutrition Program and for site visits to community nutrition programs.

Dr. Rudolfo Florentino, Deputy Director, Nutrition Center of the Philippines,was on home campus for one week in October,1977. He received orientation in computer technology for Management and Information Systems and was briefed on data processing of the cost-benefits research project (see 3 above).

11. VPI and Philippine contacts related to the Philippine nutrition program but not supported by contract funds.

William F. Masterson, S.J., Director, Agricultural College Complex, Xavier University, Cagayan de Oro City, Mindanao, Philippines, was on campus for two days in 1975, five days in 1976, and two days in 1977. The 1976 visit was in connection with the conference on International Development held at VPI as mentioned in section 10 above.

VPI has provided graduate training, including training assistantships for two Ph.D. degree trainees in Agricultural Economics and one Ph.D. degree trainee in Plant Pathology and Physiology. VPI has also provided an exchange professor for the Xavier University Department of Agricultural Biochemistry in 1973, who developed the first Filipino textbook in biochemistry for use in undergraduate instruction. Xavier University trains Southeast Asian technicians in its Southeast Asian Rural Life Institute, an institute dedicated to service to the rural poor of Asia through rural extension education.

In 1978 Mr. F. Sionil Jose, noted author and scholar and consultant to the Philippine Program for Agrarian Reform since 1968,visited the VPI campus for two days. He received briefings on the VPI technical support to the Philippine Nutrition Program and presented a lecture on Agrarian Reform in the Philippines before the class on International Affairs: The World Hunger Problems, its Economic and Social Implications.

Dr. Virgilio Carangal, Deputy Director, National Food and Agriculture Council, visited the VPI&SU campus in 1974 for two days. He was presented with a briefing of the VPI research extension and instruction program in food and agriculture and was given a tour of the research facilities. He also was briefed on VPI's role in the Philippine Nutrition Program.

In 1976 Dr. William E. Lavery, President of VPI&SU, spent five days in the Philippines for an administrative review of the role of the university in the Philippine Nutrition Program. He received briefings from the Philippine Mission Director.

Thomas C. Niblock, USAID Mission Director, Manila, visited the home campus for two days in 1974 for discussions with President Lavery and for review of VPI's role in providing technical backstopping for the nutrition program in the Philippines.

Philippine Mission Director, Garnett A. Zimmerly and Vance L. Elliott, Philippine Desk Office, USAID, Washington, visited the home campus for one day in June, 1976, for discussion with the campus coordinator, Dr. Jesse Arnold, relating to nutrition support. Discussions were also held with President William E. Lavery, Provost John D. Wilson, and Dr. Wilson B. Bell, Director of Development. A luncheon meeting was held with members of the VPI Committee on International Programs.

In June, 1977, Peter M. Cody, Director USAID, Philippines, visited the home campùs for one day. He was accompanied by Mr. Hank Merrill, International Development Internist with the AID mission in Manila. They were presented with a review of VPI's role in the Philippine Nutrition Program and plans for the University's role through August, 1978.

Attachment
Section C

Summary of Cost/Benefits Analysis of Nutritional Health
Delivery Systems Operational Research Project

The above operational research project is being conducted by a research team from the Medical School of the University of Santo Tomas. The Nutrition Center of the Philippines and the National Nutrition Council are cooperating agencies in planning, supervision, and management. The project is now in the stage of yielding the most important data of the study concerning impact of alternative nutrition/health interventions for infant children. The extremely dedicated Filipino research team will complete final data collection by the end of May, 1979. From the beginning of the project, VPI&SU has furnished technical assistance in the research design, data collection instruments, transferring the data to high speed computers, and statistical analysis. We are convinced that the final results of this project will be extremely valuable to the Philippine program and can be applied to other developing countries.

Rationale of Project

Nearly one-half of all deaths in the Philippines occur in infants and children under five years of age. Many of these are caused by a combination of nutritional, intestinal or other acute infections including complications from childhood diseases. The mothers of many of these children do not have adequate access to health service. Simple information and knowledge which would prevent malnutrition is also not available to many of these mothers.

Previous research indicates that growth failure in infants is very common between the ages of six months and one year. During this six month interval the average body weight declines to about 78% of standard weight. The growth failure tends to persist throughout the pre-school age period. Surveys conducted reveal that infants and young children receive only about two-thirds as much food (calories) as is necessary for normal growth. Parents and older children in the family receive a large share of the family food. Usually their diet is only 10% to 15% below recommended levels.

It is extremely important to determine the value and impact of alternative nutrition, education, and health delivery systems aimed at prevention for the infant child. This kind of research information would enable one to make decisions about nutrition health interventions based upon the economic constraints associated with the delivery alternatives.

Interventions

Infants from 18 selected barrios in the province of Bulacan are the subjects in the study. A baseline instrument was used for families and subject children prior to interventions. Interventions begin at age five months until completion of the intervention period after which follow-up data are collected for all children completing the interventions up to the

project completion. The study was statistically designed so that reliable estimates of intervention impact can be obtained through mathematical statistical procedures. The statistical analyses are performed at VPI&SU utilizing high speed computers, under the direction of Dr. Jesse Arnold, Head of the Department of Statistics and Campus Coordinator. The nine interventions listed below are replicated in the 18 study barrios.

1. Control (no intervention).
2. Nutrition/Health Education.
3. Education and Supplementary Food.
4. Education and Childhood Immunizations.
5. Education and Sanitation.
6. Education, Immunization, and Food.
7. Education, Sanitation, and Food.
8. Education, Sanitation, and Immunization.
9. Education, Sanitation, Immunization, and Food.

Detailed descriptions of the interventions are available in annual reports prepared by the UST research team.

Statistical Analysis

Since nutrition and/or health status is influenced by many factors in addition to the interventions applied, the statistical analysis needed is complicated and must be performed by a professional statistician. Preliminary analysis has already amply demonstrated that simple data analysis is not only inadequate but may be extremely misleading. The final proposed analysis will include studies of various nutritional indices, disease and death prevalence, and socioeconomic analysis. The research design will enable us to estimate the effect of each intervention and their combinations. For example, we can estimate the additional value of immunizations when combined with supplementary food. Preliminary analyses for 12 month old subjects were presented to the NNC and USAID/Philippines in March of 1978. Though the analyses can only indicate trends, they show that in terms of percent standard weight, food contributes most, then education, immunization, and finally sanitation. The order for similar estimates of height to weight ratios was food, immunization, education and sanitation.

The final analysis will yield numerical estimates for each intervention and a combination of interventions for various nutrition indices. Extensive morbidity and mortality analysis will also be performed. The final report will give in detail the analysis, interpretation, and a cost-benefit analysis for the completed study.

Section D

A brief history of the evolution of the Nutrition Program in the Philippines-a perspective from the office of the VPI Chief of Party.

This brief history is a recording of the evolution of the infrastructure for nutrition in the Philippines. The significant events here are as they were seen by me as a foreign technician whose purpose in the Philippines was that of assisting with promotion of nutrition activities that would relieve suffering among the very young.

1. Background and early nutrition activities, 1932-57.

Many Filipinos versed in the history of nutrition recognize Dr. F. O. Santos as the Father of Nutrition in the Philippines. He was on the faculty of the College of Agriculture, University of the Philippines, Los Banos, Laguna. A formal government nutrition program began in 1932 when the National Research Council established a Nutrition Section under the chairmanship of Dr. Santos. High-lighted among the early accomplishments were food composition studies, which was a development similar to that seen at the Land-Grant Colleges of Agriculture through-out the United States. The College of Agriculture at Los Banos had been developed along the same lines as those in the United States, with resident instruction, research, and extension education as the three major functions. Thus the Philippines began to identify the nutrient content of the foods typical of the average Filipino diet, just as the U.S. Land-Grant institutions were doing in each state.

Under the leadership of Dr. Santos, in the late 1930's plans were initiated to organize an association of nutrition workers. These plans were, however, delayed by World War II.

In 1947 the Philippine Association of Nutrition was chartered with Dr. Santos serving as its first president. No doubt the organizers of the Philippine Association of Nutrition were also largely instrumental in the establishment of the Philippine Institute of Nutrition, in 1947, in the Office of President Elpidio Quirino. The institute, with assistance from the U.S. Public Health Service, immediately undertook the revision and expansion of the food composition data developed earlier at the College of Agriculture at Los Banos. The institute also initiated food and nutrition and applied medical nutrition activities, including field surveys and field studies. A very noteworthy research endeavor was first initiated in 1946 by Dr. Juan Salcedo, who was then Director of Field Operations for the U.S. Public Health Service in the Philippines. Beri-beri, a disease caused by a dietary deficiency of Vitamin B_1 (thiamin) was prevalent in the population. Dr. Salcedo, with support from the Philippine Institute of Nutrition, the U.S. Public Health Service, and the Williams

and Waterman Fund, Research Cooperation, New York City[1], set out to determine the feasibility of enriching milled rice with Vitamin B_1 as a public health measure for preventing beri-beri in the population.

The studies on rice enrichment were carried out in Bataan Province, on the island of Luzon, a province with a mountain barrier through its center, thus affording opportunity for studying enriched versus non-enriched rice as the food staple to determine impact on the prevalence of beri-beri. The results confirmed that rice enrichment was effective for beri-beri and anemia. (The enrichment mix also contained iron and niacin.)

Clearly, as a young nation, having received its independence from the United States only on 4 July 1946, the Philippines was making important strides towards the development of a nutrition program which would address major nutrition health problems.

Few nations had, however, suffered the loss of life and the destruction of property as severely as had the Philippines in W.W. II. Therefore, its resources were severely taxed and nutrition, like many other programs, was considerably curtailed, following the decade after W.W. II.

The Institute of Nutrition was actually established in the compound of the Department of Health in 1947 and in addition to the Bataan rice-enrichment study, it was active particularly in extending food composition studies. Under the leadership of Dr. Conrado R. Pascual, who had been recruited by Dr. Salcedo to serve as the Director of the Institute, it became increasingly of concern that a national program for food and nutrition extend beyond the boundary of the Health Department. These concerns culminated in 1957 in the renaming of the Institute of Nutrition as the Food and Nutrition Research Center (FNRC) and transferring it to the National Science Development Board under an executive order. The National Science Development Board placed the FNRC, as an operating agency, under its National Institute for Science and Technology.

Thus, in the period of a quarter of a century (1932-57) nutrition in the Philippines moved from a scientific base (National Research Council) to Health (Institute of Nutrition) and back to a science base in the National Institute of Science and Technology. The FNRC was initially housed on the campus of the University of the Philippines, College of Medicine, in the Cancer Institute. By 1961 the Food and Nutrition Research Center building had been completed for occupancy on the NIST Campus adjacent to the Medical School and the Institute of Public Health.

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[1]A history of Philippine Nutrition would be incomplete without mention of Dr. R. R. Williams, the inventor of a synthetic process for Vitamin B_1, royalties from which provided the Williams and Waterman Fund with resources for support of worthy nutrition projects. Since much of Dr. Williams' pioneer work on Vitamin B_1 had been done in the Philippines in the early 1900's, he was himself intensely involved not only in providing financial support for the feasibility study on enrichment of rice, undertaken in Bataan Province, but also in serving as an active investigator on the study team.

2. The National Coordinating Council on Food and Nutrition (NCCFN).

U. S. foreign aid involvement in the Philippine nutrition program began in 1957, when the U.S. Interdepartmental Committee on Nutrition for National Defense (ICNND)[1] offered the Republic of the Philippines technical services and equipment to conduct nutrition surveys as the means of assessing the nutritional health of the population. Dr. Pascual, Director of the Food and Nutrition Research Center, responded favorably to this offer. Since transportation of the survey team (U.S. and Philippine counterparts) was a major problem, the survey was essentially limited to members of the Armed Forces of the Philippines and to some extent dependents of enlisted personnel. The Philippine military provided air and surface transportation.

Despite budget limitations the Philippine government had made considerable progress in providing capable scientists and technicians in the FNRC, who became the counterparts for the U.S. team of food and nutrition specialists who brought equipment and technology for conducting the survey. The joint team conducted the survey between March and May in 1957.[2]

The major purpose of the survey was to provide laboratory capability to support food and nutrition surveys and to train local technicians in the methodology of conducting surveys (dietary, clinical, biochemical, and food availability) so that survey activities could be continued without external assistance.

The Philippine counterpart team mastered the survey technology without difficulty. By 1959, when I served for 2 months as a follow-up observer for the ICNND in the Philippines, it was clearly evident that all the survey equipment donated after the 1957 survey was in working order and regional surveys had been initiated in the civilian population.

Of the nearly 40 countries of the world that requested assistance from ICNND for developing nutrition survey capability, few, if any, used the equipment as effectively for identifying nutrition problems as did the Philippines. In the decade from 1959 to 1969 all the major regions of the country were surveyed. Most of the equipment is still in use today.

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[1]Post-WW. II U.S. international nutrition activities were carried on mostly by individual government agencies (Health, Agriculture, Defense) without any serious attempt at coordination. This uncoordinated state of the affairs became particularly evident during the Korean conflict. Thus, in the mid 1950's, with initiative from the Department of Defense and the National Institutes of Health, the Interdepartmental Committee on Nutrition for National Defense (ICNND) was created to serve as the coordinating body for international nutrition activities to be carried on by the U.S. Government. It was housed on the National Institute of Health campus in Bethesda, Maryland.

[2]The survey team members were in the field and departed in a Philippine Air Force aircraft from the same airfield in Cebu City on that fateful night in March, 1957, shortly after President Ramon Magsaysay also departed in a similar military aircraft which crashed on the mountainside minutes after take-off. The team did not learn of the tragic loss of President Magsaysay and his companions until they landed safely in Manila.

Much of the credit for the continuing development of a data-base for nutrition in the Philippines must be given to Dr. Conrado R. Pascual, Director of the FNRC. Two other distinguished public servants, Dr. Juan Salcedo and Dr. Paulino Garcia, each of whom served terms on the Cabinet as Secretary of Health and as Chairman of the National Science Development Board, were also instrumental in moving nutrition activities forward and developing base-line data for effective program planning.

When Dr. Conrado R. Pascual, Director of the FNRC, the agency which had been given the responsibility of coordinating all nutrition activities in the country, decided to organize a National Coordinating Council for Food and Nutrition (NCCFN), he had consulted many sources and received considerable advice. I myself was consulted and thought it was an excellent idea when he proposed it in 1959. An infra-structure of regional, provincial and lower level coordinating units was needed which could serve as coordinators of nutrition planning and program implementation. Such activities were logically required in each region of the country as analysis of nutrition survey data identified the important remedial or preventive measures to be undertaken. In forming the coordinating council all agencies, both public and private, were identified which had an interest in nutrition. It seemed as though it would admirably serve the purpose of getting agencies at all levels to develop effective nutrition interventions. It was only after several years of operation that I began to have my doubts, and, in frequent discussions with Dr. Pascual and others, I could identify three factors which may have contributed to these doubts and which led to the modification of NCCFN's future role in Philippine nutrition.

First, the name "Food and Nutrition Research Center" implied it was a research facility, not a coordinating agency, as conceived by those who created it and provided funds for its operation. To my knowledge, no specific budget line items were ever developed for FNRC in support of coordinating councils. As the coordinating councils became organized they joined themselves into a Federation of Nutrition Councils and Related Agencies. The management of the national and related coordinating councils was assigned to the Nutrition Foundation of the Philippines, (NFP)[1].

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[1]The Nutrition Foundation of the Philippines was organized by Dr. Juan Salcedo partially to facilitate the organization and management of food and nutrition coordinating councils, although the NFP was a quasi-government agency and relied initially on support from the Williams and Waterman Fund, Research Corporation, New York City, through Dr. R. R. Williams' interest in Philippine nutrition. It was later supported by one national lottery annually and by modest contributions from industry. With a staff of approximately 10-15 field nutritionists and a small nucleus of central staff, (executive officer, assistant, and clerks) the NFP, from its office building in Quezon City, provided an outreach to the agency responsible for coordination of nutrition. Thus, the NFP functioned importantly in assisting local government or private agencies in organizing their coordinating councils. The NFP also assisted with organizing post-nutrition survey conferences and planning nutrition interventions.

Second, although the FNRC had organized the NCCFN, it did not have a mandate from the government, either executive or legislative, to organize a central secretariat nor to develop a field staff which could supervise and manage the nationwide network of coordinating councils.

Third, although line agencies of government freely agreed that their technical staffs at all levels should involve themselves with the NCCFN, this did not imply that they were relieved in any way of their regular duties as defined by directives within their own agencies. Thus, many government technicians considered service on the coordinating council as necessary for appearances' sake, knowing full well that fulfillment of their line agency duties was a full-time job in itself.

There were, then, some problems which faced the FNRC as designated coordinator of nutrition activities. There may have been a fourth factor which could have had an impact on NCCFN's operations. In many cases leadership on local coordinating councils was provided from the private sector, public-spirited citizens who desired to be of service. They created an additional problem for some conscientious public servants. How could they forsake their assigned line agency duties and responsibilities while working for a private citizen who had no such responsibilities himself? In some cases, also, it was no doubt true that private citizens responded as nutrition coordinating council leaders for purposes of self-aggrandizement rather than broad public interest. Certainly, at more peripheral levels, many coordinating councils failed to perform properly because the mayor, or governor, or village captain used the office for political gain but with no serious interest in rendering service to nutrition.

In defense of NCCFN, I want to emphasize that there were many councils which functioned effectively and to good purpose despite these difficulties, and serious efforts were made by the FNRC and NFP to nurture and strengthen the organization. Nonetheless, forces were at work which were to have their impact on the nutrition structure.

3. The involvement of the Agricultural Sector and its coordinating role for nutrition.

One major development in the mid-1960's was no doubt the global concern about population and food. The U.S., under a White House study, conducted an analysis of the world food problem which suggested governments urgently needed to examine the balance between their food supplies and their populations. I had been involved in the World Food Program Study in 1966-67 and assisted the FNRC in its analysis of projected food requirements. The FNRC, under Dr. Carmen Ll. Integan, Deputy Director, used the methodology evolved by the U.S. study to project Philippine food requirements as well as calorie and protein requirements for nutritional adequacy of the population. These could not be ignored by the Department of Agriculture, the agency responsible for the national food supply. Food Balance data revealed that national food supplies were more or less in harmony with market demands (low demands because of low incomes) but not with nutritional needs. Thus, the community of nutritionists in the Philippines, supported by USAID and UN agencies nutrition workers, (particularly UNICEF, WHO and FAO) tried to influence agriculturalists to plan food supplies to meet nutritional requirements.

I strongly urged the FNRC, along with representatives of the UN agencies, to explore, with agriculture, how the gap between food demands in the market place and food demands for nutritional adequacy could be narrowed.

A fortunate circumstance for nutrition occurred on the political front in late 1969. Mr. Arturo R. Tanco, a non-agriculturalist technocrat with expert managerial experience, was appointed to the post of Secretary of Agriculture and National Resources. His father had been very active in promoting rice enrichment as a means of preventing beri-beri and so he was of a family whose concern for nutrition was clearly evident. It was a good time for nutrition, politically, for the nutritionists felt they could talk to Secretary Tanco about the food problem and he would understand.[1] Dr. Intengan, now Acting Director of the FNRC, prevailed upon Secretary Tanco to address the Philippine Association of Nutrition on the subject of food supply and nutritional implications. He minced no words. He pointed out that it was the responsibility of the Department of Agriculture to produce enough food to satisfy market requirements and to produce agricultural products for export as a means of generating foreign currency requirements for economic development. He was critical of the nutrition community, stating that in his opinion it was the role of the nutritionists, through FNRC, to develop a data-base for predicting how changes in family incomes would influence food habits, namely, income-demand elasticities for various foods. If nutritionists were seriously interested in working with agriculture hand-in-hand toward a nutritionally oriented food program, he pointed out, such data were essential for agriculture to plan future food production levels. He went further and agreed that for various reasons, including moral and humanitarian, agriculture would assume a greater responsibility and begin to plan food not only for market demand but for nutritional demand as well. Certain events suggest that the Secretary may have had some doubts about the role of his agency in the total national nutrition effort. At any rate he sought the services of Dr. Eric J. Underwood, internationally-recognized nutritionist from Australia, through an FAO-support consultancy, in the summer of 1970 for expert advice on the prevailing food and nutrition situation and recommendations as to any appropriate remedy for existing defects.

Dr. Underwood was a former associate of mine at the University of Wisconsin graduate training program in Agricultural Biochemistry. He therefore consulted with me regularly as well as with UN agencies. His study, review and recommendations were, therefore, a summation of Philippine multilateral and bilateral concepts of nutriton problems and current status of nutrition programming in the country.

Secretary Tanco was apparently very much impressed with the report presented by Dr. Underwood. It concluded that the gap between food demands and food needs was considerable and that responsible government agencies should examine their roles and seek administrative, managerial or coordinating structures which would address the food/nutrition issue in a meaningful way. The report emphasized that the importance of food in the programs to date had not been given sufficient attention.

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[1]Even before Tanco's appointment the executive secretary to the President, Raphael Salas, had met with FNRC and Agriculture Representatives to give some nutrition perspectives to the food program.

Another agricultural development in the mid to late 1960's which had a nutritional impact was the success that had been achieved in developing a coordination-of-disciplines to convince farmers to adopt the new rice technology which was being developed by the International Rice Research Institute and the University of the Philippines College of Agriculture at Los Banos.

This coordination-of-disciplines body or group later became the National Food and Agriculture Council. Those of us concerned with food and nutrition sensed the need for establishing effective linkages between the nutrition-coordinating efforts and the food-production coordinating efforts carried on by agriculture. To this end several discussions were arranged between FNRC, UNICEF, and USAID nutrition program specialists in 1969 and 1970 to explore future courses of action.

Recognizing the need for more extensive data on family food purchases and their relationship to family income, the National Food and Agriculture Council initiated research in this area in 1970. This data-base also provided nutritionists with another measure of the nutritional adequacy of family food supplies, and through this interest more frequent contacts between nutritionists and food economists became a reality.

It was also in 1970 that USAID made its decision to combine its Food for Peace and its nutrition activities and to target its food donations to the malnourished child population. Through operational research support to Catholic Relief Services and Foster Parents, the AID nutrition office had developed a methodology for a Targetted Maternal Child Health Program and had begun testing the nutribun, a ready-to-eat bakery-bun snack food for school children. A vastly expanded nutritionally-oriented food assistance program was thus being offered but with the urging that its effective delivery to the target population would require an improved national food and nutrition plan. The operational research had also yielded the crude estimates of the target populations of children needing such assistance, if all of them below 75% of standard weight for age were to be assisted. This estimate was 3.5 million infants and pre-schoolers and an equal number of elementary age school children. No doubt these statistics, together with the special FAO study on the food and nutrition situation, were important factors which led to an executive order in April, 1971, which assigned to the National Food and Agriculture Council the responsibility for coordinating all nutrition activities and for developing a Philippine Food and Nutrition Program.

It is appropriate to relate here that there was by no means unanimous agreement in USAID in 1970 as to the extent of outreach that should be planned with donated food assistance. I, for one, maintained that our agency should not expand the program beyond the capacity of implementing agencies to operate the program properly. In effect, operational research had taught us that one professional nutritionist could manage mother education (on elements of nutrition and how to blend the donated food into the diet of her malnourished children) and food distribution to families, with about 1,000 recipients (children and mothers). The Food for Peace officer, Mr. A. S. Fraleigh, vigorously supported the view that with 7 million children in need, there would be merit in sacrificing quality if necessary, but with the reward that greater outreach would save lives, particularly, among the severly malnourished. Actually the Targetted Maternal Child Health Program expanded so rapidly that

in some cases one nutritionist was responsible for as many as 4,000 or 5,000 recipients during the period 1970-74, at which time outreach had expanded to about 450,000 recipients and the number of trained nutritionists in the program increased to about 125. Both views can be defended, obviously, although rapid food assistance expansion also reduced opportunities for planning local food production interventions and possibly created a dependency attitude among recipients. One reason why I did not vigorously oppose the rapid expansion of the food assistance programs was because I saw in them a possibility of a self-help element that could eventually provide the resources required to employ nutritionists.

In the early 1970's neither the government of the Philippines nor the US Voluntary Agencies,nor USAID, were prepared to provide the necessary financial support for integrating effective nutrition-related interventions with food aid, particularly for pre-school children, infants, and mothers. Therefore, a way had to be found of supporting the program through self-help.

I proposed, and it was accepted, that the School Nutrition Program in Metro Manila, which was implemented by Catholic Relief Services and the Department of Education, should support the pre-school child program. Approximately 17% of the nutribun ingredients were local (sugar, salt, yeast, vegetable oil). The cost of these, plus the cost of baking and delivery to schools, was levied against the schools. The schools, in turn, agreed to seek pupil participation. Although the pupil contribution was never imposed as a condition of participation, a condition which would have violated U.S. regulations regarding donated food programs, it was supported by 80-90% of the recipients. One centavo per day of each pupil's contribution was allocated to CRS to support its pre-school program. Thus, through self-help older children assisted their younger brothers and sisters with nutrition and food aid. With 200,000-250,000 pupils contributing 150 school days, 1.50 pesos per pupil would be generated for the support of nutritionists for the pre-school program or a total of 300,000 to 375,000 pesos annually, enough to employ about 75 nutritionists. It was easily seen that if this nutribun program could be implemented nationwide, the prospects seemed excellent that a major share of the more costly delivery of nutrition-food-aid services to pre-schoolers at family level could be supported in this way. Experience, however, proved otherwise. Major nutribun outreach beyond Manila became the responsibility of CARE and it was not prepared to manage both a school and pre-school program with its limited resources. Therefore, in its program, resources generated by pupil participation were used to generate other school nutrition activities, including food production through school gardens. The Targetted Maternal Child Health Program thus operated at a professional input level far below that recommended by my office, on the basis of estimates of program requirements derived from operational research.

The National Food and Agriculture Council (NFAC) began its coordinating role in Nutrition in April,1971,by establishing a nutrition unit within its secretariat. As a further action to insure harmonious transfer of function, NFAC added to its composite of cooperating agencies the National Coordinating Council for Foods and Nutrition. Mrs. Delfina Aguillon of the Food and Nutrition Promotions Staff of the Food and Nutrition Research Center was designated as the Director of the Nutrition Unit.

There was some reluctance on the part of the National Nutrition Program Office, Department of Health, to accede to this new development since its director felt strongly that malnutrition was a health problem and that therefore the major coordinating role for nutrition should be delegated to the Department of Health. There was considerable behind-the-scenes maneuvering by health officials both in the health department and in the Office of the President.[1] These efforts to call for a review and reconsideration of the appropriate coordinating agency for nutrition, however, did not bear fruit. Thus, in late April, 1971, all agencies of the government,as well as concerned private agencies and multi-lateral and bilateral foreign assistance entities, responded to the call from the NFAC Nutrition Unit to form working groups and participate in the development of the first nationwide Philippine Food and Nutrition Program.

As the Philippine Food and Nutrition Program emerged, under the coordination of the National Food and Agriculture Council (NFAC), the various participating agencies were required to identify their respective nutrition activities. Regular inter-agency contact was maintained through the Management Committee of the Nutrition Secretariat at NFAC. The Management Committee was composed of the heads of each agency's nutrition program, persons who could act with authority regarding nutrition policies, manpower inputs and organization of their respective offices.

Interestingly, representation on the Management Committee was also extended to USAID, the U.S. Voluntary Agencies, and the United Nations agencies concerned with nutrition, namely, UNICEF, WHO, and FAO. The wisdom of this decision could be questioned. Certainly, it was done as one expression by the Filipinos of their appreciation for the support extended by these agencies to the nutrition program. Nonetheless, there were times no doubt when frank and open discussions of program implementation difficulties were stifled at Management Committee meetings because of the presence of representatives from the external donor agencies.

One development worthy of mention was the emergence of a nutritionally oriented Day Care Center program in the Department of Social Welfare (renamed the Department of Social Services and Development in 1976.)

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[1] In developing the Department of Health-USAID supported Mothercraft Nutrition Program, memoranda of agreement had been negotiated with other line agencies, such as Social Welfare, Agriculture, Education,and Community Development, to be certain that the Health Department's efforts to extend outreach to pre-schoolers were adequately supported by these other agencies. These cooperative arrangements were, however, never extensively developed. The initial plan, when the program was implemented in 1968, was to convene these agencies once a month for exchange of information to improve cooperation. These meetings were poorly attended and were entirely abandoned after the first year. It would seem that the Department of Health National Nutrition Program Office did not have any strong indication of possessing the desire or the necessary leadership for accomplishing a coordinated attack on nutrition through cooperative effort among the concerned agencies.

Estafana Aldaba Lim, Secretary of the Department, had also taken the leadership in strongly supporting the Tulungan project initiated by Mrs. Imelda Romualdez Marcos with the Social Action Arm of the Catholic Conference, Philippines, in 1970. It was Secretary Lim who came to the USAID Mission to brief the USAID Mission Director on the Tulungan program plan. Under this plan, centers in urban depressed areas were organized to rehabilitate malnourished pre-school children, educate mothers in nutrition, motivate them in family planning, and also provide primary health services and treatment. Approximately 40 such centers were supported for two years with USAID funds for personnel, supplies, and donated food commodities. Since then, the program has been maintained entirely through Filipino contributions and has been extended to rural areas.

After the Tulungan Centers were functioning effectively, Secretary Lim began the Day Care Center Program, a vastly expanded effort to deliver nutrition and family planning services throughout the country through 2,000 Day Care Centers. To finance this program, particularly to provide remuneration for center supervisors and food for nutritional rehabilitation, Secretary Lim sought the support of the First Lady, Mrs. Marcos. Approximately 4,000,000 pesos were generated in support of this program through the appeal of the First Lady. About half of these resources were used to provide local food on a matching basis with U.S. Food for Peace inputs (4 lbs. per malnourished recipient per month) and the rest was used to provide salaries for the Day Care Center operators. The pre-school children of all working mothers in a community were eligible to participate, and performing routine house work constituted qualification.

Day Care Centers were to be operated in every municipality, with the understanding that after the first year of operation the salary of the center caretaker, designated as a health, nutrition or family planning aide, would become the responsibility of the municipal or city government. There is no doubt that these developments and the frequent exposure of Mrs. Marcos to social welfare problems and programs, including nutrition, health, and family planning, were important forces creating a growing awareness among the populace of the extent and magnitude of the malnutrition problem. It was probably a major factor which forcefully and dramatically emphasized the high cost of food as an important intervention for effectively dealing with malnutrition.

In 1973 when the Day Care Centers were being organized in large numbers, the U.S. Voluntary Agencies, mainly Catholic Relief Services, had an outreach of about 300,000 recipients, or a food donation level of 28,800,000 pounds. The Day Care Center Program envisioned an outreach to about 200,000 additional recipients and an additional food requirement of 19,200,000 pounds, half of which was to be provided through Philippine effort and half through U.S. Food for Peace. The value of the latter was about 10,000,000 pesos, far greater than the amount that had been raised through the fund-raising campaign for the Day care Center Program. Because of these funding problems, the total number of centers qualifying for food support on a matching basis (targetting food to malnourished children) achieved a level of only about 30,000 recipients. This is not to say the program was not a success but quite the contrary. Many municipalities supported

programs on their own, not only by providing a salary for the center operators but also by providing food snacks through local self-help efforts. The greatest value of the program was no doubt the fact that it brought forcefully to the minds of local public officials the magnitude of the malnutrition problem and the growing concern for action by public officials of high level, including the First Family.

Another development, under the Nutrition Secretariat leadership in NFAC and departmental responses to this leadership, was a plan, also urged by USAID and the U.S. Voluntary Agencies, to integrate nutrition and family planning motivational services in a cooperative effort between the home economics rural extension workers and the midwives in the health department. The former were to deliver food assistance and nutrition education and the latter were to deliver family planning services into the homes of families who had malnutrition problems in young children, families obviously greatly in need of both types of services. In preparation for planning U.S. Food for Peace requirements for such a program, envisioned to reach over 100,000 food recipients, body weight surveys were conducted in 1973 on nearly 100,000 pre-school children and infants in all the major regions of the country. Although this program was never fully implemented, it nevertheless again served as an important outreach by public servants into the homes of families requiring these important social services and therefore served as another important element in creating public awareness of the malnutrition problems.

At this point, reference needs to be made to another factor which sharply focused, for national public officials, the high cost of the food component of nutrition programs. When the food-aid program of the U.S. reached 400,000 pre-school children in 1974, the cost of storing and transporting this food within the country, a responsibility of the Philippine government, exceeded 10,000,000 pesos. This factor alone forced many concerned public officials in the nutrition program, particularly those in social welfare and in education whose agencies had to pay these food handling costs, to turn to agriculture for help. If local food production could be augmented to share in providing food needs of nutrition programs, costs of transporting donated foods could be avoided or at least reduced.

It was no doubt these developments which compelled the Nutrition Secretariat in NFAC to examine carefully food assistance interventions. A very significant event in early 1974 which brought this in focus was a Rizal Province nutrition program review attended by the Secretary of Agriculture and concurrently chairman of the NFAC. At this review each agency, private and public, was requested to present a summary of its nutrition program activities in the province, including a report of magnitude of outreach. Secretary Tanco expressed great surprise that a U.S. Voluntary Agency Program to the malnourished, most-vulnerable, population was much greater than that of any other agency in the program. As a result, Secretary Tanco requested the USAID Nutrition and Food for Peace Offices to provide for him a detailed briefing of the total U.S. donated food assistance to the Philippines Food and Nutrition Program and also to review the magnitude of the malnutrition problem and the extent to which U.S. food aid was reaching out and meeting total requirements.

Only a few months following this briefing, a major policy decision occurred at highest level of government, namely, the creation by Presidential decree of the National Nutrition Council (NNC) on an equal level with the NFAC. From the vantage point of the USAID Nutrition and Food for Peace Office, then, it was a reasonable conclusion that at least two government agencies, Social Welfare and Agriculture, no doubt were major factors in influencing both Mrs. Marcos and President Marcos in taking action in support of nutrition programs. When the Nutrition Council was established, Mrs. Marcos established the Nutrition Center of the Philippines as the mechanism for mobilizing the private sector for a vastly expanded attack on the malnutrition problem and as the national source of all information with which to educate the public on nutrition matters.

As has been stated frequently by the Director of the National Nutrition Council and the Director of the Center, Dr. Florentino S. Solon, it was expedient politically to launch a major effort in nutrition at this time. The malnutrition problem in the population was obviously an inheritance from the previous decadent and ill-advised Old Society. The New Society, promoted after the declaration of martial law, was to serve all of the people; therefore relief from hunger for all Filipinos was a logical endeavor for the New Society. President Marcos also endeavored to develop a strong rural base in the New Society through rural electrification, through dispersal of industry, through massive efforts to improve food production, and through building of an infrastructure of highways from farms to cities to facilitate more efficient marketing of foods and other products. The events that created a high level Nutrition Council in government, and a Center for rallying the private sector, deserve a more detailed description.

From my vantage point, it should be born in mind, this brief historical account is particularly concerned with the pre-school child and infant and how food and nutrition policies or programs were evolving that impinged upon this special concern. Therefore, there may be a tendency to over-emphasize the role of certain agencies to the discredit of others. I fervently hope this will not create ill-feeling among workers in agencies that may appear to have been slighted. I do want to mention the special roles played by health, science, education, military and certain elements in the private sector.

As already mentioned, the continued efforts of the National Nutrition Program staff in the Department of Health, in promoting nutrition mothercraft demonstrations as extensions of rural health units, strongly focused attention on the nutritional health problems of young children. Two other agencies provided leadership. The Department of Defense through its medical services was particularly active. Colonel Panganiban, of the Philippine Army, for example, served as Chairman of the National Coordinating Council on Foods and Nutrition and was a vigorous supporter of both military and civilian nutrition programs.

The Department of Education and Culture, being the lead-agency in the implementation of the UN-supported applied Nutrition Program in the Bureau of Public Schools did much to provide nutrition orientation throughout its field staff of teachers, school health workers, principals, and superintendants.

The Food and Nutrition Research Institute, after it had relinquished its coordinator role to the National Food and Agriculture Council, directed its attention more specifically to research, surveys and to development of, or refinement of, the recommended dietary allowances and food allowances for purposes of national planning. This agency also assumed leadership in providing services to assure a wholesome food supply free of natural or applied contaminants.

The Social Action Secretariat of the Catholic Conference, Philippines, and its counterpart, the Catholic Relief Services, U.S. Catholic Conference, probably reached more families in need of nutritional services in the early 1970's than any agencies, public or private, with a specific focus on pre-schoolers. The activities of these agencies, closely allied with the Department of Social Services and Development, which provided inland costs of handling the donated foods,brought many officials of high rank in the Catholic Church to the realization that pre-school child and infant malnutrition was widespread. Thus, through both Social Services and Development (Dr. Lim) and the Catholic Church heirarchy (Catholic Church membership comprises 85% of the Philippine population),it is perhaps a reasonable conclusion that President and Mrs. Marcos were being exposed on an increasing scale to the nutrition problem and its relation to the food problem in many Filipino families.

A few other agencies deserve mention. The Salvation Army, Philippines, was active in child nutrition as was also Foster Parents, Inc., Philippines. The Philippine National Red Cross was active in the early work of the National Coordinating Council for Food and Nutrition. All of the member agencies of this coordinating body are listed in the attachment. The attachment also contains the composition of the National Nutrition Council.

4. The National Nutrition Council (1974-78).

The events which led to the NNC and the Nutrition Center were actually planned between the 17th and 20th of June,1974,in a series of meetings convened by President and Mrs. Marcos. On the 17th of June the meeting was brief. Mrs. Marcos announced that she and the President had become convinced that the malnutrition problem in the population was serious and that priority would be assigned to nutrition programs. She further announced that concerned agencies, internal and external, were invited to a working conference the next day, 18 June, for further planning. I attended the 18 June meeting along with the USAID Mission Deputy Director, John Hummon, and Assistant Director for Humanitarian and Private Assistance, Joseph Whelton. The three of us had just returned from a 3-day field trip to Cebu to review the important nutrition activities being carried on there under the direction of Dr. Florentino S. Solon, Mental Health Consultant, Department of Health, Regional Office, Cebu City and Professor of Community Health and Preventive Medicine, Cebu Institute of Medicine. In preparation for the 18 June meeting USAID had been advised to assemble briefing materials, particularly on current programs reaching malnourished children and their mothers. The material for this briefing was drawn from the Nutrition Statistics and Guidelines referred to in Section B, sub-section 15, of this report.

At the 18 June meeting three significant events occurred. First, Mrs. Marcos announced that on 20 June we would all be invited to a meeting chaired by President Marcos for the signing of Presidential Decree No. 491 creating the National Nutrition Council and for signing of the USAID-Nutrition Support Project Agreement by President Marcos and U.S. Ambassador Sullivan. Second, Mrs. Marcos announced that a Nutrition Center was needed through which the

private sector support would be generated in support of government programs and through which the National Nutrition Campaign would be developed, and that a cornerstone-laying ceremony for the Center would be held on 20 June following the President's meeting. Third, Mrs. Marcos announced it was necessary to identify a leader for this important new program and asked for suggestions. The USAID Mission Duputy Director, John Hummon, who had been favorably impressed with the visit to nutrition projects in Cebu City, immediately proposed that Dr. Florentino S. Solon should be considered. This suggestion was strongly endorsed by Secretary of Agriculture, Arturo R. Tanco. Secretary Tanco had, in fact, held discussions in early 1974 with me and others, and urged us to persuade Dr. Solon to assume leadership in the then-existing nutrition unit coordinating the Food and Nutrition Program in the National Food and Agriculture Council. This had been done to no avail. Mrs. Marcos contacted Dr. Solon in Cebu City on 18 June and he came to Manila on 19 June. He participated on 20 June by providing a nutrition briefing for President Marcos and his Cabinet following the ceremony of the signing of the Presidential Decree and the USAID/Philippine Nutrition Project Agreement.

Thus, in a period of three days significant and far-reaching directions for nutrition had emerged. On 27 June the first meeting of the National Nutrition Council was held. It elected Dr. Solon as its Executive Director. He had been designated Executive Director of the Nutrition Center by Mrs. Marcos, its Founder-President, at the 20 June conerstone-laying ceremony.

Under the National Nutrition Council, between 1974-77, a secretariat of approximately 200 professionals and auxiliary supporting personnel was assembled, the NFAC nutrition secretariat serving as a nucleus. Through a management committee, patterned after that operating in the nutrition secretariat at NFAC[1], policies and plans were rapidly developed, resulting in 1977 in the emergence of a 5-year nutrition plan for integration into the country's 5-year economic development plan, which was achieved in 1978.

With the creation of the National Nutrition Council, President Marcos now identified nutrition as a high priority in the government's program of economic development and promised that manpower and other resources would be mobilized for a concerted attack on the malnutrition problem.

An interesting early development of the NNC was the launching of Operation Timbang (operation weigh). It was the general concensus that it would be necessary to establish a more extensive survey of the malnutrition problem by region, by province, by municipality or city, and finally, by village or barangay. This was necessary as the basis for deciding on priorities for implementing action programs. The methodology for conducting such surveys and the methodology for classifying malnutrition cases were taken essentially completely from the existing guidelines that had been developed by U.S. Voluntary Agencies and their counterpart agencies (Social Welfare and Education) and USAID in identifying target populations for food assistance programs. A very important local innovation was that of developing an inexpensive locally-manufactured suspended bar scale for weighing the child population.

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[1]The decision was made to exclude personnel from external agencies from the NNC Management Committee, primarily to permit complete freedom of discussion of program problems and difficulties at regular Management Committee assemblies, discusssions which might be stifled in the presence of external donor agencies.

To facilitate implementation, the barangay (village) network was organized. The only trained public servant in most barangays was the teacher in the public school system. The barangay captain was held responsible for the organization of the village into purok (sub-village) leaders each of whom had a unit leader to cover 10-20 households. By spot-mapping all homes in the village, a complete child weighing program was accomplished with this organization, coordinated by the teacher and supported by a health department nutritionist or midwife.

Between late 1974 and late 1976 over four million pre-school children were weighed in over 2.5 million of the country's estimated 4.0 million families with pre-school children. It is doubtful that any single intervention in any nutrition program has ever accomplished this extensive an outreach through a face-to-face exposure, in carrying a nutrition message and in identifying the population in need of assistance. It no doubt not only achieved a direct exposure of the nutrition program to 60% or more of the target population but probably also served very materially to reinforce the radio messages and similar messages through health units, schools, and the press,broadcast at frequent intervals,to awaken the public to the nutrition problem. Further, since no new public servants were employed, this outreach achievement was accomplished at minimum public cost and with major self-help effort at village level.

Perhaps the Operation Timbang had its greatest impact, however, at the municipal level. Mayors and other municipal officers were expected to take an active part in assisting with the organization of the constituent barangay network,to participate in consolidation of data collected, and to participate in the formulation of plans to provide immediate relief to the severely malnourished. The NNC developed guidelines and procedures for building a municipal center for processing and packaging local food blends (nutripaks) for issue to the severely malnourished. Thus, local public officials were directly brought into contact with the problem and were given the responsibility of developing local resources to the maximum extent possible to provide relief to those in greatest need. One can speculate, of course, on the wisdom of this approach when it was clearly evident that many local governments had only very limited resources available for launching development activities and would therefore face the risk of alienating their local clientele by entering homes to identify the malnourished and then not being able to provide relief. Director Solon, however, decided the risk was worth taking---that the total benefits of both better-informed public servants and individual citizens on nutrition matters would out-weigh the risk of reactions of resentment for lack of adequate interventions. In any event, no single action by the NNC penetrated equally effectively the political system at local level, nor was as effective in urging local officials to become involved in nutrition and to apply self-help in the process. As Dr. Solon stated at many meetings (in justification of Operation Timbang as a national thrust to the 45,000 villages of the country), under the New Society, public officials are required to forgo the extensive diversion of local energy to political gain or self-aggrandizement so common under the Old Society, and instead, were required to develop action programs for community improvement. In other words, mayors should welcome new directions, politically expedient for their own survival as public servants, such as were being offered by the nutrition program.

Whether by design or a fortunate consequence, Operation Timbang certainly has created a mass movement in the Philippines for local development planning. Over 1200 municipalities submitted nutrition plans in the first 3 years of the operation of NNC, identifying how they planned to deal with the malnutrition

problem in their communities. The quality of these varied considerably and it was clearly revealed that there was need for the government to strengthen development staffs at local level. Some plans, however, were outstanding, although admittedly not solely self-help in origin. One municipality, a town with a sizeable public budget and assisted by USAID provincial development planning services, presented a plan which reduced severe malnutrition in pre-schoolers from over 5% to less than 1% in 2 years. This was accomplished by allocating no more than about 5% of the municipal budget to nutrition activities and without any external food assistance.

In the final analysis, then, the launching of Operation Timbang was probably the single most important nutrition intervention attempted by the NNC and it involved local political leaders in a major way.

In March, 1977, the Philippines participated in an international conference on Nutrition Planning at the University of California, Berkeley, and the Philippine 5-year Nutrition Program was used as a model by the conference organizers. Although the conference planners had indicated interest in the national model, Dr. Solon, Director of the NNC, insisted that more attention should be directed to local planning on the grounds that it was at local level where implementation of action programs would have to be achieved. He rightfully made the point that in the past there has been too much attention to national planning but little attention to local planning;hence many programs have emerged with poor implementation records.

The decision to have a separate council for nutrition at the national level, in parallel with the National Food and Agriculture Council, was based on the judgment that this distinct focus on nutrition was necessary to accentuate the seriousness and magnitude of the problem. It had a consequence, however, which may not have been deliberate.

Whereas, between 1971-74 under the coordination of NFAC, a 4-year Phillipine Food and Nutrition Program evolved, with the advent of a separate National Nutrition Council (NNC), food was retained in the NFAC and the role of the NNC was to be that of developing a 5-year Philippine Nutrition Program. This separation of nutrition from its primary commodity, food, may have to some extent de-emphasized the vital role of food in any nutrition program planning, especially in the face of data-base emphasizing that the lack of an adequate food supply at family level was a major cause of extensive malnutrition or undernutrition in the child population. At any rate, during the period 1974-77 the National Nutrition Council did not come forth with any major food interventions that would begin to replace the extensive inputs of foreign-donated foods into the nutrition program. The National Nutrition Council focused on the nutripak program based on use of local food blends as emergency interventions. These food packets were to be used for one or two 6-week periods for the severely malnourished children identified through Operation Timbang.

USAID and the U.S. Voluntary Agencies were encouraged by the National Nutrition Council to develop food production interventions that might be implemented by families receiving food assistance in the Targetted Maternal Child Health Program. USAID and CARE were also urged to assist the Department of Education and Culture in designing school garden programs which would in part replace U.S. Food for Peace donations in the school snack program with the Nutribun. Thus, by 1977, no major progress had been made toward detailed planning of nutritionally-oriented food production programs. In the fall of 1977, when the NNC had called upon FAO for technical advisory services in the food and agriculture area, initial plans were developed for a more specific

focus on the food problem. Working groups were appointed to begin to examine the nutritional implications of food policies, including policy directives relating to production, processing, marketing, as well as import-export policies relating to food commodities. One national policy decision had been advanced with nutritional implications, namely, the milling of brown rice (minimum milling) instead of white rice so as to conserve quantity, as well as to improve the protein level. Its effective implementation, however, rested upon an improved marketing system to insure that the brown rice would be consumed within a few weeks after milling before rancidity reduced its palatability as well as nutritive quality.

Operational research had also been conducted, with some USAID and UN assistance, to suggest the feasibility of fortifying monosodium glutamate with Vitamin A as a blindness preventive in children. Plans were completed in 1978 to conduct pilot studies in selected provinces with this intervention. These were important developments but they did not address the issue of alternatives to the existing heavy reliance upon external food sources (US Food for Peace and World Food Program) for the child feeding programs. In July, 1976, President Marcos had issued a Letter of Instruction to the various agencies concerned to plan programs of food aid to all severely malnourished as rapidly as possible and also to devise food assistance programs as preventive efforts for the moderately and mildly malnourished.

These events again emphasize the magnitude of the food problem and the fact that no easy solutions were in the offing.

In early 1977 USAID proposed that its support to the new 5-year nutrition program should focus heavily upon assisting those communities receiving food aid to develop nutritional-sufficient food programs consistent with the requirements for a nutritionally healthy population. This suggestion was welcomed by both the NNC and the NFAC. A 5-year plan of USAID assistance is currently being completed for implementation in FY 1979. Not only will resources and technical services be provided in improvising local food and nutrition planning but support for operational research is also envisioned as the means of ultimately deciding upon the most cost-effective ways of accomplishing nutritionally-oriented food programs at municipal levels. Alternatives to be explored include multiple-cropping, inter-cropping, backyard gardening, and school or community gardening.

Even though the solutions have not yet been found, there will be major emphasis in the future on more extensive analysis of food requirements for nutrition programs and their economic, as well as social, or political, implications.

An analysis of the food and nutrition situation and (political) decisions relative thereto also brings to mind their possible implications with respect to the total economic development plan. When President Marcos chose to give nutrition high priority in 1974, he was aware that a continuing and heavy emphasis on food lack as a major factor responsible for malnutrition in the population would eventually recognize that the government's intensified food production was a failure. Fortunately, the Philippines experienced excellent weather and production conditions between 1974 and 1978, and farmers responded to the government-sponsored supervised credit programs of intensified production. Thus, it was a politically expedient move to support nutrition programs because of the improved and more favorable food balance resulting in even small amounts of rice exports.

The stage is thus set for developing nutrition-oriented food production and utilization programs in the Philippines and involving the political structure at the local level in a major way in food and nutrition planning for nutritional well-being. There are not many nations in the world who have advanced to this stage.

Attachment
Section D

NCCFN OFFICERS FOR 1964-1965

Dr. Conrado R. Pascual. . . . . Food and Nutrition Research Center, NIST	Chairman
Lt. Col. Elpidio C. Panganiban. . . . . Department of National Defense	Vice-Chairman
Mrs. Delfina B. Aguillon. . . . . Food and Nutrition Research Center, NIST	Executive Secretary

Members

Dr. Bernardo Acena.	Department of Agricultural and Natural Resources
Dr. Eduardo E. Agustin.	Philippine Rural Reconstruction Movement
Dr. Buenaventura Angtuaco.	Philippine Federation of Nutrition Councils and Related Agencies
Dr. Ignacio V. Austria.	National Economic Council
Dr. Generoso G. Caridad.	Philippine National Red Cross
Dr. Amadeo Cruz.	Department of Health
Dr. Minerva B. Inciong.	Nutrition Foundation of the Philippines, Inc.
Dr. Josefina B. Jayme.	Food and Nutrition Research Center, NIST
Mr. Felicisimo S. Maceda.	Agricultural Productivity Commission
Mr. Alvaro L. Martinex.	Presidential Assistant on Community Development
Mrs. Brigida C. Millan.	Department of Education
Dr. Gloria S. Sanchez.	Social Welfare Administration
Dr. Lourdes M. Sumabat	National Science Development Board

Advisers

Members from International and Other Agencies

Composition of the NNC

Chairman, Chairman-Coordinator of the National Food and Agriculture Council and Minister of Agriculture

Vice-Chairman, Minister of Health

Other Members:

Public Sector

Minister of Education and Culture
Minister of Local Government and Community Development
Minister of Social Services and Development
Chairman of the National Science Development Board

Private Sector

Executive Director, Nutrition Center of the Philippines
President, Philippine Medical Association
President, The Nutrition Foundation of the Philippines

SECTION E

A Summary of Evaluations as to VPI's Effectiveness in Carrying out its Role in the Philippine Nutrition Program

Although VPI & SU provided services in a broad sense and responded to requests in many areas, its primary focus was on activities which would assist the government of the Philippines in reducing its serious problem of malnutrition in children, particularly the very young. Therefore, its role can be evaluated by examining the evaluations carried out to determine program impact on child growth and development.

In 1971 the Catholic Relief Services contracted with the Economic Development Foundation to evaluate the receptivity of the clientele being served by the Targetted Maternal Child Health Program to the food commodities being offered. The USAID Nutrition Office had determined, on a pilot scale through operational research, that the corn-soy blend used in the program was acceptable as a food readily blendable into local diets through 38 recipes that had been developed by CRS and Department of Health nutritionists.

This evaluation indicated that the recipient families valued the food assistance highly and had no difficulty in utilizing the corn-soy blend as an ingredient in their regular diets.

In 1972 The Catholic Relief Services contracted with the Asia Social Institute to evaluate the Targetted Maternal Child Health Program from the standpoint of receptivity of the families being served and the characteristics of these families in terms of need.

The survey results concluded that the program was effectively targetting food to needy families, the average annual per capita income of recipients being $45, U.S. Further, the study concluded that mothers were highly appreciative of the nutrition education provided by the program and the majority indicated they would like to see the mother classes expanded, particularly to include more instruction on planning meals, new recipes, and selecting the right foods in the market for improved family nutrition.

In 1974 the Program Office, USAID Mission, Manila, contracted with the Asia Research Organization, Manila, an affiliate of the Gallup Polls, to conduct a study of the effectiveness of the Targetted Maternal Child Health Program, a program planned by the USAID Mission Nutrition Office with assistance from the US Food for Peace Office. The detailed survey report is on file in the USAID Mission Resource Library, Manila. Mr. Thomas Cook, American Technical Assistance Corporation, under contract for food and nutrition consultations by AID, was asked on a visit to Manila in Autumn 1974 to summarize the major findings of the evaluation of the program which had been largely developed by the VPI&SU in-residence nutrition advisor in cooperation with CRS.

Mr. Cook concluded that the evaluation revealed that the program was reaching target group families with great accuracy and that it was having a significant impact on the weights of the enrollees. Mr. Cook's description of the evaluation is shown as Attachment A.

In 1977 the USAID Manila Nutrition Office began an evaluation of the Targetted Maternal Child Health Program operated by CRS with counterpart Philippine agencies. The records of 9965 recipients in 32 centers from 4 regions of the country were carefully examined with the conclusion that child weight responses to this food assistance and mother-education program were essentially the same as those reported 4 years earlier by the Asia Research Organization. The USAID evaluation is summarized in Attachment B.

In 1974 in response to questions submitted by the Honorable Clarence G. Long regarding successful USAID programs, the Philippine mission selected the Child Support program in the Philippines (Targetted Maternal Child Health Program) as one of the two most successful country programs in the Asia region in the sector of health, nutrition, and population. See Attachment C.

In 1977 the Nutrition Program Manager, USAID Manila Mission,and the Program Office prepared a summary evaluation of the contribution of VPI&SU to the nutrition effort in the Philippines. This evaluation concluded that the technical advisory services provided by VPI&SU are continuing to impart significant direction of the Philippine Nutrition Programs toward increasingly effective means of reducing incidence of malnutrition and that in large measure the success of Philippine experience can be directly attributed to efforts of VPI&SU. A copy of this summary and assessment of VPI&SU involvement is shown as Attachment D.

In June,1977,the USAID Mission Director, Manila, requested the nutrition office to conduct a brief review of the impact of the nutrition program on infant mortality. The results of this review are included as Attachment E in which evidence is presented that in areas where USAID-supported nutrition interventions are operating there is considerable reduction in the infant mortality rate.

In May,1977,a similar analysis was prepared which presented convincing evidence that the nutrition program was accomplishing the objective of reducing the prevalence of malnutrition in the pre-school child population. This paper is presented as Attachment F.

In December,1977,a summary was prepared for the USAID Mission which identified the benefits and beneficiaries in the mission Food and Nutrition Project. The paper presents evidence that the nutrition project has focused very significantly upon the poor and the under-privileged in the population. This summary is presented in Attachment G.

In 1974 the American Institute of Nutrition, comprising the nation's 1300 nutritional scientists, presented Dr. R.W. Engel, VPI Chief of Party, with the Conrad A. Elvelyim Award. This award is presented annually by the Institute to the individual judged to have served most successfully and effectively in public service for nutrition. Attachment H contains the award statement, revealing that the USAID contribution to a comprehensive nutrition program in the Philippines was considered a significant public service achievement.

As a means of assisting the USAID Mission in Manila in planning continued support to the Philippine Nutrition Program (1979-83), a review team from Washington DC, composed of AID/W technical staff and members of the US National Academy of Science Committee on International Nutrition, Food and Nutrition Board, evaluated the Philippine Nutrition Program and USAID's involvement.

The summary of this review contains the following conclusion:

"The Philippine Nutrition Program stands out as one of the best national nutrition programs with which the team is familiar and AID's support for the program has apparently contributed materially to that success. The technical and financial aid and food support provided by AID has played a significant role in reducing infant and child malnutrition and in establishing the current program."

The late Dr. Grace A. Goldsmith, Chairman of the Food and Nutrition Board, National Research Council, National Academy of Sciences, Washington D. C., and Dean Emeritus, Tulane University School of Public Health and Tropical Medicine, served in the Philippines on a brief assignment in 1973 and recorded her views of the effectiveness of VPI in its nutrition efforts in the Philippines. These are summarized in Attachment I, a feature article on the Philippine program, published in Nutrition Today, March/April, 1974.

The Philippine community of nutritionists and private citizens with interest in nutrition have also taken certain actions which bear upon the effectiveness of VPI in carrying out its advisory function.

In 1973 the Philippine Association of Nutrition presented Engel with honorary membership, a distinction that has been bestowed upon only one other foreign scientist, the late R. R. Williams, (see Section A of this report for details of R. R. Williams' contribution to Philippine nutrition).

Honorary membership for Engel was bestowed on the occasion of the Silver Jubilee Celebration of the Philippine Association of Nutrition. Attachment J presents the award citation and announcement.

In June, 1976, on the occasion of the 2nd anniversary of the Founding of the Nutrition Center of the Philippines, its Founder, Chairman and President, Mrs. Imelda Romualdez Marcos, recognized the contribution of the Engels to the Center through a personal letter, included in Attachment K.

In July, 1977, a 65th Birthday Certificate of Appreciation was presented to Engel by the Food and Nutrition Research Institute, Manila. Attachment L contains the citation.

In June, 1978, upon conclusion of services as VPI Chief of Party, Dr. Engel was recognized by the National Nutrition Council with the GINTONG PARANGAL (Gold Award). The Department of Social Services and Development presented him with the SALAMAT PO AWARD (Thank you). The Nutrition Center of the Philippines presented him with a Plaque of Appreciation and a citation. All of these awards (Attachment M) identified the concern for the young children, those most vulnerable to the ravages of poor nutrition, as the significant contribution of VPI to the Philippine Nutrition Program.

The Honor Society of Agriculture, Gamma Sigma Delta, presented Engel with the International Award for Distinquished Service to Agriculture for 1978. The announcement of this award is included as Attachment N.

There are many factors contributing to the success of working in an alien environment. An important one is that of exhibiting a real interest in the people and their culture and how this may relate to one's own people and culture. There is probably no more effective way to maintain a friendly and productive relationship with counterparts than to cultivate inter-cultural understanding. This has been effectively carried out not only through VPI's chief of party in the Philippines but also by his wife, Frances, on an entirely volunteer basis as curator of the Philippine American Historical Library and as author of a weekly article in the Embassy newsletter on Philippine and U. S. historical connections.

In recognition of this contribution of VPI to the Philippines, Ambassador David D. Newsom in March, 1978 awarded Frances H. Engel a Certificate of Appreciation (see Attachment O).

ATTACHMENTS

Section E

Attachment A
Section E

1. Description of the Recent TMCH Evaluation

(a) General

The USAID-sponsored supplementary feeding program has had two outside evaluation during the last 14 months. Most recently the Asia Research Organization (ARO) submitted their report of a study of the TMCH, paid for by USAID/Program Office. The study gives a national perspective of the effect of the program on the target group and compares this effect with that achieved by the GOP's Department of Heath Mothercraft Centers.

Thirty-two centers and 960 children were included in the sample through random selection, and we can extrapolate from our findings to the program as a whole. Data were collected through interviews with mothers and Center Directors and by weighing the children.

(b) Findings

Targeting - Only 4% of the children were ineligible because of age (2% below 6 months; 1% over 60 months; 1% not reported); and 9% because of weight, and of the latter nearly all were in the 0-6 month age bracket. This is an enviable record in targeting of children. However about 1/4 of the mothers enrolled were neither pregnant nor lactating.

Family participation in the program is high. 59% of sample children had other family members in the program, 27% of whom were mothers.

Record Keeping - Maintaining accurate weight charts and disease

records has been difficult; although weights seem to be no problem the age in months is usually (67%) incorrect, invalidating the record and graph.

Growth Response - About 60% of the children are on the projected schedule of weight gain; with the best weight gains being realized by the most malnourished. In general, best gains were experienced by the 12-23 month old children.

Food Distribution - Directors of fourteen of the 32 sample centers reported problems with food delivery: 9 - delayed delivery; 5 - insufficient quantity; 3 - poor quality; 1 - high transportation cost; 4 directors said that foods were not always available.

Nearly all mothers (96%) had no complaints about food distribution.

Ration size varied widely, with 41% of sample children receiving less than 6 pounds, but about 15% receiving 10 pounds or more. ARO felt that this variation was due more to the availability of food than any other factor.

91% of the recipients share their food with the entire family, thus in 49% of the families the food was gone in two weeks, in three weeks by 72%.

Visits by Outreach Workers - Most of the mothers (90%) claimed to have been visited by center workers and about 3/4 of these were visited by family planning motivators. Nutritionists visited 57%, and Mothercraft, DSW and DOH visited 16%; 19%, and 19%, respectively.

Researchers were unable to find any significant relationship between visits of family planning motivators and increasing intervals between births.

(c) Conclusions:

The program is reaching target group families with great accuracy, and it is having a significant impact on the wieghts of enrollees, especially the most malnourished while they remain in the program.

Growth rate improvement is about what is expected considering the following inefficiencies:

- 13% of the children are ineligible because of weight or age;
- Dropout rate of about 20%;
- 41% of recipients receive less than their planned ration (6 pounds);
- 90% of recipients share their ration with the family;
- 50% of recipients use the food in two weeks or less;

These last two inefficiencies probably explain why mothercraft children responded faster than those in TMCH.

Improvements in each of these inefficiencies can be made but will require greater effort than in the past. Nutrition education should be strengthened since most mothers are exposed to education for only a few hours during the entire program. (Family planning motivators seem more aggressive in outreach than the nutritionists.)

Attachment B
Section E

PRELIMINARY REPORT ON THE IN-HOUSE EVALUATION OF TMCH IMPACT

One hundred forty-five (145) centers were chosen by stratified random sampling from a complete list of CRS TMCH centers reported operating as of March 1977. This preliminary report covers 34 centers so far visited where data on 9,965 children have been obtained. Appendix A shows the breakdown of the 34 centers by province.

In each of the centers visited, weight records of children-recipients were copied either from a general listing or from individual ration cards. In either case, two weight data were obtained -- the first is the child's weight at enrollment and the second his latest weight at the time of the visit. Birthdays and dates of weighings were also obtained to cross-check recorded ages. Children whose birthdays were not known or who did not have second weighings recorded were not included in the analysis.

From the raw data gathered, ages in months and nutritional levels (NL) were determined both for the first and the latest weighings. Nutritional levels were then sorted using the "cross-overs" table shown in Appendix B.

Results

Data on the 9,965 children at the time of their enrollment (before) and after varying lengths of feeding[1] (after) are summarized in Table I:

---

[1]Length of feeding ranged from two to twenty-four months depending on the length of time the sample centers have been operating. Because of time constraints, a further refinement in the study, e.g., breakdown according to length of feeding and age of enrollment have not been done.

TABLE I

Distribution of Children by Degree of Malnutrition
Before and After Varying Lengths of Feeding
(9,965 Children)

Degree of Malnutrition	Before	After	% Change
Third Degree	1,220	668	(-) 45.2%
Second Degree	6,827	4,605	(-) 32.5%
First Degree	1,437	4,017	179.5%
Normal	481	675	40.3%

Third and second degree prevalence decreased by 45.2% and 32.5% while that for first and normal increased by 179.5% and 40.3%, respectively.

More detailed nutritional state movements are shown in Appendix C. Of the 1,220 third degree starters, only 387 or 31.7% remained in third degree.

The rest improved to second and first degree including 3.6% or 44 children going up to normal. The number of second degree decreased similarly, though to a lower extend from 6,827 to 4,605. Almost half of the second degree starters remained in second degree, 40.9% (2,793) moved to first and 5.8% (397) improved to normal. Some 249 children (3.7%), however, moved down to third. It is interesting to note that first degree starters showed the same trend. More than half remained in first degree while 37.3% moved to second degree. Of the normals, 127 children or 26.4% maintained their status, 53% moved down to first degree and five children (1%) became third.

Overall, 54% (5,384) improved by at least one nutritional level or more while 2,163 or 21.7% became worse to the same extent. 2,418 children

or 24.3% remained in the same nutritional level until after varying lengths of feeding. Average percent standard weight for age increased from 71% to 75%.

Appendices D-G shows a breakdown of cross-overs by region.

APPENDIX A

Region I - Ilocos Region

Ilocos Norte	1. Bacarra Center
	2. Narvacan Center
	3. Sta. Cruz Center
	4. Cabugao Center
	5. Magsingale Center
Benguet	6. Sangilo Center
La Union	7. Bagulin Center

Region II - Cagayan Valley

Cagayan	1. Enrile Center
Isabela	2. Magsaysay Center
Nueva Vizcaya	3. Solano Center
	4. Aritao Center

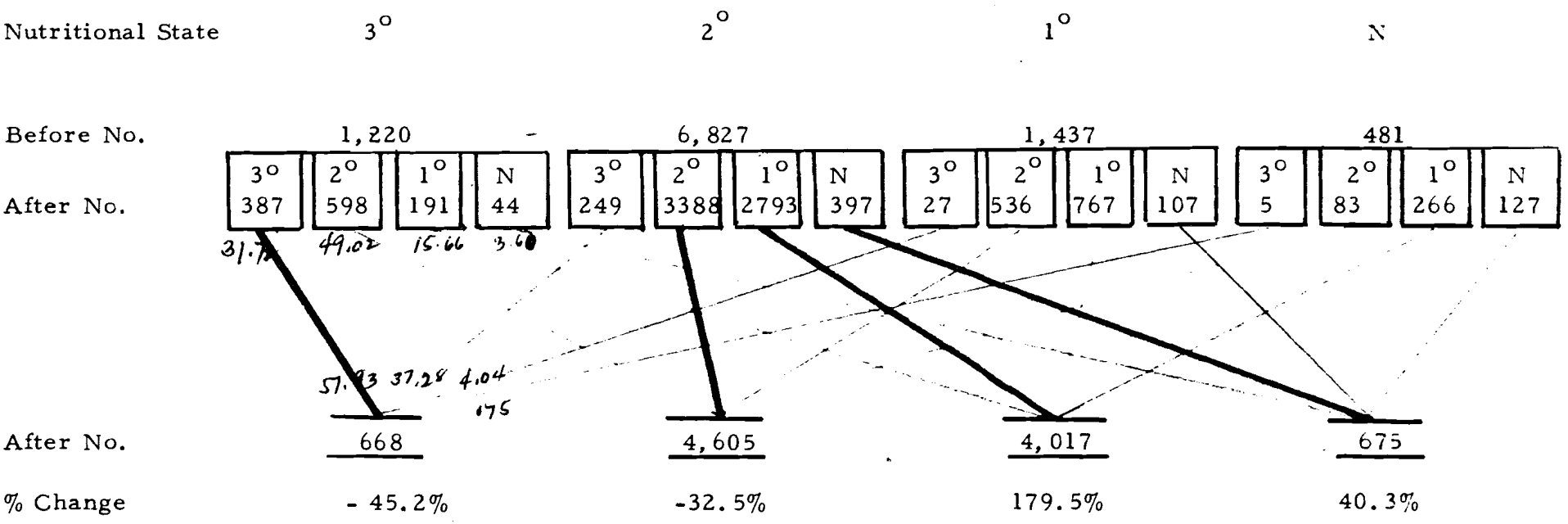
Region III - Central Luzon

Pampanga	1. Angeles City Center
	2. Anao Center
	3. Mansgold Center
Nueva Ecija	4. Carranglan Center
	5. Llanera Center
Bulacan	6. Bambang Center
	7. Sapang Palay Center
	8. Iba Center

Region IVa

Quezon City	1. Cabatuan Center
	2. Maryknoll Center
Malabon	3. Sacred Heart Center
Manila	4. Gagalangin Center
	5. TFDA/Rawis Center
	6. San Pablo Apostol Center
	7. San Rafael Center
Pasay City	8. Pildera Center
Makati	9. Leao Center
	10. Archimedes Center

APPENDIX C
IN-HOUSE EVALUATION OF TMCH IMPACT
Summary of 4 Regions
32 Centers/9,965 Recipients

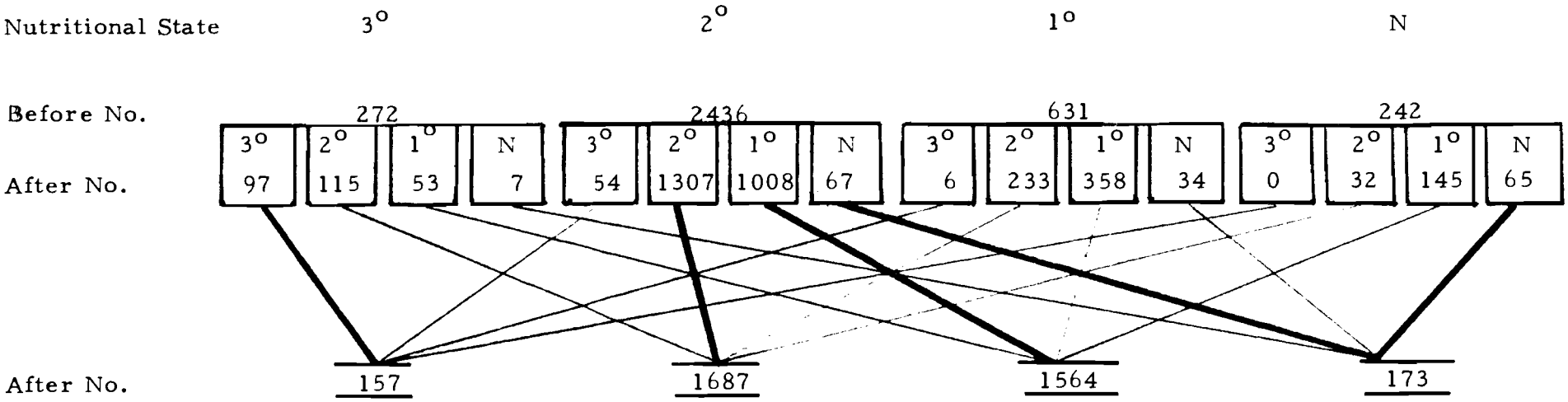


Number and % who Improved INL and now	- 5384	54.0%
Number and % who did not change	- 2418	24.3%
Number and % who became worse INL and more	- 2163	21.7%
Number in NL 5 at enrolment	- 3912	
% of total		39.2%
Number in NL 5 at latest weighing	- 2316	
% of total		23.2%

APPENDIX D

IN-HOUSE EVALUATION OF TMCH IMPACT
Region I - Ilocos

7 Centers/3, 581 Recipients



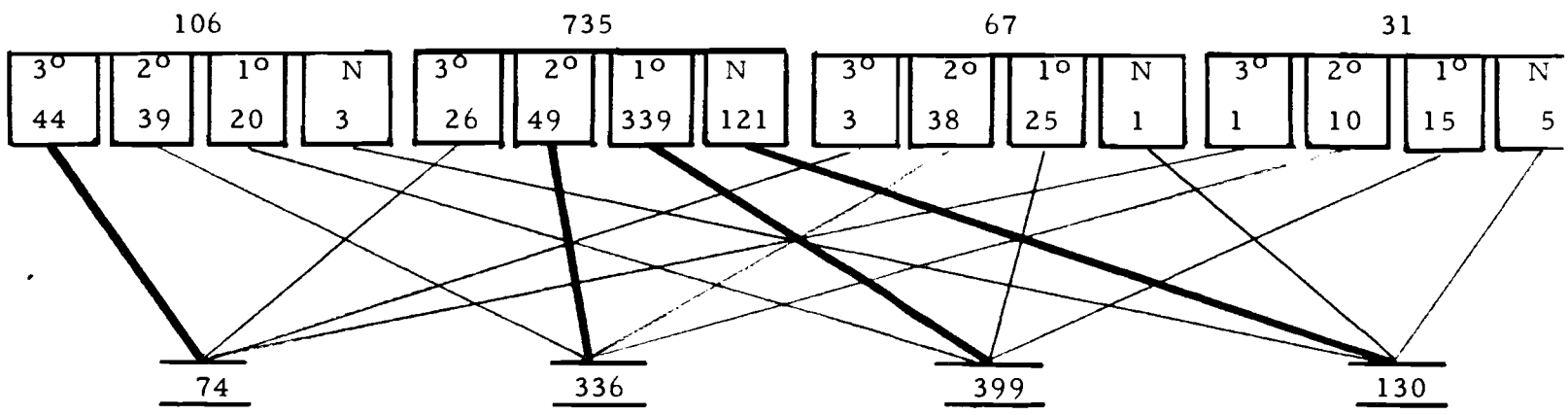
Number who improved INL and more	- 1,635	45.7%
Number who did not change	- 1,103	30.8%
Number who became worse INL and more	- 843	23.5%
Number in NL 4 enrolled	- 1,510	
% of total	- 42.2%	
Number in NL 5 at latest weighing	- 968	
% of Total	- 27.0%	

APPENDIX E

IN-HOUSE EVALUATION OF TMCH IMPACT

Region II - Cagayan

4 centers/939 Recipients



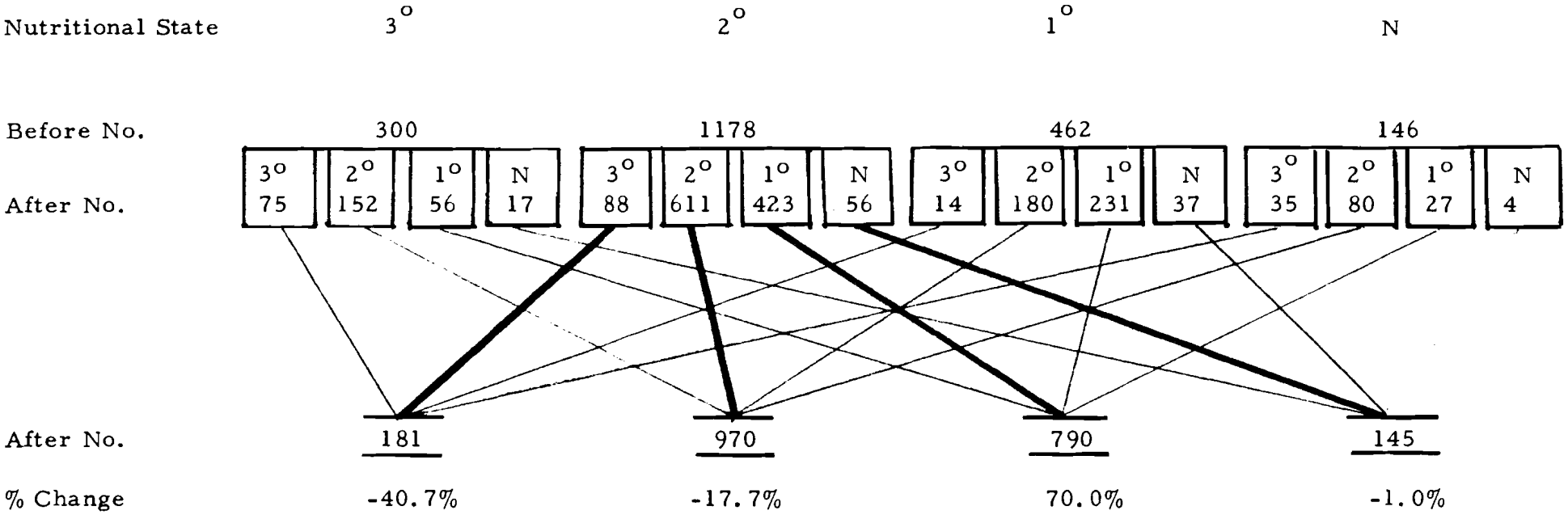
Number who Improved INL and more	- 623	66.3%
Number who did not change	- 147	15.7%
Number who became worse INL and more	- 169	18.0%
Number in NL 5 enrolled	- 415	
% of total	- 43.7%	
Number in NL 5 at latest weighing	- 151	
% of Total	-16.1%	

APPENDIX F

IN-HOUSE EVALUATION OF TMCH IMPACT

Region III - Central Luzon

8 Centers/2086 Recipients



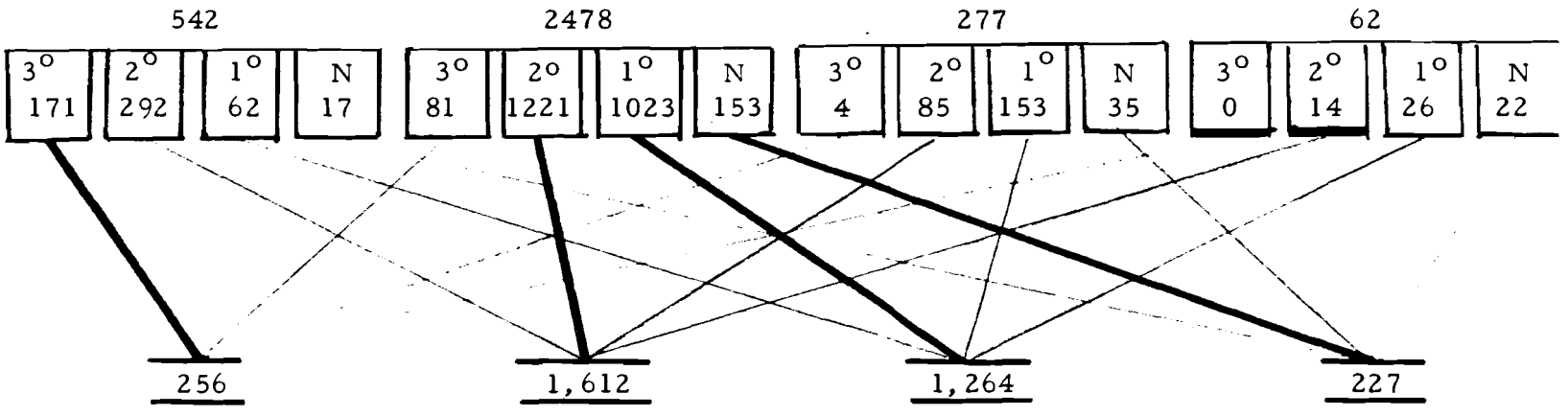
Number and % who improved INL and more	- 1010	- 48.4%
Number and % who did not change	- 415	- 19.9%
Number and % who became worse INL and more	- 661	- 31.7%
Number in NL 5 at enrolment	- 610	
% of total	29.2%	
Number in N5 at latest weighting	- 453	
% of total	21.7%	

APPENDIX G

IN-HOUSE EVALUATION OF TMCH IMPACT

Region IVa. Metro Manila

13 Centers/3359 Recipients



Number and % who improved IN and more	- 2116	63.0%
Number and % who did not change	- 753	22.4%
Number and % who became worse IN and more	- 490	14.6%

Number in NL 5 at enrolment	- 1,377
% of total	- 41.0%
Number in NL5 at latest weighing	- 744
% of total	- 22.1%

RESPONSES TO QUESTIONS SUBMITTED BY

THE HONORABLE CLARENCE D. LONG

REGARDING RECENTLY COMPLETED OR ALMOST COMPLETED PROGRAMS

1. In A.I.D.'s judgment, the two most successful country programs in the Asia region in agricultural productivity and rural development are:

India: Agricultural Universities Development

Philippines: Rural Electric Services

3. In A.I.D.'s judgment, the two most successful country programs in the Asia region in the sector of health, nutrition and population planning are:

Nepal: Malaria Eradication

Philippines: Child Nutrition Support

Philippines: Child Nutrition Support
Year Project Began: FY 1968
Year Project Ending: FY 1974
Total Obligations: $1,500,000

Malnutrition of children in the Philippines has presented a serious health problem and has been a major cause of high infant mortality rates. Nutrition survey data collected in the early sixties indicated deficiencies in caloric-protein intake among some 80% of the child population with nearly 20% suffering from serious malnutrition. An infant mortality rate of 70 per 1,000 live births and a death rate among children aged 1 to 4 years comprising 20% of all deaths reflected the seriousness of the prevalence of child malnutrition.

The problem has been assessed as having stemmed from a combination of various social and economic conditions, with the greater number and more severely malnourished children being found in the larger, low income, poorly educated families living either in slum areas of cities or in the more remote rural areas.

In FY 1968 A.I.D. agreed to provide technical assistance to the Philippines over a five-year period to help address the child-nutrition problem. This assistance was designed (1) to devise and test means of reaching malnourished infants, pre-school and elementary school age children with supplemental feeding programs, (2) to undertake programs for reaching and educating mothers of malnourished children on nutritional aspects of

child feeding, (3) to effect better use and distribution of available PL 480 Food for Peace commodities to reach the most needy children, (4) to develop various nutritional food formulas utilizing agriculture products indigenous to the Philippines or a combination of these and imported products, (5) to work with the private sector in developing, testing, and marketing nutritious products, and (6) to generally encourage the government of the Philippines to develop and support a nationwide nutrition effort. A.I.D. assistance has consisted of technical advisors provided under a contract with Virginia Polytechnic Institute, commodity assistance and participant training.

The ensuing period since 1968 has witnessed substantial progress in meeting these objectives. Some 250 child-feeding centers have been established throughout the Philippines in which mothers of malnourished infants and pre-school children are enrolled in three-month training programs to participate in the preparation and feeding of nutritious foods to their children and to witness the often dramatic results in improved growth and development. Under the supervision and direction of trained dieticians, the mothers learn to improve their homemaking proficiencies in such areas as handicrafts, home gardening, sanitation, health care and family planning. Prepared foods consist of a mixture of locally grown and PL 480 provided foodstuffs.

The Philippine Government, in cooperation with these A.I.D. technical advisors and U. S. voluntary agencies, such as the Catholic Relief Service

CARE, the Church World Service, and the Seventh Day Adventist Welfare Service, devised a variation of the child feeding center programs in order to reach a greater number of needy children. Under this variation, distribution centers for PL 480 Title II commodities are being established throughout the Philippines to provide mothers of malnourished pre-school children monthly rations of supplemental foods to be fed in the home. Over the life of the project, $33.8 million PL 480, Title II commodities will have been provided. The degree of malnourishment is identified at the outset through body-weight measurements and mothers are given instruction in nutrition, food preparation and diets. The condition and improvement of each child is monitored by taking body-weight measurements prior to the issuance of each new monthly ration. The mother continues to receive monthly rations until the malnourished condition has been eliminated.

To help combat the presence of malnutrition among the elementary school population, the Philippine Government, in cooperation with A.I.D. voluntary agencies and the private sector have utilized a nutritionally fortified "nutribun" which is being provided to malnourished children. Nutribuns, whose principal ingredient is enriched or soy-fortified flour, is formulated to meet one-fourth to one-third the average daily nutrient requirements of elementary school children. The baking of the nutribuns is done in school bakeries where baking facilities exist or by commercial bakeries. The nutribun has been widely accepted and several commercial bakeries are now producing and marketing their own versions of the bun. It also proved to

be a valuable means of meeting emergency food needs of victims of floods and typhoons as in the case of the flood disaster of 1972. Experiments are continuing to make the nutribun even more nutritious and flavorful through additional high protein coconut flour.

The project owes its success to the high visibility in the results of better nourished children in many parts of the Philippines. The cooperation of public and private Philippine organizations, and government officials at all levels has also been a major factor in the success of this project. Significantly, it has led to a greater awareness by the Philippine Government of the extent of child malnutrition in the country, especially among low income groups. A National Nutrition Program Office has been established under the Department of Health and is being staffed with competent, well trained personnel. Nutrition has been given a higher priority in the Philippines Four-Year Development Plan and a greater emphasis in the nation's overall agriculture program.

Attachment D
Section E

Proj. 252

DEPARTMENT OF STATE

TELEGRAM

77 AUG 17 PM 4 35

INDICATE
☐ COLLECT
☒ CHARGE TO USAID

FROM	CLASSIFICATION	
AMEMBASSY MANILA	UNCLASSIFIED	

E.O. 11652: N/A

P 170735z Aug 77

TAGS:

SUBJECT: Food and Nutrition PROP Amendment

ACTION: SECSTATE WASHDC PRIORITY 3842-3843 12841

UNCLASSIFIED MANILA 12841

AIDAC

REF: (A) STATE 188974
(B) MANILA 11661
(C) MANILA 11243
(D) STATE 167478
(E) MANILA 8939

DIST:
ODM
PO
OC
HRD-4
C&R

ADM
EC/COM
CRU

SUMMARY: Mission currently assembling data requested reftel (A). We expect to complete amended PROP by Aug. 18 at which time data will be sent AID/W via cable or pouch. Meantime in order to assist project review committee to make decision on extension of VPI&SU contract, justification requested para 4 ref (A) given below. Mission recommends immediate action be taken to extend subject contract.

END SUMMARY.

1. VPI role in Philippine Nutrition Program began in 1968 when the University was selected by Office of War on Hunger

DRAFTED BY:	DRAFTING DATE	TEL. EXT.	CONTENTS AND CLASSIFICATION APPROVED BY:
NTR:WFDoody/PO:Ploch:pfm	8/16/77	444	Peter M. Cody, Director

CLEARANCES:
HRD:HWDodge
ODM:CCChristian

UNCLASSIFIED
CLASSIFICATION

50152-101

OPTIONAL FORM 152(H)
(Formerly FS-413(H))
January 1975
Dept. of State

to evaluate malnutrition problem here. The University was selected for this task because its staff was recognized as one of the best in field of nutrition and VPI had pioneered new concepts of nutritional interventions, latest being the Pre-School Child Feeding Program in Republic of Haiti. Immediately following the evaluation AID awarded the university a contract whose scope of work required VPI to assist GOP Department of Health (DOH) in organizing a national nutritional staff, develop Mothercraft nutrition demonstration centers to reach malnourished pre-school children not serviced by rural health units; and develop the research methodology needed to target PL480 donated food assistance to the malnourished and undernourished, especially children.

2. Research resulting from these initial programs revealed the true and disturbing facts about malnutrition in the Philippines. Therefore in 1971 with the help and advice of the USAID team, the UN and American VolAgs, the Philippine Government launched a nationwide "Targeted Nutrition Program" (TNP) designed to overcome undernourishment. One of the most important elements of the TNP was inclusion of VPI-developed programs for assisting malnourished pre-school and elementary grade school children.

3. In spring 1973, the Chairman of the Philippine National Food

and Agriculture Council, Secretary of Agriculture Tanco (DOA), attended a provincial nutrition program review and learned that food assistance through USAID-sponsored targeted nutrition programs constituted the major nutrition intervention in rural areas. He requested USAID/VPI Nutrition staff to brief him on targeted food assistance. Following the briefing Sec. Tanco stated he was impressed by the programs progress and especially with the mass of data accumulated through which at least crude estimates could be made at the intent of malnutrition in the child population. Concurrently, another agency of government, the Department of Social Services and Development (DSSD) had become concerned about the child malnutrition problem. This awareness again related directly to USAID/VPI interest and interventions in this area. Targeted food assistance was adopted by DSSD for the initiation of Project Tulungan, a private effort of Mrs. Imelda R. Marcos and social action workers in the Catholic Church.

4. The increasing expressions of concern by DOA and DSSD led to a recognition in June 1974 that there was a need for mobilizing both the public sector, through a National Nutrition Council in parallel with the National Food and Agriculture Council and the private sector through establishment of a Nutrition Center of the Philippines. These actions were taken simultaneously by

President and Mrs. Marcos in July 1974.

5. With these new developments there was need for the assembling of a common, mutually agreed to, set of nutrition and food statistics so that information flowing to the public from the Council and the Center would be consistent and represent the prevailing food and nutrition situation. The USAID/VPI Nutrition Office was requested to assemble such data. It made available in bound form, its series of operational research and sectoral analysis reports entitled Nutrition Statistics and Guidelines. This publication, constituted a digest of the contributions of various Philippine agencies, notably the Food and Nutrition Research Institute and the operational research results USAID had assembled through its Nutrition Office in cooperation with U.S. Voluntary agencies and cooperating agencies of the Philippine Government (Department of Agriculture, Health, Social Welfare, and National Science Development Board).

6. These events clearly indicate that USAID strategy of making highly skilled manpower available, through its technical services contract with VPI&SU, contributed significantly to evolution of high priority assigned nutrition program in national development planning of GOP. Philippine Food and Nutrition Program was cited to the U.S. Congress in 1973 as example of successful

USAID program in Asia. The peer-organization of nutrition scientists, the American Institute of Nutrition, recognized significant contribution of in-residence VPI&SU Nutrition Advisor by awarding him its annual Conrad A. Elvehjem Award for distinguished public service to the science of Nutrition in 1974.

7. Identification of Nutrition as a national priority in July 1974 occurred as VPI&SU and USAID were in process of negotiating a new contract which was to provide Nutrition services for first two years of Philippine Food and Nutrition PROP, approved provisionally by AID/W in April 1974. Under this contract (Asia C-1136) VPI&SU was to provide services beginning Sept. 1, 1974 and extending over a two-year period. Simultaneously the National Nutrition Council of the Philippines launched its program known as "Operation Timbang" (Weigh the Child). This program was initiated to bring an awareness of problem of malnutrition to doorstep of every household in the nation and to further identify magnitude of child malnutrition problem and its location. Between 1974 and 1976 this program was extended to half of all households, which involved weighing over 4 million children. In 1975 USAID/Philippine Nutrition Program was again selected for citation to U.S. Congress as example of successful program.

8. The expanded awareness, and concrete actions on part of government to address malnutrition problem led USAID in Summer 1976 to negotiate an extension of VPI&SU contract for additional two years (until Aug. 31, 1978), so as to assure adequate technical backstopping for expanding outreach particularly to pre-school children and infants. The significant technical service contribution through VPI&SU under the new program initiated in 1974 was that of planning and implementing, in cooperation with Bureau of Agricultural Extension and the National Nutrition Council a program of Malnutrition Prevention in infants. Earlier operational research conducted on over 15,000 infants in two provinces had pinpointed the onset of malnutrition in infants as occurring at the 5th to 6th month of life when breast milk alone was no longer adequate. Malnutrition Program of the extension home management agents has two elements: first, regular, supervised monthly weighing of infants by the mothers themselves; and second, demonstrations on home-grown indigenous foods that should be used to adequately supplement breast milk.

9. Monitoring of above program through Nutrition Advisor's Office for first 18 months (July 1975 to Dec. 1976) indicates it is protecting infants against severe malnutrition during the critical first 18 months. These favorable results have prompted

Bureau of Agricultural Extension to assign implementation responsibility nation-wide for its current 1,300 technicians and to add 1,000 new workers to the staff to extend implementation to every municipality and city.

10. It is considered judgment of Mission that technical advisory services provided through VPI&SU are continuing to impart significant direction of Philippine Nutrition Program towards increasingly effective means of reducing incidence of malnutrition. GOP concurs that continuation of VPI&SU nutritional services to the Philippines is necessary and warranted. In large measure, the success of Philippine experience can be directly attributed to efforts of VPI and SU. To say the program would topple without expertise of VPI&SU would be fictitious. Termination of their services, however, could weaken nutritional achievements already made and planning for next year. It is therefore strongly recommended that immediate action be taken by AID/W to extend VPI&SU contract to project completion date of September 30, 1978.

STULL

Attachment E

Section E

Is the Nutrition Program Impacting on Infant Mortality

It is difficult to identify specific impact of a single program on infant mortality because a number of activities are in place which can also have impacts. For example, in addition to Nutrition per se there is a program of tradition midwife training with a nutrition component. There is a program supported by UN to improve rural health units. Some agencies sponsoring family planning activities also carry on nutrition activities. All of these efforts are contribution to a slight but significant downward trend in infant mortality rate of about 3.5% ('68-'72 five-year average of 64.0 infant deaths per 1,000 live births, compared to 62.0 in '73-'74).

There is evidence that the nutrition programs can claim a part of this improvement. Examples follow.....

In a program of babyweight monitoring and nutrition education by rural extension agents operating in 370 villages in 22 provinces have maintained accurate records over the past 18 months of the infant mortality rate. Assuming in these villages the neonatal infant death rate (which was not measured in this program) is equal to the national average (one-half of all infant deaths nationally are reported to be neonatal) the infant mortality rate was found to be 26 per 1,000 live births, a rate considerably below the national average of the five-year period 1970-74 (63/1,000 live births).

One municipality in the town of Bauan, Batangas province initiated a program of third degree or severe malnutrition in its pre-school child population in 1974. By 1976 the prevalence of third degree

malnutrition had been reduced from an initial level of 5.8% to a level of 0.25%. The infant mortality rate during 1975-1976 was 53/1,000 live births, a value considerably below the national average. The municipal nutrition program manager is reluctant to relate pre-program infant mortality statistics to the statistics collected during the nutrition intervention because of evident incomplete reporting, hence the comparison is made with the current national average.

In the province of Cebu program of using Barangay Health Aides to improve health services to rural areas was field tested in 12 rural barangays (6 control and 6 experimental) in 6 municipalities during the period 1973-1976. Pre-experimental child health conditions were comparable between control and experimental barangays, including infant mortality rate. A significant reduction was noted in the experimental barangays in infant mortality. Nutrition education and food assistance were concluded to be the important interventions that were responsible for the reduction in infant mortality rate.

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Is there any evidence of an impact of the Philippine Nutrition Program on pre-school child malnutrition?

Between 1968 and 1973 the Department of Health conducted surveys throughout the Philippines (except Region 9) in its Mothercraft Program and its involvement in the TMCH program. These surveys were usually conducted or supervised by trained nutritionists. A total of 97,728 children were weighed.

Between 1974 and 1976 the NNC initiated Operation Timbang. In this program the same group of nutritionists in the Department of Health were assigned the responsibility of conducting weight surveys. A total of 4,131,979 children were weighed.

The results of these 2 surveys are summarized in Table 1. The combined prevalence of third degree and second degree malnutrition in the period 1968-1973 averaged 36.9% of the total pre-school child population. In 1974-76 it averaged 30.6--a decrease of 6.3 percentage points, or a 17% reduction in malnutrition prevalence. There is striking similarity between the prevalence of malnutrition among the regions. For example, regions 4, 10 and 11 are among 3 of 4 regions with lowest malnutrition prevalence in both surveys. Regions 1, 3, and 6 are among the 3 of 4 regions with highest malnutrition prevalence in both studies.

The program which, through an independent evaluation has/shown been to have a significant impact in reducing malnutrition prevalence is the TMCH program. It is also the program that has probably had a greater outreach than any other, reaching over 400,000 pre-schoolers annually since 1973. Additionally, Mothercraft Centers, Day-Care Centers, and Nutrition Education Program have no doubt made some impact. Note that Region 5 had a very high prevalence in 1968-73 and a major reduction in

1974-76, an average change of 15.3 percentage points. Region 5 has an excellent TMCH Program in which government sector and the private sector (church) cooperate fully and the nutritionists share the same office in the private and public sector.

NTR:RWEngel:yvg
4/27/77

TABLE 1: Prevalence of 3^{o} and 2^{o}

Malnutrition Among Pre-School Children

	1968-73 /1			1974-76 /2			
	3^{o} %	2^{o} %	Total %	3^{o} %	2^{o} %	Total %	Change %
All regions	6.5	30.4	36.9	5.8	24.8	30.6	- 6.6
Region 10	5.7	21.7	27.4	5.2	23.0	28.2	+ 0.8
" 11	6.2	26.0	32.2	3.8	21.1	24.9	- 7.3
" 8	5.8	27.9	33.7	7.9	28.4	36.3	+ 2.6
" 4	5.6	29.4	35.0	4.9	24.3	29.2	- 5.8
" 2	6.1	29.0	35.1	5.6	23.7	29.3	- 5.8
" 7	5.1	33.2	38.3	4.8	22.2	27.0	-11.3
" 1	6.6	32.0	38.6	5.7	25.3	31.0	- 7.6
" 3	7.3	32.9	40.2	6.7	25.6	32.3	- 7.9
" 6	7.9	33.5	41.4	8.3	30.7	39.0	- 2.4
" 5	8.1	37.8	45.9	6.0	24.6	30.6	-15.3

/1 Dept. of Health data, Mothercraft Nutrition Program

/2 Dept. of Health Data, Operation Timbang

Attachment G
Section E

FOOD AND NUTRITION PROJECT: BENEFITS AND BENEFICIARIES

I. Introduction

The National Nutrition Council was established in 1974 to serve as the coordinating body for the purpose of developing programs to combat the serious malnutrition problem in the child population. Since there is a high correlation between income and capacity of families to provide basic needs, malnutrition is concentrated in poor families. The average family spends 57% of its income for food whereas low-income families spend 80-90% of their income to meet this most basic need in a tropical environment. Other factors which contribute to the malnutrition problem are ignorance of nutrition facts or principles and mal-distribution of the food within the family, the very young usually not receiving their fair share. The rapid population growth and large family size further exaggerate the food insufficiency situation for much of the population.

II. The Setting (The people suffering from malnutrition)

Since 70% of the population is classified as rural and close to the land one could assume that in the tropical atmosphere where year-round food production is possible the capacity exists for correcting the food deficit and the malnutrition problem. There are however a number of constraints. Lack of water in the dry seasons, excess water in the wet seasons, lack of access to land, worker migration, partially effective land reform are all deterents to food production by many rural people.

Several categories of low-income people can be differentiated as examples of those who suffer from the malnutrition problem in the Philippines.

Brackish water fishing families

The number of families engaged in brackish water fishing (600,000 families) far exceeds the number required to satisfy the market. These low-income families generally live on sandy beachs or in homes built over the water so food production is not possible.

Urban Poor

The malnutrition problem also exists among the urban poor, those who have left the countryside for a better life in the city. These are living in slums under very crowded conditions and with very minimal housing. They also rapidly adopt city-ways, such as bottle-feeding rather than breast-feeding their infants. Nutritional deterioration and infectious diseases result from crowded unsanitary conditions and often impure water supplies that in turn lead to high mortality in those under 5 years of age, which is the best measure of the seriousness of malnutrition in children.

Families engaged in coconut production

Families engaged in coconut production also suffer from malnutrition. There are an estimated 600,000 "small farmer" families engaged in coconut production. The potential for producing food to meet family needs by multiple cropping under the coconut trees exists but the production technology has not been fully developed nor is there an adequate infrastructure of trained technicians to assist coconut farmers with improved cropping schemes.

Landless Poor

Finally, there are many poor families in the rural and urban areas (600,000 or more) who are landless and underemployed and consequently suffer from malnutrition. The male heads of these families are usually identified as drivers (pedicab or tricycles) or as casual laborers.

III. The Beneficiaries

The National Nutrition Council, by July 1976, had entered into individual households across the Nation with a nutrition message and a scale. The latter was used to weigh children 0-6 years of age to classify them as to nutritional state. About 4.5 million children were weighed. Those weighing 75% or less of standard weight (the local standard used is 10% lower than that in use in the United States) were and are considered the target of the project and its chief beneficiaries. Additionally, pregnant and lactating mother were and are also considered as major targets of the program.

The above mentioned survey indicated that 500,000 children weighed only 60% or less of standard weight (the severely malnourished and about 2,300,000 who weigh between 60-75% of standard weight (the moderately malnourished). Together these two groups constituted nearly one-third of all pre-schoolers .

The crude birth rate is about 3.8 per 1,000 population which indicates that there are about 1,600,000 pregnant or lactating mothers, the other major beneficiaries in the highest priority category of the malnourished. Thus the preschool children and the pregnant and lactating mothers are the first major target of the project and total some 4.4 million people.

Approximately 1,600,000 elementary school children are considered to be malnourished while an additional 2,000,000 are underweight for age or permanently stunted in their physical growth and development. Thus a total of about 3.6 million elementary school children constitute a second major target and class of beneficiaries of the program.

The beneficiaries are poor

A survey conducted by Asia Social Institute in 1971 revealed that the average beneficiary pre-school child receiving Food for Peace commodities came from families that had an annual per capita income of $45 (U.S.). This would place most of the beneficiaries in the lowest 30% of the population on the income scale, with heavy concentration in the lowest 10-15%.

Recent surveys in Central Luzon and Metro-Manila conducted by the Food and Nutrition Research Institute established that the lowest 15% of the population on the income scale was subsisting on 1,200 calories per capita per day. This is 60% of the recommended intake. It is among these that the food assistance program is focused.

Where are the beneficiaries

As already stated, malnutrition exists among the rural poor as well as the urban poor. U.S. food assistance to families with the malnourished pre-schoolers are reached through approximately 1,600 centers mostly established by church groups with about 70% in rural communities and 30% in urban areas. Assistance to school children is likewise concentrated in the public schools in the slum areas of cities and in the poor rural communities. Assistance to the malnourished is limited by the availability of infrastructure to channel the assistance.

How is the Assistance Extended?

Each malnourished pre-school child receives 3.6 kg. of Food for Peace commodities (8 lbs) per month for 18-24 months depending upon severity of the malnutrition. This child's mother also receives instructions on how to use this food. Pregnant and lactating mothers also receive 3.6 kg. of Food for Peace commodities per month for up to about 2 years.

Each malnourished or underwiehgt school child receives a nutribun (soy-fortified wheat flour with added local ingredients like sugar, oil, yeast, and salt) which supplies about 500 calories each school day.

With these programs about 2,000,000 children and mothers benefit directly. An additional 7,000,000 children and mothers benefit indirectly because to a certain extent the food is shared by other members of the family, sharing being a basic aspect of Filipino culture.

Other beneficiaries of the nutrition program

In addition to the specific targets described above, the nutrition program is sending radio messages regularly throughout the country over the network of over 150 radio stations. An estimated 45% of all families have operational radios. An additional 20 to 25% who do not have radios listen to their neighbors. The nutrition program thus penetrates an estimated 70% of the entire population or a total 33,000,000 beneficiaries. The radio messages are reinforced with barangay nutrition booklets and rural nutrition, health, and extension workers supporting the nutrition program.

In the child weighing program described above over half of all families (4,000,000 families or 28,000,000 people) have been reached with a direct

message to give small children their fair share of the family food. This message is repeated every six months when children are re-weighed to measure progress to words normally.

Other benefits

With the food assistance nutritionists also provide education on such related subjects as family planning, home, gardening, health and sanitation, and improvement of income through handicrafts.

There are instances where a low-income family with three beneficiaries for example will to some extent substitute the donated food for other food purchases. Since the Filipino mother and father have a strong desire to give their children an educational opportunity, the meager funds saved on food purchases is used to buy the minimal clothing and supplies needed to ter the child in school. To this extent the nutrition program is aiding in expanding educational opportunities to the poor.

Conclusion

Because of the close direct relationship between poverty and malnutrition the heavy focus of food assistance is to the poor in the nutrition program. The private sector, particularly the church, has cooperated effectively with the government in enabling U. S. food assistance to penetrate very effectively into the low income segment as the chief beneficiaries and has also resulted in a small but gradual improvement in the nutritional status of children in these poor families.

It is recognized that a nutrition program by itself will not be the ultimate solution to the malnutrition problem. The program now operating will however significantly accelerate the nutritional rehabilitation process as socio-economic improvements are achieved through the entire mix of developmental assistance. The nutrition program is heavily focused on poorest families as beneficiaries and represents a signficant effort to assure that the poorest of the poor are not forgotten but share in the development process.

It is significant to note that the study to assess social and economic impact of USAID/Philippines assisted projects conducted by G. C. Hickey and R. A. Flammang in the summer of 1977 found that "... the projects which have the greatest prospect for benefitting the poorest of the poor, the families with the least economic contact with the rest of the economy are the nutrition, health, population and education projects....."

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Attachment H

Section E

Reprinted from NUTRITION NOTES, Vol. 10, No. 1, March 1974

Conrad A. Elvehjem Award for Public Service in Nutrition

R.W. Engel

The Conrad A. Elvehjem Award for public service in nutrition, sponsored by WARF Institute, Inc., is to be presented to Dr. R. W. Engel, Professor of Biochemistry and Nutrition, Virginia Polytechnic Institute and State University, and Nutrition Advisor, USAID, Manila, Philippines. Dr. Engel's contributions to human and animal nutrition span the horizon of basic research, teaching and service to his state, nation and the world. Through his leadership the first U.S. Agency for International Development-supported comprehensive nutrition program was launched in the Philippines in 1967. His innovations and dedication have resulted in a multidisciplinary approach to treat and prevent serious problems of infant and child malnutrition. A Past President of the AIN, Dr. Engel's distinguished service to world nutrition began early in his career as a Food and Nutrition Officer in the World War II Pacific Theater, and continued through his service and participation on the NAS-NRC Food and Nutrition Board, nutrition study section of NIH, consultant to the Interdepartmental Committee on Nutrition for National Defense, and participant in nutrition surveys in Brazil and Haiti. He has served on the IUNS, the U.S. Army Nutrition Research Advisory Board and on numerous Expert Nutrition Committees of the WHO.

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MARCH 1974

PUBLIC SERVICE IN NUTRITION AWARD

Dr. R. W. Engel, Nutrition Advisor U.S. AID, Manila; and Professor of Biochemisty and Nutrition, Virginia Polytechnic Institute and State University has been selected to the receive the 1974 Conrad A. Elvehjem Award for Public Service in Nutrition. Dr. Engel's contributions are international in character and have lead to improvement in nutrition programs in Latin America and The Far East.

After a productive period of research in nutrition at the University of Wisconsin and at Auburn University, Dr. Engel organized the Department of Biochemistry and Nutrition at Virginia Tech in 1952 and developed a strong research and teaching organization. During 1966-68 as Associate Dean of the College of Agriculture and Life Sciences he undertook the preliminary organization of a program of nutritional improvement in the Philippines, and in 1968 was assigned to implement that program as Chief of Party, funded by U.S. AID Office of War and Hunger. Since 1968 he has directed the development of a multifaceted nutrition program, national in scope, based upon the "Mothercraft Center" concept established earlier in Haiti by his former colleague Dr. Kendall King. In the role as Chief of Party, Dr. Engel served as nutrition advisor to the Director of the Philippines U.S. AID Mission, and has had phenomenal success in organizing a program in the Department of Health that will serve as a model for approaching nutritional problems in other countries.

Dr. Engel has served as President of the American Institute of Nutrition and as a member of its Council, as a member of the Food and Nutrition Board of the National Research Council, and in an advisory capacity to many organizations involved in the application of nutrition knowledge to the public good.

Formal presentation of the award which consists of an inscribed scroll and $1000 will be made at the annual dinner of the American Institute of Nutrition on April 10 in Atlantic City. The American Institute of Nutrition is the only professional society of nutrition scientists in the United States. Its membership is drawn from scientists from industry, the government, and academic institutions who are interested in the nutrition of man and animals. They are elected by their fellow scientists on the basis of demonstrated research competence and productivity. About 1500 scientists are members of the Institute.

# # # # #

Attachment I

Section E

A Novel Idea from the Philippines

Medical educators in the Philippines may have found a way to teach nutrition in the medical schools. They initiated this project by teaching the deans and faculty members about this popular and important subject.

by GRACE A. GOLDSMITH, M.D.

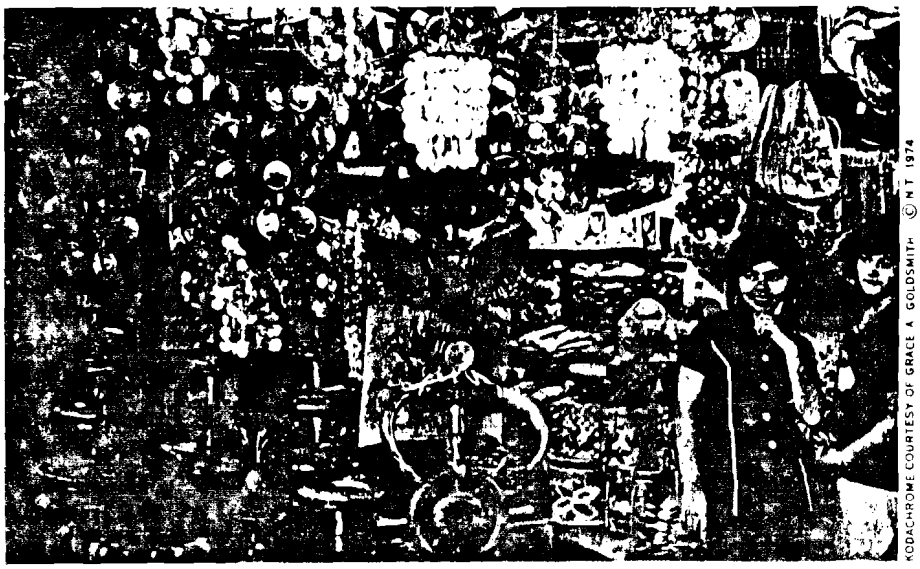
Responding to an invitation from Ruben W. Engle, Ph.D., of the U. S./A.I.D. Nutrition Program in the Philippines, the Department of Health of the Philippine government and the Association of Philippine Medical Colleges, I went to that country to act as a consultant for a program of nutrition education to be initiated or expanded in the medical schools. I spent my first few days meeting members of the Department of Health. The Secretary, Clemente Gatmaitan, M.D., was most helpful throughout my visit, and Antonio Pardo, M.D., Director of the Nutrition Program delegated one of his nutritionists, Mrs. Letitia Manlulu, who received her M.P.H. at Tulane, as my guide, coordinator and arranger of a complicated program of activities.

The project of development of a program for nutrition teaching in medical schools began with a conference of medical educators on the importance of nutrition to the future practicing physician and to health. This direct approach to top administrators and teachers may have been chosen because in this nation overt malnutrition is a fact of life. It is not necessary to "sell" the importance of the subject. So, rather than having lengthy discussions of what to do, they approached the teaching of nutrition in medical schools head-on by having the deans of each of the seven medical schools in the nation and four professors from each school, biochemists, physiologists, pathologists, internists, pediatricians or other clinical specialists, meet together for a six-day workshop. When you come to think of it, this is an excellent way to start. The idea was that first the teacher must be taught and inspired.

When this ingenious approach to a problem, which we in the United States have been thrashing about for some time, was first discussed in detail with me by Jose Cuyegkeng, M.D. who is Executive Director of the Association of Philippine Medical Schools, and Florentino Herrera, M.D., Dean of the School of Medicine, University of the Philippines, I wondered what the reaction would be if a similar attempt was made in North America. Not only were lecturers from outside their own circles, like myself, invited to participate, but they also had consultants from the Government, and the entire six-day course was planned and managed by a most capable staff. The first thing that struck me was that the workshop for leaders in medicine was not held at one of the medical schools; rather, we gathered together in the semi-isolation of the Continuation Education Center of the College of Agriculture at Los Banos, in Laguna Province, far away from telephones, administrative aides, and students. This may help to explain the surprising fact that, not only did all the 28 faculty members attend, but seven deans came and stayed the whole week. This made the course most successful. The friendship and the interchange of ideas promoted an intense interest that would be hard to match, and the interest increased as the week went on. These people who would be responsible for incorporating new ideas of nutrition into their medical school curriculum became more enthusiastic the more they learned and discussed.

The meeting opened with a discussion by Dean Florentino Herrera who spoke on the philosophy of nutrition, and the opportunities that were being given to the teachers to open up a new world to students in undergraduate work, and to physicians in their continuing education studies. The time of most sessions was divided about equally between formal presentations and discussion periods. We covered such topics as assessment of nutritional status, how to conduct community surveys, present knowledge of relationships of nutrition to mental development, and nutrition and infection. Some time was spent discussing the nutritional values of individual foods, particularly proteins,

The largest market in Manila where fruits and various handicrafts are sold.



KODACHROME COURTESY OF GRACE A. GOLDSMITH © N T 1974

Dr. Goldsmith is Dean Emeritus and Director of the Graduate Program in Nutrition at the School of Public Health and Tropical Medicine of Tulane University, New Orleans, La.

and the concept of the recommended dietary allowances, a matter that is not well understood by many practitioners. Continuing in the area of nutritional physiology, there was one period on the interrelationships of nutrients. There was a long session on the effect of drugs on nutritional status, and one on therapeutic diets. The specific causes of various kinds of malnutrition, such as the nutritional anemias, protein-calorie malnutrition, and deficiencies of vitamin A and the vitamin B complex, were discussed in detail. The Philippines has had a long history of beriberi, and the disease is still seen occasionally throughout the nation. However, caloric undernutrition and protein-calorie malnutrition in children are today's important problems.

Turning from the basic science and clinical aspects of nutrition, there were lectures on nutrition and health education, nutrition and socio-economic development, including a description of the social and cultural factors affecting the nation, and nutrition and the world food problem.

To bring this all to focus there were sessions on nutrition as a multidisciplinary science. Two evenings and one whole day near the end of the session were devoted exclusively to suggesting how to integrate the study of nutrition into the curriculum of medical schools. In the discussion period, this brought forth a number of candid comments on what had been done in the past, and listed a number of splendid suggestions as to what might be done in the future.

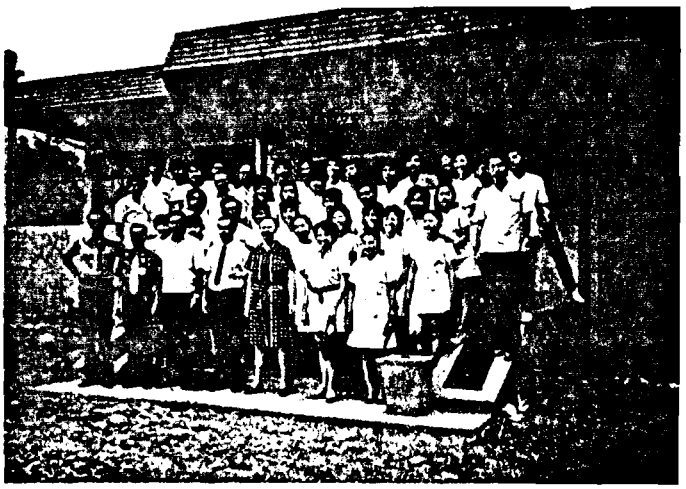
Anyone interested in undergraduate medical education and continuing education of physicians would have benefited greatly from the experience at Los Banos. Particularly interesting were some of the general recommendations made in the workshop. Not surprisingly, these were not very different from the recommendations that came out of the conference on guidelines for nutrition education held in Williamsburg in June, 1972. At both meetings, it was agreed that medical teaching of nutrition should be a combination of the integration of the subject in basic science and clinical courses, accompanied by a separate course exclusively devoted to nutrition which might best be given at the end of the third year of medical school. The Los Banos group agreed that to make students aware of nutrition knowledge and see that nutrition programs are carried through to completion, each medical school should have a nutrition committee with a chairman who had demonstrated a real interest in the subject.

The content of the nutrition curriculum was outlined in general. However, the disciplines in which each specific aspect of nutrition was to be taught were left to the decision of the faculties

KODACHROME COURTESY OF GRACE A. GOLDSMITH © N.T. 1974

All of the members at the workshop in Los Banos gathered for a photograph during the working session. The Deans and Consultants are seated in the front row.

KODACHROME COURTESY OF GRACE A. GOLDSMITH © N.T. 1974



Employees of the Community Medical Center of the University of Santo Tomas

KODACHROME BY LETITIA MANLULU © N.T. 1974

Alumni reunion of the School of Public Health and Tropical Medicine, Tulane University. Photograph by Letitia Manlulu

PHOTOGRAPH BY GOLDEN GATE STUDIO, MAKATI, PHILIPPINES

The Philippine Medical Women's Association Executive Board Members during a luncheon given in honor of the author.

of each school. This was a very good decision since it promotes participation by those directly concerned.

It was obvious that while one could get busy teachers, physicians and medical administrators to a well-planned conference without much difficulty, it wasn't going to be easy to carry out all of the recommendations in the medical schools. The obstacles that must be overcome before nutrition can be taught adequately are not greatly different in the Philippines from the hurdles encountered in the United States and Canada. I almost thought I was at home when I heard mention of the lack of trained, interested, and mature academic personnel to carry out the programs, the paucity of funds, and the difficulties inherent in implementing a new and extensive program, and finding room for it in a medical curriculum that is already crowded. It was obvious that my friends in the Philippines did not expect any miracles. They foresaw frustration and realized that many instructors would be inclined to give up because the accomplishments would not be fast enough in coming. At the end of the meeting, it was resolved to come together in a year or more and evaluate the progress that had been made in nutrition education. It will be interesting to learn what was done. In any event, this was a fresh and inspiring approach.

If funds were forthcoming from either the Government or from foundations, it would be interesting to attempt a comparable program in North America. The first giant step to be taken is to arouse the interest of the people who are going to teach nutrition to medical students and practicing physicians.

NO HOLIDAY

When the week at Los Banos was over, I found that my duties in the Philippines were by no means completed. Instead of going off for a holiday, as might have seemed desirable, I was asked to visit each of the medical schools and discuss the curriculum with the deans and other members of the faculty. In doing this I was fascinated to see the wards and clinics where acute and severe cases of malnutrition are very common. I also visited a number of community nutrition projects which are being carried on in association with the teaching programs of the medical schools. I gave at least one lecture in each school and my audience, in most cases, included students, interns, residents, and faculty.

I was privileged to deliver two special lectures at the University of Santo Tomas. One of these dealt with "Nutrition Problems in the Tropics" which was given as a part of the Don Leon Ma Guerrero Conference sponsored by the Pharmacy Faculty Club in commemorating the 362nd anniversary of the founding of the university. This institution, founded by the Spaniards in 1611, was the oldest university under the American flag before Philippine independence. Some may recognize the name, for it was here that so many American citizens were imprisoned by the Japanese in World War II. The buildings and the areas used are a tourist attraction these days.

My second lecture at Santo Tomas came by invitation of the faculty of Medicine and Surgery; it was the twenty-fourth Luis Guerrero Memorial Lecture. I chose for my subject "Nutritional Anemias and Malabsorption Syndromes." It may surprise many readers to learn that sprue, a common manifestation of malabsorption in the tropics of the western hemisphere, for some unknown reason is not seen in the Philippines.

Of course, under circumstances of a visit such as mine, I was entertained almost without interruption by these wonderful and hospitable people. On one accasion my hosts were the Executive Board of the Philippine Medical Women's Association, a very active group. Almost half the practicing physicians in the Philippines are women. On another occasion it was my pleasure to attend a dinner given by the Dietetic Association of the Philippines, at the Andres Soriano Executive Center in Manila. Not only was the setting lovely and the food delightful, but all of the speeches were short and to the point, suitable and fitting for the occasion. If I can be pardoned for a little praise of my own school, I would like to report that one evening we had a reunion of the Alumni of the Tulane School of Public Health and Tropical Medicine. We counted among our graduates the Dean of the School of Public Health of the University of the Philippines, the Dean of the Far Eastern Medical School, and the Professor and Chairman of the Department of Microbiology and Parasitology of the University of Santo Tomas.

There were few aspects of nutrition and community health that were not shown to me while I was in the Philippines. After the Conference on Continuing Medical Education, I went south to Cebu where there are two medical schools, then on to Davao City on Mindinao where we visited one of the general training hospitals of the government. All in all, I saw just about everything in medicine, public health and nutrition that the Philippines had to offer.

After seeing the medical schools, visiting with the faculty and getting a firsthand look at a number of the community health programs, I came away with a feeling of immense admiration for what the Philippine scientists and their Government are doing in elevating human health. From my experience, I think it is safe to say that there is probably not a more health oriented

continued to page 23

continued from page 14

government than that of the current administration in the Philippines. Health is talked about widely, the health programs are active, the people are responsive, and the Government appears to be genuinely committed. This was well demonstrated one evening at the so-called "kick-off ceremony" of a national effort to improve the growth and conservation of rice to assist in improving the nutritional health of the Philippine people. First came the invitation with its title in Tagalog. It had the tongue-twisting words *ANG KILUSAN NG WASTONG PAGKAIN SA BAGONG LIPUNAN.* This, my friends later informed me, was the name of the organization promoting the program. In any event, the meeting was held at the Malacanang Palace in Manila, a most impressive building.

The meeting was opened by Mr. Jesus Tanchanco, the Administrator of the Philippine National Grain Authority. He was followed by His Excellency, the President of the Philippines, Ferdinand E. Marcos who gave the address of the day. I was very much impressed by the man; he was forceful, his speech was dynamic and carried with it just enough humor to keep the audience's attention complete. Fortunately for me he spoke alternately in English and Tagalog. I could not help thinking how much further along we could be in North America if we could get the heads of the Administration to take such a sincere interest in furthering the goals that we know are attainable in nutrition. The day before I left the Philippines the Secretary of Health, Dr. Gatmaitan, honored me with a despadado (farewell breakfast) at the Filipino Hotel. We discussed the National Nutrition Program of the Philippines and he asked me to write him a letter giving my recommendations for the future program. This I was very pleased to do.

While this journey to the Philippines was officially at the invitation of the Association of Philippine Medical Colleges and the Department of Health of the Philippine government, it was sponsored by the nutrition program of the United States Agency for International Development in the Philippines, as

Chiang Mai Research Center Opened

Recently an International Symposium on Protein-Calorie Malnutrition was held in Thailand's second largest city, Chiang Mai, a provincial town of approximately 100,000 people, located 500 miles north of Bangkok. The gathering was a part of the ceremonies dedicating the new research building of The Anemia and Malnutrition Research Center by His Majesty Bhumibol Adulyadej, the King of Thailand. Of special interest is the fact that the new Center at Chiang Mai is another example of the cooperative efforts of the local faculty of medicine and of a U. S. medical school, St. Louis University, St. Louis, Mo. The meeting was international in character and was sponsored by the faculties of both the universities and the International Union of Nutritional Sciences.

The Center is under the combined direction of Avudh Srisukri, M.D., and Robert E. Olson, M.D., Professor of Biochemistry and Medicine at St. Louis University. Its research objectives are to study the biologic mechanisms of nutritional anemias in adults and children and determine their relation to protein-calorie malnutrition. Closely associated with this is the study of the underlying interaction between malnutrition and infection. Clinical investigations are supplemented with biological studies in animals and micro-organisms and public health nutrition.

Anything ceremonial in the remarkable kingdom of Thailand is stirring and spectacular. Thus the festivities marking the dedication of this new international enterprise were colorful and memorable. The highlight of the occasion was the arrival of His Royal Highness, the Crown Prince Mahavajiralongkorn, who opened the Institute by Royal Command on behalf of His Majesty the King. Dignitaries in nutrition from many lands attended. *G.A.G.*

KODACHROMES COURTESY OF ROBERT E. OLSON © N.T. 1974

A Thai faculty wife offers scissors to the Crown Prince for the ribbon cutting ceremony at the dedication of the Center's new research building.

Dr. Robert Olson; Mrs. Dan Schlafly, wife of the Chairman of the Board of Trustees of St. Louis University; Dr. Nevin Scrimshaw, Professor of Human Nutrition and Head of the Department of Nutrition and Food Science at M.I.T.; Dr. Norio Shimazono, Professor and Head of the Department of Biochemistry, Tokyo Medical College; and Dr. G. Donald Whedon, Director, National Institute of Arthritis, Metabolism, and Digestive Diseases at N.I.H. await the arrival of Thailand's Crown Prince for the dedication of The Anemia and Malnutrition Research Center's new research building.

mentioned previously. The powerful impulse for that action came from Dr. R. W. Engel whom many of our readers will recognize as having been one of the founding members of the Editorial Advisors of *Nutrition Today*.

Dr. Engel took leave of his post as the Head of the Department of Biochemistry and Nutrition of the Virginia Polytechnic Institute in Blacksburg to go to the Far East as the Nutrition Advisor to the U.S./A.I.D. mission, and to the Philippine Government under an A.I.D. contract with V.P.I.

Most of the health professionals in the United States might be interested in knowing just what a man does when he undertakes such a project. I, therefore, had long talks with my old friend Butch Engel, and this is what he told me.

He said that the first months of his stay in the Philippines were devoted to planning the program which was undertaken at the invitation of the Secretary of Health, who had outlined the general type of assistance that he would like to have from the United States. The assistance was divided into three broad categories: (1) To develop an infrastructure in the health department for delivering improved nutritional health services through the rural health units. This program would also serve to increase the awareness of health workers of the seriousness of the malnutrition problem in the country. (2) To set up a program with effective coordination with agriculture so that food aid, which was being requested, could be replaced with local food at some future date. In this area, research assistance was required in the development of local food combinations or blends that could be used for weaning to combat the serious protein-calorie malnutrition in the islands. It was hoped that agriculture could be coordinated with food production and processing. (3) To develop training programs in nutrition for Filipinos since there was a need for upgrading such training. It was anticipated that the program would focus on mothers and preschool children, but would also include work with school children.

Where is the program now? There have been significant advances in achievement of the above goals. In the first place, there is increased awareness of the problem of malnutrition in all parts of the country. One-third of the 66 provincial governments have appointed professional nutritionists to initiate programs at the provincial level. Many other areas are in the process of setting up these programs. Second, the National Government has committed about twenty percent of the effort of their home demonstration agents for nutrition education of preschool children and for initiating feeding programs in rural areas. Third, the Philippine private industrial sector has established an industrial fund for social action projects. One of the first projects established was directed toward improved nutrition of the preschool child. This was to be carried out in association with projects in improved housing and rural development.

NUTRITION NEEDS FULFILLED

Three provinces have established combined nutrition and family planning programs using a model developed in the Bulacan Province by Dr. Engel in association with his collaborator and able assistant, Miss Minda Caedo.

The Department of Health is making use of the infrastructure established by the nutrition program for assisting the preschool malnourished child. The Department has assumed the complete costs of 50 nutritionists who originally were paid by U.S./A.I.D. These nutritionists are scattered all over the country in demonstration centers which, locally, are called mothercraft centers. The governor and health officers pick the community to be served. First of all, a survey is carried out using body weights as a primary measure of nutritional need. The children's weights have been less than 75 percent of U. S. standards. Children who are malnourished are brought to the center by their mothers. Each mother works one day a week in the center, purchasing and cooking the food and feeding the children. This is done for three months. In each center about 30 children are taken care of in a group. Use is made of the nurse-midwife in the community in directing the program.

A significant research accomplishment of the nutrition program has been the development of a weaning food to replace imported food. This food is essentially based completely on local commodities, rice flour, coconut flour, and mango bean flour, with a very small amount of skim milk. It may be possible to replace the milk with local dried powdered fish. The new weaning food has been evaluated by nitrogen balance studies in children 15-18 months old and findings are most satisfactory.

THE NUTRIBUN

Two important innovations in feeding large numbers of undernourished people have been tried in the Philippines, and have been most successful. The first is the development of a highly nutritious bread, the *nutribun*, which everyone likes. The second is a *green revolution* which is not what we think it is, namely, the use of the new wheat and rice seeds to increase cereal output, but is a home gardening program similar to that encouraged in Great Britain during World War II. Each of these programs will be described in some detail.

For 20 years the United States has donated food to the schools in the Philippines with few obvious beneficial results. The Philippine government gave no indication of taking over this program and Dr. Engel advised that it be terminated. Forced with a decision, the government asked the United States to continue, but to develop a program to define the responsibilities of the U. S. and the Philippine governments. An analysis of the public school system indicated that it obviously could not afford a lunch program, but that some supplementary food was needed in view of the extensive malnutrition that was present. The current program includes the development of the nutribun. Each bun furnishes 500 calories, which is ¼ of the daily energy need of the average elementary school child. This was the estimated caloric deficit of the diet. The bun also furnishes 17 grams of protein which is ⅓ of the protein needed daily. In addition, it supplies significant amounts of the vitamin B complex, vitamin A, and the minerals, calcium and iron. This particular product was chosen for school feeding because surveys of food habits, as part of the nutrition program, showed that the most popular snack in the Philippines was *pan de sal*, which is a small bun made out of wheat flour. The popularity is now history. This year the nutribun is being served in 3,000 schools. A total of 1.6 million children are involved and approximately ¼ of the elementary children enrolled in school are receiving it. In major population centers, the bun is baked by local bakers and delivered to the schools at a cost of 6.5 centavos or one U. S. cent per bun. Children pay between 5 and 10 centavos depending on local prices to cover the cost of ingredients and of baking. Several hundred schools have built their own bakeries to reduce costs.

Proceeds from charges to students, in excess of actual costs, accumulate as a school nutrition fund. This is used to develop education materials, to purchase scales for weighing, etc. For children who cannot afford to pay anything, local philanthropic citizens are asked to assist, and they usually do.

The nutribun is an excellent prototype of food in which increasing amounts of local ingredients can be used, *e.g.* coconut flour. This flour has been tested as a replacement for skim milk with good results in nutritional balance studies on college students at V.P.I.

A HOUSEHOLD WORD

Initially, about 15 percent of the ingredient cost of the nutribun, plus the cost of baking and delivery, were locally absorbed costs. When coconut flour substitution at the 10 percent level is initiated, approximately 25 percent of the total cost will be born by the Philippines, thus reducing the U. S. input. It seems likely this will be a most successful program and that U. S. inputs can be phased out in six to eight years. Even an earlier phase-out may prove possible in view of the tremendous interest of the national government.

Although the nutribun was initially introduced in 1971, only two years ago, it has become a household word in the Philippines. During the flood disaster in the summer of 1972, 8 million nutribuns were airdropped to about one million people in the most severely affected area. This ready-to-eat food resulted in immediate relief. A delivery system was in place. The bakeries shifted from schools to disaster feeding. This is an ideal food for disaster situations. It can't be stockpiled or hoarded as the shelf life is only 3 days before mold growth begins. It is possible that the nutribun could be adapted for preschool feeding or even for feeding of infants by slicing and toasting, similar to the process used in zwieback. This has been tried by local medical societies and found to be useful.

Plans have been made for expansion of the preschool child program to reach at least 60 percent of the target population, mainly through the private sector. This is being done largely through the social action arm of the Catholic Church. In addition, a comparable organization of the Church World Services is planning similar assistance.

The Governor in one of the provinces told me that the nutribun helped him win an election and he has become an enthusiastic supporter.

Commercial production of coconut flour is now under serious consideration by several Philippine industrial concerns. In order to expand the market for coconut flour, a program has been initiated in combination with the World Food Program, whereby all patients in public hospitals will have as a ration component, 3-4 ounces of coconut flour daily. Recipes incorporating this flour in rice, wheat and corn products (such as noodles, pies, cakes etc.) have been developed which can easily absorb this amount of coconut flour. The use of 10 percent coconut flour in various nutrition programs would annually absorb about ⅓ of the production of the economically feasible commercial operation. Thus, the Philippines are well on the way to developing its most important protein resource, the coconut. Currently, the replacement of components of corn-soy-milk (CSM), used in infant feeding with coconut flour is under way.

The First Lady of the Philippines, Mrs. Imelda Marcos, initiated what is alled the green revolution which means the production of food through the planting of vegetable gardens in the barrios. The history of the green revolution indicates that the U. S. input created an awareness of the serious nutritional problems in the country, and the First Lady assumed responsibility for generating interest among local groups. She launched the green revolution in 1971. Everywhere one goes vegetable gardens are seen along the highways, in front of small houses, on the campuses of universities, etc.

Anyone who looks upon an A.I.D. nutritional advisor job abroad as a sinecure or a fat, cushy way to spend a few years should listen to the reply that Butch Engel gave me when I asked him to describe a week in the life of a nutrition advisor. Here is what he said. First, he must figure out which hat to wear.

These are some of his activities: (1) He is consultant advisor to the Committee on Science and Agriculture of the Philippine Congress. (2) He is advisor to the Philippine wage commission which is in the process of determining nutritional requirements of workers in various occupations. (3) He is advisor to the Director of the National Grain Authority in food and nutrition matters and especially in the rice conservation program. (4) He is consultant-advisor to the committee established by the National Science Development Board composed of food industry representatives. The purpose of this group is to develop low-cost highly nutritious food through local industry. (5) He serves as advisor to the local committee of the Science Board to develop Philippine height-weight standards. (6) He has been popular as a commencement speaker, especially in schools of nutrition, dietetics, and home economics. He is also active on the circuit of local medical associations.

But, all in all, it is rewarding even if it does make one very busy. The A.I.D. mission to the Philippines is the first to include a Nutrition Officer through a university contract procedure in East Asia. It is a prototype that, it is hoped, will stimulate other nations, especially in Asia, to launch similar programs. As Dr. Engel said, "What we think the Philippine program has demonstrated is that a proper mix of public and private support can be structured so as to minimize the strains upon the National budget of a developing country. The whole mission in the Philippines is concerned that the program now developed will guarantee improvement in the health of Filipino children receiving donated U. S. foods as a supplement to native foods. We believe the program will prove that this can be done and that the program can be phased out and taken over by the Philippine government through the increased input of local foods." A significant development is the interagency agreement signed by all concerned agencies to coordinate all food and nutrition activities in the National Food and Agriculture Council, the agency responsible for food production under the secretary of Agriculture. A program such as this should assist the developing nations in attaining self-sufficiency.

The Philippines are not exactly a developing nation. They are a remarkable people with a magnificent country that is moving ahead rapidly. During no part of my stay was I aware of any of the disturbing features that make the headlines for newspaper writers. Through the work of such people as President and Mrs. Marcos, the Secretary of Health, Dr. Gatmaitan, the Director of the Nutrition Program, Dr. Pardo, Dr. Herrera, Dr. Cuyegkeng, Dr. Engel and many, many others, there is close collaboration in national planning. The results should be spectacular.

Silver Jubilee Celebration: Philippine Association of Nutrition, Manila, Philippines - March 1-7, 1973

For extending the benefits of proper nutrition to the nutritionally vulnerable groups in the country offering opportunities for the professional advancement and training of a number of our nutrition workers; Planning and initiating ameliorative programs and activities to improve the Filipino diet within the economic resources of the Filipino family; Having encouraged more nutrition researches to be undertaken and for his enthusiasm, generous assistance and sustained efforts for the advancement of nutrition work in the Philippines.

Press Release

Dr. R. W. Engel (left), a well-known nutritionist and college professor from Blacksburg, Virginia receives a wooden statuette of the Madonna and Child from Dr. Carmen L. Intengan, President of the Philippine Association of Nutrition. The statuette symbolizes honorary membership in the PAN, a prestigious organization of active professional nutritionists in the Philippines. Dr. Engel was granted honorary membership in the Association in recognition of his valuable contribution and sustained efforts for the enhancement of nutrition work in the country. As Nutrition Advisor of the U.S. Agency for International Development, Dr. Engel has been instrumental in the planning and implementation of various nutrition and health programs of government, private and civic organizations. In addition to the statuette, Dr. Engel also received a citation plaque from the Association.

Nutrition Center of the Philippines
South Superhighway (Nichols Interchange) Makati, Rizal, D-3116 Philippines

Telephone: 85-30-71 to 79

June 18, 1976

Dr. & Mrs. Reuben Engel
Nutrition Advisor
USAID, Roxas Boulevard
M a n i l a

Dear Dr. & Mrs. Engel:

As we mark the second anniversary of the Nutrition Center of the Philippines on July 2, 1976, we look back over the past two years with mixed feelings of pride and humility. Pride because we have been associated with the growth of this important institution, and humility because our activities could not have achieved any significance without the help of many concerned organizations and individuals here and abroad.

It is for this reason that we feel we cannot fully commemorate the founding of the Nutrition Center without reiterating our deep appreciation to the many who have given it support. Among those who helped the Nutrition Center, you have indeed been one of the most generous. Rest assured that your help has been channeled to specific areas in the nutrition program where it was most needed.

On this second anniversary of the Nutrition Center, we therefore extend to you our warm greetings, with thehope that you will share fully in the blessings of this occasion.

Very truly yours,

IMELDA ROMUALDEZ MARCOS
Chairman and President

Attachment L
Section E

65th Birthday - Certificate of Appreciation - Food and Nutrition Research Institute, Manila, July 8, 1977

In recognition of his invaluable and generous contribution to the progress of nutrition in the Philippines, in general, and in the Food and Nutrition Research Institute in particular.

His deep concern for the problem of mycotoxins in food led to the establishment of an aflatoxin surveillance laboratory in the Institute. In a similar manner, his great interest in weaning foods for infants and in food formulations for pre-school children had led to a considerable enhancement of the Institute's capabilities. Likewise, the advanced training of some of the personnel was made possible through his initiative.

But above all, the time and effort given unselfishly and wholeheartedly in consultations covering problems big and small, as well as the countless other kindnesses received from him have endeared him in the hearts of all those whose lives he touched and have left their deep imprint in Philippine nutrition history.

Attachment M
Section E

Gintong Parangal (Gold Award) National Nutrition Council : For his dedicated commitment to the improvement of nutrition in the Philippines; for contributing his valuable insight, talent, and energies in the development of a national nutrition program for the Philippines; for bringing the benefits of nutrition improvement to a greater number of Filipinos within the vulnerable groups; for his untiring efforts in obtaining the support and assistance of the United States Agency for International Development for the Philippine Nutrition Program. Signed by Secretary Arturo R. Tanco, Jr. - June 9, 1978 - Philippine Plaza

Salamat Po Award - in appreciation for his sustained interest and continued efforts in support of the Department of Social Services and Development objectives to combat the malnutrition problem of the Filipino pre-school children. Sylvia P. Montes, Officer in charge, Department of Social Services and Development, Manila, Philippines, June 9, 1978 - Philippine Plaza

Nutrition Center of the Philippines: Plaque of Appreciation: for zealous and dedicated years of service showing deep concern for the welfare of the Filipino children, endearing him to all nutrition workers whom he has guided and inspired in the pursuit of a better quality of life for the children of today and the generations of tomorrow. May 26, 1978 - Manila Hotel Luncheon

Attachment N
Section E

The Honor Society of Agriculture

GAMMA SIGMA DELTA

June 15, 1978

Dr. R. W. Engel
Dept. of Biochemistry and Nutrition
VPI and State University
Blacksburg, VA 24061

Dear Dr. Engel:

It is my pleasure to inform you that you have been selected to receive the Gamma Sigma Delta International Award for Distinguish Service to Agriculture for 1978. You were selected from a slate of very distinguished nominees to receive this, our highest award. The award recognizes your truly outstanding contributions to agriculture, particularly in the fields of biochemistry and nutrition. We recognize that your contributions are truly of international significance. The award is accompanied by a monetary prize of $500. Our International Officers of Gamma Sigma Delta will communicate with you through your Gamma Sigma Delta colleagues at VPI in order to arrange for an appropriate time and place for presentation of the award. The presentation will be made by your friend, Clarence Ammerman, who is the current International President of Gamma Sigma Delta. Please accept our congratulations on this honor and the great achievement which it recognizes.

Sincerely,

D. A. Holt
Past President

DAH/cjk

INSTITUTIONS WITH CHAPTERS

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University of Nevada
North Carolina Agricultural & Technical State University
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The Pennsylvania State University
University of the Philippines
University of Puerto Rico
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University of Tennessee
Texas A&M University
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University of Wisconsin
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PLAN NOW TO ATTEND
THE 1978 BIENNIAL CONCLAVE
University of Tennessee
Knoxville, Tennessee
JUNE 11, 12 and 13

Recipients of Gamma Sigma Delta International Awards for Distinguished Service to Agriculture in Past Years.

1951	Dr. Elvin C. Stakeman	Plant Pathology	Minnesota
1952	Dean H. H. Kildee	Administration	Iowa
1953	Dr. Samuel Brody	Animal Physiology	Missouri
1954	Dr. Clyde H. Bailey	Biochemistry	Minnesota
1955	Dr. Charles J. Willard	Agronomy (Crop Science)	Ohio
1956	Dr. Paul H. Harvey	Agronomy (Plant Breeding)	North Carolina
1957	Dr. William G. Murray	Agricultural Economics	Iowa
1958	Dr. Ernest R. Sears	Agronomy (Cytogenetics)	Missouri
1959	Dr. Reginald H. Painter	Entomology	Kansas
1960	Dr. Gertrude Cox	Statistics	North Carolina
1961	Dr. George A. Young	Veterinary Science	Nebraska
1962	Dr. Ernest A. Fieger	Agricultural Chemistry	Louisiana
1963	Dr. John A. Johnson	Cereal Chemistry	Kansas
1964	Dr. Bernardo G. Capo	Agronomy (Soil Chemistry)	Puerto Rico
1965	Dr. Khem M. Shahani	Dairy Technology	Nebraska
1966	Dr. James D. Johnston	Dairy Science	Louisiana
1967	Dr. Raymond V. Olson	Agronomy	Kansas
1968	Dr. Roy L. Lovvorn	Administration	North Carolina
1969	Dr. John W. Schmidt	Agronomy	Nebraska
	Dr. Virgil A. Johnson	Agronomy	Nebraska
1970	Dr. William Jack Miller	Dairy Science	Georgia
1971	Dr. Leo Dale Newsom	Entomology	Louisiana
1972	Dr. Glenn Willard Burton	Agronomy (Plant Breeding)	Georgia
1973	Dr. E. T. York, Jr.	Administration	Florida
1974	Dr. Earl O. Heady	Economics	Iowa
1975	Dr. Glen S. Pound	Administration	Wisconsin
1976	Dr. Tony J. Cunha	Animal Science	California
1977	Dr. Charles O. Gardner	Agronomy	Nebraska

Dr. Reuben William Engel

1978
Gamma Sigma Delta

International Awardee
for
Distinguished Service to Agriculture

DR. REUBEN WILLIAM ENGEL

Dr. Engel's contributions to human and animal nutrition span the horizon of basic research, teaching and service to his state, nation and the world. Through his leadership the first U.S. Agency for International Development-supported comprehensive nutrition and agriculture program was launched in the Philippines in 1967. His innovations and dedication have resulted in a multi-disciplinary approach to treat and prevent serious problems of infant and child malnutrition. A Past President of the American Institute of Nutrition, Dr. Engel's distinguished service to world nutrition began early in his career as a Food and Nutrition Officer in the World War II Pacific Theater, and continued through his service and participation of the NAS-NRC Food and Nutrition Board, nutrition study section of NIH, consultant to the Interdepartmental Committee on Nutrition for National Defense, and participant in nutrition surveys in Brazil and Haiti. He has served on the IUNS, the U.S. Army Nutrition Research Advisory Board and on numerous Expert Nutrition Committees of WHO.

A Professor of Biochemistry and Nutrition at VPI & SU, Dr. Engel has been Nutrition Advisor to the U.S. Agency for International Development in the Philippine Islands for the past ten years. He has devoted his entire professional career to Public Service in Nutrition and his activities in the Philippine Islands epitomize his efforts to improve the health and economy of people everywhere.

A description of Dr. Engel's activities in the Philippine Islands is presented as a list of accomplishments. It cannot adequately describe the success achieved in obtaining cooperation between the various Philippine government agencies, the academic institutions, industry, agriculture and the various philanthropic organizations to move together toward a common goal of improving the health and economy of the Filipino people. An indication of the success of one of his accomplishments is the recognition by President F. Marcos and his wife, Imelda, that Nutrition deserves attention at the highest government level. Accordingly, President Marcos established the National Nutrition Council in 1974. This Council is chaired by the Secretary of Agriculture and was budgeted with 3.4 million pesos in 1974-75 and 10 million pesos in 1976. In 1975, a building to house and integrate all activities related to Nutrition was completed. Such interest by heads of state in developing countries is unusual.

All of Dr. Engel's contributions are inter-related and overlap in an effort to improve the health, industry and agriculture of the people in the Philippine Islands.

Industry and Agriculture. The Nitribun was initially prepared from Food for Peace commodities from the U.S. Dr. Engel believed that these commodities should be replaced by products produced in the Philippine Islands, thus stimulating local industry as well as decreasing the burden on the U. S. taxpayer. He initiated research on the feasibility of using coconut flour in the Nutribun instead of wheat. Coconut is a major export crop of the Philippines but coconut parings produced during the production of copra could be converted to flour. Research in the U. S. as well as in the Philippines revealed that coconut flour could replace 5 per cent of the wheat flour in the Nutribun.

Dr. Engel has persistently promoted the concept of using indigenous crops for as many uses as possible, thus stimulating agriculture, industry and nutrition.

The Nutribun. As a result of his work approximately 1.6 million school children received the Nutribun as a supplement to their daily intake of food. Five million Nutribuns were dropped from a helicopter to isolated families in rural areas when disaster struck in the form of floods and typhoons. The Nutribun is now a standard form of disaster intervention and has attracted world-wide interest.

Mothercraft Centers. He developed and implemented "Mothercraft Centers" throughout the Philippine Islands to bring adequate nutrition to the rural population as well as to the poor urban dwellers.

Teaching and Research. Teaching is one of his primary objectives and this is accomplished in various ways. Training of hospital technicians, municipal workers, farmers, and mothers is a major part of every program initiated by him. In Manila, a program with an equipped laboratory was organized to teach modern clinical laboratory procedure to hospital technicians.

Publications. Dr. Engel is the author or coauthor of over 70 publications.

CERTIFICATE OF APPRECIATION

awarded to

Frances Engel

in recognition of your gracious and valued activities in promoting friendship and understanding between the people of the Philippines and the United States, in particular for:

your constant and unselfish efforts to develop a greater understanding of the cultures and peoples of the two countries.

MANILA, PHILIPPINES
MARCH, 1978

DAVID D. NEWSOM
AMBASSADOR

ATTACHMENTS

Section B

Attachment A

Section B

IMPROVEMENT OF THE PROTEIN OF RICE DIETS

by R. W. Engel, USAID Nutrition Advisor and Associate Dean for Research,
Virginia Polytechnic Institute, Blacksburg, Virginia

Seminar, Production of Protein-rich Foods, CEU Research and Development Center
Manila, January 23-25, 1969

There is much interest in improving the quality or quantity of cereal proteins, through plant genetics, namely, changing the native cereal protein either in amount or in composition. There is also interest in improving quality through direct addition of amino acids, namely, fortification. The relative merits of these approaches must be assessed for each of the major cereal crops, wheat, rice, corn, or sorghums.

Justification for amino acid fortification of rations is well established as a means of improving the efficiency of production of food-producing animals but it must be remembered that efficient animal rations are highly standardized as to composition and the same mixture is offered to the animal for consumption day after day. In human nutrition the same situation does not prevail. As a matter of fact, quite the reverse is true, namely, variation in menus is encouraged for at least two reasons: (1) people like variety; they do not like to consume the same mixture day in and day out (2) variety in foods is widely recognized as the means by which one can consume a nutrient mixture most likely to satisfy the body's requirement for all nutrients. It is not fool proof, of course, but it is the simplest rule for the average layman to follow who does not have the

technical knowledge or ability to calculate the nutrient contribution of various foods. Historically, variety in diet is implicit in most nutrition teaching, whether it be based on the basic 4 food groups, the basic 6 as is used in the Philippines, or variations of these.

The merits of amino acid fortification of cereals must be assessed for each of the major cereals, wheat, corn, and rice. For the purposes of this discussion, an assessment will also include the merits of fortification for a target population, namely, weanling infants and pre-school children.

The recommended daily dietary intake for a one-year old child in the Philippines is 1200 kilocalories and 36 grams of protein, or about 3 grams of protein for each 100 kilocalories. It is well to remember that calorie or energy intake is important because if calories are not consumed to meet requirements, there is little purpose in worrying about protein.

The fortification of wheat with lysine, the most limiting amino acid, can probably be justified most readily both on nutritional and on economic grounds. White wheat flour (72% extraction) contains 11% of protein and 365 kilocalories per 100 grams, or about 3 grams of protein per 100 kilocalories, the ratio of protein to calories recommended for the young child. In other words, the quantity of protein in wheat is sufficient to balance the calories. Thus a fortification aimed at improving its quality would be justified economically since lysine is now available at about $2.00

per kilogram. The estimated cost of fortifying a kilogram of wheat is about 3 centavos. If all food energy were to come from wheat, the cost would be about 1 centavo per child per day.

The fortification of rice, however, presents a somewhat different problem. One hundred grams of milled white rice contains about the same number of calories (368 kilocalories) as white flour, but the protein content is only 7% or slightly less than 2 grams of protein per 100 kilocalories. Since the one-year-old child requires 3 grams of protein per 100 kilocalories, it would still be necessary to find other protein foods to correct this deficit. With careful selection, it might be possible to find protein foods that would accomplish both the replenishment of the amino acids most lacking in rice (lysine and threonine) and the correction of the total protein deficit of rice. In any event, total protein needs should be the first consideration, since total protein in the diet has an influence on specific amino acid requirements, the requirement being increased with increasing amounts of protein in the diet.

Table 1 contains illustrations of protein resources that might be considered in mixtures with rice to increase the protein level of the diet from about 2 grams per 100 kilocalories (rice) to the required level of 3 grams.

Of the sources contained in Table 1, coconut, fish and legume proteins are locally available or producible in quantities required for the target population. For example, the annual coconut harvest of 20 billion nuts, if the copra meal were to be converted to coconut flour, is nearly 10 times the amount needed for the target population.

Table 2 is presented to illustrate costs, based on present prices or where lacking reasonable estimated retail prices, as for example, for coconut flour and fish protein concentrate.

Of the local protein resources used as examples, dried fish and coconut would appear to be the most economical sources to consider. It should be noted that the calculated daily per child cost is only 5 to 10% of the per capita expenditure for food. The average per capita expenditure for food was estimated to be 0.67 pesos per day in 1965 (Special Release No. 68, Office of the Director, Bureau of the Census and Statistics, Manila, May 1968).

Returning to amino acids, it is now appropriate to determine how well the protein sources (Tables 1 & 2) balance the rice diet for lysine and threonine, the two most limiting amino acids. Table 3 summarizes the average content of these amino acids in these protein sources compared with rice. A detailed analysis would be required to assess the merits of considering amino acid fortification. Suffice it to say that all protein

sources shown will effect some improvement in lysine. Two of the sources, coconut protein and mungo, would not improve the rice with regard to the second limiting amino acid, threonine.

Returning to the question of improving the quantity of protein in rice through genetics, if the average protein content of rice could be increased from 7% to 8%, the quantity of protein foods needed to balance the rice would be reduced by 15%. Although this may not seem large, when one considers the target population as a whole, it would constitute a saving of several million dollars annually in food costs. Whether or not such an improvement in rice protein can be achieved through genetics without sacrificing rice yields must also be considered. Generally when optimum yield is sought, there is a tendency for the protein fraction of cereal grains to decrease.

Why there would be interest in mungo beans is a logical question. Interest can be justified on the ground that it is locally grown, widely a part of the diet of Filipinos, and potential for production is favorable.

It is well recognized that milk and fish are proteins of high quality. Legumes generally are recognized as having proteins of intermediate quality. The preliminary studies with mungo beans and rice have established that with a small admixture of fish such a mixture approaches in protein quality that of milk or animal proteins generally. Also, pre-

liminary studies with coconut flour have established that its quality is equal to that of milk protein. Whether or not this high quality can be maintained in quantity production of coconut flour needs to be investigated. Further, more studies are needed with mixtures of rice, mungo, coconut, and small addition of fish, milk, or other animal protein sources.

This discussion has intentionally avoided mention of soybeans as a protein to supplement the protein of rice because production currently is very low and much work still needs to be done on locally adapted varieties. The contribution soybeans could make is well recognized.

Finally, it is appropriate to mention that whenever programs are launched aimed at changing the food habits of populations, there are likely to be changes in the relative costs of food resources. These are not always predictable but mention is made of them to reinforce the contention that an assessment of costs of fortifying cereal proteins, either in terms of quantity or quality, is difficult.

Summary

Rice contains only about two-thirds as much total protein as is recommended for infants and pre-school children. This fact must be recognized before consideration is given to improving the quality of the protein in rice through fortification with the amino acids which are deficient in rice protein, namely, lysine and threonine in that order.

Coconut flour, fish flour, milk powder and mungo beans have been discussed as possible food resources for correcting the protein-deficit in rice. Individually, or in selected combinations, these protein resources, added to rice in amounts to correct the total protein deficit would at the same time correct the lysine deficiency of rice. Certain combinations of these would also correct the second amino acid deficiency of rice, namely, threonine.

Cost estimates have been made, revealing that fish or coconut flour are least-cost protein resources for improving rice as a food staple for young children.

The caution has been advanced that major changes in food habits can influence market demand, and in turn food costs, thus making it difficult to predict the merits of amino acid fortification of rice once its quantitative protein deficit has been corrected.

Table 1

Amount of protein foods required to improve the protein of a rice diet from approximately 2 grams per 100 kilocalories to 3 grams (diet of 1400 kilocalories and 42 grams of protein, the average requirement for 1 to 6-year-old children).

Source	Amount per Child		Amount for Estimated Population of 6,000,000 children	
	daily gm	annually kg	daily metric tons	annually metric tons(thousands)
Coconut flour (20% protein)	70	25.5	420	154
Non-fat Milk Powder (36% protein)	38.8	14.2	233	85
Fish Protein Concentrate (80% protein)	17.5	6.4	105	39
Local Dried Fish (60% protein)	23.3	8.5	140	52
Mungo Beans (25% protein)	56	20.4	336	124

Table 2

Estimates of Cost of Protein Sources

Source	Per Kg	Per Child		Per 6 M target population
		daily	annually	annually (million pesos)
Coconut flour	1.00	0.07	25.55	153.30
Non-fat milk powder	3.60	0.14	51.10	306.60
Fish protein concentrate	1.64	0.03	10.95	65.70
Local dried fish	2.80	0.065	23.72	143.32
Mungo beans	3.00	0.168	61.32	367.92

Table 3

Lysine and Threonine Contents of Proteins

Protein Source	% Protein	
	Lysine	Threonine
Coconut flour (copra cake) 1/	5.54	3.38
Non-fat milk powder 2/	8.01	4.28
Fish protein concentrate 3/	8.41	4.47
Local dried fish 4/	11.16	5.22
Mungo beans 1/	12.41	3.84
Rice 1/	4.76	4.01

1/ Food Composition Table, FNRC, NIST, NSDB, Handbook 1 4th revision 1968

2/ USDA Home Economics Report No. 4, December 1957

3/ Marine Protein Concentrate, U.S. Department of Interior, Fishery Leaflet 584, April 1966

4/ Private Communication, FNRC, NIST, NSDB, January 1969

Attachment B

Section B

CARRYING OUT A PRE-SCHOOL CHILD ACTION PROGRAM IN NUTRITION

I feel deeply honored to have been given this important task of keynoting an assembly dedicated to serving the public and particularly dedicated to serving the cause of those who are not yet old enough to serve themselves; namely, the infants and young children. I have taken the liberty of slightly modifying the title of this address. We are not going to discuss simply child-feeding programs. We are concerned about nutritional health. Feeding, by itself, does not achieve the result we are after. It is the mother's understanding of the problem of malnutrition in her children that we are trying to improve. Establishing a feeding station is simply the action necessary; and properly supported with technically-trained staff, the feeding station provides the atmosphere or environment for reaching out to the mothers. We call it mothercraft. More properly then,the title for this keynote is "Carrying Out a Mothercraft Program in Nutrition".

I am not going to describe the program in detail. My worthy discussants are in a better position to do this than I am. Both discussants have top-level responsibilities in programs that have as

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Dr. R. W. Engel, USAID Advisor in Nutrition and Associate Dean for Research, Virginia Polytechnic Institute. Presented at Nutrition-Week Workshop of the Federation of Nutrition Councils and Related Agencies, Dr. Paulino J. Garcia Memorial Pavilion, March 7, 1969.

their aim the use of the education and demonstration processes to achieve the goals. In the case of the Department of Education the focus is upon the organized educational facility, the school. In the case of the Department of Health the focus is upon health services as a vital and essential element in reaching the population on all matters of health including Nutrition. Since many of you are lay leaders with a dedicated interest in the problem of malnutrition, I thought it might be more useful if I focused my remarks upon the problem itself and the factors related to it. A clear understanding of the problem is necessary if we are to devise logical action programs.

This nation is facing a serious problem. Of the 6 million children in the population, aged 6 months to 6 years, it is estimated that 3 million are undernourished or malnourished. This estimate is based on a preliminary weight survey of children in barrios on Luzon, both urban and rural, and comparing the results with internationally accepted child weight standards. The results are summarized in Table 1. This estimate supports the data on body weights derived from nutrition surveys conducted by the Food and Nutrition Research Center (FNRC), National Institute of Science and Technology (NIST) and the National Science Development Board (NSDB) although there is some evidence, in this sample, that the situation may have become more critical than the earlier surveys revealed. Table 2 reveals more

forcefully the fact that growth arrest occurs early in life. The average Filipino child requires 40 months to achieve the body stature of a 2-year-old. That the potential exists for the average child in the Philippines to grow at the normal rate is borne out by comparison with Philamlife data on well-nourished Filipino children from well-to-do families. These children required only 25 months to achieve a 2-year old body stature and their body weights are only 3% below the international standard. I know of no more forceful way of illustrating the problem, namely, that the growth arrest occurs early in life. Table 3 shows this in still another way. By 9 months of age, Filipino children have already suffered a set-back so that on the average, they are only 83% of standard weight. By 18 months they are down to 75% of standard and they seem to maintain this level of sub-normal development at least up to 7 years of age. Table 3a presents the problem in still another way. Since the average Filipino child is only 75% of standard in physical growth and development at age 6, it is almost 8 years of age before the body size of a normal 6-year-old is reached. Although we know that mental development takes precedence over physical development, there is nevertheless good evidence that physical growth arrest is also accompanied by some arrest in mental growth. This poses the question: Are 6-year-old Filipino children ready for elementary school when their development implies

a chronologic age of about 3-1/2 years? The nation's resources in elementary education maybe largely wasted if applied to 6-year-old children who in truth do not reach the body stature of a 6-year-old until they are 8 years old.

We are all aware that a poorly-nourished child is less capable of warding-off the debilitating and often fatal infectious diseases. No one questions that the health statistics shown in Table 5 have a relationship to nutrition. The leading reported causes of these infant deaths are pneumonia, beriberi, bronchitis, and gastro-intestinal diseases. Among 1-4 year olds, they are the same except that beriberi is replaced by nutritional diseases other than beriberi among the top four causes of death. There is no indication of improvement in this situation in recent years as is shown in Table 5. As a percentage of all deaths, the slight improvement or slight lowering of deaths among infants is off-set by an equal rise in deaths among toddlers. With the very high birth rate and the rapidly growing population, there were actually over 12,000 more small coffins leading those sorrowful processions to the cemeteries in 1966 than in 1961. These statistics are stark reminders that the problem of malnutrition in young children is a serious one and that action programs are needed.

When such action programs are to be launched, it is also important to examine factors that can influence the chances of their

success. Among these there are such factors as:

Sources of nutrition knowledge for the target population;

Understanding of food economics by the target population;

Eating habits of the target population; and

Extent to which economics is a factor in malnutrition.

The nation has taken important steps forward in trying to reach the population with nutrition or nutrition science information through the Food and Nutrition Research Center and through the Nutrition Foundation of the Philippines. The former agency of government in science matters also has the responsibility of facilitating the incorporation of this knowledge into the textbooks and the classrooms of the schools operating under the Department of Education. Important efforts have been made to reduce this sophisticated nutrition knowledge to the comprehension-level of the barrio citizen but the task is not yet complete. It is still true that we, nutritionists, have not yet found the means of bringing nutrition knowledge into useful or effective focus with the day-to-day life in the barrio. The barrio mother who usually has a very minimum cooking or kitchen facility has difficulty fitting all of the basic 6 food groups into her usual food preparation or cooking pattern for the simple reason that the 12-14 servings recommended somehow

don't fit into the two cooking pots she can manage on her small stove or cooking fire.

As a measure of the success that has been achieved in reaching the rural Philippines with nutrition knowledge, I have summarized the data collected on this subject in the nutrition surveys conducted by the Food and Nutrition Research Center in three regions, namely, the Cagayan Valley-Batanes, the Ilocos-Mountain Province, and the Southern Tagalog regions. This is summarized in Table 6. I don't know exactly how to interpret this survey information, but one conclusion that might be drawn is that rural citizens connect nutrition more with health facilities than they do with schools, with extension programs or with the national science structure. Friends and relatives are still a significant source of information on nutrition and I would suspect this kind of information includes much of the food taboos, food fads or beliefs that do not have a scientific basis. There is obviously need for the science structure of government to look further into effective means of disseminating nutrition knowledge. The observation that health services are most frequently recognized as the source of nutrition information would make it seem logical to identify mothercraft activities with the rural medical services program as is now being done.

The importance of socio-economics must be recognized in the launching of any applied nutrition program, and it is particularly important in launching programs aimed at the dependent segment of the population. Again, because of the high birth rate and the rapid growth in population, the dependent population is very large. Nearly one out of 5 Filipinos is under 5 years of age; nearly one in two is under 15 years of age. With a high birth rate and large families, a significant portion of the total family expenditures must be spent for food. In 1965 the nation's food expenditures amounted to nearly 8 billion pesos and this represented 53.7 per cent of all family expenditures. Despite this high level of expenditure in terms of total resources used for satisfying the basic food, clothing and shelter requirements, the food consumed was nearly 25% deficient in calories alone, disregarding other nutrient deficits. I have attempted to arrive at some estimate of the socio-economic problem. According to the Bureau of the Census and Statistics (Special Release No. 68, May 1968) in 1965 there were 5,126,000 families in the Philippines, distributed as to income, as shown in Table 7. According to that release, in 1965 there were over 1.5 million families with annual incomes below 1,000 pesos. According to my calculations these families would have to receive a subsidy to enjoy a minimum cost adequate diet or improve their home food

production for home consumption to make up the deficit. This is why it is so important that augmented food production must be pursued with vigor, or any attempts at nutrition improvement through mothercraft or other programs will fail.

The eating habits of the target population is, of course, another example of useful background information as to the causes of infant-child malnutrition. It is useful information for planning action programs. What is known about eating habits for infants and pre-school children? Actually very little, and conducting the surveys for such precise information is very costly. Table 8 is a summary of the 2 studies that have been reported in recent years dealing with weaning habits. I have used interview question particularly pertinent to and providing information on the nutrient content of weaning foods and how such weaning food selection were made. It is clear that coffee and rice gruel, both of insignificant nutrient value, were the leading liquid and solid weaning foods. Further, related questions make it clear that neither medical attendance nor advice, even approached advice received by the barrio mothers on infant feeding from relatives and friends. This in itself would be a compelling reason for launching mothercraft programs.

Another factor of importance is an understanding of food economics by the mother or the housewife. The fact that Filipino

families derive more than 70% of their food energy from rice, which is relatively inexpensive food energy, would imply that food economics is well understood. A little further search, however, reveals a very inadequate understanding of food economics. In Table 9 I have summarized survey results from the surveys conducted by the Food and Nutrition Research Center relative to food costs for calories or energy and for proteins. Survey regions included were the Cagayan Valley-Batanes, the Ilocos-Mountain Province, and the Southern Tagalog.

For both calories and proteins, meat, fish, and poultry are 3 times as expensive as are legumes, but 14 times as much money is spent by the housewife for meat, fish, and poultry than for legumes.

I am told repeatedly by the barrio mothers that fats and oils are very expensive foods and cannot be afforded. The fact is, however, that fats and oils as energy sources in the diet are as inexpensive as energy in the form of rice. I stress this point because an infant at the breast is receiving 40% of its food energy from fat. In order to avoid an abrupt change to less concentrated food than breast milk, weaning foods should contain at least 20 or 25% of food energy as fat. This can be accomplished inexpensively but the mothers are lacking this simple knowledge of food economics.

Perhaps through mothercraft this lesson can be taught during shopping expeditions to the local market.

Time does not permit a detailed analysis of the economics of current food habits versus recommended intakes. However, in order to, at least, touch briefly on this subject, I have again chosen data from the nutrition surveys of the Food and Nutrition Research Center. This is presented in Table 10. It should be noted that the food intake levels recommended for daily consumption would increase the daily per capita expenditure for food by as much as 35%. Nearly all of the increased cost would come from the recommended increases in intakes of animal products. The recommendation is that 50% of the proteins in the diet come from animal sources. I do not know of any strong scientific justification for recommending such a high proportion of animal protein in the diet. There is particular need for re-examining this policy recommendation in view of the fact that it markedly increases the cost of the diet and would be unrealistic to achieve for nearly 50% of the families in the country. I believe most of the recommended increase in animal product consumption could be met with increases in legume consumption with no loss in the quality of the protein in the total diet but with considerable savings in per capita food costs.

In summary then, the nation faces a serious problem in that much death and suffering in infants and children has a nutritional basis. The nation is now launching a preventive program and a corrective program which can yield significant benefits not only to health but to the nation's manpower development. The average municipality can operate three mothercraft centers from the savings derived from funeral expenses of infants and children alone. The success of such a program can depend upon many factors and I have attempted to cover some of these. For the program to succeed, there will be need for continuing examination of such factors as socio-economics, population growth, food costs, adjustments in agricultural production and attitudes towards food generally. Solutions to these many problems are feasible and the benefits to the nation can be high. In closing, it is only proper that I pay tribute to the efforts that have set the stage for launching a mothercraft program. The Food and Nutrition Research Center, the Nutrition Foundation of the Philippines, and the Department of Education Applied Nutrition Program operating through the schools deserve praise for the impact that has been made. The Food and Nutrition Research Program has identified local nutritious food resources. The Nutrition Foundation and Education Department Programs have evolved a mechanism for sensitizing the public. A mechanism

has also evolved, through the Coordinating Councils on Nutrition, for organizing local lay leaders. The stage is set, then, for launching a vigorous attack on the problem through mothercraft.

Table 1

Summary of Preliminary Body Weight Survey
of Philippine Infants and Pre-school Children*

Location	Total No. of Children (6 mos to 6 yrs of age)	Substandard in Body Weight	
		No.	%
Urban (4 Bo.)	337	226	67.1
Rural (6 Bo.)	838	434	51.8

Degree of Substandard Body Weight % of Standard	No. of Children
30 - 39	7
40 - 49	14
50 - 59	50
60 - 69	257
Total	328 (28%)

*Source: Preliminary Survey Data, National Nutrition Program (NNP), Department of Health.

Table 2

Chronologic Span Required by Filipino Children
for Achieving International Weight Standards
of a Two-year-old*

Sample	Months	% of Standard at 2 years
Philam Life	25 months	97
F N R C Sample	40 months	78

*Philippine Journal of Nutrition, Vol. XIX, page 29-50, 1966.

Table 3

Average Body Weights of Filipino Children
as Percentage of Standard*

Age in Months	% of Standard
9 months	83.2
18 months	75.6
30 months	75.8
42 months	76.7
54 months	75.8
66 months	76.1

*Source: Preliminary Survey Data, NNP, Department of Health.

Table 3a

Chronologic Age Span Required by Filipino Children
to Achieve 6-year-old Standard Body Weight

	Standard	Filipino
Body weight at 6 years (lbs.)	44.4	33.3
Average age at which 44.4 lbs is reached (month)	72 months	95 months

Table 4

Infant and Child Deaths and All Reported Deaths
(Source: Health Statistics, Department of Health, Manila)

Year	All Deaths	Infant Deaths	1-4 yr. old Deaths
1961	213,587	56,663	39,030
1966	240,865	59,818	48,195

Table 5

Trends in Infant and Child Deaths as Percentage of All Deaths
(Source: Health Statistics, Department of Health, Manila)

Year	Percentage of All Deaths			
	Infants	1-4 yr. old	Both Groups	
			%	Total No.
1961	26.5	18.3	44.8	95,693
1963	26.3	19.1	45.4	
1964	25.2	17.9	43.1	
1965	24.8	19.5	44.3	
1966	24.8	20.0	44.8	108,013

Table 6

Sources of Nutrition Information*
(Total Survey Sample: 2,085 Individuals)

Nutrition Information Source	% of Sample
Health Centers, Physicians, Nurses	28.2
Friends, Neighbors & Relatives	23.1
Food and Nutrition Research Center	10.5
Books, Newspapers, Magazines	9.2
Schools, Teachers & Other School Personnel	8.6
Home Agents or Agricultural Agents	4.9
Radio or Television	4.2
All Other Sources	11.3

*Sources: FNRC Nutrition Surveys: Ilocos-Mt. Province, Southern Tagalog and Cagayan Valley-Batanes.

Table 7

Family Income and Food Costs for Minimum Adequate Diet*

Annual Family Income Range	No. of Families (000)	% of all Families	Minimum Adequate Diet Cost	Subsidy Required**
₱0 -499	594	11.6	₱1095	₱845
500-999	907	17.7	1095	345
	Sub-total	29.3		
1000-1499	856	16.7	1095	none***
		46.0		

* Source Bureau of the Census and Statistics, Special Report No. 68, May 1968. Minimum adequate diet calculated to be achievable at ₱0.50 per capita per day at 1969 retail prices in Manila.

** Altervative to subsidy could be home gardens.

*** For this income group, 87% of income would be required for minimum adequate diet.

Table 8

Data on Infant Feeding Obtained by Interview with Mothers*

Infants who:	% of Those Interviewed
Had never been seen by a physician	50
Were weaned because of another pregnancy	50
Received no supplement (vitamin) to breast feeding	25
Received solid food by 6 months of age	4
Received coffee as liquid weaning food	40
Received milk as liquid weaning food	33
Received milk more dilute than recommended	33
Received rice gruel as first solid food	90
Infants whose mothers:	
Received advice on infant feeding from physicians	12
Received advice on infant feeding from relatives, friends	87

*J. Trop. Ped. & Afr. Child Health, 10:65-73, 1964.
Phil. Pedia., 14:330-39, 1965.

Table 9

Source and Cost of Energy and Protein in Philippine Diets*

	Cost per:		Cost as % of
	100 Calories	10 gr Protein	all food costs
Cereals	₱ 0.013	₱ 0.07	41.0
Legumes	0.024	0.04	1.8
Meat, Fish, Poultry	0.082	0.12	26.0
Fats & Oils	0.013	-	2.3

* Source: FNRC Surveys: Ilocos-Mt. Province, Southern Tagalog, and Cagayan Valley-Batanes.

Table 10

Cost of Present Diet Compared with Cost of Recommended Diet*

	Per Capita Daily Cost	
Food Class	Present Diet	Recommended Diet
All animal products	₱ 0.112	₱ 0.219
All other foods	0.276	0.296
	0.388	0.515
Increase in cost		33%

* Data from Ilocos-Mt. Province Survey, FNRC.

Attachment C
Section B

Body Weight Survey of Infants and Pre-school Children in the Province of Laguna, May - June, 1969

Summary Observations

1. Malnutrition was found to be widespread. Over 50 percent of the children were malnourished to some degree.

2. The average age of the 7,815 children studied was 36 months. Their average physical growth and development was equal to that of a normal 21-month old child.

3. With the present situation continuing, these children will not reach the stature of a 3-year old normal child until they are over 5 years old.

4. In many municipalities the number of female children with severe or third degree malnutrition outnumbered those who were normal in body weight for their age.

5. For the entire sample of 7,815 children, 284 or 3.6 percent were found to suffer severe or third degree malnutrition. When the prevalence of severe malnutrition in children reaches 3 percent of the total child population, it is generally recognized as a serious public health problem.

6. The severity and prevalence of pre-school child malnutrition increased as the number of children in the family increased.

7. The third pre-school child in the family was more stunted than the first or second in 73 percent of the families studies. The fourth pre-school child in the family was more stunted than the older brothers or sisters in 96 percent of the families studied.

8. Spacing of children in a family also affected their nutritional health. In families with less than 18 months between offspring, the second or younger child of the pair was less well developed physically than the first. No doubt this is caused by the declining ability of a mother, because of poor nutritional health, to nurse otherwise feed or care for the younger child.

9. These observations make it emphatically clear that improvement in child feeding deserves the highest priority for relieving a major public health problem. These observations also clearly indicate that proper child spacing and more judicious planning of family size would also be important measures to emphasize for relieving malnutrition in children.

Attachment D

Section B

Abstract Paper: Group Va 4

AID Activities in the Development of Nutritional Institutions in SEAMEC Countries

by R. W. Engel, Nutrition Advisor, USAID/Philippines

USAID is supporting a comprehensive Nutrition Program in the Republic of the Philippines under a bilateral agreement. The program was initiated in 1968. It is based upon the recognition that malnutrition is a complex problem and that, therefore, a multidisciplinary approach is necessary. The program recognizes that the segment of the population most severely affected with nutritional ill health are the toddlers or pre-school children. Therefore, a field-action program aimed at improving child care and feeding through education of mothers is an important program component.

The agencies of the government involved in the program are Health; Agriculture, including extension and community development; Education; and Science. Through the latter the AID-supported program is providing equipment and supplies to Food and Nutrition Research Centers so that local food resource development can proceed under local direction and consort with local food industries. Traineeships in food nutrition, including clinical, is also provided in the AID support as a further means of strengthening local institutions.

This approach, as well as others considered by USAID as applicable to developing countries that have malnutrition problems, will be discussed.

Working Paper: Group Va 4

US AID Activities in Nutrition in SEAMEC Countries
by R. W. Engel, Nutrition Advisor, USAID/Philippines

The US Agency for International Development has, in recent years, given increasing attention to nutrition as a useful component in assistance programs to developing countries. In its 1965 guidelines AID health personnel expressed the view that correcting severe protein deficiencies of pre-school children would have a greater contribution to development than any other health measures, malaria eradication, sanitation and water supply not excluded.

The Food for Peace food donation program of AID has been far more effective in reaching school-age children than preschoolers and infants. The reason is clear. It is easier to deliver the food to the school child than it is to deliver it to the preschooler. The latter is accomplished only through the mother. The recent AID guidelines nevertheless clearly state that the pre-school child is the most vulnerable to malnutrition, and thus high priority should be directed to this age group in nutrition programs.

When guidelines for nutrition programming were developed in the mid 1960's, very few of the USAID overseas missions were staffed with professionals who had the technical capability of initiating programs. Despite this lack of technical expertise on a broad scale, significant steps were taken by USAID centrally in Washington to improve the nutritional situation. Among these actions were:

1. Enrichment of milk and US grains destined for overseas shipment with vitamins and minerals.
2. Research activities into improvement of cereal proteins through amino acid fortification and development of new protein resources.
3. Backstopping mission field staff in Food for Peace, Health, and other technical services with full-time nutritionists in the Technical Services in Washington or through contracts with universities.
4. Encouragement of US industries, through feasibility or incentive grants, to explore the development of new low-cost food formulations.
5. Support of regional meetings to assist countries in identifying nutrition and food problems.

With the recognition that food donation by itself would not lead to significant improvement among malnourished pre-school children, the need was recognized, by AID, of examining alternative approaches in selected countries. The USAID Nutrition Support Program in the Philippines is an example. This program, as planned, recognizes that malnutrition is a complex problem and, therefore, a comprehensive approach is necessary. The agencies involved are health, agriculture, education, social welfare, and research support through science, in this case the Food and Nutrition Research Center, National Institute of Science and Technology, National Science Development Board.

The agency which assumed leadership in implementation of the program was the Department of Health. At this point it is appropriate to emphasize that leadership does not have to be from health in comprehensive program approaches. Any one of the agencies involved could assume the leadership. All are perhaps equally important. In the Philippines, the decision to place the program office in the Health Department was, I think, related to the fact that the infrastructure of about 1,400 rural health units provided a good base from which pre-school child feeding programs could be extended to the population in need. It is appropriate to mention also that a pilot Applied Nutrition Program has been operating in selected schools in the Philippines since the mid 1960's, a UNICEF-supported applied nutrition project. This program utilizes the public school on the assumption that through school gardens, school-lunch programs and nutrition promotion in the community generally, the nutrition impact would penetrate the entire community, including pre-school children. Although this school-oriented program has been quite successful in making communities more nutrition conscious, little evidence has emerged to indicate an impact in the nutritional health improvement of pre-school children. For this reason it was felt desirable, in program planning, to explore the more direct approach to the mothers and pre-school children, namely, mothercraft centers as extensions of rural health units.

The comprehensive program, initiated in August of 1968, will not be described in every detail. Pertinent components can be listed as follows:

1. Mothercraft centers, operated to accommodate about 30 malnourished pre-school children, aged 6 months to 6 years, and with mothers participating in the operation. These are in effect extensions of rural health units.
2. Experimental feeding center in Manila for the purpose of developing acceptable recipes and developing menus for use in the feeding program in the rural areas. This center also serves for preceptor training of field staff in mothercraft center operation.
3. Research support to the Food and Nutrition Research Center, Manila, for identifying local protein resources and processing these to serve as substitutes for food blends initially furnished through Food for Peace donations. Research involves chemical composition and bioassays to determine nutritive qualities as well as freedom from hazardous substances such as aflatoxins.
4. Participant traineeships offered to Filipino technicians on a competitive basis for study abroad to improve local professional competence in both the research and applied aspects of the comprehensive program.
5. Augmentation of production of legumes and other protective foods in the communities where mothercraft activities are initiated.

6. Improvement of the pediatric and dietetic services of provincial hospitals and introduction of malnutrition wards as a part of such hospital services.
7. Incorporation of mothercraft nutrition activities as a useful applied nutrition tool in the formal nutrition course structure of schools of public health, nursing, dietetics, and nutrition.
8. Exploration with local food industry of the feasibility of processing promising local low-cost protein resources into blends for commercial distribution as weaning foods.
9. Improvement of nutrition capability among the voluntary agencies responsible for distribution of donated Food for Peace commodities. This aspect of the program has been facilitated by an incentive grant from USAID, permitting the agency to employ nutritionists who provide nutrition instruction to mothers on the proper use of donated foods through mothercraft centers in the slum areas of Manila. This is in essence a social welfare program since generally family incomes are inadequate to meet food needs among these largely indigenous families.

AID technical assistance in rural development and food production is extended only in those instances where there is a major self-help effort. The Nutrition Program follows this pattern.

In the mothercraft centers operating in the rural areas as extensions of rural health units, no donated Food for Peace commodities are used for pre-school child feeding. All foods used are either donated by participating mothers or are purchased in the local food market. Participating families are expected to initiate home gardens to improve family food and nutrition practices at minimum cost. A series of over 40 recipes have been developed and published in booklet form to assist mothercraft supervisors with menu planning around the locally available commodities. These menus are based heavily upon mongo beans or other legumes as the primary protein supplement to the staple food of milled rice. Local vegetables and fruits are used in the menus to provide accessory nutrients. On the average, local market prices of the food commodities used are such that generally an adequate daily food supply for a 3-year-old child is between 6 and 10 cents (US) per day.

Space does not permit a detailed description of mothercraft centers. This can be found in a publication by Dr. K. W. King entitled "Community Mothercraft Centers", Research Bulletin 13, Virginia Polytechnic Institute, Blacksburg, Virginia, USA. Mothercraft is a term that has been proposed to best describe what is encompassed in reaching pre-school children with better nutrition. The aim of mothercraft centers is to educate mothers on how to

feed and care properly for their infants and pre-school children, using educational techniques compatible with the average village or rural mother's capability and recognizing her usual financial limitations on the family food budget. Although the children in need receive meals at the mothercraft centers, it is really subordinate to the primary objective of educating mothers. The response of the malnourished children obviously becomes a powerful visual aid in improving the mother's understanding of the value of proper food in improving health.

Although the program has been in operation only slightly more than a year, the combined total of urban and rural mothercraft centers now operating number about 30, each serving from 25-35 children and 20-25 mothers. Not all are equally effective. In some centers the growth responses of the malnourished children served are well over the normal growth rate for age, averaging 150-180 per cent of normal. In others these responses are much less.

In the research program in the Food and Nutrition Research Center, animal bioassays have been completed on a food blend in which nearly all the ingredients of the Food for Peace blend CSM (corn-soy-milk) have been replaced by local food resources. The blend, with coconut flour replacing corn meal and mongo bean flour replacing soy, has a protein efficiency ratio equal to that of CSM. Further tests are underway to determine if the milk powder in the blend can be replaced by fish protein concentrate or locally prepared fish flour without loss of quality.

Since there is a variety of activities in this comprehensive approach, the degree to which coordination is achieved becomes highly important. As the program was planned, an interagency committee was the mechanism decided upon for achieving coordination. The Secretary of Health invited the respective cooperating agency heads to appoint one representative each to such an interagency group. All of us are aware of the difficulties of achieving a truly coordinated attack on a problem as complex as malnutrition and the experiences thus far in this program are no exception. After a year of experience with the interagency nutrition committee approach, there is emerging a strong sentiment for achieving overall administrative control for all nutrition activities in the Philippines by merging agency representation for food with that for nutrition. Overall coordination for food resides in the National Food and Agricultural Commission in the Office of the President. This commission, formerly the Rice and Corn Production Coordinating Council, is credited with organizing the coordinated program which achieved rice sufficiency in the Philippines in 1968. Under its newly designated title of Food and Agricultural Commission, its role is expanded to cover augmentation of production of a variety of other foods as a basic necessity for achieving total self-sufficiency in foods both in quality and quantity. The merging of top level nutrition planning with food planning would seem to be a logical step. Such a top level administrative structure would assure that food production becomes synchronized with nutritional demand.

This discussion would not be complete without the precaution that the Nutrition Program presented here for the Philippines should not be considered necessarily ideal for all other countries. AID recognizes that in addition to complexity, malnutrition does emerge with characteristics varying from one country to the next. For this reason, current AID policy encourages technical assistance to countries expressing interest on a project basis. The project approach is particularly appropriate for countries which have only a minimum capability for planning comprehensive programs due to lack of trained professionals in Nutrition.

Before comprehensive programs for nutrition are planned, there should be an advance assessment of the identifiable factors which are important to long-range program development. Among these are the following:

1. Prevalence and types of malnutrition in the country.
2. Food production statistics and food composition tables so that an assessment is possible of the balance between availability of food and requirements for optimum health.
3. Nutrition education at all levels in the educational structure and the rate of trained manpower production.
4. Transportation, storage, processing, distribution, and marketing systems for the food supply.
5. Regulations relating to food safety, wholesomeness, and freedom from adulteration.

NUTRITION IN DEVELOPMENT

Until recently, it was common to treat nutrition among the welfare factors and not among the development factors. That is not to say that development planners completely ignore welfare factors. However, such factors are usually given very low priority, particularly in developing countries where resources are limited. During the past decade, nutrition has received increasing attention as a public policy issue. The point has now been reached where calling attention to it no longer suffices. In many quarters, including international agencies, forces are at work to build the case for nutrition as an important variable to be considered in development plans and programs. What are the arguments for such a case?

1. Malnutrition in early life results in permanent impairment of intellectual capacity.

   Within the past few months, it has been shown clearly that poor nutrition during the first year of life results in a reduced total number of brain cells and thus a reduced intellectual capacity. Since most of the growth (number of cells) of the brain occurs before birth, it is generally agreed that poor nutrition in the pregnant woman may have a greater effect on mental retardation of the child than a poor nutritional state during the first year after birth.

For practical policy purposes, the number of individuals affected and the extent to which their intellectual capacity is impaired are far more important than the question of whether or not the process can be reversed. For reversal to occur, it is, of course, pre-supposed that as the child grows up, more and better food will become available to it. This,of course, is also false reasoning unless action programs are initiated to alleviate malnutrition.

To the development planner, does it really matter whether the mental retardation seen in malnourished children was caused by poor economic status, poor educational status of the mother or father, poor hygiene in the home, poor food patterns, stunted growth due to repeated infections, or simply the drab non-stimulatory environment of the home? All these factors are relevant and many interact with each other; thus, the task of unravelling the root cause of mental retardation calls for expensive long term longitudinal research programs which have no place in planning action programs in developing countries where resources are limited. The point here is that inclusion of well-conceived action programs for improving the nutrition of the infant and pre-school child will of itself bring about improvements in all other factors generally mentioned as contributory to developmental retardation in children.

2. Malnutrition can lead to permanent arrest in physical development

It is not easy to build a case for the argument that under

nutrition in early life produces smaller bodies which in turn, do not have as great a capacity to perform assigned tasks. Certainly, the small physical stature of the Japanese race has not deterred its climb to a highly developed prosperous nation in a very short post-war period. While this climb in economic development occurred, there was, of course, a considerable improvement in nutritional well-being and also an acceleration in the physical growth of Japanese children. Both nutrition and family planning were important components of the Japanese recovery program and these 2 programs actually operated as an integrated activity.

The fact that Japanese children are now larger in body size does not necessarily mean they are healthier. It is, however, inevitable that if children are offered wholesome nutritious foods in sufficient quantity to satisfy their appetites, they will grow at a rate equal to their genetic potential, barring the intervention of debilitating disease. Stated in another way, the current best measure of nutritional health in children os optimum growth. Whether or not some slower growth rate would lead to still better nutritional health, such as increased longevity, can only be answered by expensive long term longitudinal studies that would be of little or no concern to planners in developing countries.

Thus, the argument of whether or not smaller people reduce productivity has no relevance in development planning. Improved nutrition, which is relevant to development, will inevitably

result in larger bodies.

3. The Nutrition problem is solved by increasing incomes

The argument that increased income will automatically improve nutritional health is indeed the basis for generally excluding nutrition as a variable among the social, political, and economic indications in development planning. There are, however, many indications that the argument has faults. The migration to the cities, a trend in all developing countries, is made by relatively illiterate young families in the quest for the better life and the higher income. Even though income may be higher, it does not necessarily follow that nutritional health will improve. As a matter of fact, the reverse usually happens. Because such a young mother is generally poorly educated, she substitutes the bottle for the breast in nourishing her infant. But she cannot read the label so usually over-dilute formulations are fed. Further, she does not understand the elements of sanitation so the formula fed is likely to be contaminated and lead to infections. Finally, her reason for migrating was to find a better life so some of the new income goes for transistor radio, ball point pens, flashlights, and other affluent factors in her new environment. Thus, increased incomes does not necessarily lead to better diets in a developing situation. Only in developed societies can economists predict fairly accurately how much rise in food purchases can be expected from a given

rise in income or purchasing power.

For the Philippines, the argument that increased income will solve the malnutrition problem is of course a myth for perhaps as many as one and half million families. Only through miraculous economic growth could it be otherwise for these families. Even with a real economic growth rate of 3 per cent annually, a reasonable guess is that there would still be nearly a million families a generation from now who would be malnourished because of low income.

The argument that increased income will solve the malnutrition problem can be accepted only if one is willing to wait a generation to solve the problem. Development planners generally are impatient with such slow results.

4. Assuming health deserves a place in development program, nutrition deserves the highest priority.

Can the argument be defended that nutrition deserves the highest priority among health or preventive medicine programs in the Philippines? It probably can. Health specialists generally agree that low infant mortality in a population is an indication of relatively sound and adequate overall general health and social services. Such specialists also agree that a relatively high mortality rate among children aged 1-4 years is an indication of poor nutritional health, particularly if these high child mortality rates are found where infant mortality rates are relatively

low. In the Philippines, the mortality rate among toddlers is 10-15 times as high as in Western European Countries, contrasted with infant mortality rates only 2-3 times higher. Thus, if one accepts reported vital statistics, a strong case can be made for a high priority for nutrition in health program planning.

5. A High priority for nutrition in development planning implies malnutrition is amenable to eradication, just as infectious diseases, given proper inputs.

Although there are not many examples of success on a national scale, certainly the experience with Vitamin D fortification of milk, salt iodization and cereal enrichment with vitamins and minerals have gone a long way towards eradicating target diseases such as rickets in children, goiter, and B-vitamin deficiencies. The case of iron-fortification and anemia alleviation is weak and the reason is perhaps that fortification levels have not been sufficiently high.

It is, therefore, possible to build a case for nutrition programs that would lead toward eradication of certain nutritional problems (vitamin-mineral deficiencies) by fortification or enrichment of staple foods with vitamins and minerals. All known important vitamin and minerals can now be included in such enrichment media at a cost of between 30 and 50 U.S. cents per capita per year. This cost is probably not much more or may be even less than the cost of immunizing the population against the major infectious conditions such as diptheria, smallpox, polio myelitis, typhoid fever, etc.

The case becomes more equivocal, however, when one considers that the major nutrition problem in the Philippines is not vitamin or mineral deficiencies but calorie and protein deficiency. For the correction of the calorie deficiency alone, it would cost nearly 2 billion pesos annually to do it with the nations food staple, rice, with the price of rice at the current rate of 2 pesos per ganta (2.2 kg.).

Because of this high cost, there must be alternatives found if a case is to be built for the argument that malnutrition can be eradicated, given proper consideration in planning. A policy decision to promote vigorously (and to see to it that the necessary inputs are available such as seeds, fertilizer, pesticides, and simple preservation techniques), the home production of foods for direct home consumption (since 75% of Philippine families still live in the rural environment where such an action program is possible) would be a logical alternative approach to solving the calorie deficiency and the protein deficiency at relatively low cost.

6. Inadequate diet leads to lowered productivity of the work force.

This argument is not easy to support with sound data in the rice-eating populations of Southeast Asia. The single most important nutrient is, of course, calories, but when a labor surplus exists, and there is no pressure for maximum output per man hour, it is difficult to prove that the cost of rice would be lowered to the average consumer if the man producing the rice were to do it more

surplus, this argument is difficult to sell to development planners.

In developed countries, there is ample evidence that this factor has been recognized. German work physiologists kept accurate records of productivity among German steel workers and coal miners as related to caloric intake. A 1000 calorie reduction in food energy intake (from about 4200 to 3200 kilo calories per day) resulted in a 25% reduction in steel output per man per month (from 120 tons to 90 tons). Coal production per man per day dropped from 1.90 tons to 1.65 tons.

Farmers in Europe require 3600 kilo calories daily to be fully productive. The productivity decreases 30% or more if their caloric intake is decreased 16%.

Such basic data from Europe has recently been used by one economist to arrive at an estimate of the average Filipino laborers work capacity. Based on the per capita caloric intake reported by Philippine nutritionists, the average Filipino laborer can work at only 74% of capacity.

Economists are beginning to consider nutrition as a variable in evaluating the factors in economic development. The increments of gain in agricultural production in Taiwan between 1935 and 1960 have recently been analyzed in terms of significant input variables that could be quantitated. Improved work capacity of the farm labor force due to better nutrition was credited with 61.3 per cent of the total gain in agricultural production over that 25 year period. Increased working capital was credited with 18.8 per cent while size of work force was the third most important, accounting

for 16% of the gain.

Making a case for nutrition in development planning as the basis of its impact on productivity is not difficult. What is difficult, however, is selling the idea in development situations where labor is surplus. However, in the interests of developing a competitive position in world markets for the products of labor, adequate nutrition for efficient productivity is essential.

7. Nutrition is a necessary component of family planning.

In a country with serious child malnutrition problems, it would seem expedient to invest in improvement of the survival of pre-school children through better nutrition since it is widely recognized that this is an important factor in reducing the size of a family. As the survival of existing children improves, the desire to have more children decreases. This is perhaps the most improtant case for the argument of combined family planning-nutrition program.

The avenues open for and the delivery system used to bring family planning services to the population are the same as those traditionally used to affect nutritional improvement. The customer to be reached is the mother, primarily. Assuming that a case for nutrition is development planning has been made, the best delivery system then, is for the nutrition program to be integrated with the family planning program.

Family Planning as an international issue has high priority today because of the alarm created by dwindling world food supplies during the past 2 decades coupled with a high rate of population

growth in those areas of the world where food deficits were most critical. National planning without attention to nutrition, the science of food in relation to health, would actually appear to be irrational in light of this background.

8. The major obstacles to sound nutritional health are mostly outside the sphere of either the nutritionist or the family planner.

Nutrition operates in a vacuum without food, and because nutrition is generally aligned with health in delivery systems, the development planner is often confused. Should the delivery system be in agriculture, since it is responsible for producing the food, he can well ask? This is, in fact, a reason why even in developed countries, the case for nutrition in development planning is confused.

An assessment, without regard to priorities, of obstacles to nutritional health, leads to the following:

a. Illiteracy or misinformation - Nutrition knowledge in the Philippines is sought more through relatives, friends, and neighbors than through conventional educational channels, according to GOP survey results.

b. Lack of motivation by the power structure - The Philippine Government has had a dietary standard for over a decade but there has been no firm indication that this is heeded by those responsible for food production targets and goals.

c. Difficulty in reaching the pre-school child, the place where the malnutrition problem has its origin. This reach-out must be down to the individual home-maker. Seeking economical yet effective reach-outs is a major justification or purpose

for the existing nutrition-support aspects of the Philippine Family Planning program.

d. Non-availability of highly nutritious food products at low cost to consumers.

The cost of convenience weaning foods now available in the Philippines is so high that well over 90% of the households cannot afford them. Again, the existing nutrition-support program is seeking low-cost alternative products or approaches.

e. Lack of sufficient production of less expensive protein crops.

National Food production planning has until recently ignored such crops as local legumes as low cost sources of protein for home production and consumption.

f. Low purchasing power due to poverty, due to limited job opportunity, due to low state of economic development.

Almost one third of Filipino households have to subsist on 2.50 pesos a day,which is less than the cost of one package of imported cigarettes.

g. Large family size to share limited food available, early weaning due to next pregnancy, and related problems.

The Laguna province survey under auspices of the FP nutrition support program revealed that child nutritional health deteriorated with increasing numbers of pre-school children per household and also with spacing of less than 18 months between pregnancies.

h. Malabsorption of available nutrients due to disease and infections.

Intestinal parasitism is known to lower digestibility and utilization of nutrients, although the amount of this loss is generally less than 4 or 5% of the total nutrients consumed. There are probably other malabsorption problems more important that need researching. For example, there is no information on the extent to which Lactase deficiency in the digestive system of the Filipino child may impair utilization of the milk sugar in the 2,000,000 dollar food donation program in the form of non-fat dry milk solids.

These obstacles to improving the nutritional health of Filipinos have been listed in this order intentionally. Nutritionists and Family Planners have a major direct role to play in only the last 2 of these 8 obstacles. In all other cases, the work that needs to be done to overcome the obstacles to better nutritional health involve primarily agriculture, education, and national economic planning councils.

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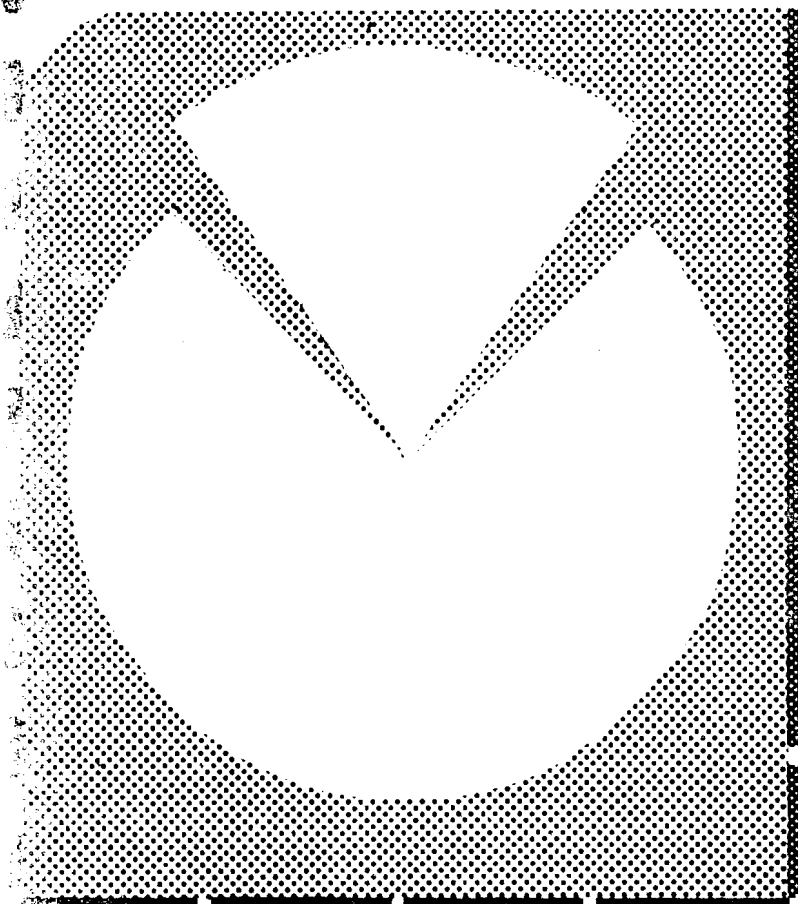
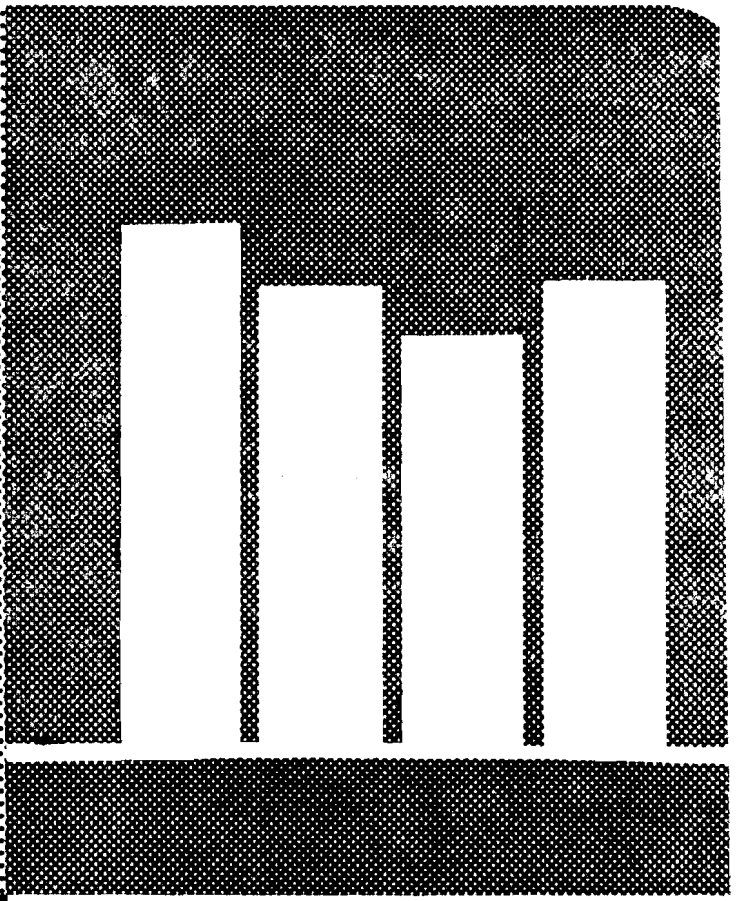
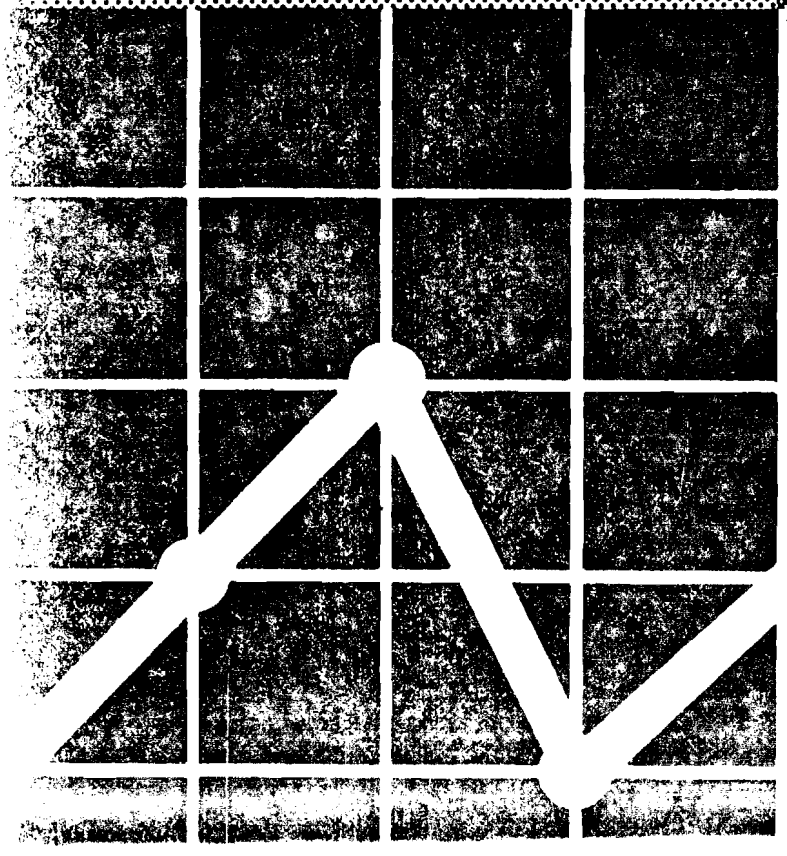
NUTRITION STATISTICS & GUIDELINES







THE TARGETED MATERNAL CHILD HEALTH (TMCH) NUTRITION PROGRAM GUIDELINES [1]

I. Purpose

Recognizing that correcting calorie-protein malnutrition is difficult and also costly, particularly in the preschool child and infant, this program has as its purpose the chanelling of U.S.-donated food commodities to the most undernourished. The program has set the very ambitious goal of successfully supplementing the diets of up to one-half of the undernourished preschool children living between 1972 and 1976 and educating mothers on the value of nutrition. The program also recognizes that undernourished children are often the product of poorly nourished mothers and thus also makes provision for the participation of pregnant women and lactating mothers.

II. Eligibility for Participation

1. All infants aged 6 to 11 months are enrolled.

2. Children aged 12 to 60 months are enrolled if their body weight is 75% or less of normal for their age.

3. Pregnant women and lactating mothers are enrolled if they have undernourished children or infants enrolled in the program. As a general policy, the ratio of pregnant and lactating mothers to infant and child enrollees should be maintained at about 2:5.

III. The Food Supplement

Since the purpose of this program is successfully supplementing the inadequate diet which has precipitated undernutrition, or providing a successful supplement early to avert undernutrition, the daily supplement should supply at least 425 calories and 20 grams of protein. On the average, this supplement is one-fourth to one-third the daily energy requirement and half or more of the protein requirement of infants and young children. Further, to insure optimum benefit, the commodities available for the program have been fortified with vitamins and minerals.

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[1] Nutrition Division, USAID, Manila.

IV. Duration of Supplemental Feeding

1. Infants aged 6-11 months are enrolled for 18 months except for those below 60% of standard weight. These are enrolled for 24 months.

2. Children aged 12 to 60 months are enrolled for 18 months if body weight is between 60 and 75% of normal upon enrollment. Enrollment extends to 24 months for those initially below 60% of normal.

3. Pregnant and lactating women are enrolled for the duration of pregnancy or lactation.

V. Conditions for Continuing Participation in the Program

If a child fails to maintain satisfactory recovery (on schedule) for three consecutive months, the food supplement will be discontinued. (See Directions for Use of Child Growth Records below). Through guidance and counsel by a nutritionist and by local volunteers assisting in the program, every effort will be made to assure that illnesses or infectious diseases are ruled out as causes of consistently poor growth and development among the participating children. In other words, termination of food supplement will be considered an extreme measure to be invoked only after it has been established that poor performance is due to lack of proper motivation of the mother in the adequate feeding of her family.

VI. Participating Agencies

1. Philippines

a) The Department of Social Welfare provides funds for receipt and inland handling of food commodities and technical assistance.

b) The Departments of Health and Agriculture provides technical assistance and training.

c) Any agency, public or private,which has as its purpose the improvement of the health or welfare of Filipino infants and preschool children is eligible for participation in this program. Participation can be solicited through the U.S. Voluntary Agencies concerned with donated food programs. (See below).

2. United States

a) The following U.S. Voluntary Agencies administer this Food and Nutrition program in the Philippines:

Catholic Relief Services
2655 F. B. Harrison
Pasay City
or
P. O. Box 1160
Manila

Division of Self-Development
National Council of Churces in the
Philippines (DSD, NCCP)
941 E. de los Santos Avenue, Quezon City
or
P. O. Box 1761
Manila

b) The USAID in Manila has Nutrition and Food for Peace Divisions to assist the participating agencies with professional and technical advisory services.

VII. Records and Reporting System

Any agency, private or public, participating in this program will be required to report quarterly the information contained in Tables 1 and 2.

VIII. Implementation Plans

No firm or hard implementation rules are deemed desirable.

Annex A sets forth some useful background information.

Annex B provides some useful information in bodyweight surveys and identification of target population.

ANNEX A

PLANNING AND IMPLEMENTATION

1. In order to assure complete coverage, implementation planning should consider reasonably complete inclusion of all the population in the area, be it a barrio, poblacion, city, municipality or province.

2. As a general rule, a population of about 5,000 is needed to have enough enrollees for the ideal size food donation unit. This is considered by the U.S. Voluntary agencies to be about 250 recipients; namely, 180-220 malnourished children and 30-70 pregnant women or lactating mothers. Thus, for an average town of 20,000 people, the agency or agencies contemplating a program should consider the following requirements in terms of local volunteer workers to help with mother education and with assuming the responsibility of maintaining the necessary food and nutrition records.

a) From 3 to 5 food for peace consignees, each able to handle food for 250 enrollees, experience has indicated this might require as much as 4 to 5 days of work each month.

b) From 15 to 25 volunteer workers willing to organize participating mothers into classes for purposes of teaching them how to utilize the donated food in locally developed recipes as a supplement to the regular diet of their participating children. Such volunteer would need to devote 2 to 3 days of work to the program each month.

3. Cooperation and Coordination

For a given location, the initiative for an action program may have arisen from either the private or the public sector. Generally, since both private and public efforts are needed to find enough workers for an effective program, it will be desirable to organize a community maternal child health council or committee to serve as the overall community agency responsible for program development and coordination of effort.

4. Preventive Aspects and Coverage of the Community

As already stated under eligibility requirements, a vigorous preventive program is desirable because if future child malnutrition can be halted before it becomes serious the need for long and tedious rehabilitation will have been avoided.

Therefore in program planning, volunteer workers should be selected who know their work regions (towns or barrios) very well, know the composition of families and the ages of the eligible children. A really effective worker, for example, would be one who knows when every infant in the community reaches 6 months of age and needs to be checked and enrolled in the program if it qualifies. Communities which can organize themselves effectively for early enrollment of children will have the most effective programs in the long run.

ANNEX B

DIRECTIONS FOR CONDUCT OF BODYWEIGHT SURVEY TO IDENTIFY THE TARGET CHILD POPULATION

Any agency, private or public wishing to participate in the TMCH nutrition program must identify enrollees by name, date of birth (for children only), and their bodyweight and the date the weighing was accomplished. For pregnant or lactating enrollees identification by name only is sufficient (see Table 1).

The following are useful suggestions for conduct of the bodyweight survey:

1. Usually two persons comprise a bodyweight survey team, one to record and the other to conduct the bodyweight measurement.

2. Weighing should be done with a minimum of clothing and without any shoes or footwear.

3. Care should be taken to be certain the scale reads "0" when empty. Scales that do not have "0" adjustment mechanism should not be used. For the initial bodyweight survey, the use of bathroom scales is adequate. However, for actual enrollment and for completion of the child growth record and target growth line all child enrollees should be reweighed on a clinical scale which is adjustable to "0" and which weighs accurately to within 0.25 pound or 0.1 kilogram.

4. To assure complete coverage, the bodyweight survey should be conducted from house-to-house. This is very important. The families who have the most severely malnourished toddlers are the ones most likely not to come to a weighing site because of weakness and lack of energy.

5. Also, to insure complete coverage the area to be surveyed should be carefully defined geographically. All houses on a designated block of streets or highways or all houses in a given barrio would be examples of geographically defining the area to be covered.

6. In cases where the public sector assumes strong interest and active participation (mayor, barrio captains) it might be desirable to complete the weight survey of the entire municipality including the poblacion (divided into geographic sections to insure complete coverage) and all accessible barrios. This can be accomplished for an average community of 20,000 (poblacion and about 18-20 barrios) in a week or ten days by 4 or 5 weigh-teams.

7. In cases where initial community interest and available volunteer workers or manpower are insufficient for complete coverage, it would still be important to carefully define the geographic area by the initial weight survey to be covered. If interest grows as the program is introduced, the weight survey can then be extended to the geographic areas not covered initially under a planned schedule, assuming a team can generally conduct a house-to-house bodyweight survey of a typical barrio in 1.5 to 2.0 days.

8. Data obtained from the weight survey should be summarized using Table 2.

9. All agencies participating in the program should maintain records of the type shown in Table 3 as a measure of progress in implementation of their program.

Table 1

WEIGHT SURVEY FORM

Centers: _____ Date of Survey: June 30, 1972

Province: _____

Municipality: _____

Barrio: _____

NAMES	Pregnant	Nursing	Birthdate	Age in months	Weight Lbs/Kg	Nutritional Level *
1. Maria Cruz						
1) Ana			[redacted]	11	12.0	8
2) Jose			[redacted]	33	22.0	5
2. Josefa Reyes	x					
3) Marcelo			[redacted]	29	25.0	2

* See Table of Nutritional Levels for Weight by Age.

NUTRITIONAL LEVELS BY WEIGHT FOR AGE*

NUTRITIONAL LEVELS

(% Standard)

Age in months	10 (-50%)	9 (51-55%)	8 (56-60%)	7 (61-65%)	6 (66-70%)	5 (71-75%)	4 (76-80%)	3 (81-85%)	2 (86-90%)	1 (91-100%)
6	3.7**	4.1	4.4	4.8	5.2	5.6	5.9	6.3	6.7	7.4
7	4.0	4.3	4.7	5.1	5.5	5.9	6.3	6.7	7.1	7.9
8	4.2	4.6	5.0	5.5	5.9	6.3	6.7	7.1	7.6	8.4
9	4.6	4.9	5.3	5.8	6.2	6.7	7.1	7.6	8.0	8.9
10	4.6	5.1	5.5	6.0	6.4	6.9	7.4	7.8	8.3	9.2
11	4.8	5.3	5.8	6.2	6.7	7.2	7.7	8.2	8.6	9.6
12	5.0	5.4	5.9	6.4	6.9	7.4	7.9	8.4	8.9	9.9
13	5.1	5.6	6.1	6.6	7.1	7.6	8.1	8.6	8.1	10.1
14	5.2	5.7	6.2	6.7	7.2	7.7	8.2	8.8	9.3	10.3
15	5.3	5.8	6.4	6.9	7.4	8.0	8.5	9.0	9.5	10.6
16	5.4	5.9	6.5	7.0	7.6	8.1	8.6	9.2	9.7	10.8
17	5.5	6.1	6.6	7.2	7.7	8.2	8.8	9.4	9.9	11.0
18	5.6	6.2	6.7	7.3	7.8	8.4	9.0	9.5	10.1	11.2
19	5.7	6.2	6.8	7.3	7.9	8.5	9.0	9.6	10.2	11.3
20	5.8	6.3	6.9	7.5	8.1	8.6	9.2	9.8	10.4	11.5
21	5.9	6.4	7.0	7.6	8.2	8.8	9.4	9.9	10.5	11.7
22	6.0	6.5	7.1	7.7	8.3	8.9	9.5	10.1	10.7	11.9
23	6.0	6.6	7.2	7.8	8.4	9.0	9.6	10.2	10.8	12.0
24	6.1	6.7	7.3	7.9	8.5	9.2	9.8	10.4	11.0	12.2
25	6.2	6.8	7.4	8.1	8.7	9.3	9.9	10.5	11.2	12.4
26	6.3	6.9	7.5	8.1	8.8	9.4	10.0	10.6	11.2	12.5
27	6.3	6.9	7.6	8.2	8.8	9.4	10.1	10.7	11.3	12.6
28	6.4	7.0	7.7	8.3	9.0	9.6	10.2	10.9	11.5	12.8
29	6.5	7.1	7.7	8.4	9.0	9.7	10.3	11.0	11.6	12.9
30	6.6	7.2	7.9	8.5	9.2	9.8	10.5	11.1	11.8	13.1
31	6.6	7.3	7.9	8.6	9.2	9.9	10.6	11.2	11.9	13.2
32	6.7	7.3	8.0	8.6	9.3	10.0	10.6	11.3	12.0	13.3
33	6.8	7.4	8.1	8.8	9.4	10.1	10.8	11.5	12.2	13.5
34	6.8	7.5	8.2	8.8	9.5	10.2	10.9	11.6	12.2	13.6
35	6.9	7.6	8.3	9.0	9.7	10.4	11.0	11.7	12.4	13.8
36	7.0	7.6	8.3	9.0	9.7	10.4	11.1	11.8	12.5	13.9
37	7.0	7.7	8.4	9.1	9.8	10.5	11.2	11.9	12.6	14.0
38	7.1	7.8	8.5	9.2	9.9	10.6	11.4	12.1	12.8	14.2
39	7.2	7.9	8.6	9.3	10.0	10.7	11.4	12.2	12.9	14.3
40	7.2	7.9	8.6	9.4	10.1	10.8	11.5	12.2	13.0	14.4
41	7.3	8.0	8.7	9.4	10.2	10.9	11.6	12.3	13.1	14.5
42	7.4	8.1	8.8	9.6	10.3	11.0	11.8	12.5	13.2	14.7

* Weights have been rounded to the nearest 1/10 kg.

**Figures indicate upper limit of nutritional level.

Nutritional Levels by Weight for Age (cont'd)
Nutritional Levels
(% Standard)

Age in months	10 (-50%)	9 (51-55%)	8 (56-60%)	7 (61-65%)	6 (66-70%)	5 (71-75%)	4 (76-80%)	3 (81-85%)	2 (86-90%)	1 (91-100%)
43	7.4	8.1	8.9	9.6	10.4	11.1	11.8	12.6	13.3	14.8
44	7.5	8.2	8.9	9.7	10.4	11.2	11.9	12.7	13.4	14.9
45	7.5	8.2	9.0	9.8	10.5	11.2	12.0	12.8	13.5	15.0
46	7.6	8.3	9.1	9.8	10.6	11.3	12.1	12.8	13.6	15.1
47	7.6	8.4	9.1	9.9	10.6	11.4	12.2	12.9	13.7	15.2
48	7.7	8.5	9.2	10.0	10.8	11.6	12.3	13.1	13.9	15.4
49	7.8	8.5	9.3	10.1	10.9	11.6	12.4	13.2	14.0	15.5
50	7.8	8.6	9.4	10.1	10.9	11.7	12.5	13.3	14.0	15.6
51	7.8	8.6	9.4	10.2	11.0	11.8	12.6	13.3	14.1	15.7
52	7.9	8.7	9.5	10.3	11.1	11.8	12.6	13.4	14.2	15.8
53	8.0	8.8	9.6	10.4	11.2	12.0	12.8	13.6	14.4	16.0
54	8.1	8.8	9.7	10.5	11.3	12.1	12.9	13.7	14.5	16.1
55	8.1	8.9	9.7	10.5	11.3	12.2	13.0	13.8	14.6	16.2
56	8.2	9.0	9.8	10.6	11.4	12.2	13.0	13.8	14.7	16.3
57	8.2	9.0	9.8	10.7	11.5	12.3	13.1	13.9	14.8	16.4
58	8.3	9.1	10.0	10.8	11.6	12.4	13.3	14.1	14.9	16.6
59	8.4	9.2	10.1	10.9	11.8	12.6	13.4	14.3	15.1	16.8
60	8.4	9.3	10.1	11.0	11.8	12.7	13.5	14.4	15.2	16.9
61	8.6	9.4	10.3	11.1	12.0	12.8	13.7	14.5	15.4	17.1
62	8.6	9.5	10.3	11.2	12.0	12.9	13.8	14.6	15.5	17.2
63	8.7	9.6	10.4	11.3	12.2	13.1	13.9	14.8	15.7	17.4
64	8.8	9.6	10.5	11.4	12.2	13.1	14.0	14.9	15.8	17.5
65	8.8	9.7	10.6	11.4	12.3	13.2	14.1	15.0	15.8	17.6
66	8.9	9.8	10.7	11.6	12.5	13.4	14.2	15.1	16.0	17.8
67	9.0	9.9	10.8	11.7	12.6	13.5	14.4	15.3	16.2	18.0
68	9.1	10.0	10.9	11.8	12.7	13.6	14.5	15.4	16.3	18.1
69	9.2	10.1	11.0	11.9	12.8	13.7	14.6	15.5	16.5	18.3
70	9.2	10.2	11.1	12.0	13.0	13.9	14.8	15.7	16.6	18.5
71	9.3	10.2	11.2	12.1	13.0	14.0	14.9	15.8	16.7	18.6
72	9.4	10.3	11.3	12.2	13.2	14.1	15.0	16.0	16.9	18.8

USAID/NTR-2
6-8-72

Table 2

SUMMARY OF WEIGHT SURVEY DATA

A. No. of families surveyed _____

B. No. of children surveyed _____

C. No. of pregnant mothers _____

D. No. of nursing mothers _____

Children

Nutritional Levels	AGE GROUP (MONTHS)					TOTALS
	6-11	12 - 23	24 - 35	36 - 47	48 - 60	
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
Totals						

Table 3

CONSOLIDATED REPORT

For the month of _____ 19 __

Project Target	Monthly Target	Activities	This Month	Cumulative to date
_____	_____	No. of infants (6-11 mos.)	_____	_____
_____	_____	No. of pre-schoolers (12-60 months)	_____	_____
_____	_____	No. of pregnant women	_____	_____
_____	_____	No. of nursing mothers	_____	_____
_____	_____	No. of nutritionists fielded	_____	_____
_____	_____	No. of TMCH Centers reporting	_____	_____

Directions for use of Child Growth Record

The Child Growth Record should be completed for every child enrolled in the TMCH program. It has value, when properly used, as an educational tool for the mother. It is also to be used by mothercraft class supervisors and food consignees to complete monthly reports which identify number of children on schedule toward nutritional rehabilitation. The program envisions nutritional rehabilitation in 18 to 24 months, depending upon the severity of malnutrition at the time of enrollment.

For children between one and five years of age, a child is deemed on schedule and would be recorded on schedule in Table 1, if rehabilitation is achieved (76% of normal) as follows:

a) In 18 months for those who initially were between 60 and 75% of normal.

b) In 24 months for those who initially were less than 60% of normal.

Mothercraft class supervisors, with the assistance of a nutritionist or nutrition aide should draw in the growth chart lines defined by the above conditions (target growth lines). When monthly body weights are plotted, mothers can be shown if their children are on schedule. To be on schedule, they must remain on or above their target growth line.

Specific examples follows:

Example A. A child was born in January 1971 and was enrolled in the TMCH program in August 1972. At enrollment, it weighed 16.25 pounds and was 20 months old:

Place a dot on the growth chart where the lines for August 1972 and 16.25 lbs. intersect.

This child should rehabilitate in 18 months since its initial weight is within the zone of 60-75% of normal. Therefore, from the line for August '72 count off 17 months to the right on the chart (February '74) and place a dot on the February '74 where it intersects the 75% line (75% of normal). Now draw a straight line between the 2 dots. This would be the target growth line. The child would be reported on schedule each month if its weight is on or above this line.

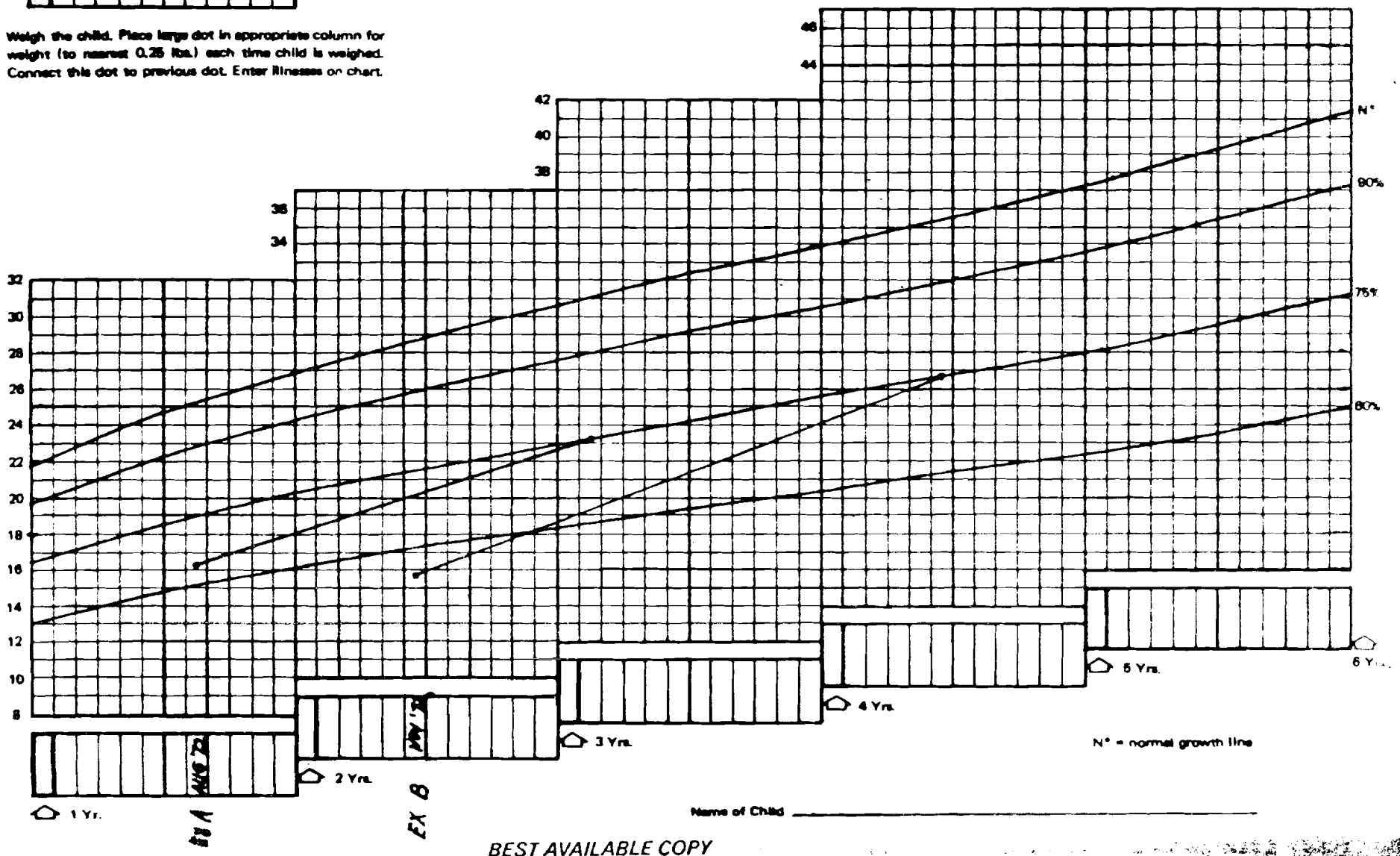
WEIGHT IN POUNDS

INSTRUCTIONS:

Enter the MONTH of birth in the first block square, then fill in all the months in chronologic sequence, like this:

Oct. 70	Nov.	Dec.	Jan. 71	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.

Weigh the child. Place large dot in appropriate column for weight (to nearest 0.25 lbs.) each time child is weighed. Connect this dot to previous dot. Enter illnesses on chart.



CHILD'S RECORD

Family Number ☐☐☐☐☐ Case Number ☐☐☐☐

Province ..... ☐☐ Child's Name ..... ☐☐

Municipality ..... ☐☐ Male ☐ Female ☐ ☐☐

Address ..... Date of Birth ..... ☐☐☐

..... Birth Certificate Filed (date) ..... ☐☐

Father's Name ..... Child's Birth Order ..... ☐☐

Father's Occupation ..... ☐☐ No. of living brothers/sisters ..... ☐☐

Mother's Name ..... ☐

Mother's Age ..... ☐☐ ☐

Mother's Occupation ..... ☐☐ ☐

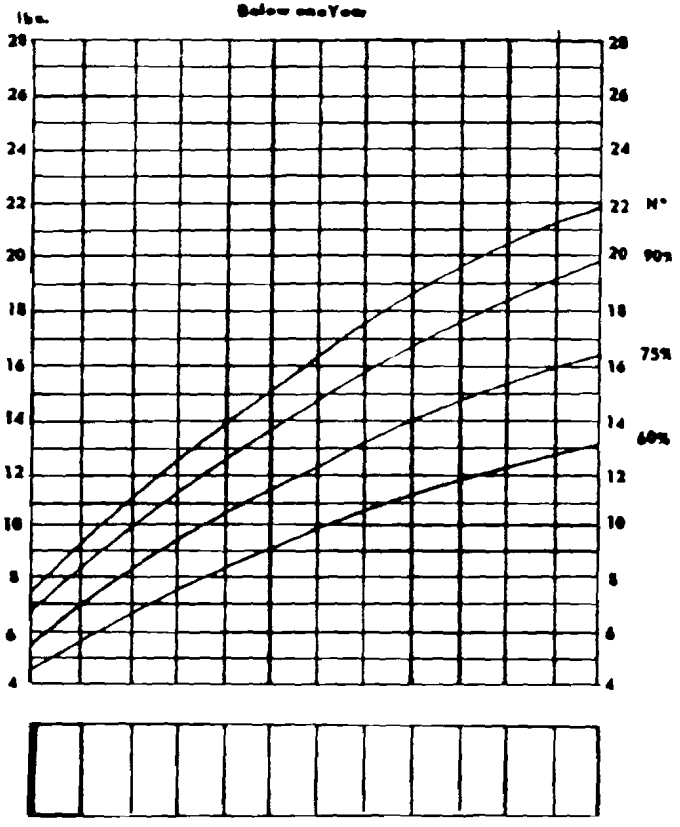
DELIVERY

Place	Mode	Attendant
House ☐	Spontaneous ☐	M.D. ☐
Hospital ☐	Forceps ☐	Nurse ☐
Other ☐	Caesarean ☐	Midwife ☐
	Other ☐	Pilot ☐
		Other ☐

DATE	W/C	HISTORY (including Diet): FINDINGS	ADVICE: TREATMENT

Do not fold these pages

WEIGHT IN POUNDS
Below one Year



Birthmonth (instructions – see over)

IMMUNIZATIONS – enter dates

	Primary		Booster	
BCG				
DPT				
Polio				
BCG Tur				
Small Pox				

N° = normal growth line

Example B. A child was born in June 1970 and was enrolled in November 1972 when it was 29 months old. At enrollment, it weighed 15.75 pounds. Place a dot on the growth chart where the lines for November '72 and 15.75 pounds intersect.

This child should rehabilitate in 24 months since its initial weight is less than 60% of normal. Therefore, from the line for November '73 count off 24 months to the right on the chart (November '74) and place a dot on the November '74 line where it intersects the 75% line (75% of normal). Now draw a straight line between the 2 dots. This is the target growth line for this child.

A special situation is presented by children 6-11 months of age.

They will be considered on schedule if their monthly weight gain is one pound or more per month from the time they are enrolled until they are one year old. When they reach one year of age, their target growth line should be entered as in the above examples, assuming 18 or 24 months recovery depending upon severity of malnutrition at this point.

A special situation is also presented by children 6-11 months who are in the body weight zone 75-90% of normal when they are enrolled. They will be deemed on schedule if their weight does not drop below the line for 75% of normal. Therefore, there will be no need to have a target growth line on the child growth chart. However, if the child's growth begins to drop downward or approach the "75%" line this should be brought to the attention of the mother. Dismissal from the program would be invoked should such a child drop below 75% of normal for three consecutive months.

To determine project goal achievement, information contained in Table 4 should be reported quarterly.

Table 4

CHILDREN RESPONDING TO PROGRAM INPUTS

Province _____ Quarter _____

Municipality _____ Ending _____

Barrio _____

Nutr Level	No. Weighed	ON SCHEDULE No.	ON SCHEDULE %
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
Total			

Barrio _____

Nutr Level	No. Weighed	ON SCHEDULE No.	ON SCHEDULE %
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
Total			

COSTS/BENEFITS

MOTHERCRAFT AND TMCH AS NUTRITION INTERVENTIONS

The average Philippine rural municipality of 25,000 citizens would have about 1,500 malnourished preschool children.

Intervention I - Mothercraft

One mothercraft nutrition worker could take care of about 100 of these malnourished children in a year (4 classes of 25 children each). Experience has indicated that the average initial body weight, as % of standard, would increase from about 70% to 74% for the participating children in one year. At the end of the year one could, therefore, expect the community-wide child health situation, as measured by body weight for age, to be as follows:

Mothercraft	Body Weight as % of Standard
1st Class, 25 Children	74.00
2nd Class, "	73.00
3rd Class, "	72.00
4th Class, "	71.00
Average, 100 Children	72.50
Average, 1,400 Non-Participating Children	70.00
Over-all Community Average	70.1667

Intervention II - TMCH

One TMCH Nutritionist could target all of the 1,500 malnourished children in one year. However, some would be extremely inaccessible and some would drop from the program. Assume 80% can be targeted, or 1,200. On the average, health improvement is 90% that of mothercraft or improvement from 70% of standard weight to 73.6% over a period of one year, then the community-wide health status after one year would be about as follows:

TMCH	Body Weight as % of Standard
1st month class, 100 Children	73.60
2nd month class, "	73.30
3rd month class, "	73.00
4th month class, "	72.70
5th month class, "	72.40

6th month class,	100 Children	72.10
7th month class,	"	71.80
8th month class,	"	71.50
9th month class,	"	71.20
10th month class,	"	70.90
11th month class,	"	70.60
12th month class,	"	70.30
Inaccessible ,	300 Children	70.00
Overall Community Average		71.560

Comparing mothercraft with TMCH, the former improved health, measured by body weight, by only 0.17% (from 70.00 to 70.17%), whereas TMCH resulted in community-wide improvement of 1.56% (from 70.00 to 71.56%). TMCH was more than 9 times as effective as mothercraft.

Aside from Nutritionist salaries, there were of course differences in food inputs. These can be equated as follows:

I. Mothercraft (Value of food for one recipient per year in FY '73 was $10.26 for preschool child):

1st Class	25 Children times $10.26	$256.50
2nd Class	" " " 7.695	192.38
3rd Class	" " " 5.13	128.25
4th Class	" " " 2.565	64.13
Total Food Cost	.....	$641.26

II. TMCH

1st month	100 Children times $10.26*	$1,026.00
2nd month	" " " "	940.50
3rd month	" " " "	855.00
4th month	" " " "	769.50
5th month	" " " "	684.00
6th month	" " " "	598.50
7th month	" " " "	513.00
8th month	" " " "	427.50
9th month	" " " "	342.00
10th month	" " " "	256.50
11th month	" " " "	171.00
12th month	" " " "	85.50
Total Food Cost	.....	$6,669.00

* This value decreases 8 1/3% each month.

Costs:

The annual costs of the two interventions would be as follows:

	Mothercraft	TMCH
Nutritionist Salary, perquisites and travel included.	$ 823.35	$ 823.35
Food costs (PL 480 Title II, donated)	641.26	6,669.00
T o t a l	$1,464.61	$7,492.35
Cost Per Recipient	$14.65	$6.24
For education (nutritionist)	8.23	0.69
For food	6.42	5.55

This analysis suggest that in mothercraft the nutritionists professional or technical expertise is probably not fully utilized. It also suggests that food is probably much more important in achieving health improvement than education. Clearly, cost per recipient for education and food is nearly 2.5 times as high in mothercraft as in TMCH.

What is not yet known is how a food input reduction would influence health benefits under the two programs. Would the more concentrated education input of mothercraft yield greater health improvements than the more diluted education input in TMCH if the donated food were reduced to 75% or 50% of current levels?

If a community is committed to solving the malnutrition problem, it is also of interest to calculate cost of a 1% improvement per child annually in body weight for age (Improvement from 70.00 to 71.00% of average normal body weight for age).

The calculation follows:

	Mothercraft	TMCH
Total annual cost	$1,464.61	$7,492.35
Annual Body Weight Improvement, %	0.1667	1.560
Annual Cost to Achieve 1% Improvement in Body Weight	8,787.66	4,802.79

Clearly, for a given level of health improvement, TMCH is about half as costly as mothercraft if both food costs and technical support (education) costs are considered.

Attachment H

Section B

PROGRESS REPORT

Integrated Nutrition - Family Planning Program

Province of Bulacan

1971 - 1972

Ma. Minda Caedo (USAID)

Victoria B. Santiago (POPCOM-POB)

Carmelita Diaz (POPCOM-POB)

R. W. Engel (USAID)

NUTRITION PROGRAM
PROVINCE OF BULACAN

The provincial government of Bulacan (POB) in cooperation with the Commission on Population (POPCOM) launched an Integrated Family Planning and Nutrition Program in July 1971. The present report covers the activities under the Nutrition Program during fiscal year 1971-72. Through supplementary feeding, the program aims to improve the nutritional status of both preschool and school children in selected communities in the province.

PART I
PRESCHOOL FEEDING PROGRAM

PROCEDURE:

The preschool feeding program has as its important feature the mothercraft approach to improvement of family life generally and the improvement of the nutritional health of the preschool child specifically. Home Management Technicians (HMT) and Rural Youth Officers (RYO) of the Agricultural Productivity Commission served as mothercraft center operators under the immediate supervision of a preschool feeding program coordinator of the POB-POPCOM office who was responsible to the nutritionist of the Provincial Health Office.

The municipalities where mothercraft centers were established were selected using the following criteria:

1. existence of a family planning program.

2. incidence of malnutrition as revealed by body weight survey.

The ten municipalities thus selected included Baliwag, Bustos, Guiguinto, Hagonoy, Malolos, Marilao, Obando, Pandi, Pulilan and Valenzuela. Calumpit was designated by the Governor as the pilot municipality.

To select the barrio in each municipality where the mothercraft center was set up, the following criteria were used:

1. incidence of malnutrition - a weight survey was undertaken in five barrios agreed upon by APC and RHU (Rural Health Unit) personnel of each selected municipality. The barrio with the highest incidence of malnutrition among its preschool children was chosen provided it met the other criteria (below).

2. cooperation of the mothers of the malnourished children.

3. cooperation of local (barrio) officials or leaders.

4. existence of physical facilities - housing and water supply.

5. existence of a Rural Improvement Club (a club organized by HMT's for purposes of improving family life through expanded homemaker activities).

6. feasibility of food production to augment donated foods and eventually replace these.

Auxiliary centers were established in the 4 other barrios of each municipality.

To determine the extent of preschool child malnutrition in the province and to screen participants for the program, a body weight survey was carried out in all the 24 municipalities of the province: in the five barrios of each of the ten selected municipalities, and in one barrio of each of the other fourteen towns. The survey was a joint undertaking of the APC and RHU personnel. Clinical scales for the weight survey and eventual use in the mothercraft centers were made available by the National Nutrition Program Office, Department of Health.

The children, in light clothing and without shoes, were weighed to the nearest 1/4 lb. The values obtained were compared to the Stuart standards using the Gomez classification. That is, children whose weights fall below 90% of the normal weight for age were considered malnourished; severe or 3rd degree malnutrition if their weight is 60% or below normal for age; 2nd degree or moderate malnutrition if their weight is between 60%-75%; and first degree if their weight is between 75%-90%.

Infants 6 to 11 months old who were 90% or less than normal weight for age, and children 12-66 months old 75% or less than standard weight for age were considered eligible for participation in the program.

For each mothercraft center, about thirty children were enrolled. The selected children were fed, twice a day, six days a week for twelve weeks, a meal consisting of CSM (corn-soya-milk) or rolled oats, sauted vegetables and rice. The meal is estimated to contain about 300 calories and 8 grams of protein. The CSM and rolled oats have been made available through the Catholic Relief Services (CRS). Mothers of participant children took turns, once a week, in helping in the Center activities. They were met once a week as a group by the center operator for lectures on basic principles of nutrition, hygiene and sanitation, child care and responsible parenthood or family planning. Weights of the children were recorded at the start of the program and every two weeks thereafter. After the 12-week feeding period, the children were enrolled in the CRS Targeted Maternal Child Health (TMCH) Program. Thus, they became entitled to 8 lbs of dry rations (CSM and rolled oats) a month until they are rehabilitated or reach the age of 6 years provided that their mothers agree to have them weighed monthly.

To explore the feasibility of establishing mothercraft activities on a less intensive scale, four auxiliary centers were established in each of the ten selected municipalities. In these centers mothers of participating children were organized into groups for demonstration lessons on the preparation of donated food commodities and for lectures on the improvement of family life every week for four weeks. Every month, they were then given 8 lbs. dry ration after a lecture-discussion session and their children weighed. Duration of participation in this program is the same as that in the mothercraft approach --- that is, until the children are rehabilitated or reach the age of 6 years.

Before any attempt was made to extend the program to the ten selected municipalities, a pilot mothercraft center fully supported by provincial funds was brought into operation in Barrio Palembang, Calumpit, for purposes of formulating workable operation procedures. The center also served as the location for in-service training and orientation of the mothercraft center operators.

Due to delays in release of funds, the mothercraft centers did not start operating until the last week of September 1971. Activities in the auxiliary centers were further delayed by the dock strike at the West Coast of the United States which hampered the immediate shipment of the needed food. The first auxiliary center was set up in February 1972.

Data obtained from these studies were statistically analyzed using the Wilcoxon Signed Rank Test.

RESULTS AND INTERPRETATIONS:

Body Weight Survey

The body weight survey covered 4,332 families and 8,941 children. Data from the survey are summarized in Table 1; details are given in Appendix A. It can be seen from the table that about 86% of the children weighed are malnourished; almost 6% of them severely so. This finding draws attention to the seriousness of the plight of the preschool children in Bulacan. The appendix tabulation reveals that in some towns the number of severe malnutrition cases exceeds the normals.

Figure 1 illustrates the growth pattern of the children. Weight for age, the Bulacan preschoolers fall below the Stuart standards throughout all ages; but, in the first six months of life, the deficit is small. Thereafter, the divergence becomes progressive and marked until the age of 12 months. In the Philippines, approximately 85% of mothers breastfed their babies. The monthly observation in Figure 1 suggests that growth progresses satisfactorily while the child is breastfeeding, and the supply of mother's milk is adequate; but, after the sixth month, mother's milk alone is not sufficient to support the rapidly growing infant. Thus, unless mother's milk is supplemented with other nourishing foods by 6 months, growth slows down.

It is evident from the data presented in Table 2 that it is in the age group of 12-23 months that the incidence of severe (3rd degree) malnutrition is highest. Since the weaning process generally is completed in 14 months, the poor performance of one-year olds is probably due to the complete loss of breast milk to supplement the meager weaning food. The incidence decreases with increasing age. It is perhaps reasonable

to assume that the decline is due to the fact that many children suffering from severe malnutrition during their second year of life fail to survive to their fifth year. Also, the synergism between infections and malnutrition becomes less severe as children grow older.

Data from the present survey clearly demonstrate the accepted observation that the child at or immediately after weaning is at the greatest risk of suffering arrest in physical development. Although poverty is often a vital causative factor of malnutrition, frequently a considerable proportion of the malnutrition observed is potentially avoidable if mothers are properly taught to make better use of locally available resources. Early nutritional guidance of the mothers in the feeding of their children (aim of mothercraft centers) is therefore necessary if malnutrition during this critical period is to be prevented.

Mothercraft Centers

The program envisioned that each mothercraft center in the 10 municipalities would hold 3 classes of 12-weeks duration. This, however, was not possible. The Bustos Center operated two classes only because the APC, due to changes in personnel assignments, failed to provide the needed manpower to operate the last class. The third class of Hagonoy Center was for 8 weeks only. The center was under water for almost a month during the severe floods in July-August 1972. By the time the water subsided and the Center became habitable, the project year had ended.

Of the original 895 children enrolled in mothercraft class, 832 were able to complete a 12-week feeding period. Drop-out rate was therefore 7% and was brought about by several families who changed residence, mothers who found jobs and so were unable to participate in the activities of the Center, and by those mothers who did not persevere in bringing their children to the Center on the regular schedule.

On the average, the children were present at the feeding sessions 90.6% of the time. Their growth performance is presented in Table 3. Before mothercraft class, the average body weight of the children was 70.4% of standard; after the class, it was 72.3%. The 1.9% increase in weight was significant at the 1% level of probability. It is apparent in Table 4 that children below 3 years old do not respond to the feeding

as well as the older ones. The weight gain as percent of standard of the former group ranged from 101 to 121% while that of the latter group from 129 to 149%.

The efficacy of the mothercraft approach in combatting malnutrition among the preschoolers is also demonstrated in Table 5. The table shows that mothercraft reduced severe and moderate malnutrition by 18.3% and effected a change in a few children to enable them to be classified as "normal" in weight for their age.

If mothers of participating children benefited from the mothercraft classes, it was assumed that the application of the knowledge gained in the classes would be reflected in the growth response of the children after they leave the center. Table 6 compares weight response of the children while in the center and that of the same children 3 months and 6 months later. For the calculation of the data, only those children whose weights were available for the 3 periods indicated were included. Some children were absent at the time of weighing and many of them have reached the age of 6; hence, the discrepancy between the number of children in Tables 3 and 6. It is worthy of note that the children of Class I continued to hold gains they made at the Center even six months after leaving the Center. Data available for Class II, to date, indicate that these children were also retaining the gain achieved during mothercraft.

Oftentimes due to limited funds, questions have cropped up as to whether a shorter feeding period than 12 weeks would suffice to effect a significant improvement in the nutritional status of preschoolers. To answer such queries, the present data were further analyzed according to different lengths of feeding periods and summarized as shown in Table 7. Results of statistical analysis revealed that whether the feeding period is 8, 10, or 12 weeks, the resulting increase in weight is significant. Although the difference in weight gains between the 8 and 10-week feeding periods is statistically significant, that between the 10 and 12-week periods is not. Present data, therefore, suggest that a 10-week feeding period elicits a weight response as good as a 12-week one.

Auxiliary Centers

Thirty-six auxiliary centers were established between February 3 and March 24, 1972, with a total enrollment of 1,243 children and 824 mothers. Of these, complete data for a 6-month period were available for 667 children. Tables 8 and 9 show that after 3 months the children had improved slightly in physical growth; however, this weight increment did not prove to be significant, although, the 0.7% gain from the 3rd to the 6th month was significant at the 5% level. These results indicate that in auxiliary centers it takes about 6 months to effect a significant health improvement. In cases, therefore, where funds and personnel are limited, auxiliary centers can help alleviate the malnutrition problem.

Nutrition and Family Planning

Table 10 shows that among the 519 mothers participating in mothercraft classes, 223 were potential family planning acceptors. (The rest were either acceptors already, were pregnant or were in their forties and were not interested in family planning practices.) The table further shows that the percentage of potential acceptors motivated to practice family planning by mothercraft center operators decreased from 73.3% to 51.8% during the period under study. The center operators do not get any remuneration for their efforts while motivators of Rural Health Units and other Family Planning Clinics get paid or receive some sort of incentive. This situation caused the waning interest of the center operators to function as family planning motivators. Consequently, the number of acceptors they motivated decreased.

Of the 824 mothers in the auxiliary centers, 313 or 37.9% were motivated by center operators to become family planning acceptors. Records, however, do not show how many of the 824 mothers are potential acceptors although there is no reason to believe it would be any different from those mothers in the adjacent barrios covered by mothercraft classes.

With the data on hand, it was deemed possible to determine if there exists any association between the number of children in the family and the prevalence of malnutrition. For this phase of the study, only

families whose children are all preschoolers were considered; in other words, young mothers who must be reached for effective family planning programs.

Table 11 A shows that with increasing number of preschool children, the proportion of malnourished children increases. Aside from the fact that the number of families with 4 preschool children are few, the lower percentage of malnourished children in the group can be accounted for by the fact that the 4th child in these families has a greater chance of being less than 12 months old and, therefore, is generally still breastfeeding. When all children less than 12 months old were eliminated from the analysis, the prevalence of malnutrition in relation to number of preschoolers in the family comes into sharper focus as shown in Table 11 B.

Table 12 shows the prevalence of malnutrition by interval until next sibling among 635 families with only two children in the family, both being preschoolers. In the analysis of the data, the older of the two children has been considered the index child (also referred to as the deposed child). The table reveals that prevalence of malnutrition is highest among index children when the next sibling comes 18 months after or less, also that the incidence decreased as the birth interval is lengthened. This information should be very useful to family planners and motivators for Family Planning programs. Education programs aimed at preventing the weanling arrest in growth and education on family planning can be delivered simultaneously as illustrated by the results of these studies. Indeed for both programs, the target mother is identical --- the young mother with closely spaced children.

SUMMARY

Preschool child malnutrition is a serious public health problem in the province of Bulacan. Almost 6% of the children weighed are suffering from severe (3rd degree) malnutrition.

Mothercraft approach is an effective way to alleviate malnutrition among preschoolers.

Where funds and personnel are limited, a modified approach can be an alternative.

Donated commodities are useful in the program as an intervention until local production of food of comparable quality can be achieved.

The more the number of children in a family, the higher the incidence of malnutrition.

The closer the births are spaced, the higher the prevalence of malnutrition in the older child.

Table 1. Distribution of Children According to Degree of Malnutrition*

Degree of Malnutrition	Children		
	Sex	No.	%
3rd	M	224	2.5
	F	302	3.4
	Both	526	5.9
2nd	M	1482	16.6
	F	1653	18.5
	Both	3135	35.1
1st	M	2092	23.3
	F	1936	21.6
	Both	4028	44.9
Normal	M	727	8.2
	F	525	5.9
	Both	1252	14.1
Total	M	4525	50.6
	F	4416	49.4
	Both	8941	100.0

*Gomez Classification adapted to Stuart's Standard

FIGURE 1. AVERAGE WEIGHTS AS PERCENT OF STUART STANDARDS OF BULACAN PRE-SCHOOL CHILDREN

TABLE 2. DISTRIBUTION OF CHILDREN ACCORDING TO DEGREE OF MALNUTRITION BY AGE GROUP

Age Group (months)	Degree of Malnutrition							
	3rd		2nd		1st		Normal	
	No.	%	No.	%	No.	%	No.	%
6 - 11	44	8.5	189	6.0	451	11.2	328	26.2
12 - 23	134	25.7	651	20.8	807	20.1	275	22.0
24 - 35	107	20.5	581	18.5	757	18.8	220	17.6
36 - 47	84	16.1	573	18.3	714	17.7	190	15.2
48 - 59	85	16.3	581	18.5	682	16.9	132	10.5
60 - 71	67	12.9	560	17.9	617	15.3	107	8.5
Total	521	100.0	3,135	100.0	4,028	100.0	1,252	100.0

TABLE 3. AVERAGE GROWTH RESPONSE OF CHILDREN BY CLASS

Class	No. of Children	Initial Weight lbs.	Initial Weight % std.	Final Weight lbs.	Final Weight % std.	Weight Gain lb.	Weight Gain % std.
Class I	296	21.6	69.3	22.9	71.2	1.3	120.9
Class II	298	22.6	70.5	24.1	72.9	1.5	141.7
Class III	238	22.5	71.8	23.8	73.2	1.3	119.2
TOTAL/AVE.	832	22.2	70.4	23.6	72.3	1.4	127.9

TABLE 4 AVERAGE GROWTH RESPONSE OF CHILDREN BY AGE GROUP

Age Group (Months)	No. of Children	Initial Weight		Final Weight		Weight Gain	
		lbs.	% std.	lbs.	% std.	lbs.	% std.
6 - 11	65	14.3	75.7	16.5	77.8	2.2	101.4
12 - 23	184	17.0	69.8	18.5	72.3	1.5	121.2
24 - 35	170	20.7	70.3	21.9	72.0	1.2	118.5
36 - 47	144	23.4	69.4	24.9	71.6	1.5	148.9
48 - 59	153	26.8	70.3	28.0	71.6	1.2	129.4
60 - 71	116	29.8	70.4	31.1	71.9	1.3	139.2
TOTAL/AVE.	832	22.2	70.4	23.6	72.3	1.4	127.9

TABLE 5. DISTRIBUTION OF CHILDREN ACCORDING TO DEGREE OF MALNUTRITION BEFORE AND AFTER MOTHERCRAFT CLASS

Degree of Malnutrition	Before Mothercraft		After Mothercraft	
	No.	%	No.	%
3rd	82	9.8	57	6.9
2nd	643	77.3	515	61.9
1st	107	12.9	253	30.4
Normal	0	0	7	0.8
TOTAL	83.2	100.0	83.2	100.0

TABLE 6. CENTER AND POST CENTER GROWTH RESPONSES OF CHILDREN

No. of Children	CENTER RESPONSE		POST CENTER RESPONSE Weight After	
	Initial Wt. (% std.)	Final Wt. (% std.)	3 months (% std.)	6 months (% std.)
231 (Class I)	68.3	70.2	70.2	70.3
222 (Class II)	70.1	72.4	72.9	

TABLE 7. AVERAGE GROWTH RESPONSE OF CHILDREN BY LENGTH OF FEEDING PERIOD

Feeding Period	No. of Children	Initial Weight		Final Weight		Weight Gain	
		lbs.	% std.	lbs.	% std.	lbs.	% std.
8 weeks	857	22.3	70.6	23.1	71.8	0.8	116.0
10 weeks	832	22.2	70.4	23.4	72.3	1.2	127.1
12 weeks	832	22.2	70.4	23.6	72.3	1.4	127.9

*Twenty-five children did not complete the 12-week feeding period because of the closing of a center due to the July-August floods.

TABLE 8

AVERAGE GROWTH RESPONSE

OF 667 CHILDREN IN AUXILIARY CENTERS

Feeding Period	Weight (% std.)
Initial	69.1
After 3 months	69.6
After 6 months	70.3

TABLE 9. DISTRIBUTION OF CHILDREN IN AUXILIARY CENTERS ACCORDING TO DEGREE OF MALNUTRITION AT THE START, AFTER 3 MONTHS, AND AFTER 6 MONTHS OF THE PROGRAM

	Initial		3 mos. after		6 mos. after	
	No.	%	No.	%	No.	%
Red	74	11.1	75	11.2	55	8.2
Yellow	441	66.1	429	64.3	423	63.4
White	152	22.8	160	24.0	183	27.4
Green	0	0.0	3	0.5	6	1.0
TOTAL	667	100.0	667	100.0	667	100.0

TABLE 10.

FAMILY PLANNING ACCEPTORS

MOTIVATED BY CENTER OPERATORS

	Class I	II	III	Total
Total No. mothers	182	174	163	519
No. potential acceptors	60	80	83	223
No. motivated thru program	44	48	43	135
% motivated thru program	73.3	60.0	51.8	60.5

TABLE 11. PREVALENCE OF MALNUTRITION AMONG PRESCHOOL CHILDREN ACCORDING TO NUMBER OF CHILDREN IN THE FAMILY

A.

No. of Children in Family	Total No. of Children	Malnourished	
		No.	%
1	484	149	30.7
2	666	238	35.7
3	543	221	40.6
4	76	28	36.8

B.

No. of Children in Family	Total No. of Children	Malnourished	
		No.	%
1	256	91	35.5
2	476	186	39.0
3	303	147	48.5

TABLE 12.

PREVALENCE OF MALNUTRITION BY INTERVAL

UNTIL NEXT SIBLING

Spacing Interval (months)	No. of children in Interval Group	Percent of Total Population in Interval Group	Malnourished Children	
			No.	%
18 or less	200	31.5	110	55.0
19 - 30	330	52.0	117	35.4
31 or more	105	16.5	30	28.5
TOTAL	635	100.0	257	40.5

Appendix A. Distribution of Children According to Degree of Malnutrition by Municipality

Municipality	Total No. of Children	Degree of Malnutrition							
		3rd		2nd		1st		Normal	
		No.	%	No.	%	No.	%	No.	%
I. Covered by Program									
1. Calumpit	630	32	5.1	217	34.5	285	45.2	96	15.2
2. Baliwag	696	30	4.3	253	36.4	319	45.8	94	13.5
3. Bustos	465	24	5.2	165	35.4	224	48.2	52	11.2
4. Guiguinto	519	31	6.0	160	30.8	254	48.9	74	14.3
5. Hagonoy	558	96	17.2	243	43.6	177	31.7	42	7.5
6. Malolos	713	91	12.8	264	37.0	277	38.8	81	11.4
7. Marilao	524	10	1.9	210	40.1	212	40.4	92	17.6
8. Obando	581	32	5.5	195	33.6	247	42.5	107	18.4
9. Pandi	538	6	1.1	140	26.0	320	59.5	72	13.4
10. Pulilan	591	30	5.1	227	38.4	258	43.6	76	12.9
11. Valenzuela	775	44	5.7	271	34.9	337	43.5	123	15.9
Sub-total	6590	426	6.5	2345	35.5	2910	44.2	909	13.8
II. Not Covered by Program									
1. Angat	56	5	8.9	15	26.8	26	46.4	10	17.9
2. Balagtas	278	9	3.2	90	32.4	142	51.1	37	13.3
3. Bocaue	197	20	10.2	65	33.0	91	46.2	21	10.6
4. Bulacan	172	14	8.1	45	26.2	90	52.3	23	13.4
5. Meycawayan	146	4	2.7	48	32.9	71	48.6	23	15.8
6. Norzagaray	186	2	1.1	54	29.0	106	57.0	24	12.9
7. Paombong	102	16	15.7	46	48.1	33	32.4	7	6.8
8. Plaridel	334	6	1.8	204	61.1	89	36.6	35	10.5
9. San Ildefonso	176	6	3.4	44	25.0	91	51.7	35	19.9
10. San Jose del Monte	143	5	3.5	42	29.4	68	47.5	28	19.6
11. San Miguel	162	2	1.2	35	21.6	94	58.0	31	19.2
12. San Rafael	259	6	2.3	66	25.5	145	56.0	42	16.2
13. Sta. Maria	140	5	3.6	36	25.7	72	51.4	27	19.3
Sub-total	2351	100	4.2	790	33.6	1118	47.6	343	14.6
TOTAL/AVERAGE	8941	526	5.9	3135	35.1	4028	44.9	1252	14.1

PART II
SCHOOL FEEDING PROGRAM

The School Feeding Program is a joint project of the Bureau of Public Schools and CARE (Cooperative for American Relief Everywhere), a United States Voluntary Agency.

To assess the progress of the program and to guide future implementation, it was deemed necessary to make a survey of the nutritional status of all elementary public school children of the province. The present report covers the results of the weight survey of the children in 8 schools participating in the Nutribun Program. The survey was undertaken by the Coordinator on School Feeding of the POB-POPCOM (Province of Bulacan-Commission on Population) Integrated Family Planning and Nutrition Program with the help of the teachers in the schools involved in the Nutribun Program.

PROCEDURE:

The children with light clothing and without footwear were weighed to the nearest 1/4 pound on a clinical scale at the start of feeding period and at quarterly intervals thereafter.

From the birthdate and the date the survey was undertaken, the age of a child was calculated to the nearest month. Using the Student Nutrition Chart, the nutritional status of a child was then determined. The Chart, devised by the Food for Peace Division of the United States Agency for International Development (USAID), is based on the Iowa Growth Norms. The malnutrition line or the border between the red and yellow zones is the International Malnutrition Line as proposed by Ford and is approximately 2/3 of the Iowa Standard. Children whose weights fall in the red zone are considered malnourished, while those whose weights fall in the yellow zone are underweight or are at the risk of being malnourished. The white or normal zone is between 90% and 110% of standard.

The study includes only those children up to 13 years old at the end of the school year who have complete weight records.

The feeding period averaged 17 weeks for all schools. It started about the last week of August and ended mid-March with almost more than two months break between October and January.

RESULTS AND INTERPRETATIONS:

The distribution of children according to nutritional zone by school before and after nutribun feeding is presented in Table 1. It can be seen from the table that before the feeding program, on the average, 35.6% of the children in the eight schools were malnourished. Nutribun feeding reduced the proportion of children classed under this category to 29.1%. It is interesting to note that Banga Elementary School which had the highest percentage of malnourished children made the best showing in improving the nutritional status of its schoolchildren. The table further shows that females responded better than males. The number of malnourished females was reduced by 8.2%, malnourished males by 4.9%.

Data presented in Table 2 indicate that the prevalence of malnutrition is higher in the lower grades and tends to decrease as the educational level increases. This trend is observed before and after feeding suggesting that children in each grade level respond equally to the feeding.

To obtain more conclusive evidence of the above findings, the weights as percent of standard of the children in the red and yellow zones before and after the feeding were calculated and the data analyzed using Wilcoxon Signed Rank Test. Tables 3 and 4 summarize the weight data. The mean increase in weight as per cent of standard ranged from 0.7% to 3.3% among the schools with an overall average of 1.6%. This weight increment although small was significant at 1% level. Friedman's Rank Test was applied to the data to determine if there was any difference in response between schools and between grades. At the 1% probability level, the difference between the weight increments of Banga schoolchildren and those of both Bambang and Gen. Gregorio del Pilar Schools was significant. There was not sufficient evidence, however, to say that any of the other differences were significant. Neither was there any significant difference observed in weight gains between grades.

From the results of the present study, it is reasonable to assume that with a nutribun program frank malnutrition among schoolchildren can be reduced by 50% in 1-1/2 years or eliminated in three years. This projection is made on the assumption that the rate of improvement observed during this study period would be maintained.

TABLE 1 - Distribution of Children According to Nutritional Zone by School by Sex Before and After Nutribun Feeding

	SCHOOL	Sex and No. of Children		RED Before %	RED After %	YELLOW Before %	YELLOW After %	WHITE Before %	WHITE After %	GREEN Before %	GREEN After %
1.	F. Balagtas Memorial	M	235	39.1	37.9	54.5	54.0	6.0	7.2	0.4	0.9
	Panginay, Balagtas	F	234	30.3	20.5	57.3	58.6	11.1	18.8	1.3	2.1
		Both	469	34.8	29.2	55.9	56.3	8.5	13.0	0.8	1.5
2.	Gen. Gregorio del Pilar	M	336	37.2	34.5	58.6	61.9	4.2	3.6	0.0	0.0
	Sta. Ana, Bulacan	F	322								
		Both	658	33.3	29.8	60.8	64.0	5.3	5.6	0.6	0.6
3.	Bambang Elementary	M	310	34.8	32.2	58.4	60.0	6.1	6.8	0.7	1.0
	Bambang, Bulacan	F	322	30.4	24.2	57.8	58.4	10.9	15.8	0.9	1.6
		Both	632	32.6	28.2	58.1	59.2	8.5	11.4	0.8	1.2
4.	Marcelo H. del Pilar	M	204	36.3	31.9	57.3	61.7	5.4	5.4	1.0	1.0
	San Nicolas, Bulacan	F	198	30.8	22.2	62.6	64.2	6.6	12.6	0.0	1.0
		Both	402	33.5	27.1	60.0	62.9	6.0	9.0	0.5	1.0
5.	Matungao Elementary	M	111	35.1	29.7	57.7	62.2	7.2	7.2	0.0	0.9
	Matungao, Bulacan	F	119	40.3	36.1	56.3	57.1	3.4	5.1	0.0	1.7
		Both	230	37.8	33.0	57.0	59.6	5.2	6.1	0.0	1.3
6.	Pulo Elementary	M	145	38.6	35.9	55.2	57.2	6.2	6.9	0.0	0.0
	San Isidro, Paombong	F	160	38.8	30.6	55.0	58.8	5.6	10.0	0.6	0.6
		Both	305	38.7	33.1	55.1	58.1	5.9	8.5	0.3	0.3
7.	Banga Elementary	M	338	46.2	34.3	50.6	58.3	2.9	6.8	0.3	0.6
	Banga, Plaridel	F	311	41.2	28.0	57.8	60.4	6.4	10.6	0.6	1.0
		Both	649	43.8	31.3	51.1	59.3	4.6	8.6	0.5	0.8

TABLE 1
Page 2

	Sex and No. of Children		RED Before %	RED After %	YELLOW Before %	YELLOW After %	WHITE Before %	WHITE After %	GREEN Before %	GREEN After %
8. Tiburcio de Leon Valenzuela, Bulacan	M	321	33.6	28.1	61.1	62.6	5.0	8.7	0.3	0.6
	F	294	30.2	20.7	58.2	63.6	10.9	13.3	0.7	2.4
	Both	615	32.0	24.6	59.7	63.1	7.8	10.8	0.5	1.5
TOTAL/AVE.	M	2000	37.9	33.0	56.7	59.9	5.0	6.5	0.4	0.6
	F	1960	33.2	25.0	57.8	61.3	8.2	12.2	0.8	1.5
	Both	3960	35.6	29.1	57.3	60.6	6.6	9.3	0.5	1.0

Table 2. Distribution of Children According to Nutritional Zone by Grade Before and After Nutribun Feeding

Grade	No. of Children	RED				YELLOW				WHITE				GREEN			
		Before		After		Before		After		Before		After		Before		After	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Grade I	777	331	42.6	281	36.2	418	53.8	456	58.7	27	3.5	37	4.7	1	0.1	3	0.4
Grade II	757	286	37.8	231	30.5	438	57.8	481	63.6	33	4.4	44	5.8	0	0.0	1	0.1
Grade III	673	268	39.8	236	35.1	373	55.4	393	58.4	30	4.5	38	5.6	2	0.3	6	0.9
Grade IV	629	236	37.5	186	29.6	361	57.4	389	61.8	30	4.8	50	8.0	2	0.3	4	0.6
Grade V	625	189	30.2	150	24.0	377	60.3	386	61.8	53	8.5	76	12.2	6	1.0	13	2.0
Grade VI	499	99	19.8	67	13.4	301	60.3	294	58.9	88	17.7	124	24.9	11	2.2	14	2.8
TOTAL/AVE.	3960	1409	35.6	1151	29.1	2268	57.3	2399	60.6	261	6.6	369	9.3	22	2.5	41	1.0

Table 3. Mean Weights as Per Cent Standard Before and After Nutribun Feeding by School

	School	No. of Children	Initial Weight Lbs.	Initial Weight % std.	Final Weight lbs.	Final Weight % std.	Weight Gain lbs.	Weight Gain % std.
1.	F. Balagtas Memorial Panginay, Balagtas	425	49.6	72.8	54.5	74.6	4.9	91.8
2.	Gen. Gregorio del Pilar Sta. Ana, Bulacan	619	48.9	73.0	52.4	73.8	3.5	82.8
3.	Bambang Elementary Bambang, Bulacan	573	49.7	73.2	53.6	73.9	3.9	83.4
4.	Marcelo H. del Pilar San Nicolas, Bulacan	376	49.3	72.8	53.8	75.0	4.5	109.2
5.	Matungao Elementary Matungao, Bulacan	218	48.9	72.5	52.7	73.8	3.8	92.3
6.	Pulo Elementary San Isidro, Paombong	286	50.5	71.2	54.6	72.3	4.1	91.9
7.	Banga Elementary Banga, Plaridel	616	49.2	71.2	54.2	74.5	5.0	126.2
8.	Tiburcio de Leon T. de Leon, Valenzuela	564	50.1	73.4	54.2	75.0	4.1	112.0
	TOTAL/AVE.	3,677	49.5	72.5	53.7	74.1	4.2	99.6

Table 4. Mean Weights as Per Cent Standard Before and After Nutribun Feeding by Grade

Grade	No. of Children	Initial Weight lbs.	Initial Weight %std.	Final Weight lbs.	Final Weight % std.	Weight Gain lbs.	Weight Gain % std.
Grade I	749	39.3	72.9	42.4	74.1	3.1	91.1
Grade II	727	43.4	72.5	46.9	73.9	3.5	94.8
Grade III	633	48.1	71.7	51.8	73.1	3.7	96.4
Grade IV	595	52.8	71.9	57.1	73.7	4.3	99.6
Grade V	573	58.0	72.2	63.4	74.4	5.4	110.6
Grade VI	400	64.8	74.9	71.3	77.3	6.5	110.1
TOTAL/AVE.	3,677	49.5	72.5	53.7	74.1	4.2	99.6

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Attachment I
Section B
NEWSLETTER

March 1972

THE NUTRIBUN: A READY-TO-EAT COMPLETE MEAL.

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Throughout history bread has been recognized as a convenience food. It has also been recognized as an economical means of satisfying man's need for food energy in order to perform work. International trade introduced wheat, a cold or temperate climate cereal, into the tropics where rice had been the cereal of choice. The fact that wheat bread is a product which requires no further preparation, i.e., it is a "convenience food", is perhaps the key to its continuing penetration into the rice-eating world.

Convenience foods enjoy markets and popularity for various reasons. In the case of the Nutribun, our "convenience food", it was necessity which dictated its development in the school feeding program. There are very few elementary schools (Grades 1-6) in the Philippines that either have or can afford to have an area to prepare and serve hot lunches. Yet there are youngsters who urgently need a nutritious meal. How to solve the problem?

Our answer was the Nutribun. By combining the milk and cereal of the traditional American breakfast into a bread, we created a complete, ready-to-eat meal.

In developing the formula, the guiding principle was to maintain the two parts plant protein to one part animal protein ratio prevailing in the national consumption pattern. The present formula is:

wheat flour	100
nonfat dry milk solids	14
sugar	12
vegetable oil	5
salt	1.5
yeast	1

The recommended daily protein intake for a 12 year old Filipino is 45 grams. The Nutribun has 17 grams of protein, exceeding the minimum of 25% set as a standard to be furnished by the "school meal". The more liberal protein is intended to compensate for the lack of protein in the between-meal snacks of sweets and carbonated beverages which are popular among Filipino children. It was also felt that the school meal should furnish a minimum of one fourth the average daily recommended calorie intake (2000 calories for a 7-13 year old Filipino), hence the Nutribun has 500 calories.

The Nutribun supplies the following percentages of the RDR (recommended daily requirement):

Vitamin A	30%
Niacin	30%
Riboflavin	56%
Thiamin	50%
Calcium	33%
Iron	47%

Thus all major nutrients, except Vitamin C, are furnished in amounts proportionately higher than their daily contribution to recommended food energy intake for an active elementary school pupil. Although not to be ignored, the lack of ascorbic acid is considered a much less critical one than the lack of calories and protein. That is, on the average, an elementary school child has an intake of over 90% of the recommended level of ascorbic acid but less than 70% of the recommended level for calories.

One might question the advisability of deciding upon a cereal foreign to the major preferences of Filipinos whose average cereal food supply is estimated to be 68% rice, 25% corn, and only 9% wheat. However, all indications are that wheat products are well liked. They are often considered a special treat in the more remote areas. "Pan de sal", a small wheat bun is a favorite snack item in many of the small barrios or sari-sari stores.

Once the formula was agreed to (in cooperation with the Bureau of Public Schools, the Philippine Government agency responsible for administering the Nutribun feeding program), a method had to be found for delivering the ready-to-eat product to the student in his school. This problem was solved in several ways. The most common procedure has been to negotiate with local commercial bakeries. They supply all ingredients, except flour and milk, and deliver the finished product to the school in sanitary plastic bags of 25 Nutribuns each. Cost analyses reveal that this can be done for between 5 and 10 centavos per Nutribun (0.8 to 1.6 US cents). Pupils pay between 5 and 10 centavos for their Nutribun, covering the costs of local ingredients, baking, and delivery.

Alternate preparation and delivery systems have included the utilization of central school or trade school bakery installations with delivery of products to the peripheral barrio schools in the municipality. Also in a few provinces, provincial administrations have built low cost concrete dome-like bakery pits at barrio schools. Under the supervision of home

economics teachers, pupils prepare the Nutribun as a vocational training operation, thus minimizing bakery costs.

Since its formula is simple and open to modification, the Nutribun lends itself to the possibility of substituting local food resources for the donated US Food for Peace commodities. For example, a number of Filipino firms are gearing up to manufacture partially defatted coconut flours, a by-product of the desiccated (shredded) coconut industry. Tests show that 10 to 15 percent coconut flour can replace proportionate fractions of the Food for Peace wheat flour and milk powder without adversely affecting baking quality or product acceptance. Thus, the school feeding program can serve as an important outlet for a new Filipino food ingredient. The cost of replacing the donated foods with locally available ones can be borne by the pupils within the 10 centavos per bun cost.

The Nutribun can also have its ingredients varied by partial replacement of the wheat flour with oatmeal or bulgur. Wheat-soy blends can also substitute for the wheat-milk combination.

Going beyond the donated and institutionalized school lunch program, several bakeries in Manila have introduced the Nutribun as a commercial venture, using locally purchased ingredients. There is every indication that it has become a widely accepted product and that sales are increasing.

Presently thoughts are turning to the Nutribun as a possible means of reaching the pre-school child with more nourishing food formulas. For years Zweiback, a twice-baked, toasted bread has been a popular food for babies to chew on. Carrying the Nutribun one step further, it could be sliced and toasted to be used as a baby biscuit. Grinding the toast into a powder and packaging it accordingly could provide another pre-schcol children's food. Enterprising local bakers have been advised to explore these possibilities.

No doubt there will be those who will question the Nutribun (the "Ideal Meal") as an approach for teaching good nutrition in the classroom. To this we can only reply that necessity is the mother of invention. Filipino children need a nutritious meal at school. The Nutribun is the simplest, the most economical, and, in many cases, the only way to provide such a meal. Through body weight measurements, each child is made aware of the fact that this extra meal is improving growth and development.

In the 1970-71 school year, approximately 200,000 pupils received the Nutribun. Before this school year ends, about 1,300,000 pupils will be enjoying this energy-packed, wholesome, and nutritious product.

Better Nutrition for a Stronger Philippines

PHILIPPINE SCHOOL NUTRITION PROGRAM USING FOOD FOR PEACE COMMODITIES 1/

GUIDELINES

SCHOOL YEAR 1973 - 1974

I. Introduction

Adequate nutrition is an essential factor for the proper health and growth of children. It conditions their learning ability and their ability to work.

Of a total Philippine population of 36,684,486 in the 1970 Census, 8,493,985 are children of elementary school age, ranging from 6 thru 14. Of these elementary school age children, approximately 7,247,265 are studying in private and public elementary schools. Recent body weight samplings of elementary school children in selected areas throughout the Philippines revealed that the majority are underweight for their age and frankly malnourished.

This alarming condition reflects current average elementary school age per capita caloric intake which is about 34% less than the desired Philippine national standard of 2,000 calories. The current average protein intake is 41 grams which is about 18% less than the required 50 grams daily. 2/

U.S. Food for Peace Programs have been operating in the Philippines for 15 years, providing PL 480 Title II foodstuffs to Filipinos mostly through American Voluntary Agencies. As a better realization of Philippine nutrition problems has developed, the Philippine Government, USAID, and the American Voluntary Agencies (CARE, CRS, CWS, and SAWS) have worked since 1970 to use U.S. Food for Peace commodities as a direct tool in combatting malnutrition among undernourished Filipino children. This effort to direct Food for Peace commodities to children has resulted in the development of targeted Maternal-Child Health feeding programs and The Philippine School Nutrition Program.

1/ Food for Peace Division, USAID, Manila.

2/ Based on Carmen Ll. Intengan's "What Is the Protein Gap", Food and Nutrition Research Center, NIST, Manila, Philippines.

II. Objectives of the Philippine School Nutrition Program

To ELIMINATE by 1976 the majority of serious UNDERNOURISHMENT among the children ages 6-14 years by:

- apprising teachers, parents and children about undernourishment in our country.

- introducing adequate, proper food intakes for children.

- assisting in food production through home and school gardens gradually substituting local foods for imported foods.

III. Eligibility

A. Selection of Participating Schools:

1. Priority will be given to those schoolsin economically depressed areas.

2. Schools participating in the Applied Nutrition Program which have been operating bakeries at the start of this school year are qualified to receive the regular nutribun ration provided standard Philippine School Nutrition Program weight charts are used for each participating child and all other program procedures and reporting requirements are met. The Philippine School Nutrition Program ration is intended to complement the ANP School feeding and should in no way be utilized as a substitute for the indigenous food now being served.

B. Selection of Beneficiaries: Only undernourished children are eligible for this program.

1. Each child must be weighed carefully - barefoot and with minimum clothes. Be sure the scale is balanced at "0" before the child is weighed and checked frequently against standard checkweights of known correct weight. (A checkweight may be a stone or piece of iron of known correct weight provided by your Division Superintendent.) Checkweights must be used to make sure that the scaling weight is right. Children should be weighed four times yearly, i. e. in July, October, January and April, and weights charted accordingly.

Using the Student Nutrition Chart, which reflects international standards for elementary school children which are higher than the current

tentative Filipino standards, we determine the child's nutritional status by locating the point where its "age line" and "weight line" meet. If this point falls in the red or yellow zone on the chart, the child is eligible to be a regular recipient of the Program. The child should continue to be in the Program until the end of the school year even if the child moves up to the white zone.

For further information on weighing, see Attachment A - Individual Growth Chart.

2. If at the start of the school year the child is in the white zone and during the school year the child falls down to the yellow zone, it becomes eligible to participate and will remain in the program up to the end of the school year.

IV. Approaches

Each implementing agency will develop its own respective approaches based on the requirements that each undernourished child receives a minimum additional, nutritional supplement of 500 calories and 17 grams of protein daily.

Schools may elect to utilize the services of commercial bakeries for the preparation of a "Nutribun" or its nutritional equivalent. In all cases where the services of commercial bakeries are employed, a contract between the baker and the school must be signed. All such baking contracts are subject to the approval by the host Philippine counterpart and/or each Voluntary Agency. A sample contract is attached herewith along with a copy of the nutribun recipe: (See Attachment C.)

The Philippine School Nutrition Program encourages the construction of school bakeries. Various types of oven plans are available in the Philippines ranging in cost from approximately ₱500 to ₱3,000. Schools desiring to construct bakeries should contact their respective head offices in Manila for plans, cost estimates and any further details.

V. Records

The following records have to be maintained and submitted by the school and division. Follow instructions at the back of each form.

1. Individual Growth Chart (See Attachment A)
2. Consolidated Report Form (See Attachment B)

VI. Reports

Refer to the U.S. Voluntary Agency supporting the program.

Attachments: a/s

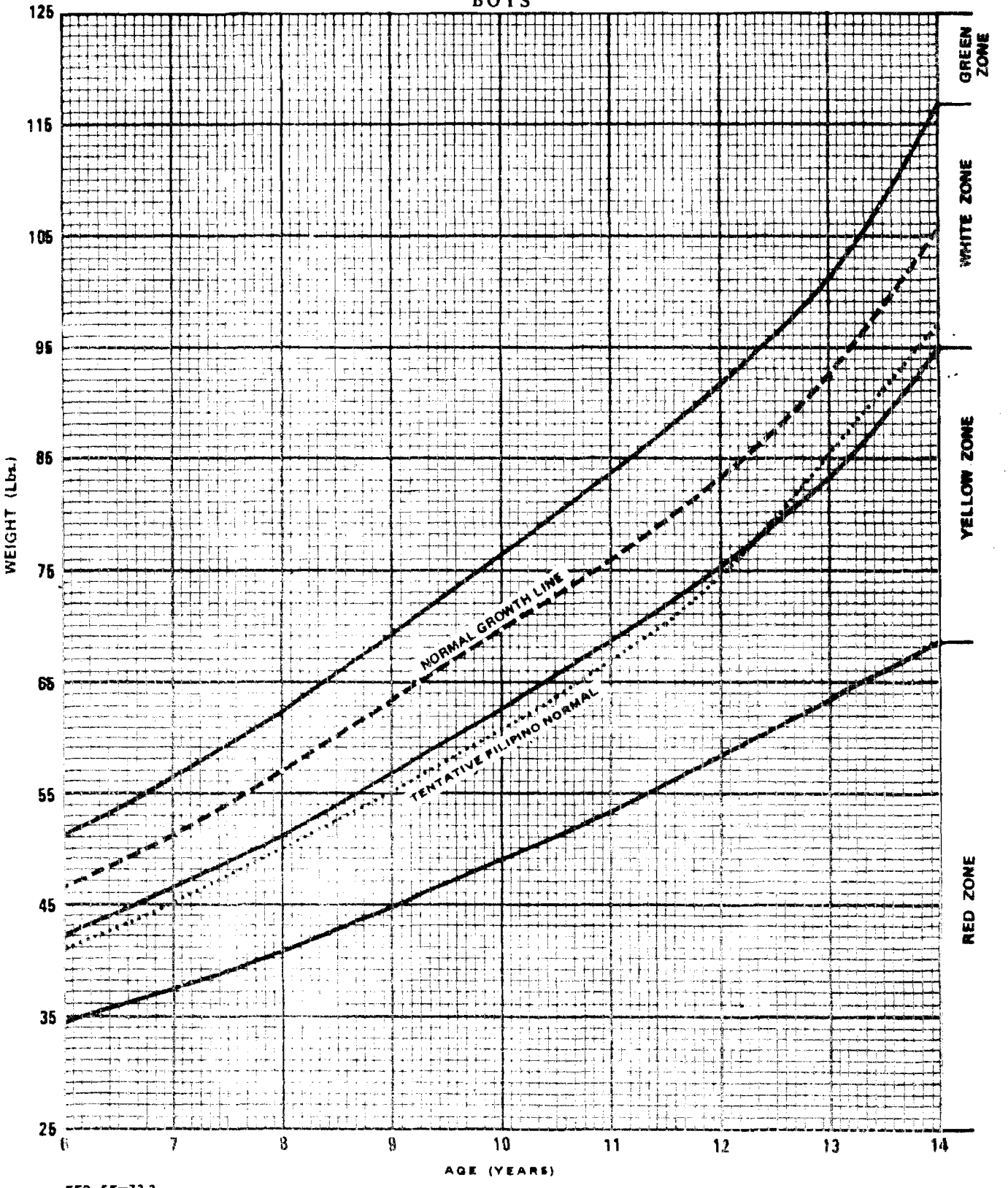
PHILIPPINE SCHOOL NUTRITION PROGRAM · INDIVIDUAL GROWTH CHART

Name _____ *Date of Birth* _____ *Grade/Sec.* _____

School _____

Province _____ *Municipality* _____ *Barrio* _____

Date Started _____



FFP—SF—72-2

Better Nutrition for a Stronger Philippines

HOW TO USE THE INDIVIDUAL GROWTH CHART

1. An Individual Growth Chart should be prepared and maintained for each child. Use the chart corresponding to the sex of the child.
2. Fill in correctly the child's name and other data as indicated on the top of the Individual Growth Chart.
3. Compute the age of the child to the nearest month on the date of weighing by subtracting the date of birth from the date of weighing.

Example –	Year	Month	Day
Date of weighing	1971	7	21
Date of birth	1964	5	15
	7	2	6

If the difference under column "Day" is 1 to 15, the age of the child is 7 years and 2 months, whereas, if it is 16 to 29, the age of the child will be 7 years and 3 months.

4. Weigh the child carefully – barefoot with minimum clothes on a scale, which accuracy has been tested, preferably using a beam-balance scale. Weighing should be done in July, October, January and April on the same date and time as much as possible. This should be accomplished regularly whether food commodities are received or not.
5. Take the correct weight of the child. Locate its weight on the chart and plot it on the vertical line corresponding to the age of the child to the nearest month. Note that each horizontal line corresponds to one pound weight and one vertical line to one month of age. After each weighing connect the plotted points on the growth chart. This will enable you to determine the child's growth curve and response to the feeding program.
6. Individual Growth Charts for each class should be placed in envelopes, each representing the color on the chart, i.e., red, yellow, white and green near the Student Nutrition Chart. This individual growth chart is a permanent health record which should follow the child from grade to grade. For public schools, it should be attached to Form 137 at the end of each school year.
7. Each child should be encouraged to take an active interest in its own progress towards recovery from undernourishment by eating one nutribun a day!

* * * * *

NOTE:

The normal growth line is an imaginary line bi-secting the white or normal zone on the Student Nutrition Chart. The top of the normal growth line is ten percent above normal weight and the bottom of the white zone is ten percent below normal weight. The Filipino normal growth line is tentative and is expected to be revised as child health improves.

After you have plotted the child's normal growth curve on its Individual Growth Chart you will be able to see if its own growth rate is faster than normal. A faster (positive) than normal growth curve will show that the child is responding well to increased feeding and correcting his malnutrition.

Children in the Student Nutrition Program who fail to show a positive growth curve, should be checked by the school physician, other local doctors, and/or nurse to determine if they are suffering from any organic diseases which requires treatment.

Father's Name _____

Occupation _____

Mother's Name _____

Occupation _____

No. of Living Brothers and Sisters _____

Immunizations (Enter Dates)

	Primary	Booster	
Small Pox			
BCG			
DPT			
Polio			
El Tor			

PHILIPPINE SCHOOL NUTRITION PROGRAM · INDIVIDUAL GROWTH CHART

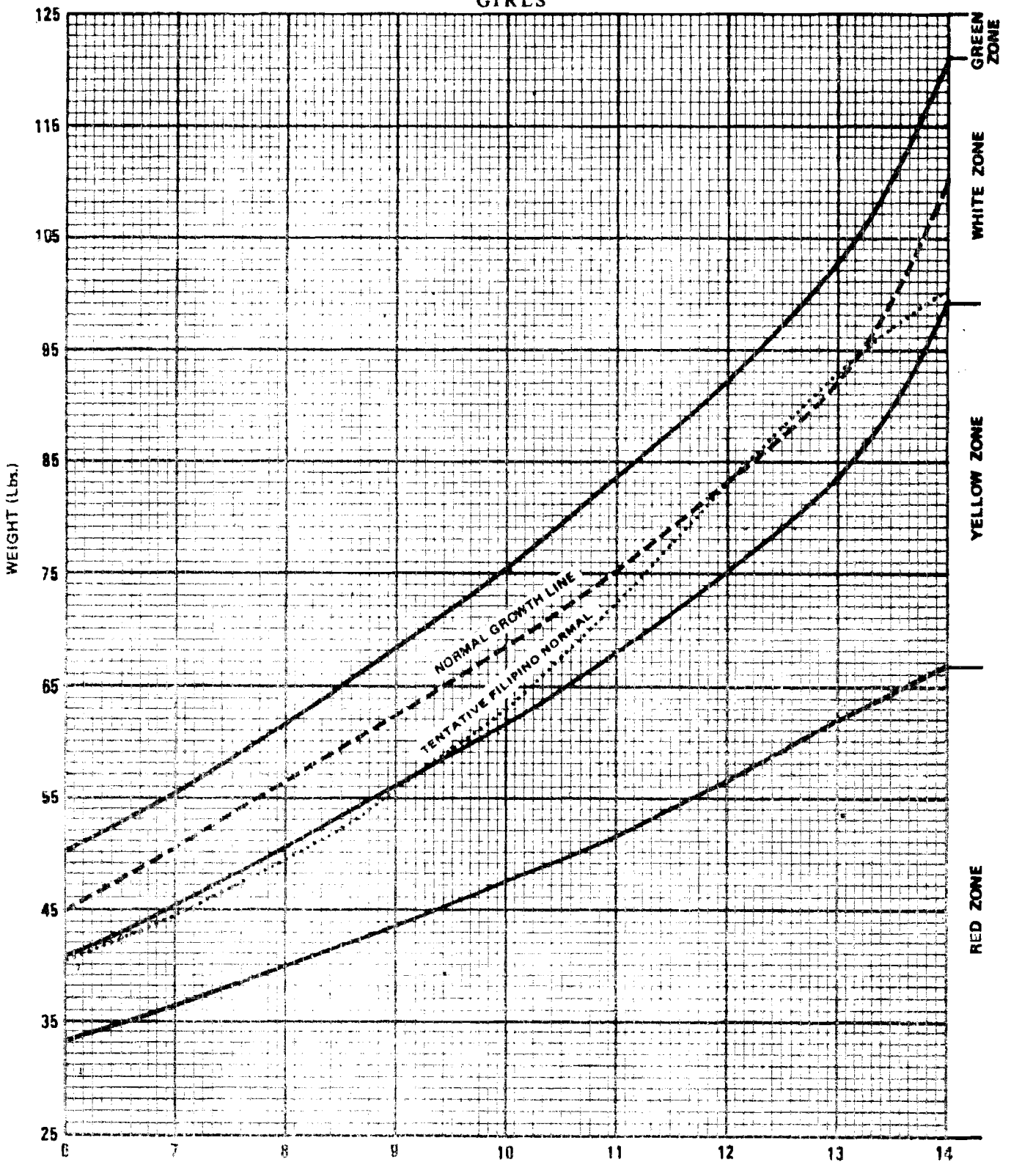
Name _____ *Date of Birth* _____ *Grade/Sec.* _____

Province _____

School _____ *Municipality* _____ *Barrio* _____

Date Started _____

GIRLS



FFP–SF–72.2

Better Nutrition for a Stronger Philippines

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5. Take the correct weight of the child. Locate its weight on the chart and plot it on the vertical line corresponding to the age of the child to the nearest month. Note that each horizontal line corresponds to one pound weight and one vertical line to one month of age. After each weighing connect the plotted points on the growth chart. This will enable you to determine the child's growth curve and response to the feeding program.
6. Individual Growth Charts for each class should be placed in envelopes, each representing the color on the chart, i.e., red, yellow, white and green near the Student Nutrition Chart. This individual growth chart is a permanent health record which should follow the child from grade to grade. For public schools, it should be attached to Form 137 at the end of each school year.
7. Each child should be encouraged to take an active interest in its own progress towards recovery from undernourishment by eating one nutribun a day!

• • • • •

NOTE:

The normal growth line is an imaginary line bi-secting the white or normal zone on the Student Nutrition Chart. The top of the normal growth line is ten percent above normal weight and the bottom of the white zone is ten percent below normal weight. The Filipino normal growth line is tentative and is expected to be revised as child health improves.

After you have plotted the child's normal growth curve on its Individual Growth Chart you will be able to see if its own growth rate is faster than normal. A faster (positive) than normal growth curve will show that the child is responding well to increased feeding and correcting his malnutrition.

Children in the Student Nutrition Program who fail to show a positive growth curve, should be checked by the school physician, other local doctors, and/or nurse to determine if they are suffering from any organic disease which requires treatment.

Father's Name _____

Occupation _____

Mother's Name _____

Occupation _____

No. of Living Brothers and Sisters _____

Immunizations (Enter Dates)

	Primary	Booster	
Small Pox			
BCG			
DPT			
Polio			
El Tor			

PHILIPPINES
SCHOOL NUTRITION PROGRAM
CONSOLIDATED REPORT
OF NUTRITIONAL STATUS OF ELEMENTARY SCHOOL CHILDREN

I

PERIOD COVERED _____

Nutritional Status	Sex	A. Start of the School Year — Age in Years										B. End of the School Year — Age in Years									
		6	7	8	9	10	11	12	13	14	Total	6	7	8	9	10	11	12	13	14	Total
RED	Boys																				
	Girls																				
	Total																				
YELLOW	Boys																				
	Girls																				
	Total																				
WHITE	Boys																				
	Girls																				
	Total																				
GREEN	Boys																				
	Girls																				
	Total																				
TOTAL	Boys																				
	Girls																				
	Total																				

II

A. No. of pupils participating in the Program _____

B. No. of feeding days _____

C. No. of pupils enrolled _____

D. No. of drop outs _____

E. No. of classes/schools included in this report _____

Submitted by:

Signature _____

Printed Name _____

Title _____

School _____

Municipality _____ *Province* _____

SCHOOL NUTRITION PROGRAM

HOW TO USE THE "CONSOLIDATED REPORT OF NUTRITIONAL STATUS OF ELEMENTARY SCHOOL CHILDREN

1. This form should be used by the teacher to summarize the nutritional status of her pupils in her classroom, by the principal to summarize the nutritional status of her pupils in her school; and by the Division Superintendent to summarize the nutritional status of his pupils in his entire school division.

   a. **Teacher's Use**

      (1) Based on the Individual Growth Charts of your pupils, enter the number of boys or girls in the **Red, Yellow, White,** or **Green** zones under the respective age columns. The age of the child at the start of the school year should be reflected as the same age at the end of the school year. For example: a child recorded as age seven (7) at the start of the school year should be recorded as age seven (7) at the end of the school year even if the child's actual age has changed.

      In recording the age at the start of the school year under column 1A, the child's age in years after five (5) months should be rounded up to the next year. Example: Age seven (7) years and 1 to 5 months should be entered under column 7 years and age 7 years and 6 to 11 months should be entered under column 8 years.

   b. **Principal's Use**

      (1) Based on the consolidated report of each classroom teacher prepare a summary for your school.

      (2) Accomplish this form in triplicate and forward the original and duplicate copies to the Division Superintendent, keeping a copy for your own files.

   c. **Superintendent's Use**

      (1) Based on the consolidated reports of the principal, prepare a summary for your school division.

      (2) Accomplish this form in duplicate and forward the original copy together with the original consolidated report submitted by the principal of each participating school to the School Health Division, Bureau of Public Schools, Manila, keeping a copy for your own files.

2. This report is to be accomplished and submitted by the teacher, principal and superintendent twice a year, one at the start of the school year (not later than August 15 of the corresponding school year) and another at the end of the school year (not later than May 15 of the same school year.)

3. If the report is for the Start of the School Year or start of the nutrition program in the school reflect the month and year when the school starts or the month and year when the school nutrition program starts in the school and use column 1.A. Do not fill out 1.B.

4. If the report is for the End of the School Year, fill out 1.A. and B using the figures in 1.A. that you have previously submitted at the start of the school year. Enter under Period Covered the corresponding school year for which the report is made.

5. 11.A,B,C,D & E and the rest are self-explanatory. It is obvious that 11.B. & D cannot be filled out at the start of the school year.

* * * * * * *

IMPROVED NUTRIBUN FORMULATION USING SOY FORTIFIED FLOUR

BASIS: 50 lb-bag of flour

Ingredients	*Bakers %*	*Gram-weight*
FLOUR, soy fortified	100.00	22,700.00
WATER, (not less than)	64 to 70.00	
YEAST, active dry	2.00	454.00
SALT	1.50	310.00
SUGAR, fine granulated	12.00	2,724.00
OIL	5.00	1,136.00

MIX (conventional mechanical mixer): 20 to 30 minutes

BENCH REST: 15 to 30 minutes

SCALE TO SIZES: not less than 185-190 grams per bun

ROUND AND PAN

FINAL PROOF: 45 to 60 minutes

BAKE: 15 to 20 minutes at 385°F.

Minimum Baked Weight/bun: 160 grams

YIELD: Not less than 195 and not more than 205 Nutribuns

NOTE:

1. Soy fortified flour is an improved flour which takes the place of flour and milk in the nutribun formula.
2. The water absorption is variable according to the type of mixing process employed. With mechanical mixer, absorption is higher than 60% usually about 64–70%.
3. The yeast level could be less than 2% depending upon the length of time to make-up the doughs. However, the 2% level is highly recommended.
4. The bench rest could be longer than recommended. This will be influenced by the amount of yeast used. Bench rest must be from 45 minutes to 60 minutes when using manual mixing.
5. Regardless of the blending of the flour, it is always taken as 100% (Baker's Per Cent).

NUTRIBUN – FOOD COMPOSITION (Per Bun)

(Using Soy Fortified Flour - 12%)

COMMODITY	GRAMS	CALORIES	PROTEIN (gms)	CALCIUM (mg)	IRON (mg)	THIAMINE (mg)	RIBOFLAVIN (mg)	NIACIN (mg)	VITAMIN A (I.U.)	ASCORBIC ACID (mg)
FLOUR	113.6	405	18.7	263	3.3	0.45	0.34	3.9	1,240	–
OIL	5.0	44								
SUGAR	12.0	46								
YEAST	2	6	(0.7)*	(0.9)*	(0.3)*	(0.06)*	(0.11)*	(0.7)*	Tr	Tr
TOTAL	132.5	501	19.4	263.9	3.6	0.5	0.45	4.6	1,240	Tr

*Numbers in parenthesis denote values imputed from another form of the food or from similar food.

I.U. = International Unit

Tr = Trace

BUREAU OF PUBLIC SCHOOLS
School Nutrition Program
Nutrition Education Guidelines[1/]

INTRODUCTION

Philippine health and nutrition authorities have concluded that 80 to 90 percent of pupils enrolled in the elementary public schools are either clearly malnourished or are underweight for their age. These conditions are caused mainly by an insufficient consumption of calories (food energy) and protein, with calories being the most deficient. Such a conclusion is supported by nutrition surveys which show at least a 15-20 percent deficiency in calorie consumption for the population as a whole. Although only very little data is available, these suggest that in elementary school-age children the calorie deficiency may even be higher.

In order to overcome the low nutritional level and consequent reduced health and vigor in school children, the Bureau of Public Schools has introduced a School Nutrition Program with assistance from the Government of the United States of America and U.S. Voluntary Agencies. Through this program the Nutribun is made available as a ready-to-eat, high-energy, highly nutritious food supplement.

If the Nutribun is regularly consumed as a supplement to the ordinary diet of elementary school children, their physical stature as well as health and well being will be improved.

GROWTH CHARTS

The growth response of boys and girls to an adequate diet is one of the most easily measured indicators of improvement in health and well-being. Such growth response is easily measured by weighing the children.

The weighing exercise should be considered an important classroom experience in health education and should be made a part of the pupils' health instruction on a regular schedule, monthly if possible or as a minimum, at least once each three months.

The School Nutrition Program supplies each school participating in the program with growth charts, one for each pupil. These should be used to plot the progress in body weight gains on a monthly or quarterly schedule. Directions for plotting the growth line and calculating the age of a child are given on the back of the growth charts; samples are attached.

1/ Nutrition Division, USAID, Manila.

THE TARGET GROWTH LINE

As a useful exercise in health education, each pupil should be given a "goal" or a "target" as his or her own measure of whether or not the Nutribun is bringing about the desired improvement in growth and development.

The following is a suggested procedure or method for drawing the nutrition "goal" or "target" line.

1. For pupils in the age range 6 to 11 years in the red zone (malnutrition or red zone on growth chart):

a) Place a dot in the correct age column corresponding to the weight of the child.

b) Place a dot in the age column 3 years from the present age, corresponding to the weight inside the yellow zone just beyond the red-yellow border (Note: Three years is allowed for recovery of a child in the red zone).

c) Join the two dots to form the "target" line.

Example I
(See accompanying chart)

Age of child: 7 years, 4 months

Weight: 34 lbs.

(1) Place a dot (A) on the age column 7 years 4 months corresponding to 34 lbs. This point is in the red zone.

(2) Place a dot (B) on the age column 10 years 4 months (3 years after) inside the yellow zone just beyond the red - yellow border or at 49 pounds.

(3) Joint points A and B. The straight line (AB) formed is the "target" line.

2. For pupils in the age range 6 to 12 years and in the yellow zone (underweight or yellow zone on the growth chart):

a) Place a dot in the correct age column corresponding to the weight of the child.

b) Place a dot in the age column 2 years from the present age, corresponding to the weight inside the white zone, just beyond the yellow-white border. (Note: Two (2) years is allowed for recovery of a child in the yellow zone.)

c) Join the two dots to form the "target" line.

Example II
(See accompanying chart)

Age of child: 7 years, 2 months

Weight: 41 lbs.

(1) Place a dot (C) on the age column 7 years, 2 months corresponding to 41 pounds. This point is in the yellow zone.

(2) Place a dot (D) on the age column 9 years, 2 months (2 years after) inside the white zone, just beyond the yellow-white border at 58 pounds.

(3) Join points C and D. The straight line (CD) formed is the "target" line.

3. For pupils in the age range 11 years, 1 month to 14 years in the red zone or 12 years, 1 month to 14 years in the yellow zone:

Example III
(See accompanying chart)

Age of child: 12 years, 7 months

Weight: 64 lbs.

(1) Place a dot(E) on the age column 12 years, 7 months corresponding to 64 pounds.

(2) Between 12 years, 7 months and 14 years there are 17 months.

(3) Place a dot (F) on the age column 14 years corresponding to 81 pounds (64 plus 17 equals 81).

(4) Join points E and F. The straight line (EF) formed is the "target" line.

Example IV
(See accompanying chart)

Age of child: 11 years, 4 months

Weight: 51 lbs.

(1) Place a dot (G) on the age column 11 years, 4 months corresponding to 51 pounds.

(2) Between 11 years, 4 months and 14 years, there are 32 months.

(3) Place a dot (H) on the age column 14 years corresponding to 83 pounds (51 plus 32 equals 83).

(4) Join points G and H. The straight line GH formed is the "target" line.

Each month or quarter when a child is reweighed and is found to be on or above the target line, he is considered to be improving his nutritional health.

Children do not grow at the same speed or rate at all ages. Notice how the growth rate accelerates or speeds up when the child is about 11 years old (girls) and 12 years old (boys). This is known as the growth spurt associated with onset of adolescence, or the "growing-up" into adults. Good nutrition and adequate food is particularly important to take care of the extra demands of speeded up body building.

DETERMINING PROGRESS OR SUCCESS

The above suggested health education classroom exercise of weighing pupils and instructing them on the meaning of these weights in terms of normal growth and development can also serve as a useful guide to the teachers on whether or not the program is achieving the objectives of improving nutritional health.

As a measure of program effectiveness, classroom scores can be assigned. These can be expressed in percent as follows:

80% on or above target line - Excellent
70% on or above target line - Good
60% on or above target line - Satisfactory
50% on or above target line - Fair
40% on or above target line - Poor

For example, in a class of 50 pupils if there are:

a) 40 or more pupils on or above the target line, the score is excellent.
b) 35-39 pupils on or above the target line - Good.
c) 30-34 pupils on or above the target line - Satisfactory.
d) 25-29 pupils on or above the target line - Fair.
e) 20 or less pupils on or above the target line - Poor.

SUGGESTIONS FOR IMPROVING CLASSROOM PERFORMANCE

Not all pupils will necessarily respond by exhibiting improved growth. For those children who regularly consume the Nutribun and still do not gain weight, proper medical attention is indicated.

Poor or only fair performance may be improved by discussing individual cases with pupils and parents at regular PTA meetings. Special parent-pupil health days might be promoted once a quarter when parents would be invited to visit the school on weight dates. This increases parent interest in the school health program and its objectives.

Often with improved nutrition and satisfaction of hunger pains, pupils become better learners, better listeners and actually improve their class standing. Teachers should be alert and make note of any improvements in classroom performance as well as in increased participation in extra curriculum activities as possible additional benefits from the Nutribun program.

Another measure of improved performance is improved pupil attendance or reduced tardiness or absenteeism. These should also be noted as possible benefits from the nutrition program.

COURSE OF ACTION FOR IMPLEMENTING NUTRITION INTERVENTIONS

FLOUR-EXTENDER SUBPROJECT AS A MODEL[1/]

By executive order in August 1973, an action group was established in the National Food and Agriculture Council with the specific task of identifying local resources that can be used as extenders of cereals. The group has selected the following resources:

Coconut
Root Crops (Ubi, Taro, Arrowroot)
Sweet Potatoes
Cassava
Banana
Legumes (Mongo Beans, Peanuts, Soybeans, Kadios, Cowpeas)

The action team is organizing a workshop with three working panels:

Panel 1 - Production

Role: To develop specific information on above crops as to calorie yield per hectare per day, protein yield per hectare per day, production potential, estimate of production costs and market value of the raw agricultural commodity.

Panel 2 - Processing

Role: To develop for the most promising above crops processing techniques that could be applied to produce flour or extrusion products that could be blended with wheat, corn, or rice with final products such as flours, noodles, macaronis, crumbles, or ready-to-eat snack items.

Panel 3 - Utilization

Role: To identify market potentials and particularly to identify supplementary feeding programs as embodied in this PROP as avenues for test marketing such new products.

1/ Drafted by National Food and Agriculture Council, Committee on Indigenous Foods.

The workshop has as its objective the development of a list of priorities in terms of immediate, most practical raw materials and processes that would be recommended for either further research or immediate pilot plant production.

These recommendations would serve as the basis of developing specific product processing for which USAID would be prepared to provide technical assistance, commodities or other inputs to supplement the GOP or Philippine private industry inputs.

Attachment K

Section B

THE MOTHERCRAFT CONCEPT APPLIED TO SOUTHEAST ASIA

by

Minda Caedo[1/] and R. W. Engel[2/]

INTRODUCTION:

In 1967, the Republic of the Philippines requested assistance from the United States for the organization of a nutrition program. The major purpose was to implement action programs which would alleviate malnutrition in the most vulnerable, namely, the preschool children and women in the reproductive age range. Several years of experience with an Applied Nutrition Program had led to the conclusion that a more specific focus on the vulnerable segment of the population was indicated. The applied nutrition effort had been effective in establishing improved nutrition training facilities, in creating more awareness of the malnutrition problem and in encouraging school, home, and community gardens. It had not, however, been very successful in reaching into homes with malnourished preschool children. Most of the Applied Nutrition work was carried on by school teachers as an added burden to their routine duties.

For these reasons, there was general agreement that the USAID should provide developmental assistance for strengthening the nutrition program in the Department of Health, particularly maternal child health. To accomplish this, assistance was extended for the employment of nutritionists (college graduates in Foods and Nutrition or Dietetics) who constituted the field staff

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1/ Program Specialist in Nutrition, USAID, Manila.

2/ Nutrition Advisor, USAID, Manila, and Professor of Biochemistry and Nutrition, Virginia Polytechnic Institute, Blacksburg, Va.

for operating mothercraft centers as extensions of the Rural Health Units of the Department of Health. The National Nutrition Program Office was established in the Office of the Health Department as the administrative unit for managing the program. The Rural Health Units, approximately 1,400 throughout the Philippines, are usually located in the centers or poblacions of the towns or municipalities. The mothercraft centers were mostly operated in the more peripheral areas of the towns, in the smallest political subdivisions known as barrios.

In the period between 1957 and 1967, Philippine scientists in the government service had developed a considerable background of data concerning the malnutrition problem. Initially, a survey was conducted in the Armed Forces with technical assistance through USAID and the U.S. Interagency Committee on Nutrition for National Defense (ICNND). In the decade 1958-1967, surveys were continued in the 10 major regions or geographic areas of the country on a structured sample of the total population. From these studies, it was evident that the per capita consumption of energy and protein was approximately 15% below recommended or desirable levels. It was apparent also that the energy deficit was more serious than the protein deficit. Approximately 30% of protein consumed was from animal products, mostly from fish. Other dietary deficiencies noted were thiamine, riboflavin, Vitamin A, Vitamin C, Calcium and iodine[1].

Also vital statistics supported the view that the preschool child was in particular hazard. Body weight for age as an index of nutritional

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[1]Nutrition Surveys by Regions, Publications of the Food and Nutrition Research Center, National Institute of Science & Technology, National Science Development Board, Manila.

status revealed that 35% were in 2nd (25-40% below standard) or 3rd (over 40% below standard) degree malnutrition. 80% were 10% or more below standard weight for age. The age specific death rate in children aged 1-4 years was 8.2 per 1,000, or approximately 12 times that in the developed countries. The death rate from measles was 51 times higher than in the U.S. and this was attributed to the lowered resistance to infectious diseases caused by undernourishment. Deaths from other major infectious diseases in 1-4 year age children were reported to be 16 times as high as in the U.S.[1]

The agricultural production and import/export statistics revealed deficits in food available for consumption by the population as a whole. Despite this, the mothercraft center program called for only very minimal assistance by way of food donations. The plan called for strong focus in community and home gardens as the means of correcting the food deficit.

Other components of USAID development assistance in support of nutrition activities included the following:

(a) Training of local scientists abroad as a means of strengthening local research and educational institutions;

(b) Supplies and equipment in support of research to identify local protein and energy resources useful in developing nutritious weaning foods.

(c) Supplies and equipment to selected hospital laboratories for the introduction of micro-techniques for aiding in the diagnosis of malnutrition in infants and young children. The U.S. Food for Peace blend

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[1] The 4-year National Food and Nutrition Plan, the National Food and Agricultural Council, Department of Agriculture and Natural Resources, Quezon City, Philippines, June 1971.

of corn, soyabean meal and non-fat dry milk was planned for use as a supplement until a local product could be developed in the above program.

The hospital support program was minimal. One such laboratory capability was developed for each of the 10 major regions of the country, in a hospital where severe malnutrition cases could be managed.through units (malnutrition wards) set up within the existing pediatrics services.

In the Philippines, catholicism is the religion of over 80% of the population. With catholic parishes throughout the country, it was natural that the Catholic Relief Services (CRS) of the U.S. Catholic Conference would assume major responsibility in the U.S. Food for Peace food donation program.

Thus, mothercraft was introduced among urban low-income and squatter populations by CRS and its counterpart agency, the Social Action Directorate of the Catholic Conference, Philippines. Further, these agencies cooperated by conducting special studies or modifications of mothercraft from which emerged an extensive food assistance program, the Targeted Maternal Child Health (TMCH) Program. This was developed as a more extensive outreach than could be achieved through mothercraft centers alone.

MOTHERCRAFT CENTERS:

In introducing mothercraft in the Philippines, it was decided that each center would serve 2 meals daily, 6 days a week to the enrolled malnourished children. Mothers would be instructed to provide, in addition, one full similar meal at home as well as 2 snacks. Each meal was designed to provide 350-400 kilocalories (Kj 83.7-95.7) and 8-10 grams of protein. Two meals a day in the center was decided upon because earlier experience in the Applied Nutrition Program had revealed most mothers would not be

able to spend more than 4 or 5 hours a day in mothercraft. The mothercraft centers were operated as described in the footnote below.[1] Mothers were obligated to serve one day weekly as their share of work load in center operation. However, Filipino mothers do not like to be separated from their young children. For this reason, many mothers were usually present at the center daily, particularly during mealtimes.

As a guideline for selection of mothercraft centers, the following conditions had to be met:

(a) The site had to be within easy walking distance (1-1.5 Km. or less) for participating families;

(b) A minimum of 50 to 60 children in 2nd or 3rd degree malnutrition had to be available;

(c) A potable water supply and convenient outdoor sanitized toilets had to be available;

(d) A space for a vegetable garden had to be made available by the barrio.

Initially, the centers were operated for a period of 12 weeks. After 3 years of operating such mothercraft demonstrations in the health department, the decision was made to reduce the operational period to 8 weeks.

The Department of Health realized that its resources were limited; for this reason, it viewed its role as one of demonstration of mothercraft as a mechanism for creating widespread recognition of the malnutrition problem. It was assumed that the education aspects would diffuse this aware-

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[1] A Practical Guide to Combatting Malnutrition in the Preschool Child. Published by Appleton Century-Crofts, Education Division, Meredith Corporation, N. Y. Sponsored by Research Corporation, N. Y.

ness and also create the increasing attention to more intensive food production as the ultimate solution to the problem. Further, it was recognized that many rural health unit staff members, doctors, nurses, midwives, and sanitarians, needed reorientation on the malnutrition problem through participation in the mothercraft center activities under the direction of the trained nutritionist.

Table 1 summarizes some of the early mothercraft results in two provinces where the program was field-tested in 1968-69. These results are typical of centers operated as extensions of Rural Health Units. It is clear that older preschoolers in general respond better than those under 24 months of age. Further, with the relatively high drop-out rate, 19% overall, it was deemed desirable to conduct studies to determine alternative education approaches.

Food assistance combined with mother education, but with little or no actual child feeding in organized centers, was for example considered an alternative worthy of testing. This has been identified as the Targeted Maternal Child Health Program. This approach was tested as an alternative to mothercraft by the Catholic Relief Services by organizing mothercraft classes for mother instruction and by making available donated food for the malnourished preschool children in the participating families. The details of the TMCH Program are described in Appendix A.

Table 2 briefly summarizes child responses in 89 mothercraft classes operated by nutritionists employed by Catholic Relief Services. These were located mainly in the slum or low-income areas of Greater Manila. It is again clear that the growth response was better among older preschoolers. Some of the centers' participants represented in the data

presented in Table 2 were followed for 3 and 6 months after mothercraft classes had graduated to ascertain whether or not there was any permanent benefit as measured by child growth. The children were actually re-weighed at monthly intervals and on these occasions the monthly allowance of donated food (corn-soya-milk blend or CSM) was given to the mother for use at home as a supplement for her malnourished children.

The results of 3 and 6 months post-mothercraft are shown in Table 3. It is evident that the decline in prevalence of 2nd and 3rd degree malnutrition began during mothercraft and that this trend continued after mothers graduated. On the assumption that the trend observed for 6 months continues, one would predict 2nd and 3rd degree malnutrition would be essentially corrected in 18-24 months.

The TMCH Program referred to above and described in Appendix A was introduced while the above mothercraft program was in progress. Table 4 summarizes responses of 542 children participating in this program without interruption for 6 months. The results clearly reveal that there was improvement in body weight for age by participating children receiving the donated food (CSM) as a supplement to their home diet. Elevation of average body weight of these children to 80% t he/standard can be considered as a reasonable health improvement goal. The data of Table 4 suggest this could be achieved in 18-24 months, assuming the 6-month trend continues. These responses were sufficiently encouraging to consider expanded TMCH effort as described in Appendix A.

The U.S. Voluntary Agencies, namely the Catholic Relief Services and the Church World Service have provided the leadership and initiative for the TMCH program. Guidelines and targets were based on the experiences with children in the initial pilot centers as noted above and operated by Catholic Relief Services.

In the TMCH program, the regularly weekly work and learning experience of the mother in a typical mothercraft center is replaced by an initial four 30 to 60 minute lecture-demonstrations by a nutritionist on how the mother is to use a daily 4-oz. supplement of a weaning food (CSM) in improving the nutrition of her malnourished child or prevent malnutrition / occurrence in her infant. Such lecture-demonstrations emphasize popular local recipes or dishes into which either CSM or rolled oats can be incorporated but with essential retention of the local taste/preference of mothers through use of the sauces and condiments that are a regular feature of Filipino cookery.

The 4-ounce supplement furnishes about 425 calories and about 20 grams of protein, or an estimated 1/3 of the daily energy requirement and one-half the estimated daily protein requirement. The supplement is of course also fortified with vitamins and minerals. The liberal protein content of the supplement is hopefully complimentary to the relatively limited amount of protein in the traditional staples, namely, rice, corn grits, or root crops such as yams or cassava.

While the initial series of lecture-demonstrations are presented, the quantity of donated food needed for the first month (8 pounds) per participating child, lactating or pregnant mother is distributed to the participating families.

On a monthly schedule, the mothers are reassembled for further instruction on use of the food. On these occasions, the next month's supply of food supplement is distributed. All participating children are weighed monthly,and if growth response is not as expected the mother is counselled individually. An individual growth chart is maintained for each child and the child is expected to achieve a given schedule. For example, if it is

initially in 3rd degree malnutrition, its target is that of achieving 76% of standard weight for age in 24 months. This target line is entered into its growth chart. Monthly body weight plots readily reveal whether or not the desired or target growth rate is being achieved. As a further example, if the child is initially in 2nd degree malnutrition, it is given a target of advancing to 76% of standard weight for age in 18 months. The program goal is to advance 80% of preschool children participating from 3rd or 2nd degree malnutrition to 1st degree malnutrition or normalcy (76% of standard weight for higher) in 18 to 24 months.

Further, and more importantly, in the communities where the program is introduced all mothers with infants 6 to 11 months of age are encouraged to participate in a malnutrition prevention program by using the food supplement as a weaning food for their babies. The growth pattern of infants from 6 months onward is shown in Table 5. The results are based on more than 100 observations for each monthly interval. It is clear that growth failure characteristically occurs over the brief period from 6 to 11 months after birth and that this is caused by poor weaning practices. With focus on the preventive aspects, it is hoped that the goal of preventing 80% of current 2nd and 3rd degree malnutrition in toddlers can be accomplished in the TMCH Program in a typical community in 2 to 3 years at most.

The monthly exposure of the mothers for 18-24 months, it is hoped, will constitute an educational experience which en toto would be equal in education impact to the weekly exposure for 12 weeks in a typical mothercraft work-and-learn setting.

In these monthly assemblies, the same subject matter is covered as that in a typical mothercraft experience, namely, menu planning, shopping

for low-cost nutritious foods, meal preparation, food economics, home gardening, sanitation, family planning, and additionally arts and crafts for improving homemakers' role in the family. Tables 6 and 7 reveal the type of data collected in the mothercraft and TMCH program in Bulacan Province where an integrated nutrition and family planning program is being carried out on a pilot scale. These data vividly reveal that narrow birth intervals and more than 2 preschool children per family, which are characteristic in today's Philippine families, contribute to the malnutrition prevalence among the preschool children. For this reason, more and more attention is being directed toward orientation of participating mothers in family planning.

Deciding upon a reasonable measure of program progress towards goals has been difficult since there are but few examples of well documented changes in physical growth and stature in children associated with changes in dietary habits or food consumption patterns. Perhaps, the Japanese post-World War II experience is most useful and this in a sense served as the basis for the judgment that an annual increase of 1.5 to 2.0% in standard body weight for age should be a reasonable gauge of satisfactory progress in the target population. In Japan, between 1948 and 1967[1/], children increased in body weight for age approximately 1% per year, or an increase in average body weight of approximately 20% in the 2 decades.

In the Philippine TMCH Program, the target population constitutes approximately one-third of the preschool child population, mainly the

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[1] Annual Reports, National Institute of Nutrition, Ministry of Health and Welfare, Tokyo, Japan.

third with poorest physical growth and development. If this third can be improved at the rate of 1.5 to 2.0% per year (the previously stated reasonable gauge of satisfactory response), then the total preschool child population should improve at the rate of one-half to two-thirds of [illegible] one% per year, assuming there is no improvement at all in the remainder of the preschool child population. The TMCH program should actually have some positive effect on the non-participating population. Thus, it is reasonable to assume that a response of two-thirds to three-fourths of 1% annually in average body weight would be achieved in the entire population. This would be a response approaching that experienced in Japan which has been pointed to as an outstandingly successful improvement in physical growth and development of children.

The planned TMCH program in the Philippines is currently managed heavily through the Catholic Relief Services and its counterpart local agency, the Social Action Directorate of the Catholic Conference, Philippines. Supplementary food distribution is handled mainly by parish volunteers under the supervision of nutritionists employed by the Church Social Action Directorate. The Church World Service program, with its local counterpart, the Division of Self Development, National Council of Churches, Philippines, has a similar but less extensive program operating under the same guidelines. Currently, both the Department of Health and the Department of Agriculture are considering more extensive involvement in the TMCH program by retraining midwives or sanitarians and Home Management technicians.

These agencies are, of course, also concerned about the population problem and its pressure on the nation's food supply. Consequently, consideration is also being given to utilizing nurses, midwives or home

management technicians in TMCH who have been trained as family planning motivators.

In TMCH, every home which needs family planning counsel is visited when the preschool child body weight survey is conducted as the basis for identifying the target population. It is indeed the mothers of the target group that is in greatest need of family planning services, which can also be extended on a monthly schedule, as needed, when food supplements are distributed. Thus, the need for integrating the TMCH program with family planning is self-evident.

The comment is often made that all too regularly in the past, food donation programs have had the aura of a dole-out. To counteract this, every recipient in the TMCH program is expected to contribute an associated charge of approximately 5 cents U.S. per month. Collections have been well over 90 percent, an indication that participants consider the program useful.

It should also be emphasized that a food donation program is not a logical long term solution to meeting the nutritional needs of a nation. For this reason, the more extensive involvement of the Department of Agriculture is considered essential, so that farm agents can participate actively and lend guidance for the establishment of home or community gardens to replace donated foods as rapidly as possible. For the weanling child, however, home technology might well be replaced by the more sophisticated technology of the food industry for the development of the nutritionally complete weaning food. To this end, assistance is being extended to local food industries for the development of a blend nutritionally similar to CSM but composed of local ingredients, such as coconut flour, or coconut skim milk powder, rice or corn flour, banana flour, mongo flour, or locally manufactured dried fish powder.

Those who can be credited with the concept of village-level approaches to the rehabilitation of malnourished preschool children and infants foresaw that there might be considerable variations.from a set pattern or procedure. The TMCH in the Philippines might be considered an extreme variation since it eliminates actual feeding operations outside the home. Continued observations will establish its usefulness as an alternative to the more traditional mothercraft approach of combining a child feeding center with mother education. The TMCH program is scheduled to extend food assistance to 1.3 million malnourished children together with nutrition education to mothers. It is thus one of the most extensive major efforts to provide nutrition education along with food assistance and monitoring of nutritional improvement.

RWE:MC:mle

TABLE 1

CHILD GROWTH RESPONSES DURING MOTHERCRAFT, LAGUNA AND RIZAL PROVINCES [1/]

1968-69

Age Range (months)	CENTER NO. 1	2	3	4	5	6	7	8	9	10	All Centers
	Body weight gain as % of Std. / Values in ( ) are number of subjects /.										
6 -23	108(13)	52(7)	159(10)	89(10)	128(7)	100(16)	104(8)	118(7)	113(5)	80(4)	107(87)
24-71	129(18)	100(18)	160(15)	190(14)	176(16)	170(8)	107(12)	181(15)	114(12)	101(15)	141(143)
All Ages	120(31)	87(25)	160(25)	148(24)	155(23)	124(24)	106(20)	161(22)	114(17)	97(19)	128(230)
Drop-outs	(3)	(1)	(2)	(12)	(12)	(6)	(15)	(0)	(2)	(0)	(53)
											19% drop-out

1/ These centers operated under the supervision of nutritionists employed by the National Nutrition Program Office, Department of Health, Manila.

TABLE 2

CHILD GROWTH RESPONSE DURING MOTHERCRAFT 1/

SUMMARY OF 89 MOTHERCRAFT CLASSES, 1969-70

Age Range (mos.)	Body Weight Gain as % of Standard	No. of Subjects
6-23	121	999
24-71	156	2,551
All Ages	148	3,550

1/ These centers were operated under the supervision of Catholic Relief Services nutritionists under an incentive grants program of USAID.

TABLE 3

DISTRIBUTION OF PRESCHOOL CHILDREN ON THE BASIS OF STANDARD WEIGHT FOR AGE BEFORE AND AFTER MOTHERCRAFT, AND DURING FOLLOW-UP

	60 or less		61 - 75		76 - 90		91 and above	
Time:	3rd Degree		2nd Degree		1st Degree		Normal	
	No.	%	No.	%	No.	%	No.	%
Initial	49	10.8	306	68.0	95	21.1	0	0
3 mos. 1/	19	4.2	289	64.3	141	31.3	1	0.2
6 mos. 2/	14	3.1	246	54.7	183	40.7	7	1.5
9 mos.	13	2.8	222	49.3	204	45.3	11	2.4

1/ During attendance of mothercraft classes.

2/ During follow-up, 8 pounds of CSM was issued monthly to the mothers of the participating children while the children were being weighed.

TABLE 4

CHILD WEIGHT RESPONSES IN A TARGETED MATERNAL CHILD HEALTH (TMCH) PROGRAM

SUMMARY OF 8 CLASSES, 1971-72 [1/]

Age Range (mos.)	BODY WEIGHT AS % OF STANDARD: Initial or Base Line	After 3 mos.	After 6 mos.
6 - 23	71.4	73.0	74.3
24 - 71	73.4	74.4	75.3
All Ages	72.8	73.9	74.9

1/ These classes were operated by Catholic Relief Service Nutritionists. Participants were families residing in the low-income and squatter resettlements of Greater Manila.

TABLE 5

THE DECLINE IN BODY WEIGHT AS % OF STANDARD BETWEEN 6 AND 15 MONTHS OF AGE IN INFANTS IN BULACAN PROVINCE [1/]

Age in Mos.	No. of Subjects	Body Weight as % of Standard
6	151	92.9
7	167	89.9
8	177	88.0
9	183	86.0
10	154	83.9
11	177	81.5
12	157	79.5
13	158	80.0
14	141	80.6
15	129	79.2
18	174	77.2
24	155	78.6
30	146	78.4
36	135	79.5
42	134	78.0
48	125	78.8

These data were collected in 1971-72 by provincial nutritionists and home management technicians operating an integrated nutrition-family planning pilot project.

TABLE 6

THE IMPACT OF CHILD SPACING ON THE

NUTRITIONAL HEALTH OF THE DEPOSED CHILD

	DEPOSED CHILDREN		MALNOURISHED * DEPOSED CHILDREN	
	No.	% of Total	No.	% of Total
18 or less	200	31.5	110	55.0
19 - 30	330	52.0	117	35.4
31 or more	105	16.5	30	28.5
	635	100.0	257	40.5
T o t a l s	vvv	vvvvv	vvv	vvvv

* Children with body weights of 75% or less of standard. The deposed child is the one removed from the mother's breast as the next baby arrives.

TABLE 7

PREVALENCE OF MALNUTRITION AMONG PRESCHOOL CHILDREN AS INFLUENCED BY NUMBER OF PRESCHOOL CHILDREN IN THE FAMILY

Families with children aged 12-72 months:

No. of Children in Family	No. of Children	Malnourished Children	
		No.	%
1	256	91	35.5
2	476	186	39.0
3	304	147	48.3
T o t a l s	1,036	424	40.9

A. RATIONALE FOR A PHILIPPINE FOOD AND NUTRITION PROGRAM

1. Food Supply Inadequacies and Nutritional Deficiencies

The Philippines is a food deficit country, depending on imports of staples, such as wheat, dairy products, red meats, feed grains and in bad years rice to make up the difference between production and effective demand. Production of nutrients is also deficient in relation to physiologic requirements on a nationally aggregated basis, and because of inequitable distribution of nutrients among population groups, inadequate consumption is acute in many families.

Nutrition survey data collected from 1958-1968 show that actual food consumption per capita is about 1,700 Calories. The Government recommends a daily intake of 2,000 Calories per capita so consumption falls short of recommended levels by about 15 percent. Protein intake is estimated to be 47 grams per capita daily whereas 50 grams is recommended. Thus, the protein deficit is not as severe as the caloric deficit.[a/]

The food supply situation reported by the Government [b/] and the basis for food balance reported by FAO, reveal that the Philippines remains consistently among the lowest countries in this region in calories available for human consumption. Some of these relationships are shown in Tables 1 and 2.

Table 1

THE FOOD SITUATION IN THE PHILIPPINES, 1970
(PER CAPITA) [b/] [c/]

Nutrients	Supply Available	RDA*	Actual Consumption
Calories	2,084	2,000	1,673
Protein, grams	53.9	50	46.6
Fat, grams	27.8	30	21.9

*Recommended dietary allowances as developed by GOP.

a/ What is the Protein Gap? Carmen Ll. Intengan, Philippine Journal of Nutrition XXV, January-March 1972.

b/ The food availability data referred to are tabulated by the Office of Statistical Coordination and Standards, NEDA, GOP and are the basis for the food balances developed on a global basis by the FAO of the UN.

c/ Changes in Food Habits in Relation to Increased Productivity. Carmen Ll. Intengan, Philippine Journal of Nutrition XXV, 251, 1972.

Table 2

PHILIPPINE CALORIE AND PROTEIN INTAKES COMPARED TO OTHER ASIAN COUNTRIES*

Country	Year of Survey	Actual Consumption per day	
		Per Capita Calorie	Protein (grams)
1. Iran	1962-67	2460	68
2. East Pakistan	1962-64	2202	56
3. Japan	1965	2184	71
4. West Pakistan	1962-64	2111	67
5. Korea	1970	2105	66
6. India	1965	1970	51
7. Philippines	1958-67	1673	47

*Source: "Review of Food Consumption Surveys in Asia" Elena S. QUIOGUE, Proc. FIRST ASIAN CONGRESS OF NUTRITION, National Institute of Nutrition, Hyderabad, India.

Inequitable distribution of the already short food supply intensifies the problem of malnutrition in the population.[c/]

Table 3 shows that within the Philippines there are regional differences in nutritional deficiencies and again emphasizes the serious caloric deficit.

Table 3

PROTEIN/CALORIES DEFICIENCIES[d/]

	Calories (% of RDA)	Protein (% of RDA)	Calories (% of households with less than 70% of RDA)	Protein (% of households with less than 70% of RDA)
Manila & suburbs	90	92	30	20
Southern Tagalog	79	81	28	30
Ilocos - Mt. Province	88	97	16	15
Cagayan Valley & Batanes	81	87	26	21
Eastern Visayas	68	80	47	24
Western Visayas	75	88	38	20
Southwestern Mindanao	74	86	40	16

[c/] Changes in Food Habits in Relation to Increased Productivity. Carmen Ll. Intengan, Philippine Journal of Nutrition XXV, 251, 1972.

[d/] Nutrition Surveys conducted by the Food and Nutrition Research Center, NIST, NSDB, Manila 1959-69.

The age-specific food intake data (Table 4), reinforces the view that infants, preschool children, elementary school children, and pregnant and lactating mothers are at greatest risk.

Table 4

AGE - SPECIFIC FOOD INTAKE ADEQUACY, PHILIPPINES[a/]
1959-1969

	CALORIES		PROTEIN	
	Ave. Intake (Cal.)	% of RDA	Ave. Intake (grams)	% of RDA
Children 1-3 yrs	829	64	27.3	1 05
4-6	1,103	69	30.3	94
7-9	1,301	68	39.0	93
10-12	1,439	63	42.2	94
Boys 13-15	1,547	55	49.0	80
16-20	1,695	61	49.6	76
Girls 13-15	1,547	67	35.0	58
16-20	1,352	64	45.2	75
Man	1,742	73	53.3	85
Woman	1,602	89	44.8	81
Pregnancy	1,464	64	43.7	67
Lactation	1,339	46	41.7	56

Since breastfeeding is still much more common than bottle-feeding in the rural areas, it is felt that the newly-born infant is reasonably well nourished. However, from 6 months of age onward, the mother's poor nutritional state leads to inadequate breast milk, early-weaning, and nutritional deterioration of her infant.

Nutrition surveys have also detected other deficiencies. Clinical signs of Vitamin A deficiency were found in 15-20% of the population while serum

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a/ What is the Protein Gap? Carmen Ll. Intengan, Philippine Journal of Nutrition XXV, January-March 1972.

Vitamin A was in the deficient range in 60-95% of those tested. Dietary deficiencies of Riboflavin, Vitamin C and Calcium were also noted, but clinical signs of deficiency were not widely evident. Iodine deficiency was evidenced as simple goiter in some inland and mountainous areas.

2. Risk Groups

Infants, preschool children, pregnant and lactating women and elementary school age children, in that order, are considered to be the groups most vulnerable to the effects of malnutrition in the Philippines. The National Food and Nutrition Plan has selected infants, preschool children, and pregnant and nursing women as the priority groups. USAID concurs and considers elementary school age children as a second priority for nutrition rehabilitation.

The infant mortality rate (first year of life) is approximately 70 per 1,000 live births with no evidence of decline during the 1960s.

The number of deaths among children aged 1-4 years, as a percentage of all deaths, is about 20 percent, a level as high as that reported from other countries with severe malnutrition problems in the child population like India and Pakistan. The death rate among these children is estimated by Filipino scientists to be 12-14 times higher than in the United States, 4-5 times higher than in Taiwan.

These losses occur largely because of poor nutrition. Although difficult to document precisely, many recognize that malnutrition augments the morbidity-mortality of such common infectious conditions as TB, gastroenteritis, broncho pneumonia, whooping cough and measles; all rating highly as causes of illness and death in young Filipinos. The recent AID-funded RAND Report (R 773-AID, July, 1971), substantiates that in Latin American Countries, female literacy and nutrition definitely had an impact on mortality in children under five. It is probable that these variables are also major health determinants among Filipino children.

Other indicators of the effects of malnutrition among infants and young children are weight-for-age measurements. Because PL 480 Title II foods for this target group are distributed according to nutritional need, the USAID/Philippines Nutrition Office, and the concerned U. S. Voluntary Agencies (VOLAGS) have accumulated data on the extent and severity of weight deficiency among Pilipino infants and children. Approximately 90% of Filipino children, aged 1-14 are underweight for age. These observations confirm those of the GOP. [d/]

[d/] Nutrition Surveys conducted by the Food and Nutrition Research Center, NIST, NSDB, Manila, 1959-69.

In order to narrow the target further, the Government of the Philippines (GOP), USAID and the VOLAGS have agreed upon revised Filipino weight standards (about 10% below U.S. standards). Using these revisions approximately 5% of the children are severely malnourished (60% or less of normal body weight for age), and 30% are moderately malnourished (61-75% of normal body weight for age). These are the preschool children who receive priority attention in the Targeted Maternal Child Health (TMCH) Subproject. The severely and moderately malnourished are referred to as the malnourished target.

Less is known regarding the nutritional health of the school age population although poor physical growth and development is also common. Using a malnutrition definition proposed by WHO for the Western Pacific Region, clinical malnutrition appears to be present in 25 to 35 percent of the population aged 6-14 years. Again, under weight-for-age characterizes an additional 50 to 60 percent.

3. Magnitude of the Target Population

Table 5 provides an estimate of the number of infants and children expected to be living in the Philippines during the span of this Project.

Table 5

MALNOURISHED INFANT, PRESCHOOL AND SCHOOL-AGE POPULATION*

(000)

	1973	1974	1975	1976	1977
Total Population of the Philippines	40,300	41,500	42,600	43,800	45,000
6-11 months (Preventive & Curative)	449	462	475	488	501
12-24 mos. (Curative)	488	503	516	530	545
25-30 mos. (Curative)	250	257	264	272	279
Sub-Total (Curative)	738	760	780	802	824
30-36 mos. (Curative)	250	257	264	272	279
36-48 mos. (Curative)	477	491	504	518	532
48-60 mos. (Curative)	453	466	479	492	506
Sub-Total (Curative)	1,180	1,214	1,247	1,282	1,317
TOTAL CURATIVE	1,918	1,974	2,027	2,084	2,141
TOTAL PRESCHOOL	2,367	2,436	2,502	2,572	2,642
SCHOOL (6-14 years)	8,358	8,607	8,835	9,084	9,333

*6-12 mos. 75% of age group (implies 100% of age group in barrios with TMCH centers
12-60 mos. 35% of age group
6-14 yrs. 90% of age group (includes both malnourished and underweight for age)

Population based on slow fertility decline assumption of IBRD Population Sector Review.

Note: This table is based on projection of the percentage composition of age groups in the 1970 census. It does not take account of the impact of great numbers of new child bearers who will come of age in the 70s, tending to increase these numbers. Neither does it take account of the reverse impact of this nutrition program, tending to decrease these numbers.

In the 6-11 month age range, the target population is identified as preventive and curative. The assumption is made that if infants in the age range 6-11 months are included in the Project, there is a high probability of preventing malnutrition from developing. Data collected in Bulacan province has revealed that nutritional damage occurs during this brief period and is caused mainly by poor weaning practices (Table 6).

Table 6

NUTRITIONAL DETERIORATION IN NURSING INFANTS [e/]

Age (mos.)	% of Standard Weight
6	93
7	90
8	88
9	86
10	84
11	82
12	80
15	79
24	79
48	79

4. Significant Relationships Affecting Nutritional Status

The nature of the Project proposed herein arises from our experience in managing successful Targeted Maternal Child Feeding and Elementary School Feeding Programs and from our knowledge of some of the relationships that affect the nutritional status of the population. These relationships can be grouped according to the functional areas of the food system:

[e/] Report of the Bulacan Province Nutrition and Family Planning Program. Ma. Minda Caedo, Victoria Santiago and R. W. Engel. December 1972. In manuscript form, Nutrition Division, USAID/Manila, Philippines.

a. Production - Inadequacies in food production are reflected by higher food prices, periodic shortages of some staples, regional food shortages and, during the summer of 1973, an increasing reliance on imported cereals and substitution of foods of lower nutritional value. All these factors have negative nutritional effects. It should be noted also that in the Philippines with few exceptions, higher food production soon fills effective demand without providing adequate nutrients to the lowest income groups.

b. Processing - With the exception of milled rice, corn and wheat products, processed food does not have an important role in the diet of the lower income groups. Nevertheless, some processed foods such as evaporated and condensed milk, beer and soft drinks, are distributed nationally and consumed, though usually in small quantities, by nearly every family. Such processed foods offer an opportunity for enrichment and distribution through commercial channels.

The most immediately apparent opportunity to improve processing is rice milling. Rice extraction rates are very low, particularly in the Kiskisan mills (about 59%). Cono mills yield about 67% on average, but this rate is still inferior to that obtained by larger, better equipped mills. Rice mills are widely decentralized and operate as an integral part of a traditional, locality-specific, marketing system. Upgrading will be difficult. This project does not address the rice-milling issue since FAO and UNICEF are supporting investigations already.

c. Distribution - In general, the marketing of agricultural products is done fairly efficiently in the Philippines. The small farmer, deeply in debt to the barrio buyer, may sometimes pay a high interest tariff to sell his products; but generally, mark-up costs are not excessive.

However, there are considerable losses to the product as it passes through the system. Storage capacity for staples such as rice, corn and dried legume is inadequate in quality and quantity. This is particularly true at small mills. Handling of fresh fruits and vegetables contributes to the more than 20% of reported loss to produce sent to central markets. Waste losses realized by the processors and distributors are reflected in lower prices to the farmer and higher prices to the consumer.

d. Consumers - Several characteristics of the groups most affected by malnutrition are casual factors of their nutritional status:

i. Income - Income of about 60% of the population is inadequate to buy a diet which meets full recommended daily allowances. About 50% of the population are members of families whose incomes are too low to buy adequate diets, just in calories and proteins. Even allowing for errors in fixing dietary allowances, and estimating income and food costs, at least 35% of the

population has incomes too low for nutritional adequacy without radical food habit changes.

Increased income would have a strong, positive nutritional effect (with an average income elasticity for food of about .60).[f] However, income increases sufficient to bring effective demand in line with nutritional needs are in the distant future for a majority of the low-income consumers. Real income of low-income groups is growing slowly and little progress has been made toward a more equitable distribution of personal incomes.[g]

ii. Population Growth, Family Size and Spacing - Increase in food production and population have been about equal during the last decade, indicating a lack of progress in achieving real per capita growth. The current Family Planning and Rice Production Programs may help alleviate this condition.

Data collected on body weights of children in Laguna province show that physical growth is more seriously impaired in families with more than two preschool age children than in families with but one or two. Further, in families with children spaced less than 18 months apart, the growth process is more severely affected than when spacings are wider. The recent summary of population pressures[h] shows clearly that food scarcity is common among large families and that in such families third and later children are more likely to be malnourished than earlier born children. Thus, the malnourished children, the target of this Project, are largely found in the families with the population pressure. These are the families this Project addresses.

The data in Tables 7 and 8 were collected during 1971-72, and shown clearly that rapid population growth resulting from short birth intervals and large families are major contributors to the malnutrition problem.

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[f] Income and Food Consumption (average data for 3 surveys) E.L. Santos, E.D. Dosayla and L.B. Darrah, May 1973, 73-8, Marketing Research Unit, NFAC, DANR, Quezon City, Philippines

[g] Bureau of Census and Statistics, BCS Monthly Bulletin of Statistics, October 1972; Office of the Director, Bureau of Census and Statistics. "Special Release" No. 139, "Family Income Distribution, 1971, 1965, 1961".

[h] Rapid Population Growth, Consequences and Policy Implications, Volume II Research Papers, Study Committee, Office of Foreign Secretary, National Academy of Sciences. John Hopkins Press, Baltimore, Maryland, 1971.

Table 7

THE IMPACT OF CHILD SPACING ON NUTRITIONAL HEALTH e/

Child Spacing Interval (mos.)	Deposed Children*		Malnourished Deposed	
	No.	% of Total	No.	% of Total
18	200	31.5	110	55.0
19-30	330	52.0	117	35.4
31	105	16.5	30	28.5

*The deposed child is the one no longer nursed because the next baby has arrived.

Table 8

THE IMPACT OF NUMBER OF PRESCHOOLERS PER FAMILY ON NUTRITIONAL HEALTH e/

No. of children Per Family	Percent Malnourished
1	36
2	39
3	49

iii. Education and Food Habits - Several specialists have concluded that many food habits adversely affect nutritional status, particularly weaning practices and taboos during pregnancy and lactation. Breastfeeding is declining in the Philippines as the population urbanizes. One study reported that among urban children, 43% had been weaned at 6 months; while in small villages, 30-50% had not been weaned at 19 months. Supplemental weaning feeding begins about 6 months; by the 10-12th month, 40% of the children are eating entirely from the adult diet. Traditional weaning foods are overly bulky to provide adequate nutrients for a one-year old child.

Food habits during a childhood illness are especially critical since it is at this time that the marginally malnourished child is particularly threatened.

e/ Report of the Bulacan Province Nutrition and Family Planning Program. Ma. Minda Caedo, Victoria Santiago and R.W. Engel. December 1972. In manuscript form, Nutrition Division, USAID/Manila, Philippines.

Reliance on rice water and low-valued foods compounds the problem. Nutrition education, in combination with other factors, can change food habits (Table 9). Current Targeted Maternal Child Health (TMCH) programs have extensive nutrition education components.

Table 9

AVERAGE DIET ADEQUACY BY EDUCATIONAL ATTAINMENT [c/]

Region	EDUCATION (SCHOOLING)	
	Below 5 years	10 years or more
	(Diet Rating as % of Adequacy)	
Metropolitan Manila	64	83
Cagayan Valley	65	81
Ilocos-Mt. Province	74	89
Southern Tagalog	62	75
Eastern Visayas	56	68
Western Visayas	65	81
Southwestern Mindanao	60	75

5. Nutrition is a Priority of Government

Within the past five years, the GOP has recognized nutrition as an important element in its development strategy. The National Food and Agriculture Council (NFAC), an executive office of the Presidency, chaired by Secretary of Agriculture, has been given authority to plan and coordinate a National Food and Nutrition Policy, bringing together more than a dozen agencies that have programs affecting human nutrition. Further, government expenditures that directly affect food consumption have increased in the past few years; these expenditures are for such diverse programs as rice imports and retail price controls, expanded credit to small rice farmers, administrative support for TMCH and school feeding programs, research, pilot plant and test market funds for new low-cost foods for infants and young children, and supplies and technical assistance for backyard and school-yard gardening. Moreover, interest in attacking the malnutrition problem is also evident among private groups, civic organizations, and especially the local church working with the U.S. VolAgs.

[c/] Changes in Food Habits in Relation to Increased Productivity. Carmen Ll. Intengan, Philippine Journal of Nutrition XXV, 251, 1972.

6. USAID Experience

USAID experience in the last five years enables us to undertake a project of the scope and magnitude proposed herein. USAID and VolAg staff gained extensive knowledge about the nutrition problem and program possibilities in this country.

Some accomplishments over the past few years are:

- development and installation of a national rural and urban TMCH Program targeted to the most nutritionally deficient children.

- assisting in the development of the NUTRIBUN, a nutrition package for school feeding, susceptible to substitution of some donated ingredients with local foods. Each NUTRIBUN provides 500 calories and 17 grams of protein, enriched with vitamins and minerals.

- initiation and sponsorship of research on new local foods to replace donated foods in infant feeding.

- sponsorship of research on the extent and severity of the malnutrition problem.

- collaboration in an abbreviated intersectoral nutrition analysis.

- initiation of joint planning and implementation of family planning and nutrition activities.

- conduct of evaluations of the effectiveness of nutrition education and supplemental feeding.

- encouragement of local industry to participate in an incentives program for developing high nutrition/low cost weaning foods and finalizing of a grant to one industry for a rice-coconut flour blend development.

- research on several education-feeding approaches to health improvement in children, commonly referred to as abbreviations or modifications of mother-craft to enhance benefit/cost ratios.

With experience gained through these various activities, the stage has been set for launching a much broader Project. Such a Project can make a significant impact, not only in stemming further deterioration in child nutritional health, but in actually bringing about a significant reduction in malnutrition prevalence in the child population.

Although the Project is primarily that of the VolAgs and their local counterparts, which assume responsibility for PL480 Title II food distribution in the Philippines, it is recognized that the full cooperation and coordination of the private and public sectors is necessary if the magnitude of planned activities is to be achieved. Again, the experience of the pilot projects of the past three years leads to the conclusion that such cooperation and coordination is feasible, if not everywhere, certainly in those provinces and cities where a significant new awareness exists of the problems of child malnutrition.

An increasing interest in the health, well-being and dignity of the individual as an important resource in the development process, is a major reason for initiating this Project. Other compelling reasons are scarcity of foods including staples, failure of income to keep pace with food costs, rapid growth of population and large family size, all of which indicate a difficult situation with regard to the food balance. A food donation program, combined with education, can be justified as a reasonable program for alleviating hunger. Such a program can reap dividends in the form of improved physical development and, possibly, also improved mental development in the children who constitute the nation's future manpower.

B. OVERVIEW OF NUTRITION PROGRAM

Improvement of nutritional status is the most immediately apparent result of socially concerned economic development. Improvement in the ingestion and metabolism of nutrients results from a variety of conditions and activities: income growth and distribution, population changes, foreign trade, agricultural production, processing and marketing, nutritional education and health and sanitation. The GOP is committed to achieving a consistent per capita annual growth rate of 6.0% while the New Society seeks to release the energy of all the Philippine people in productive enterprises that will improve their individual conditions.

The USAID program which supports these broader goals, includes three projects directly bearing on improvement of the nutrition situation described above:

- Population Planning Project
- Agricultural Income and Production Project
- Food and Nutrition Project

The first two are described in detail in separate PROPs, but their very significant nutritional implications are discussed here. The broad impact of the successful accomplishment of the objectives of these activities increases the effectiveness of the more directly targeted activities of the Food and Nutrition Project.

1. Population Planning

The population of the Republic of the Philippines is growing at a rate of approximately 3.1% per year, requiring commensurate increases in equitably distributed economic growth and in agricultural production just to maintain the current deficient nutritional status. Clearly, any reduction in population growth rate will reduce the development task and facilitate more widespread nutritional adequacy.

The family planning program has its most direct impact on those groups considered most at risk nutritionally -- preschool children and pregnant or lactating women. Averting one-third of currently expected births by 1976, the project goal, will reduce the target group to about two-thirds by 1980.

Improved spacing and smaller family size, encouraged by family planning, will have a significant impact on the nutritional status of individuals within affected families. Recent investigations in rural low-income Philippine neighborhoods show a high correlation between family size or child spacing and the frequency of malnourished children in the family. e/ Thirty percent of all Filipino families with preschool children have narrow birth intervals (Table 7). If these were to expand their birth interval by 12 months or more, the prevalence of malnutrition among their children would decrease by 50%, or result in a 15% reduction in malnutrition prevalence.

2. Agricultural Income and Production

Food production in the Philippines is closely associated with the internal effective demand, which is primarily governed by population growth. Rice and corn together account for over 65% of the energy value of the food supply as purchased, and more than 75% of the food of vegetable origin available for consumption. The Agricultural Production and Income PROP is strongly focused on rice production, but includes a number of other subprojects which will affect both quantitative and qualitative aspects of the food supply (Table 10).

e/ Report of the Bulacan Province Nutrition and Family Planning Program Ma. Minda Caedo, Victoria Santiago and R. W. Engel. December 1972. In manuscript form, Nutrition Division, USAID/Manila, Philippines.

Table 10

TARGETS IN THE AGRICULTURAL INCOME AND PRODUCTION PROP

		Targets		
		Increase in Production	Increase Annual Farm Income	Participating Farms
Rice	EOP '76	200,000 MT	₱ 150	440,000
Corn/Sorghum	EOP '78	230,000 MT	₱ 200	40,000

Two distinct nutritional impacts will result from achievement of these targets: (1) an increase in the gross availability of nutrients per capita, and (2) an improvement in the diets of participating farm families as a result of increased income. The magnitude of these changes is illustrated by the following extracts from the Rice Subproject.

a. Increased Rice Supply

Rice production (Palay or unmilled rice) amounted to 5.3 MT in 1970 and would be expected to grow to 6.6 million MT [i/] by 1976, following traditional production trend lines. With no reduction in population growth rate, the daily per capita calorie supply from rice would be the same as now, approximately 950. Achievement of the targeted production increase of 200,000 MT about the traditional trend line by 1976 would increase availability of energy by 27 calories per capita per day, with no change in population growth rate.

b. Income Effect on Farmers Participating in the Subproject

Annual income of farm families averages approximately ₱2,800 (U.S. $1.00 = ₱6.70, May 1973). At this income level, families spend 58 percent of their income on food. Such families receiving ₱150 in increased income, could be expected to spend approximately 50% or an additional ₱75 for food. One peso will buy about 2,500 calories of an average diet at current prices (May 1973), so the additional income will provide an additional 73 calories per day to each member of a seven-member family. This income effect applies to about 3,000,000 people or 7% of the total population (12% of the rural population). Other income-producing Subprojects will similarly affect an additional 40,000 farm families (280,000 people).

[i/] Agricultural and National Resources Development, FY 1972-75, Department of Agriculture and Natural Resources, 1971.

3. Food and Nutrition Project

This is directed at more specific targeting on nutrition problems which are not responsive to the longer range and tentative impacts of population planning and increased agricultural income and production. Thus, it seeks to reach high-risk targets whose nutritional status remains poor because of persistent inequities in distribution and it seeks to identify and promote opportunities for further nutrition interventions. It includes the following four Subprojects:

a. Targeted Maternal and Child Health Program (TMCH)

This subproject is directed at the highest risk target groups: preschool children and pregnant or lactating mothers. It provides for the supplementation of diets of identified clients through TMCH Centers supported by the VolAgs and their Philippine counterparts, the Departments of Health, Agriculture, and Social Welfare, expecting to reach about 1.3 million of the target children (1/3 of those eligible), and about 500,000 pregnant or lactating mothers.

b. Elementary School Feeding (Nutribun) Program.-(The Philippine School Nutrition Program.)

This intends to reach about 2.7 million children, aged 6-14 years, with the Nutribun (500 calories and 17 grams protein/Bun) for 140 schooldays per year. The 2.7 million represents about 30% of the eligible malnourished and underweight school age population.

c. Intersectoral Nutrition Planning Assistance

Technical assistance will be provided to the staff of the National Food and Agriculture Council (NFAC) to assist it to fulfill its responsibilities as planner and coordinator of national nutrition activities. A Four-Year Food and Nutrition Plan has been developed by NFAC and approved by the concerned Government Departments, VolAgs and other participating groups. Technical assistance will also be provided to assist other GOP planning agencies to recognize the potential nutritional implications of their activities.

d. Investigation of Further Nutrition Interventions

The establishment of more desirable trendlines in agricultural production and population growth still leaves nutritional deficits which cannot be fully covered by direct feeding programs. A number of additional possible interventions have been identified which could be used to increase the availability or improve the utilization of nutrients. This Subproject provides funds to conduct adaptive research and investigate the economic and technical feasibility of the most promising interventions with the view to their subsequent implementation under loan or private financing.

A number of these interventions could fall under other development sectors. However, financing of their study under the Food and Nutrition Project is appropriate because of the specific impact sought. The interventions which appear most promising are the following:

(1) Potential sources of local flours as wheat flour extenders.

The GOP has released 300,000 pesos (August 1973) to cover costs of a locally produced coconut/banana flour blend as an ingredient for partial replacement of the Food for Peace donated soy fortified flour blend now used in the Philippine School Nutrition (NUTRIBUN) Program. At Texas A&M, Philippine scientists have participated in the drafting of a cost estimate for commercial manufacture of coconut flour from desiccated coconut or from clean copra. Cassava flour, cowpea flour or mongo bean flour are other possibilities that may be developed as incremental food sources. In order to determine the relative merits of these other possibilities, adaptive research and feasibility studies will be necessary. To this end, the Secretary of Agriculture in early August 1973, established an Action Group to initiate planning and to recommend appropriate courses of action.

(2) Upgrading coconut processing

Currently, 85-90% of all cooonuts harvested in the Philippines are processed as copra. The process of drying the coconut meat is crude and inefficient. The resulting product (copra) is heavily infested with bacteria and molds. These contaminants, some of which produce harmful toxins, lower the nutritive quality of the final products, namely,oil and meal or flour. Traditional high temperatures used in oil extraction further reduce nutritive quality of the meal or flour. Losses resulting from these current processing practices are estimated to equal as much as 10% of the total coconut harvest. There is particular need for investigations aimed at sanitary processing of fresh coconut into copra at village or barrio level as a means of producing a low-cost edible flour.

(3) Leaf Protein

Leaf proteins are recognized as having amino acid profiles superior to those found in the seeds of the cereals and legumes traditionally consumed by man. The technology for removing up to 50% of the protein in leaves has been developed over the past 20 years in both Europe and the United States; but to date, there have been no adaptive research efforts to establish the feasibility or usefulness of leaf proteins as ingredients in foods or feeds. A tropical country such as the Philippines is an ideal location for such feasibility studies. Its tropical environment promotes abundant year-round leaf growth. Further, many crops produced in abundance locally (abaca, bananas, cassava, ipil-ipil, swamp cabbage) for commercial

purposes, harvest only the fruit, or the stem or root. These crops leave high values of leaf residues as potential sources for leaf protein development.

(4) Home, School and Community Gardens

In both the TMCH and NUTRIBUN programs, there is extensive education and promotion of home or community gardens as immediate means of augmenting family food supplies and of improving the nutrition of family members. There is need for an overall study to identify more specifically the type of crops that should be grown and the hectarage required. The immediate, primary initiative will be to reinforce present efforts. Under active consideration is a plan to provide incentive grants to the VolAgs to amplify home garden efforts in TMCH and to reinforce present efforts in school and community gardens. Such efforts will involve outlays for technical manpower and planting materials.

(5) Low-cost Weaning Foods

The object is to extend CSM-Rolled Oats with local food inputs for the TMCH program. Currently under active consideration is a plan to prepare, through a local commercial firm, a blend of 60% CSM: 40% coconut/banana flour, and to market this through barrio groups. Such a blend would be marketed at cost, plus a reasonable profit to the manufacturer. Cooperatives would be organized among parish families interested in alternatives to the high-cost weaning foods now available commercially. As an alternative, Carnation International in Manila has been extended an incentive grant (through AID/W-TAB/NTR) to market-test a weaning food based on rice flour, coconut flour and milk.

(6) Vitamin-amino Acid Fortification of Local Food Resources

In connection with the development under (1), (2) and (5) above, there is need to consider the potential of all new products for further improving nutrition through enrichment, i.e., a low-cost flour such as cassava if used to partially replace wheat flour might well effect a considerable saving in wheat flour purchases. This saving could pay for fortification of the blend with amino acids thereby improving protein quality.

THE PHILIPPINE FOOD AND NUTRITION PROGRAM[1] 1974 - 1977

I. INTRODUCTION

The full recognition that the country's socio-economic development and progress is threatened by the prevalence of widespread malnutrition, precipitated evolvement of the 4-Year National Food and Nutrition Program in 1971.

The 4-Year Plan is based on the concept that efficient attainment of improved nutrition hinges on simultaneous and synchronized efforts for providing adequate food supply, promotion of wise selection and utilization of food produced, enhancement of social and healthy family life and environment, development of manpower resources for food and nutrition, and the promotion of relevant family income-generating activities. The 4-Year Plan also established the priority groups who will be the direct beneficiaries of the program. These are the vulnerable groups such as the infants, preschool and school children, and pregnant women and nursing mothers.

Since the existing malnutrition problems are caused by various factors which are multi-dimensional in nature, the 4-Year Plan grouped together ongoing projects and activities related to food and nutrition and outlined operational procedures for multi-disciplinary involvement.

NFAC was given the task of coordinating all these activities, which indicated realization that good nutrition is inescapably linked to food production. The Council's earliest efforts in demonstrating the coordinated approach in program implementation to bring about nutritional improvement has already gained much headway and has created impact in its target communities.

Presently on the second year of implementation, an organizational machinery has been established in the provinces of Batangas, Isabela, Pangasinan, Nueva Ecija, Rizal, Camarines Sur, Iloilo, Cebu, Davao del Norte, Cotabato and South Cotabato. The program now serves a total of 214 barrios in these provinces where simultaneous implementation of the 5 major projects outlined in the Plan are being undertaken.

With the experiences gained within the two-year period and the progress thus far achieved in the demonstration of the "team" approach in program implementation, present attempt is being made to expand the efforts of coordination to include all other agencies and organizations

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(1) Prepared by the National Food and Agriculture Council, Office of the President.

doing nutrition work, both government and non-government. Thus, the revision of the National Food and Nutrition Program, heretofore referred to as the Philippine Food and Nutrition Program (PFNP), to cover the period from FY 1973-1977.

II. POLICY DIRECTIONS FOR THE PHILIPPINE FOOD AND NUTRITION PROGRAM

Policy Statement

A physically healthy population is a pre-requisite to national goals. The provision of adequate meals for all citizens is a key to the promotion and maintenance of health and economic productivity. Its attainment intersects with government objectives in promoting health and education, job opportunity, family planning, maternal and infant care, early childhood development, income maintenance, food and agricultural programs and a wide range of efforts to enhance socio-economic progress.

The Philippine Food and Nutrition Program is an attempt to integrate all government and non-government efforts to achieve these goals. As such, it should be guided by the following:

Policy Direction 1 - Age Group Priorities

Priority consideration should be on the improvement of the nutritional status of the vulnerable age groups in the following order:

1. infants and preschool children, pregnant women and nursing mothers.
2. other children up to adolescence.
3. those engaged in heavy manual labor.
4. the aged.
5. all others.

Policy Direction 2 - Food Supply

Good nutrition is premised on the availability and sufficiency of essential foods. Food production programs should then be aimed primarily

at meeting effective demands and eventually to fulfill nutritional needs. The government should provide assistance and/or incentives for increased food production, improved processing, efficient marketing and distribution, storage and proper utilization.

Reliance should be on local resources. Donated foods or food aids made available to the country should be considered only as expedient resources.

Policy Direction 3 - Population growth

Recognizing that the present population growth rate counteracts efforts to improve nutritional status, mutual cooperation and support should be extended by those engaged in both family planning and nutrition activities.

Policy Direction 4 - Nutrition Education

Nutrition education programs should then be designed to stimulate demands for and encourage maximum utilization of nutritious and indigenous foods. Effective nutrition education should be carried out in all schools and all levels and in all activities on maternal and child health, farm and home extension, social welfare, family planning, community and manpower development. Therefore, all concerned should be adequately prepared to integrate nutrition education into their activities. Industry should be encouraged to promote marketing of their products according to its nutritional qualities. In order to achieve uniformity of information in foods and nutrition, the ICNC should serve as the clearing house.

Policy Direction 5 - Health Protection and Rehabilitation

Health protection of the vulnerable group should be of priority concern. Supplementary feeding program based primarily on the traditional foods must be adequately supported. Where current production of traditional food is not sufficient and in emergency situations, donated foreign food commodities are used as additional resources.

In order that potential problems are identified before many are affected and to provide a continuing reference base, nutrition surveillance and monitoring systems under the leadership of the health sector should be a part of this program.

Nutrition rehabilitation wards shall be established in selected hospitals in all regions of the country to serve as training base for the health personnel to upgrade their clinical competencies in the diagnosis, treatment, and to promote research on malnutrition. Likewise, nutrition rehabilitation wards should be established in as many hospitals as possible for the recovery and treatment of the severely malnourished cases.

In both projects, nutrition education should be an integral part.

Policy Direction 6 - Food and Nutrition Research

A stepped-up program in food and nutrition research must accompany all developments envisioned to bring better nutrition. Basic and applied researches in the field as well as those in agriculture, medicine and related fields relevant to existing and current food and nutrition problem should be encouraged.

Policy Direction 7 - Program Implementation

The country's limited resources dictate that all nutrition activities and efforts of all public and private entities be integrated and centrally coordinated through the NFAC so that maximum benefit may be derived.

III. ACTIVITIES AND TARGETS

The Philippine Food and Nutrition Program (PFNP) shall cover ten provinces each year on a graduated expansion schedule as indicated in the original (1971-75) plan where the team approach in program implementation shall be demonstrated. By 1977, 51 provinces shall have been served by the program.

Through a more vigorous implementation of the major projects, as well as supporting activities in the 4-Year Plan, it is hoped that the general objectives of the PFNP will ultimately be realized.

A. Nutrition Training

1. Objective - Further intensify training of trainers and all those directly involved in the program at all levels of operation in order to adequately prepare them to assume their respective roles more efficiently.

The agency responsible for coordinating this aspect of the program is the Department of Education and Culture (DEC). Assistance shall be provided by FNRC, NFP, DOH, NFAC, and UNICEF.

2. Targets - At the national level, different trainings will be held for key personnel of cooperating agencies, administrators and supervisors.

At the provincial level, groups to be trained will include provincial/city district supervisors and administrators, as well as representatives of cooperating agencies and local government leaders who will be involved in the Provincial Food and Nutrition Program.

At the local (barrio) level, in-depth trainings for all technicians, field personnel, and lay leaders who will directly implement various projects of the program will be conducted.

B. Nutrition Education

1. Objective - Promote nutrition consciousness on the value of nutrition for maintaining health and in order to stimulate demands for needed foods.

In the communities, the program shall be carried out through the integration of nutrition in the various extension projects of the BAEx, the rural health services of the DOH, in the activities of the PNRC, DSW, and the U.S. voluntary agencies (CRS, CARE, DSD-CWS), as well as all other agencies involved in the program. The BAEx shall coordinate all these undertakings.

In the schools, nutrition education shall be integrated in the curriculum at all levels.

Subject areas to be emphasized in nutrition education are: increased production of the more nutritious foods such as the leafy and yellow vegetables, munggo and other bean varieties besides the animal protein food sources including fish, poultry, livestock, eggs and milk; better family life through improved food habits, improved practices of home management, child care, family relations, and family planning.

2. Targets for Nutrition Education in the Community

(i) Organization of Homemaker's classes with emphasis on food and nutrition. Each class will be composed of a minimum of twenty (20) homemakers. The goal is two (2) classes a year in each barrio.

(ii) Organization of Rural Improvement Club. An association of homemakers with a minimum membership of twenty (20) will be organized in every target barrio. They will actively participate in the food production, supplementary feeding and nutrition education activities in the barrios.

(iii) Organization of 4-H Club. In each barrio, a 4-H Club composed of about 20 boys and girls aged 10-21 will be organized. They will help in the promotion and establishment of nutrition education and food production projects in the barrio.

(iv) Various extension methods and techniques will be used in nutrition education. Each member of the BAEx team (HMT and RYO) will reach a minimum of one hundred fifty (150) families per barrio per year through home visits; two hundred (200) community members through group assemblies; and conduct a minimum of 150 method demonstrations.

(v) RIC Children Centers will be established, with a goal of one center per target barrio. A minimum of twenty-five (25) children 3-6 years old will be enrolled within a six-month period. These children will be taught simple lessons aimed at their well-rounded development, and they will also be served snacks using locally available foods as an educational channel for teaching them good food habits.

C. Supplementary Feeding

1. Objective - To protect the health of the vulnerable age groups and promote recovery of the severely malnourished cases through supplemental feeding.

2. Targets - It is the goal of the project to reach about 1/3 of the estimated 3.8 M undernourished preschool children, and approximately 1/3 of the 9.7 M undernourished elementary school age children by 1977. This will be done through an organized coordinated scheme that will provide the children with food supplements and basic health services necessary for the promotion of efficient food utilization by the children beneficiaries of the project. Likewise, supplemental instructions given to the mothers and children and their actual participation in the school and preschool centers in the production, selection, preparation and serving of suitable food mixtures will help promote carry over to the homes useful experiences for the improvement of the children's nutritional health status. All technicians concerned will conduct regular follow-up visits in the homes to provide further motivation and constant guidance in the effort to increase food production and plan improved dietaries for the family.

The feeding project shall be undertaken on a nationwide scale using locally produced foods which may be supplemented by Food for Peace commodities requested through the U.S. voluntary agencies - the CRS, DSD (CWS), and CARE.

For details on the operation of this aspect of the program using different approaches, please see Implementing Guidelines for the Supplementary Feeding Program.

D. School, Home and Community Food Production

1. Objectives -

(a) To increase food supply and subsequently improve the diet of the community;

(b) To augment family income;

(c) To produce enough foods to eventually replace foreign food commodities presently being used in school and preschool feeding projects.

In addition, the food production project in the school includes the following objectives:

(a) To help elementary and secondary school pupils acquire skills in basic food production processes, to enable them to produce nutritious foods for use in the school supplementary feeding at the elementary level, and contribute to the total efforts for increased food production in the school and the community.

(b) To help college students in teacher training institutions acquire skills in imparting fundamental agricultural information and processes in both elementary and secondary levels.

BAEx, BPI, BAI, and BPS shall take the initiative and major responsibility in intensifying food production activities to reach program goals.

2. Targets -

(a) School Food Production:

i. establishment of a school nursery in each school within each target barrio.

ii. cultivation of available land area to vegetables; and

iii. participation of total school enrollment in food production activities.

(b) Home Food Production:

i. establishment of home gardens initially in at least 30% of the total household population to gradually cover all barrio households towards the end of the year; and

ii. raising of poultry, livestock, goats, pigs and other species, including eggs and milk production.

(c) Community Food Production:

i. establishment of a community garden in each target area with a minimum land area of 100 square meters;

ii. establishment of a barrio nursery in each community; and

iii. marketing of excess food supply to augment income of the community.

E. Nutrition Rehabilitation Wards Project

This project shall be pursued in order to rehabilitate, promote and preserve the health of the nutritionally sick child through proper nutrition and health education.

1. Objectives -

(a) effect improvement in the diagnosis and management of clinical malnutrition and serve as training laboratory for all Rural Health Unit (RHU) personnel;

(b) provide opportunities for the practical nutrition education of mothers geared towards improved child care and feeding;

(c) facilitate referrals of malnourished children to and from the rural health units.

The operation of the wards shall be along the following lines:

(a) Nutrition Rehabilitation - Dietary management in project hospitals will be improved with the maximum use of highly nutritious, low cost local foods, together with intensive supportive treatment and close assessment of progress.

(b) Nutrition Education - Nutrition education for the parents will be intensified during admission by providing facilities that will enable mothers to practice the preparation of suitable recipes.

(c) Follow-up services - A satisfactory follow-up system either by referral to a Health Center or Rural Health Unit (RHU) or mobile team based in the hospital, will be set-up for the follow-up of each discharged case.

(d) Staff development - Training courses for administrators, dietitians, laboratory technicians, RHU's, and other trainers shall be conducted.

2. Targets -

The program will concentrate on developing the nutrition rehabilitation wards in Teaching and Training Hospitals located in the same area as the regional health office so as to ensure better coordination in the implementation of the training aspect by the presence of the regional office in the same locality. The other hospitals now provided with assistance under the Malnourished Children's Ward Project of the Department of Health and which are by evaluation deemed viable will be maintained.

The following hospitals have been proposed for inclusion in the project for the next phase of the Malnourished Children's Ward Development schedule of the Department of Health:

Region I	Baguio General Hospital Baguio City
Region IV	Batangas Provincial Hospital Batangas, Batangas
Region IV	Quezon Memorial Hospital Lucena City
Region V	Camarines Sur Provincial Hospital Naga City

Region VI	Corazon Locsin-Montelibano Memorial Hospital (Negros Occidental Provincial Hospital) Bacolod City
Region VII	Bohol Provincial Hospital Tagbilaran City
	Opon Emergency Hospital Lapu-lapu City
Region VIII	Leyte Provincial Hospital Tacloban City
Region IX	Sulu Hospital Jolo, Sulu
Region X	Northern Mindanao Regional Hospital Cagayan de Oro City

IV. SUPPORTING ACTIVITIES

Aimed to further strengthen the implementation of the food and nutrition program are such activities that will involve the massive use of mass media communications; conduct of researches relevant to existing nutrition problems; development of skills for gainful occupation of individual families; and national movements to boost the campaign for better nutrition.

A. Nutrition Mass Communications Project

An important step towards facilitating the spread of correct food and nutrition information and promoting increased nutritional awareness on the need for better nutrition, is the establishment of a coordinated and systematic network to be delegated with the responsibility of disseminating nutrition information. For this purpose, an Inter-departmental Committee on Nutrition Communications (ICNC) composed of representatives of agencies engaged in nutrition information, education and communication efforts was recently organized to coordinate development and distribution of informational materials for consumption of different population groups and intensify use of the tri-media.

B. Food and Nutrition Research

An intensified research program shall be relentlessly pursued with the immediate objective of translating the results obtained in terms of production and marketing of newly developed products. Priority shall be on the development of low-cost high protein foods for infants.

Adaptive research should focus on the identification of nutritional problems of the various age groups and new local food resources as well as the evaluation of the effectiveness of approaches used in reaching them.

C. Income-Generating Activities

Development programs for increasing vocational skills and creative potentialities shall be provided as a means to increase the income of individual families. Emphasis shall be on the preservation of excess food produced, handicrafts, and other similar activities aimed towards making maximum use of the resources of the locality. Such activities are to be coordinated with those relative to the establishment of cooperatives in the communities.

Attachment M

Section B

RESOURCE PAPER: WORKSHOP ON INDIGENOUS FOODS

THE MAJOR CALORIE AND PROTEIN SOURCES IN THE PHILIPPINES

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This paper is drafted to serve as resource material for panelists engaged in a 2-day workshop. The purpose of the workshop is (1) to identify possible new calorie-protein food resources, and (2) to recommend priorities in the food production-processing plan which would introduce such new products. These could serve as extenders or substitutes for traditional foods now in short supply. This paper focuses particularly on calories and proteins because the Nutrition Surveys conducted by the Food and Nutrition Research Center, National Science Development Board, Manila, have shown that deficiencies of these nutrients are responsible for the most serious malnutrition problem in the country. Applying all available nutritional indices, it was concluded that 90% of Filipino children were below the suggested reference growth line or standard (Philippine Journal of Nutrition, XXIV, 161-178, 1971). Weight was consistently more seriously subnormal than height, suggesting that the primary deficiency was calories.

It has long been recognized that it is difficult to bring about changes in food habits for nutritional benefits. Food is usually consumed not for its nutritional value but for its acceptability, palatability, or pleasing taste. For this reason, the first set of tables was developed. These tables provide an overview of the ten major calorie (Table 1) and protein (Table 2) sources in the average Filipino diet. They identify the varying consumption pattern between at least 7 of the 10 geographic regions where the surveys have been completed and the results published. Further, the sub-tables a through g also reveal in what forms the individual foods are consumed; i.e., rice as polished or unpolished; anchovies as bagoong (fermented), fresh, or diced (dilis); wheat as pan de sal or noodles, etc. From this background material, it should be possible to identify those foods which are popular, foods that might serve as carriers of new products that will be identified by the workshop, or foods that might be used as extenders of food staples in short supply or requiring import.

Major Calorie Sources in the Diet

The most striking feature of the average Filipino diet is its very heavy reliance upon cereal grains for both calories and protein. In all regions except Manila, rice, corn, and wheat account for over 70% of calories consumed (Table 1)

Within the cereal group, there is clear evidence that wheat exceeds corn as a preferred cereal in Manila, Southern Tagalog region and the Ilocos-Mountain Province region. Along with rice, corn is a well-liked cereal in the Visayas, Mindanao, and also in the Cagayan Valley region.

The uniformly high intake of rice and other cereals suggests that they might well serve as extenders for introducing other calorie-protein sources.

It is of interest that bananas rank among the 10 leading food energy sources in the diet in all regions of the country. Only one other fruit is ranked among the top ten; namely, mangoes in the Ilocos-Mountain Province region.

It is of considerable interest that 4 root crops appear, countrywide, among the 10 major food energy sources. Sweet potatoes appear in all regions but Manila, whereas cassava appears in the Visayas and Mindanao. Gabi and ubi rank 10th in the Eastern Visayas and in the Southern Tagalog region, respectively.

Pork is the only food of animal origin that ranks among the top 10 calorie sources in all regions. Milk ranks usually 9th or 10th as an energy source in the diet but is not among the top 10 in the Visayas. Beef and eggs rank among the top 10 only in Manila. It is significant that a single fresh or brackish water fish species (milkfish) ranks among the 10 major food energy source in Manila.

It is somewhat surprising that legumes (mongo bean) ranks among the top 10 only in 3 of the 7 regions; namely, Cagayan, Ilocos, and Western Visayas.

Except for the Manila region, cooking oil (coconut oil) and refined sugar are consumed in relatively small amounts in all the rural areas of the Philippines. These foods offer excellent possibilities for extending the calorie-density of many other foods that are liked and acceptable. It is, of course, recognized that their use needs to be tempered since they contribute no other nutritional value than energy, unless fortification mixtures with accessory nutrients (vitamins and minerals) are also introduced as extender ingredients.

Inspection of tables 1a - g call attention to certain features of consumption patterns that are useful in the development of new indigenous foods. Pan de Sal is by far the most popular wheat product. In all regions except Manila, brown or

unrefined sugar is more popular than white or refined sugar, which is a nutritional advantage in that brown sugar contains minerals as well as traces of the B-vitamins. Two of the popular root crops, sweet potato and cassava, and also bananas, when converted to flour, could serve as extenders for a variety of baked products, noodles, macaronis and other types of products prepared from rice, wheat or corn flour. The technology for incorporating such non-gluten containing products without adversely affecting dough characteristics of the cereal flour is now well understood.

In view of the fact that mongo beans are important food energy sources in several regions, the prospects of blending this legume, as a flour, with the cassava, sweet potato or banana flours appear as an attractive possibility. This is particularly attractive because of the amino acid pattern of mongo which will be mentioned again later.

The presence of a single fish species (bangus or milkfish) as an energy source confirms the strong liking for fish as a food in the Philippine population.

Major Protein Sources in the Diet

The consumption pattern for proteins (Table 2) is revealing in that as many as 9 out of the list of 22 major protein sources are represented by specific individual fish species (anchovies, mudfish, milkfish, tuna, shrimp, crevalle, swordfish, common slipmouth, and moonfish). Again, cereals outrank all other foods supplying over 55% of the total average per capita protein consumption in all regions. In Manila, cereal protein is nearly 50% of the total protein consumed.

Only three foods are among the top 10 protein sources in all regions; namely, rice, wheat, and anchovies. It is worthy of mention that one of these (wheat) is entirely imported. Mongo beans are an important protein source (usually third or fourth in rank) in all regions except the Eastern Visayas. Pork usually ranks 5th but is not among the top 10 in the entire Visayan region. Milk ranks among the top 10 in all regions except the Eastern Visayas. Poultry ranks among the top 10 protein sources in the Cagayan Valley, the Visayas and Mindanao; whereas beef is so ranked in Ilocos, Southern Tagalog and Manila. Eggs appear as an important protein source only in Ilocos and Manila regions.

Inspection of the sub-tables (2a-g) again reveal some important regional differences as well as point to most liked or most preferred food preparations. Unpolished

rice is apparently acceptable among a significant number of consumers in the Visayan and in the Ilocos-Mountain Province regions. Unpolished rice contains about 15% more protein than polished rice. Unpolished or under-milled rice also retains 5-10% more of the food energy value of the rice kernel than polished rice. This could be a significant conservation of cereal for direct human use if acceptable and if feasible with existing milling equipment.

Anchovy protein is consumed most widely in the form of fish sauce in the Northern Luzon region. Its wide popularity signals this sauce as a possible carrier for iodine as a means of preventing endemic goiter, or as a carrier for other minerals and vitamins. Dried anchovies or dilis are also very popular and the possibility of this product as an additive to root crop or banana flour as a protein extender might be considered.

Most of the wheat protein is consumed as Pan de Sal. The popularity of this wheat product offers a number of opportunities for new products. Modern bakery technology and the use of emulsifiers would permit use of a variety of flour extenders or fillers which are among the already popular calorie or protein sources; namely, sweet potato, banana, cassava, mongo bean, dried fish, sugar and shortening.

As already stated in the discussion on calories, the wide and daily use of cereals in the diet of the average Filipino makes these foods logical carriers for new products which could enhance their total protein as well as calorie value.

Mongo beans are the most popular dried legume in the Philippines. Its use as an extender of cereals, or as a protein source blended with banana, cassava or sweet potato flour should be considered because of its high content of lysine, the amino acid that is deficient in the cereal grains.

Major Food Energy Sources Purchased by Income Classes

The studies conducted by the Marketing Research Unit of the National Food and Agriculture Council (NFAC) provide a measure of how income affects food habits.

The Nutrition Surveys referred to above were done on a structured sample of the entire population and were completed in the period 1959-67. The marketing research unit studies were done in 1970-72.

It is very clearly shown that income is a major determinant of the amount of food energy or calories purchased by Philippine families (Table 3)*. This table summarizes the food calories available for consumption per person per day from the 14 foods which comprised the major energy sources (over 90% of total calories purchased). The highest income families purchased almost 40% more calories per person than the lowest income families.

These family food purchase records support the nutrition survey or direct consumption records very well. The most important energy sources are cereals, followed by sugar, pork, vegetable oil (coconut oil), bananas, sweet potatoes, fish and milk for low and low-middle income families, which comprise about 2/3 of all families in these studies. Mongo has been replaced by fish but only because the fish includes all species of fresh, chilled, and frozen fish purchased.

The purpose of including these records is to gain some insight into food preferences as ability to purchase food improves. Surprisingly, even in the highest income families the calories purchased as cereal grains is as high as it is for the lowest income group. The major effect of income appears to be that of improving the total family non-cereal food supply.

There are, however, notable exceptions to this general conclusion. For example, wheat consumption replaces corn consumption as incomes rise. Even more steep rises occur in the purchase of calories from animal products and from fats and oils as incomes rise.

From these studies, it is reasonable to conclude that opportunity for extending cereals or substituting new foods of vegetable origin for cereals is greatest among the low and middle low-income families, which is, in effect, the majority of all families.

Wheat extenders would appear to offer the greatest opportunity if such extenders should have a price-lowering effect, because of the evident increase in wheat consumption with rising incomes.

It is of interest that food energy sources such as bananas and sweet potatoes changed very little with changing income. In other words, these foods are apparently

relatively uniformly well-liked and, therefore, the opportunity of using them as extenders seems promising, particularly if low-cost products could be developed.

Major Food Protein Sources Purchased by Income Classes

Table 4 summarizes the relation of income to food protein purchases. As would be expected, the rise in protein purchases is even higher than that for calories as incomes rise. This is because, it will be recalled, most of the rise in calorie sources was in protein-rich animal products such as meat, poultry, milk and eggs particularly in the highest income group. It should be noted that the low and middle-low income families, which is 2/3 of all families, purchase most of their animal protein as fish. Cereals and fish in these income groups, account for over 80 percent of the protein derived from the 14 major protein sources listed. Among lowest income families, mongo beans rank above all animal protein sources except pork.

Bananas are usually looked upon as low in protein, yet they rank among the top 14 protein sources for low and middle-low income families. These food purchases studies support the earlier conclusions that wheat as a cereal food will be consumed in increasing quantities as incomes rise. In effect, then, if low-cost indigenous extenders could be developed, there would be an expanding market for such modified wheat products. Fish and mongo offer possibilities as low-cost protein extenders; whereas, as mentioned earlier, energy balance for extenders could be achieved with cassava, banana, or sweet potato products.

Major Calorie and Protein Sources in the National Food Supply

Thus far, actual consumption data and food purchases by income classes have been used to identify calorie and protein resources in the Philippine diet.

The data in Tables 5 and 6 are still another source for examining prospects for greater use of local food resources. These are the Food Balance Sheets compiled annually by the Office of Statistical Coordination and Standards in the National Economic Council. It constitutes the food available for consumption.

A summary of the 10 most important calorie and protein sources in the nation's food supply in 1970, based on the Food Balance Sheets, is shown in Table 5. In comparing this table with Summary Tables 1 and 2, it becomes evident that there is reasonably good agreement between calorie and protein sources available and those actually consumed.

It is of some interest that the calorie in milled rice available for consumption in 1970 was essentially the same as the quantity actually consumed in surveys conducted during the previous decade. On a national food availability basis, cassava is the 10th in rank as an energy source whereas nutrition surveys indicated its rank to be 11th (Table 1). Mongo beans are displaced by fresh, chilled and frozen fish as a group and also by such items as beef, chicken eggs and canned fish. Surprisingly, banana ranks as a significant protein source in the nation's food supply.

For a more detailed analysis of the calorie and protein resources in the nation's food supply, Table 6 is included. This table is shown primarily to note that "coconut for food" outranks mongo beans as a food calorie source. This food resource would be overlooked if one reliedupon available food consumption data or upon food purchase records of income classes as enumerated by the Marketing Research Unit Reports. "Coconut for food" is of course identified as mature nuts or young nuts in the shell. It does not include the potential 500,000 metric tons of copre meal arising either from copra processed locally for oil or processed for oil after export. Such copra meal contains about 20 percent protein and 350 calories of food energy per 100 grams of air-dried meal. Its potential as a food resource, as extender or substitute for traditional foods is indeed very large. Processing procedures would, however, require modification. This high protein resource would be twice as much as the protein imported as wheat, and equal to the protein in the total corn crop produced for human consumption in the Philippines in 1970. In terms of protein volume in copra flour or meal, it would be exceeded only by fish and cereals among the food classes listed in Table 6.

Summary

From food consumption, food purchase and food availability records, it is concluded that a considerable potential exists for expanding the food use of a number of indigenous crops. Among such crops are root crops such as cassava and sweet potato, banana and mongo beans. Particularly impressive is the coconut as a protein and calorie resource. These crops could yield health benefits through reduction of the calorie-protein deficit in the average diet of the lower income classes, which represents 2/3 of all families.

If such indigenous foods can be blended with current staples such as cereals, or developed into attractive competitive products in terms of cost per calorie, a potential exists for conserving cereal grains while improving consumption pattern.

Table 1

SUMMARY: SOURCES OF CALORIES IN THE FOOD CONSUMED IN THE MAJOR GEOGRAPHIC REGIONS OF THE PHILIPPINES
(Taken from NUTRITION SURVEYS, FNRC, NIST, NSDB, 1959-68)

REGION	Cagayan Valley & Batanes	Ilocos and Mtn. Provinces	Southern Tagalog	Eastern Visayas	Western Visayas	Southwestern Mindanao	6 - Region Average	Metropolitan Manila	7 - Region Average
Total Calorie Intake Per Capita Per Day	1,809	1,972	1,705	1,503	1,661	1,607	1,697	1,727	1,702
Survey Population (No. Persons surveyed)	1,814	1,614	2,502	1,951	3,485	1,743	(Total) 13,109	2,967	(Total) 16,076

AVERAGE CALORIE INTAKE PER CAPITA PER DAY

FOOD	Cal.	% of Total	Cal.	% of Total	Cal.	% of Total	Cal.	% of Total	Cal.	% of Total	Cal.	% of Total	Cal.	% of Total	Cal.	% of Total	Cal.	% of Total
1. Rice	978	54.1	1,435	72.8	1,127	66.1	549	36.5	940	56.6	848	52.8	972	57.5	879	50.9	954	56.1
2. Corn	290	16.0	11*	0.6	5*	0.3	530	35.3	288	17.3	377	23.5	248	14.6	3*	0.2	203	11.9
3. Sugar	73	4.0	53	2.7	91	5.3	36	2.4	16	1.0	52	3.2	51	3.0	110	6.4	62	3.6
4. Wheat	29	1.6	39	2.0	90	5.3	45	3.0	38	2.3	36	2.2	48	2.8	182	10.5	72	4.2
5. Pork	80	4.4	73	3.7	40	2.3	32	2.1	20	1.2	21	1.3	41	2.4	122	7.1	56	3.3
6. Coconut Oil	53	2.9	30	1.5	56	3.3	22	1.5	36	2.2	34	2.1	39	2.3	89	5.2	48	2.8
7. Sweet Potatoes	25	1.4	39	2.0	31	1.8	97	6.5	17	1.0	18	1.1	36	2.1	6*	0.4	30	1.8
8. Bananas	40	2.2	17	0.9	23	1.4	15	1.0	40	2.4	17	1.1	27	1.6	23	1.3	26	1.5
9. Mongo beans	22	1.2	36	1.8	12	0.7	7*	0.4	17	1.0	8*	0.5	16	0.9	10*	0.6	15	0.9
10. Milk	18	1.0	15	0.8	23	1.4	4*	0.3	13*	0.8	13	0.8	15	0.9	46	2.7	20	1.2
11. Cassava	1*	0.1	3*	0.2	4*	0.2	43	2.9	14	0.8	14	0.9	13*	0.8	5*	0.3	12*	0.7
12. Beef															37	2.1		
13. Mango			16	0.8														
14. Gabi							14	0.9										
15. Eggs															13	0.8		
16. Ubi					12	0.7												
17. Milkfish															12	0.7		
Totals (top 10 only)	1,608	88.9	1,753	88.9	1,505	88.3	1,383	92.0	1,426	85.9	1,430	89.0	1,493	87.9	1,513	87.6	1,486	87.7

* Not among the top 10 Calorie Sources for the Region.

Table 1a

SOURCES OF CALORIES
CAGAYAN VALLEY - BATANES REGION
Total Daily Per Capita Calorie Intake = 1,809

	Food	Amount Consumed (gm.)	Calories	Calories	% of Total Calories Consumed	Cumulative Total of Calories Consumed (%)
1.	Rice	267.45		978	54.1	54.1
	Polished	241.04	887			
	Unpolished	14.30	52			
	Glutinous	6.61	24			
	All others, mostly cakes	5.50	15			
2.	Corn	73.73		290	16.0	70.1
	Yellow & White, Ground	70.62	285			
	All others, mostly Corn on Cob	3.11	5			
3.	Pork	16.37		80	4.4	74.5
	Carcass	15.38	79			
	Organs	.99	1			
4.	Sugar	20.31		73	4.0	78.5
	Brown	11.76	41			
	White	7.43	29			
	Molasses	0.60	2			
	All others, (as molasses)	0.52	1			
5.	Vegetable Lard or Coconut Fat	6.02		53	2.9	81.4
6.	Banana	39.85		40	2.2	83.6
7.	Wheat	9.01		29	1.6	85.2
8.	Kamote	18.54		25	1.4	86.6
9.	Mongo Beans	6.28		22	1.2	87.8
10.	Milk	22.12		18	1.0	88.8

Table 1b

SOURCES OF CALORIES
ILOCOS - MOUNTAIN PROVINCE
Total Calories Consumed = 1,972 Per Capita Per Day

	Food	Amount Consumed (gm.)	Calories	Calories	% of Total Calories Consumed	Cumulative Total of Calories Consumed (%)
1.	Rice	391.76		1,435	72.77	
	Polished	321.90	1,185			
	Unpolished	65.14	236			
	Glutinous	1.09	4			
	All others, as cakes	3.63	10			
2.	Pork	15.70		73	3.70	76.47
	Carcass	13.78	70.1			
	Organs	1.92	2.6			
3.	Sugar	15.13		53	2.69	79.16
	White	7.51	29.1			
	Brown	5.45	18.9			
	Others, as molasses	2.17	5.6			
4.	Wheat	11.38		39	1.98	81.14
	Pan de Sal	5.39	17.2			
	Cookies, Crackers	2.06	9.3			
	Noodles	1.45	3.5			
	Bread (American)	1.06	3.5			
	All others, as cakes	1.42	5.7			
5.	Sweet Potatoes	28.84		39	1.98	83.12
6.	Mongo beans	10.02		36	1.83	84.95
7.	Vegetable Lard or Coconut Oil	3.44		30	1.52	86.47
8.	Bananas	16.94		17	0.86	87.33
9.	Mango	26.67		16	0.81	88.14
10.	Milk & Products	20.23		15	0.76	88.90

Table 1c

SOURCES OF CALORIES
SOUTHERN TAGALOG REGION
Total daily per capita calorie consumption = 1,705

	Food	Amount Consumed (gm.)	Calories	Calories	% of Total Calories Consumed	Cumulative Total of Calories Consumed (%)
1.	Rice	308.50		1,127	66.10	66.10
	Polished, white	273.33	1,005			
	Polished, red	17.09	62			
	Unpolished	11.04	41			
	Glutinous	0.87	3			
	Others, as rice cake	5.81	16			
2.	Sugar	25.58		91	5.33	71.43
	Brown	17.18	59			
	White	7.37	29			
	All others, as molasses	1.03	3			
3.	Wheat	26.02		90	5.27	76.70
	Pan de Sal	19.94	64			
	Cookies, Crackers	3.92	18			
	Noodles	2.16	5			
	Amer. Bread	0.82	3			
4.	Vegetable Lard or Coconut Oil	6.34		56	3.28	79.98
5.	Pork	8.24		40	2.34	82.32
	Carcass	7.58	39			
	Organs	0.66	1			
6.	Sweet Potatoes	22.66		31	1.81	84.13
7.	Banana	22.94		23	1.35	85.48
8.	Milk	26.34		23	1.35	86.81
9.	Mongo beans	3.38		12	0.70	87.51
10.	Ubi	11.54		12	0.70	88.21

Table 1d

SOURCES OF CALORIES
EASTERN VISAYAS REGION
Total Calories Consumed Per Capita Per Day = 1,503

	Food	Amount Consumed (gm.)	Calories	Calories	% of Total Calories Consumed	Cumulative Total of Calories Consumed (%)
1.	Rice	150.81		549	36.53	36.53
	Polished	83.45	307			
	Unpolished	61.79	224			
	Red, Polished	2.07	8			
	Glutinous	0.50	2			
	Others, as rice cake	3.00	8			
2.	Corn	147.19		530	35.26	71.79
	Ground	137.67	515			
	Ear	9.52	15			
3.	Sweet Potatoes	72.13		97	6.45	78.24
4.	Wheat	13.04		45	2.99	81.23
	Pan de Sal	5.19	17			
	Amer. Bread	1.33	4			
	Wheat, dry	3.15	11			
	Noodles	1.17	3			
	Cookies, Crackers	2.20	10			
5.	Cassava	30.67		43	2.86	84.09
6.	Sugar	10.57		36	2.39	86.48
	Brown	9.39	32			
	White	1.07				
	Others, as molasses	.11	4			
7.	Pork	6.50		32	2.13	88.61
	Carcass	6.30	32			
	Organs	.20				
8.	Vegetable Lard or Coconut Oil	2.53		22	1.46	90.07
9.	Banana	15.30		15	1.00	91.07
10.	Gabi	16.45		14	0.93	92.00

Table 1e

SOURCES OF CALORIES
WESTERN VISAYAS REGION
Total Per Capita Daily Calorie Intake = 1,661

	Food	Amount Consumed (gm.)	Calories	Calories	% of Total Calories Consumed	Cumulative Total of Calories Consumed (%)
1.	Rice	257.87		940	56.59	56.59
	Polished	164.78	606			
	Unpolished	89.19	323			
	Glutinous	0.50	2			
	Others, as cake	3.40	9			
2.	Corn	77.68		288	17.33	73.92
	Ground	76.40	286			
	Ear	1.28	2			
3.	Bananas	40.27		40	2.41	76.33
4.	Wheat	11.04		38	2.29	78.62
	Pan de Sal	5.27	17			
	Bread, Amer.	1.13	4			
	Cookies, Crackers	2.90	13			
	Noodles	1.74	4			
5.	Coconut Oil or Vegeteble Lard	4.08		36	2.17	80.79
6.	Pork	4.35		20	1.20	81.99
	Cercass	3.82				
	Organs	0.53				
7.	Sweet Potatoes	12.96		17	1.02	83.01
8.	Mongo beans	4.71		17	1.02	84.03
9.	Sugar	4.69		16	0.96	84.99
	Crude	3.93	14			
	Others, as molasses	0.76	2			
10.	Cassava	10.11		14	0.84	85.83

Table 1f

SOURCES OF CALORIES
SOUTHWESTERN MINDANAO REGION
Total Calories Consumed Per Capita Per Day = 1,607

	Food	Amount Consumed (gm.)	Calories	Calories	% of Total Calories Consumed	Cumulative Total of Calories Consumed (%)
1.	Rice	231.41		848	52.77	52.77
	Polished	227.32	836			
	Unpolished	1.48	5			
	Glutinous	.06	0			
	Others, as cake	2.54	7			
2.	Corn	102.01		377	23.46	76.23
	Ground	99.69	373			
	Ear	2.32	4			
3.	Sugar	14.22		52	3.24	79.47
	Brown	7.59	26			
	Refined	6.32	25			
	Others, as molasses	0.31	1			
4.	Wheat	10.86		36	2.24	81.71
	Pan de Sal	4.56	14			
	Bread, Amer.	1.12	4			
	Flour	3.05	11			
	Noodles	0.92	2			
	Cookies, Crackers	1.22	5			
5.	Vegetable Lard or Coconut Oil	3.84		34	2.12	83.83
6.	Pork	4.22		21	1.31	85.14
	Carcass	4.01	21			
	Organs	.21	0			
7.	Sweet Potatoes	13.25		18	1.12	86.26
8.	Bananas	17.15		17	1.06	87.32
9.	Cassava	9.76		14	0.87	88.19
10.	Milk	20.15		13	0.81	89.00

Table 1g

SOURCES OF CALORIES
METROPOLITAN MANILA
Total Daily Per Capita Calories Consumed = 1,727

	Food	Amount Consumed (gm.)	Calories	Calories	% of Total Calories Consumed	Cumulative Total of Calories Consumed (%)
1.	Rice	240.38		879	50.90	50.90
	Polished	233.38	859			
	Glutinous	0.71	3			
	Others, as cake	6.29	17			
2.	Wheat	54.88		182	10.53	61.43
	Pan de Sal	43.28	139			
	Amer. Bread	3.88	13			
	Cookies, Crackers	5.23	24			
	Noodles	2.49	6			
3.	Pork	26.94		122	7.06	68.49
	Carcass	21.79	112			
	Organs	2.15	2			
	Canned	3.00	8			
4.	Sugar	29.37		110	6.37	74.86
	Refined	22.27	86			
	Brown	5.60	20			
	Others, as molasses	1.50	4			
5.	Vegetable Lard or Coconut Oil	10.06		89	5.15	80.01
6.	Milk	71.07		46	2.66	82.67
7.	Beef			37	2.14	84.81
	Carcass	9.58	26			
	Corned	2.24	6			
	Canned	2.00	5			
8.	Banana	22.66		23	1.33	86.14
9.	Egg, hens	7.62		13	0.75	86.89
10.	Milkfish	9.27		12	0.69	87.58

Table 2

SUMMARY: SOURCES OF PROTEIN IN THE FOOD CONSUMED IN THE MAJOR GEOGRAPHIC REGIONS OF THE PHILIPPINES
(Taken from NUTRITION SURVEYS, FNRC, NIST, NSDB, 1959-68)

* (Values followed by an asterisk indicate the food is not among the top 10 protein sources for the region.)

REGION	Cagayan Valley & Batanes	Ilocos & Mtn. Provinces	Southern Tagalog	Eastern Visayas	Western Visayas	Southwestern Mindanao	6 - Regions Average	Metropolitan Manila	7 - Region Average
Total Protein Intake Per Capita Per Day	47.7	52.6	44.1	43.3	48.2	46.5	46.9	49.8	47.5
Survey Population (No. persons surveyed)	1,814	1,614	2,502	1,951	3,485	1,743	13,109 (total)	2,967	16,076 (total)

AVERAGE PROTEIN INTAKE PER CAPITA PER DAY

FOOD	Gm.	% of Total	Gm.	% of Total	Gm.	% of Total	Gm.	% of Total	Gm.	% of Total	Gm.	% of Total	Gm.	% of Total	Gm.	% of Total	Gm.	% of Total
1. Rice	19.70	41.3	29.70	56.5	22.70	51.5	11.70	27.0	20.00	41.5	17.00	36.6	20.00	42.6	18.80	37.8	19.80	41.7
2. Corn	6.45	13.5	0.30*	0.6	0.10*	0.3	12.50	28.9	7.30	15.2	8.90	19.1	5.93	12.6	0.10*	0.2	4.85	10.2
3. Anchovies	2.43	5.1	2.09	4.0	0.73	1.7	2.39	5.5	2.61	5.4	2.00	4.3	2.06	4.4	0.61	1.2	1.78	3.8
4. Wheat	0.90	1.9	1.05	2.0	2.66	6.0	1.27	2.9	1.06	2.2	1.14	2.5	1.38	2.9	5.54	11.1	2.15	4.5
5. Mongo beans	1.53	3.2	2.44	4.6	0.82	1.9	0.45*	1.0	1.15	2.4	0.57	1.2	1.13	2.4	0.71	1.4	1.04	2.2
6. Pork	1.85	3.9	2.02	3.8	0.97	2.2	0.72	1.7	0.50*	1.0	0.46*	1.0	1.00	2.1	3.05	6.1	1.37	2.9
7. Chicken	1.36	2.9	0.44*	0.8	0.59*	1.3	0.53	1.2	0.76	1.6	1.10	2.4	0.78	1.7	0.42*	0.8	0.71	1.5
8. Milk	0.75	1.6	0.69	1.3	0.90	2.0	0.18*	0.4	0.75	1.6	0.68	1.5	0.68	1.5	2.42	4.9	1.00	2.1
9. Mudfish	0.26*	0.5	0.12*	0.2	0.89	2.0	0.0*	0.0	0.03*	0.1	2.75	5.9	0.61	1.3	0.0*	0.0	0.49*	1.0
10. Beef	0.30*	0.6	1.15	2.2	0.69	1.6	0.10*	0.2	0.95	2.0	0.17*	0.4	0.60	1.3	3.04	6.1	1.06	2.2
11. Tuna, Bonita	0.02*	0.04	0.06*	0.1	0.79	1.8	1.74	4.0	0.24*	0.5	1.09	2.3	0.57*	1.2				
12. Milkfish	0.56*	1.2	0.71	1.4	0.41*	0.9	0.04*	0.1	0.78	1.6	0.27*	0.6	0.51*	1.1	1.63	3.3	0.70	1.5
13. Eggs	0.62*	1.3	0.74	1.4	0.57*	1.3	0.26*	0.6	0.37*	0.8	0.33*	0.7	0.47*	1.0	0.94	1.9	0.55*	1.2
14. Shrimp					0.70	1.6									1.00	2.0		
15. Sweet Potatoes							0.79	1.8										
16. Cowpeas	0.73	1.5																
17. Carabao	0.69	1.5																
18. Pigeon Peas			0.65	1.3														
19. Crevalle							0.72	1.7										
20. Swordfish							0.49	1.1										
21. Common Slipmouth									0.78	1.6								
22. Moonfish											1.13	2.4						
TOTALS (TOP 10 ONLY)	36.38	76.3	41.24	78.4	31.85	72.2	32.85	75.9	36.14	75.0	36.36	78.2	35.51	75.6	37.74	75.8	35.92	75.7

Table 2a

SOURCES OF PROTEIN
CAGAYAN VALLEY - BATANES REGION
Per Capita Protein Intake Per Day = 47.7

Food	Amount Consumed (gm.)	Protein (gm.)	Total Protein (gm.)	% of total consumed	Cumulative Protein Consumed (%)
1. Rice	267.45		19.7	41.3	41.3
Polished	241.0	17.80			
Unpolished	14.3	1.20			
Glutinous	6.6	0.50			
Cakes	5.5	0.20			
2. Corn			6.45	13.5	54.8
Ground	70.62	6.21			
Ear	2.94	0.14			
Others, as meal	1.13	0.10			
3. Anchovy			2.43	5.1	59.9
Bagoong	16.56	1.70			
Dried	0.89	.13			
Fresh	0.07				
4. Pork			1.85	3.9	63.8
Carcass	15.38	1.57			
Organs	0.99	0.20			
Sausage	0.27	0.03			
Dried	0.18	0.05			
5. Mongo beans			1.53	3.2	67.0
	6.28	1.53			
6. Chicken			1.36	2.9	69.9
Whole (rooster)	3.83	0.70			
White meat	1.24	0.29			
Dark meat	1.11	0.23			
Organs	0.72	0.14			
7. Wheat			0.90	1.89	71.8
Pan de Sal	3.79	0.38			
Noodles	2.53	0.31			
Crackers	1.69	0.12			
Amer. Bread	0.47	0.04			
Cake	0.71	0.05			
8. Milk			0.75	1.6	73.4
	22.12	0.75			
9. Cowpeas			0.73	1.5	74.9
	3.59	0.73			
10. Carabao			0.69	1.5	76.4
Carcass	2.99	0.57			
Organs	0.54	0.12			

Table 2b

SOURCES OF PROTEIN
ILOCOS - MOUNTAIN PROVINCE REGION
PER CAPITA PROTEIN INTAKE PER DAY = 52.6

	Food	Amount Consumed (gm.)	Protein (gm.)	Total Protein (gm.)	% of total consumed	Cumulative Protein Consumed (%)
1.	Rice	391.76		29.7	56.5	56.5
	Polished	322.63	23.9			
	Unpolished	65.14	5.5			
	Glutinous	1.09	0.1			
	Noodles	0.92	0.1			
	Cake	1.98	0.1			
2.	Mongo beans			2.44	4.6	61.1
		10.02				
3.	Anchovies			2.09	4.0	65.1
	Bagoong isda	13.66	1.41			
	Dried	0.59	0.48			
	Fresh	1.15	0.20			
4.	Pork			2.02	3.8	68.9
	Carcass	13.78	1.41			
	Dried	0.53	0.16			
	Sausage	0.50	0.05			
	Organ	1.92	0.40			
5.	Beef			1.15	2.2	71.1
	Ground	3.77	0.78			
	Dried	0.42	0.14			
	Corned	1.12	0.18			
	Sausage	0.32	0.05			
6.	Wheat			1.05	2.0	73.1
	Pan de Sal	5.39	0.54			
	Crackers	2.06	0.14			
	Noodles	1.45	0.18			
	Amer. bread	1.06	0.10			
	Cakes	1.34	0.09			
7.	Eggs			0.74	1.4	74.5
		5.94	0.74			
8.	Milkfish (Bangus)			0.71	1.4	75.9
	Fresh	3.76	0.66			
	Dried	.06	.05			
9.	Milk			0.69	1.3	77.2
		20.23	0.69			
10.	Pigeon Pea			0.65	1.2	78.4
		2.96	0.65			

Table 2c

SOURCES OF PROTEIN
SOUTHERN TAGALOG REGION
Per Capita Protein Intake Per Day = 44.1

Food	Amount Consumed (gm.)	Protein (gm)	Total Protein (gm.)	% of Total Consumed	Cumulative Protein Consumed (%)
1. Rice					
Polished	290.42	21.5	22.7	51.5	51.5
Unpolished	11.40	1.0			
Glutinous	0.87	0.1			
Cakes	5.81	0.1			
2. Wheat			2.66	6.0	57.5
Pan de Sal	19.94	2.01			
Crackers	3.92	0.27			
Noodles	2.16	0.27			
Amer. Bread	0.82	0.08			
Cake	0.49	0.03			
3. Pork			0.97	2.2	59.7
Carcass	7.58	0.77			
Organ	0.66	0.14			
Sausage	0.31	0.03			
Dried	0.10	0.03			
4. Milk			0.90	2.0	61.7
	26.34	0.90			
5. Mudfish			0.89	2.0	63.7
Fresh	4.45	0.86			
Dried	0.04	0.03			
6. Mongo beans			0.82	1.9	65.6
	3.38	0.82			
7. Tuna, Bonita			0.79	1.8	67.4
	3.21	0.79			
8. Anchovy			0.73	1.7	69.1
Fresh	4.00	0.45			
Dried	0.14	0.11			
Bagoong	1.68	0.17			
9. Shrimp			0.70	1.6	70.7
Fresh	3.12	0.52			
Bagoong	0.58	0.09			
Dried	0.17	0.09			
10. Beef			0.69	1.6	72.3
Carcass	2.61	0.52			
Organs	0.27	0.06			
Corned	0.72	0.11			

Table 2d

SOURCES OF PROTEIN
EASTERN VISAYAS REGION
Per Capita Protein Intake Per Day = 43.3

Food	Amount Consumed (gm.)	Protein (gm.)	Total Protein (gm.)	% of Total Consumed	Cumulative % of Total Protein Consumed
1. Corn			12.5	28.9	28.9
Ground	137.67	12.1			
Ear	9.52	0.4			
2. Rice			11.7	27.0	55.9
Polished	85.52	6.33			
Unpolished	61.79	5.25			
Glutinous	0.33	0.02			
Cakes	3.17	0.11			
3. Anchovies			2.39	5.5	61.4
Fresh	5.80	1.04			
Dried	0.80	0.66			
Bagoong	6.71	0.69			
4. Tuna Bonita			1.74	4.0	65.4
Fresh	5.66	1.39			
Dried	0.02	0.01			
Smoked	0.55	0.34			
5. Wheat			1.27	2.9	68.3
Pan de Sal	5.19	0.52			
Amer. Bread	1.33	0.13			
Flour	3.15	0.33			
Noodles	1.14	0.14			
Cakes	2.20	0.15			
6. Sweet Potatoes			0.79	1.8	70.1
	72.13	0.79			
7. Crevalle			0.72	1.7	71.8
Fresh	2.70	0.52			
Dried	0.24	0.20			
8. Pork			0.72	1.7	73.5
Carcass	6.30	.64			
Organ	0.20	0.05			
Dried	0.03	0.01			
Sausage	0.06	0.02			
9. Chicken			0.53	1.2	74.7
Rooster	2.68	0.49			
Organs	0.19	0.04			
10. Swordfish			0.49	1.1	75.8
Fresh	2.45	0.47			
Dried	0.03	0.02			

Table 2e

SOURCES OF PROTEIN
WESTERN VISAYAS REGION
Per Capita Protein Intake Per Day = 48.2

	Food	Amount Consumed (gm.)	Protein (gm.)	Total Protein (gm.)	% of Total Consumed	Cumulative % of Total Protein Consumed
1.	Rice			20.0	41.5	41.5
	Polished	164.78	7.40	12.2		
	Unpolished	89.19	8.50	7.6		
	Glutinous	0.50	6.90	0.1		
	Cakes	3.40	3.60	0.1		
2.	Corn			7.3	15.2	56.7
	Ground	76.40	6.70			
	Ear	1.28	0.60			
3.	Anchovies			2.61	5.4	62.1
	Fresh	1.68	0.30			
	Dried	3.41	1.97			
	Bagoong	3.31	0.34			
4.	Mongo beans			1.15	2.4	64.5
5.	Wheat			1.06	2.2	66.7
	Pan de Sal	5.40	0.55			
	Amer. Bread	0.99	0.10			
	Crackers	2.09	0.15			
	Noodles	1.50	0.19			
	Cakes	0.95	0.07			
6.	Beef			0.95	2.0	68.7
	Carcass	3.68	0.74			
	Organs	0.41	0.09			
	Corned	0.73	0.12			
7.	Common Slipmouth			0.78	1.6	70.3
	Fresh	2.05	0.38			
	Dried	0.94	0.40			
8.	Bangus or Milkfish			0.78	1.6	71.9
	Fresh	3.52	0.62			
	Dried	0.20	0.16			
9.	Chicken			0.76	1.6	73.5
	Rooster	4.16	0.76			
10.	Milk			0.75	1.6	75.1
		22.17	0.75			

Table 2f

SOURCES OF PROTEIN
SOUTHWESTERN MINDANAO
Per Capita Protein Consumed Per Day = 46.5

Food	Amount Consumed (gm.)	Protein (gm.)	Total Protein (gm.)	% of Total Consumed	Cumulative % of Total Protein Consumed
1. Rice			17.0	36.6	36.6
Polished	227.32	16.8			
Unpolished	1.48	0.1			
Cakes	2.54	0.1			
2. Corn			8.9	19.1	55.7
Ground	99.69	8.8			
Ear	2.32	0.1			
3. Mudfish			2.75	5.9	61.6
Fresh	14.2	2.75			
4. Anchovy			2.00	4.3	65.9
Fresh	1.42	0.25			
Dried	1.45	1.19			
Bagoong	5.47	0.56			
5. Wheat			1.14	2.5	68.4
Pan de Sal	4.56	0.46			
Flour	3.05	0.32			
Crackers	1.47	0.10			
Noodles	0.92	0.11			
Cakes	1.22	0.08			
Amer. Bread	0.69	0.07			
6. Moonfish			1.13	2.4	70.8
Fresh	3.94	0.96			
Dried	0.17	0.07			
7. Chicken			1.10	2.4	73.2
Rooster	5.41	0.98			
Organs	0.60	0.12			
8. Tuna Bonita			1.09	2.3	75.5
Fresh	3.41	0.84			
Dried	0.22	0.18			
Smoked	0.11	0.07			
9. Milk			0.68	1.5	77.0
	20.09	0.68			
10. Mongo beans			0.57	1.2	78.2
	2.32	0.57			

Table 2g

SOURCES OF PROTEIN
METROPOLITAN MANILA REGION
Per Capita Protein Intake Per Day = 49.8 gm.

Food	Amount Consumed (gm.)	Protein (gm.)	Total Protein (gm.)	% of Total Consumed	Cumulative % of Total Protein Consumed
1. Rice			18.8	37.8	37.8
Polished	233.38	17.3			
Glutinous	0.71	0.5			
Cakes	4.70	1.0			
2. Wheat			5.54	11.1	48.9
Pan de Sal	43.28	4.40			
Amer. Bread	3.88	0.38			
Crackers	2.74	0.19			
Noodles	4.57	0.57			
3. Pork			3.05	6.1	55.0
Carcass	21.79	2.22			
Organs	1.50	0.31			
Sausage	5.00	0.52			
4. Beef			3.04	6.10	61.1
Carcass	9.58	1.91			
Organs	1.50	0.35			
Corned	2.24	0.35			
Sausages	2.70	0.43			
5. Milk			2.42	4.9	66.0
	71.07	2.42			
6. Bangus			1.63	3.3	69.3
	9.27	1.63			
7. Shrimp			1.00	2.0	71.2
Fresh	4.61	0.77			
Sauce	1.52	0.23			
8. Eggs			0.94	1.9	73.1
	7.62	0.94			
9. Mongo beans			0.71	1.4	74.5
	2.9	0.71			
10. Anchovies			0.61	1.2	75.7
Dried	0.62	0.51			
Bagoong	0.95	0.10			

Table 3

SUMMARY: MAJOR FOOD ENERGY SOURCES PURCHASED BY INCOME CLASSES
Taken from Marketing Research Unit Reports, NFAC, May 1973; Report No. 73-8

	ENERGY VALUES IN CALORIES/CAP/DAY									
Peso Income/Cap/Yr.	LESS THAN 400		400 - 799		800 - 1,499		1,500 & over		All Classes	
FOOD:	Rank	Energy	Rank	Energy	Rank	Energy	Rank	Energy	Rank	Energy
Rice, milled	1	1,010	1	1,084	1	1,110	1	1,140	1	1,075
Corn (Grits)	2	256	2	181	6	103	6	91	3	177
Wheat (Bread)	3	111	3	177	3	236	3	318	2	182
Sugar	4	108	5	134	4	154	5	167	5	132
Pork (Carcass)	5	79	4	153	2	238	2	325	4	171
Oils and Fats	6	58	6	107	5	134	4	184	6	107
Bananas	7	50	7	53	7	70	7	80	7	59
Sweet Potatoes	8	27	9	31	14	22	14	18	12	24
Fish (fresh, chilled, frozen)	9	27	8	36	8	43	11	44	8	36
Milk, Condensed	10	19	10	30	12	29	13	26	10	25
Mongo Beans	11	17	12	24	13	24	12	27	13	23
Beef (Carcass)	12	17	11	29	9	42	8	70	9	35
Chicken, dressed	13	11	14	18	11	30	9	46	14	22
Milk, Evaporated	14	11	13	23	10	40	10	45	11	25
		1,801		2,080		2,275		2,581		2,093

Table 4

SUMMARY: MAJOR FOOD PROTEIN SOURCES PURCHASED BY INCOME CLASSES

Taken from: Marketing Research Unit Reports, NFAC, May 1973; Report No. 73 - 8

	PROTEIN VALUES IN GRAMS PER CAPITA PER DAY									
Peso Income/Cap/Yr.	LESS THAN 400		400-799		800-1,499		1,500 & over		ALL CLASSES	
F O O D:	Rank	Protein (gms.)	Rank	Protein (gms.)	Rank	Protein (gms.)	Rank	Protein (gms.)	Rank	Protein (gms.)
Rice, milled	1	20.4	1	21.8	1	22.2	1	23.0	1	21.6
Corn (Grits)	2	6.1	5	4.3	9	2.5	10	2.2	6	4.3
Fish (fresh, chilled, frozen)	3	4.7	2	6.2	2	7.3	4	7.5	2	6.2
Dried Fish	4	4.6	3	4.9	5	5.3	5	5.3	3	4.9
Wheat (Bread)	5	2.9	4	4.6	4	6.2	3	8.3	4	4.8
Pork	6	2.2	6	4.1	3	6.5	2	8.8	5	4.7
Mongo Beans	7	1.1	10	1.6	11	1.6	11	1.8	10	1.5
Beef (Carcass)	8	1.1	7	1.9	6	3.2	6	4.8	7	2.3
Poultry	9	1.0	8	1.7	7	2.8	7	4.3	8	2.1
Eggs	10	0.9	9	1.7	8	2.7	8	3.5	9	1.9
Evaporated Milk	11	0.6	11	1.2	10	2.0	9	2.3	11	1.3
Condensed Milk	12	0.5	13	0.7	13	0.7	13	0.7	13	0.6
Banana	13	0.5	14	0.5	14	0.6	14	0.7	14	0.5
Crustaceans & Mollusks	14	0.5	12	1.0	12	1.3	12	1.6	12	1.0
		47.1		56.2		64.9		74.8		57.7
ANIMAL ORIGIN		16.1		23.4		31.8		38.8		25.0
% ANIMAL		34.1%		41.7%		49.0%		52.0%		43.4%
% OF ANIMAL PROTEIN FROM FISH		61.0%		52.0%		44.0%		38.0%		48.0%

Table 5

SUMMARY

MAJOR CALORIE AND PROTEIN SOURCES IN THE NATION'S FOOD SUPPLY AVAILABLE FOR CONSUMPTION.
(Taken from the Food Balance Sheet, CY 1970, the Statistical Reporter, Vol. XVI, January-March 1972)

CALORIE SOURCES	Cal/Cap/Day
1. Rice Milled	948
2. Corn Shelled	310
3. Sugar	158
4. Wheat Flour	108
5. Pork	76
6. Fats and Oils (shortening, margarine)	68
7. Bananas	61
8. Sweet Potatoes	52
9. Fish, fresh, chilled and frozen	47
10. Cassava	23
TOTAL	1,851
TOTAL AVAILABLE	2,097

PROTEIN SOURCES	Protein Gm/Cap/Day
1. Rice, milled	19.1
2. Fish (fresh, chilled, frozen)*	7.9
3. Corn, Shelled	7.4
4. Wheat Flour	3.2
5. Pork	3.2
6. Poultry	1.5
7. Beef	1.3
8. Chicken Eggs	0.9
9. Canned Fish	0.8
10. Bananas	0.7
11. Skim Milk Powder	0.7
TOTAL	46.7
TOTAL AVAILABLE	54.2

* 12 Species used for average. Protein-Calorie Value.

Table 6

SUMMARY: CALORIE AND PROTEIN SOURCES IN THE NATION'S FOOD SUPPLY AVAILABLE FOR CONSUMPTION

(Taken from the Food Balance Sheets, CY 1970, the Statistical Reporter, Vol. XVI, January - March 1972)

FOOD CLASS:	AVAILABLE FOR CONSUMPTION PER CAPITA: CALORIES	PROTEIN (Gm.)
1. Cereals	1,378	30.0
(Milled Rice)	(948)	(19.1)
(Shelled Corn)	(310)	(7.4)
(Wheat Flour)	(108)	(3.2)
(Others)	(12)	(0.3)
2. Roots & Tubers	86	0.7
(Sweet Potatoes)	(52)	(0.3)
(Cassava)	(26)	(0.2)
(Others)	(8)	(0.2)
3. Sugar and Syrup	174	0
(Centrifugal Sugar)	(158)	
(Others)	(16)	
4. Pulses, Nuts	30	0.8
(Coconut for food)	(14)	(0.2)
(Mongo bean)	(4)	(0.3)
(Peanuts, shelled)	(3)	(0.2)
(Others)	(9)	(0.1)
5. Vegetables	21	1.1
(Leafy and Yellow)	(7)	(0.3)
(Others)	(14)	(0.8)
6. Fruits	84	0.9
(Bananas)	(61)	(0.7)
(Others)	(23)	(0.2)
7. Meat	103	7.4
(Pork)	(76)	(3.2)
(Poultry)	(7)	(1.5)
(Beef)	(9)	(1.3)
(Others)	(11)	(1.4)
8. Milk & Products	30	1.5
(Fresh milk, locally produced)	(3)	(0.1)
(Imports, converted to fresh milk equivalent)	(27)	(1.4)
9. Eggs	12	1.0
(Chicken)	(11)	(0.9
(Others)	(1)	(0.1)

Table 6 (cont'd):

FOOD CLASS:	AVAILABLE FOR CONSUMPTION PER CAPITA: CALORIES		PROTEIN	
10. Fish & Other Marine Products		66		9.8
(Fresh, chilled, frozen)	(47)		(7.9)	
(Canned Fish)	(12)		(0.8)	
(Others)	(7)		(1.1)	
11. Fats and Oils		70		0
(Vegetable Oil Lard and Margarine)	(68)			
(Butter)	(2)			
12. Miscellaneous (Beverages)		43		1.0
TOTALS (ALL FOOD CLASSES)		2,097		54.2

COCONUT FLOUR AS A FOOD RESOURCE IN THE PHILIPPINES

by R. W. Engel*

Nonfat portions of oil-bearing crops have traditionally been used in livestock or poultry feeds. The meat derived from the coconut is a good example. Coconuts are usually harvested and processed into copra, a dried meat which upon extraction yields about two-thirds of its weight as oil and one-third as copra meal. The crude protein content of this meal is about 20 per cent and the crude fiber content 10 per cent. If the oil is derived by pressing with an expeller, the fat content of the meal generally is from 6 to 8 per cent; if it is solvent-extracted, 1 per cent or less. The protein quality of commercial-grade copra meal can vary a great deal depending on the method of harvest, the degree of cleanliness during drying and the heat and pressure employed for oil extraction. This quality factor is of little concern when the meal is used in feed for ruminants but is of importance in feed for swine and poultry.

The hot, humid conditions under which coconuts are usually harvested and processed as copra can also lead to infestation with aflatoxin-producing molds (1). Control of such contamination is an increasing concern of both national and international health and regulatory officials (2).

The Philippines produces annually some 1.8 million metric tons of dried coconut meat and some 80 per cent of this is processed as copra. About 15 to 20 per cent of the coconuts is made into desiccated coconut, which is produced from fresh mature nuts under carefully-controlled sanitary conditions. Aflatoxin contamination is thus not a problem in desiccated products. Since the market demands a white product, desiccated coconut meat is prepared only from the white meat; the brownish outer layer of the nut is pared away once the meat has been removed from the coconut shell. The parings constitute 6 to 10 per cent of the meat.

There are thus two types of coconut flour; the dried, defatted ground white meat and the dried defatted ground meat prepared from the whole coconut including the outer layer. This product has a light brown tint.

To prepare coconut flour with high-quality protein from desiccated coconut meat, the temperature and pressure in the oil-expression process must be regulated so as not to damage the protein. The milder expeller treatment will in general yield a flour containing more fat than the traditional meal. Non-solvent-

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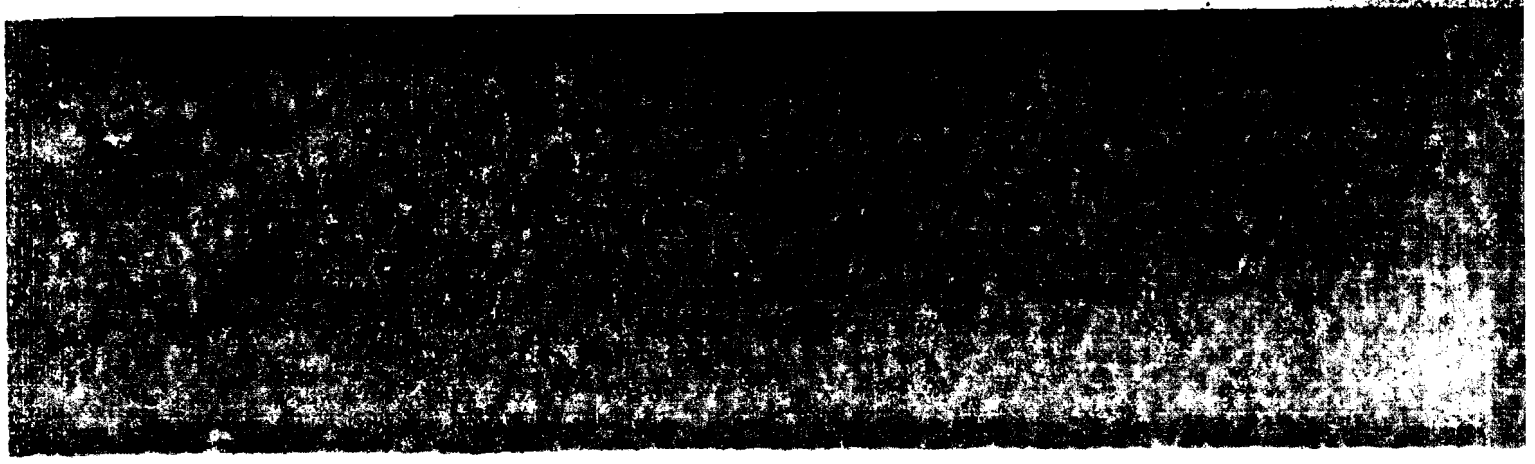

processed flour usually contains 15 to 20 per cent fat.

In the past, international trade in coconut products was pegged to the fat or oil component; the nonfat residue was considered a by-product. Recently, however, the demand for desiccated products has increased so that the market value of the oil has decreased somewhat. With the heavy demand for desiccated coconut, manufacturers have become less interested in separating oil and flour and marketing the latter as a new product. These market conditions could change were a lucrative role for such flours to emerge. Despite these aspects of marketing and the fluctuating demand for various coconut products, there is a growing interest in the Philippines to develop coconut products which would lead to greater use of this protein resource in human diets.

The U.S. Agency for International Development in the Philippines has supported some research in local institutions aimed at identifying local protein resources that could become ingredients in foods useful in child feeding programs. These foods currently contain U.S. Food for Peace commodities. For example, the Nutribun which is used in elementary school feeding programs and for emergency relief (3) is a ready-to-eat food supplement in which coconut flour could replace some part of the wheat flour-skim milk or wheat-soy flour blend currently employed.

Philippine scientists have established that coconut flour protein is of good quality (4), with protein efficiency ratios of 2.2 to 2.5 obtained in rat assays. Nitrogen balance studies were conducted with similar coconut flour as an ingredient of the Nutribun. Six college women were placed on a low-protein, high-fruit and -vegetable diet supplemented with two types of Nutribuns. One type used wheat flour and skim milk powder; the other contained 11 per cent coconut flour as part of the formulation. The Nutribuns of both kinds supplied 5.6 grams of nitrogen per subject daily and the total diet contained 7.2 to 7.5 grams of nitrogen daily. No difference in nitrogen retention was found between the two types of Nutribuns, which were given during 6-day balance periods to each of the six subjects (5).

During the 1972-73 school year, Nutribuns containing coconut flour at a 3 or 5 per cent level were distributed to pupils in Manila public elementary schools. This product was found highly acceptable, and the product's baking quality in terms of loaf size was not adversely affected by an addition of coconut flour at these levels. In these extensive tests over a six-month period, more than 7 million Nutribuns containing 5 per cent coconut flour and over 9 million containing 3 per cent coconut flour were distributed. The product used in the tests was a low-fat, solvent-extracted, white coconut flour made from pared meats. It was produced by a local Philippine manufacturer of desiccated coconuts. Research conducted in local institutions has shown that a variety of foods can be prepared in which coconut flour replaces some wheat flour or other ingredient. The amino acid pattern of coconut flour protein is generally satisfactory, with the exception of tryptophan which is low.

A growing interest in the use of coconut flour as an ingredient in food products, particularly those based on cereal grains, appears to be emerging in the Philippines. There is particular interest in coconut flour-wheat flour blends since all wheat products must be imported, a practice that affects the nation's trade balance.

The annual import of wheat in terms of flour equivalent is about 400,000 metric tons (6). Therefore, opportunities for conserving foreign exchange by partially substituting coconut flour for wheat flour could be considerable. Preliminary tests with Nutribun formulations have also demonstrated that emulsifiers such as SSL (sodium stearoyl-2-lactylate) can be used in coconut-wheat formulations as a way to assure uniformly good-quality loaf characteristics in bread-making.

As a final observation, it appears that coconut flour possesses certain characteristics more desirable than those of some other oil meals currently being considered for use in food blends. One advantage is that it is a white

product, which makes it suitable for blending with wheat, rice or white corn flours. Another is that coconut flour has none of the innate or acquired features that make some of the other widely-available oil meals undesirable. For example, cottonseed contains the toxin gossypol; soybean meal contains antienzymes; and peanut meal is often contaminated with aflatoxins. However, one characteristic of coconut flour that could make it undesirable is its relatively high crude fiber content. For this reason, admixtures of coconut flour generally should not exceed one-third or one-fourth of the final product.

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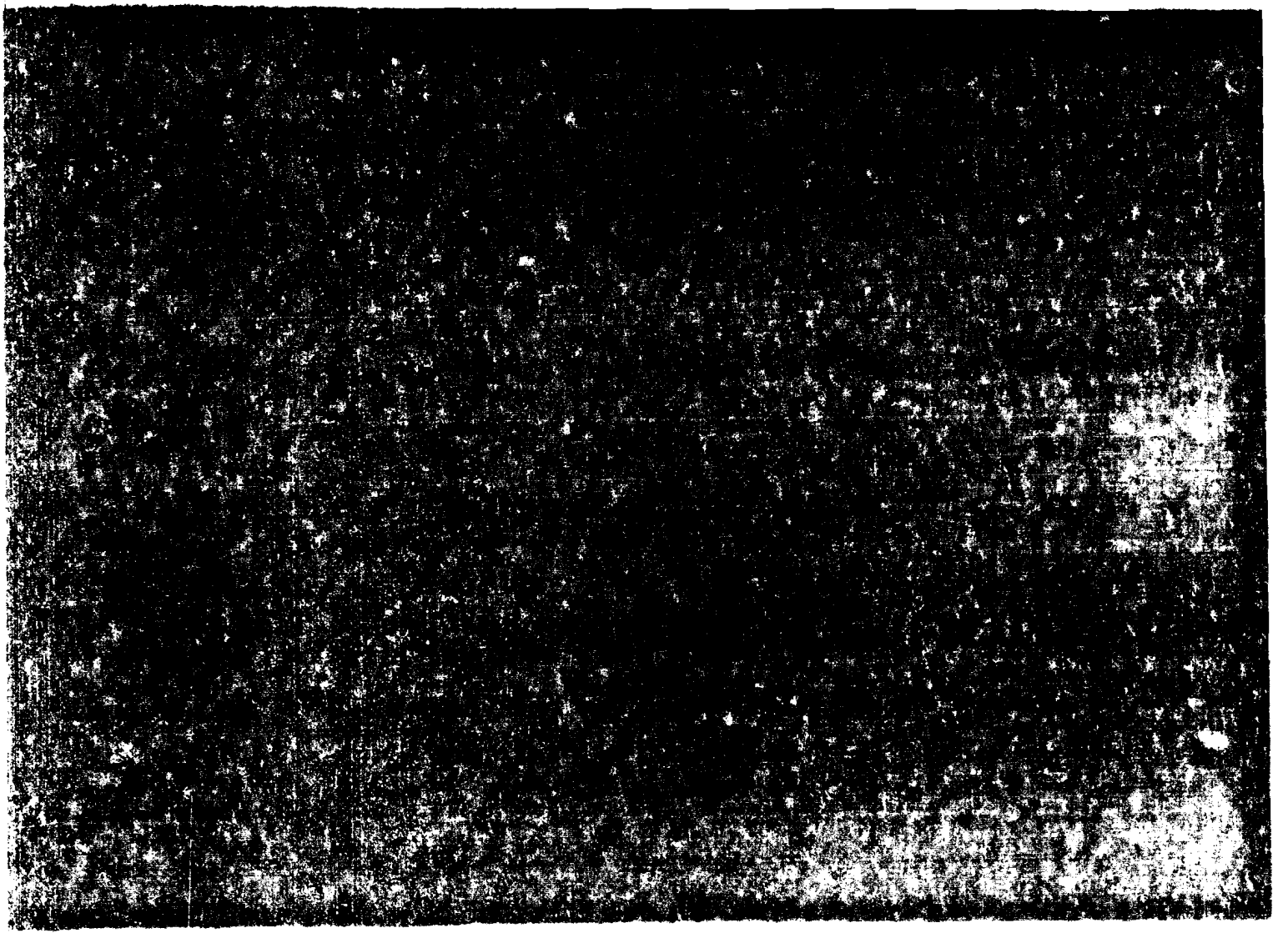

Attachment O

Section B

Draft for Discussion:RWEngel:ngb:06Dec74

SUPPLEMENTARY CALORIE AND PROTEIN REQUIREMENTS FOR INFANTS

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INTRODUCTION

There is growing interest in developing a stronger, more extensive malnutrition-prevention component in the Philippine Food and Nutrition Program. Studies by the Food and Nutrition Research Center (FNRC), by the Department of Health in Bulacan Province, and by the Bureau of Agricultural Extension in Batangas Province confirm that infants grow at normal rates during the first 4-5 months. Between 6 and 12 months, however, there is a severe growth failure in many infants. The average bodyweight of infants at 12 months of age is about 20% below standard.

All studies relating to weaning practices seem to indicate that the major cause for the growth failure in infants is inadequate food intake. Beyond 5 months, breast milk is no longer adequate and substantial supplementary feeding of the infant is lacking in many homes because of ignorance or because of a lack of appropriate food in the home.

If the nutrition campaign is to focus on the infant malnutrition problem, guidelines are needed as to quantities and kinds of foods needed to adequately nourish infants in food energy and protein.

Supplementary Calorie...

CALORIE AND PROTEIN REQUIREMENTS FOR INFANTS

Table 1 presents the requirements for calories and protein at monthly intervals and the average amounts that would be derived from breast milk and supplementary foods. These are average values--some mothers would use more, some less, supplementary food, depending upon their own capacity to provide nutrients through nursing. These same guidelines for satisfying calorie and protein requirements can also be used for introducing supplementary foods for bottlefed infants. An educational campaign, however, should stress breast-feeding as the best way to nourish the infant if it is at all possible for the mother to nurse her baby.

The average amount of calories and protein from breast milk is based on the studies summarized by Alan Berg (The Nutrition Factor, The Brookings Institution, Washington, D.C., 1973). These studies indicated that breast milk averages 850 ml during the first 5 months and 500 ml during the 6th through the 12th month of lactation. The body weights are similar to those proposed by WHO/FAO. Calorie requirements are those recommended for Filipino infants by FNRC. The protein requirements are derived from the composition of breast milk, 71 calories and 1.2 grams protein per 100 ml. The assumption is made that the protein content of breast milk is sufficient to support normal growth and development during the first 4 months.

Supplementary Calorie...

The protein requirement, derived from supplementary foods, (6 through 12 months) is given as a range. This is done to emphasize that a wide range of protein in the supplement is possible depending upon quality. The lowest values given are for a high quality protein such as whole egg (90% as good as breast milk protein). The highest values shown are for proteins of such low quality as to require 25% of supplementary calories in the form of protein.

SUGGESTED MIXTURES FOR SATISFYING CALORIE AND PROTEIN REQUIREMENTS OF INFANTS

Table 2 illustrates how simple mixtures available in many areas of the Philippines can satisfy the calorie and protein requirements as supplements to breast milk or infant formulas. The calculations are based on the procedures outlined in the "Manual on Feeding Infants and Young Children" (PAG Document 1.14/26, December 1971) Protein Advisory Group, The United Nations System, U.N., NY, USA 10017). All of the mixtures shown in Table 2 satisfy the recommendation that the combination of proteins should provide between 7 and 8 percent net dietary protein calories (NDP cal, %) in the supplement.

APPROXIMATE QUANTITY REQUIREMENTS AND COSTS OF INFANT FOOD MIXTURES

Table 3 summarizes the average quantities and costs of protein sources needed to provide adequate calories and proteins in mixtures

Supplementary Calorie...

containing milled rice, tubers, or bananas, oatmeal, wheat, or corn can be used to replace rice in these mixtures. Current retail prices for these foods are also shown (Table 4). Approximately 18 kilograms of the dry mixtures, or 35-45 kilograms of mixtures containing fresh products (bananas, root crops), will satisfy the average supplementary food requirements of the infant for the entire first year. Again, it should be remembered that these are averages and depend upon the mothers' capacity to provide breast milk. Two products have been included which are currently donated from abroad (U.S. Food for Peace). The corn soy blend contains 65% corn meal and 35% soybean meal and is fortified with vitamins and minerals. The Nutribun contains wheat flour, 88%; soybean meal, 12%; and is also fortified with vitamins and minerals.

These quantities should be well within the economic means of most households, particularly those in the rural areas where home gardens can furnish most of the foods needed.

It is very clear that with current retail prices, mixtures of dried fish with cereals would be the most economical. Because of high prices, tubers would not be as economical as cereals. Tubers, or bananas, can however, be readily grown in home gardens. It is of interest that milk, an imported product, is a more economical protein source than legumes. Again, such legumes can be produced in home gardens. Eggs and meat have not been included in these mixtures because they are more expensive than those shown in Table 3.

Supplementary Calorie...

Meat also is difficult to store without refrigeration so it would be difficult to maintain a steady day-to-day supply, which is very essential for proper nourishment of infants.

ACCESSORY NUTRIENT REQUIREMENTS

The accessory nutrients most commonly lacking are Vitamins A and C, thiamine and riboflavin and the minerals calcium and iron.

The mixtures proposed above as a general practice should be fed daily with small quantities of pureed leafy greens. The mother herself should be encouraged to eat leafy green or yellow vegetables to ensure Vitamins A and C through breast milk. Fish, the most economic protein source, can be equal to milk in supplying calcium to the diet of the infant. Dried dilis contain about the same concentration of calcium as skim milk powder.

With regard to iron, it may be necessary to supplement with iron salts although again, if mothers select iron-rich foods such as organ meats or legumes during pregnancy, the infant's store of iron at birth could be built-up to protect against deficiency.

In general, the quantities and costs of the accessory nutrients required by infants is small compared to the quantities and costs of the calorie and protein sources. If there is any doubt as to the adequacy of the above mixtures in accessory nutrients, the most economical means of correcting deficiencies would be to provide a weekly vitamin-mineral solution or capsule.

Table 1

Calorie Protein Sources and Requirements for Nursing Infants

Age (mos.)	Body Weight (kg.)	Daily Calorie Requirement per kg BW	Daily Calorie Requirement Total	Daily Protein Requirement per kg BW	Daily Protein Requirement Total	Total Daily Requirements: Calorie Breast Milk	Total Daily Requirements: Calorie Supplement	Total Daily Requirements: Protein (gm.) Breast Milk	Total Daily Requirements: Protein (gm.) Supplement (Range)
0-1	3.36	122	410	2.1	6.9	410	0	6.9	0
1-2	4.23	120	500	2.1	8.9	500	0	8.5	0
2-3	5.00	118	590	2.0	10.0	590	0	10.0	0
3-4	5.68	115	655	2.0	11.4	655	0	11.1	0
4-5	6.31	115	725	2.0	12.6	710	15	12.0	0.6- 1.7
5-6	6.90	112	775	2.0	13.8	740	35	12.5	1.4- 3.9
6-7	7.45	110	820	1.8	13.4	670	150	11.3	2.3- 6.4
7-8	7.90	108	855	1.8	14.2	600	255	10.1	4.6-12.7
8-9	8.40	106	890	1.8	15.1	530	360	9.0	6.8-18.8
9-10	8.90	105	935	1.8	16.0	460	475	7.8	9.0-24.9
10-11	9.27	104	965	1.8	16.7	390	575	6.6	11.2-31.0
11-12	9.60	102	980	1.8	17.3	320	660	5.4	13.2-36.6
12-13	9.90	102	1010	1.8	17.8	270	740	4.6	14.7-40.7

TABLE 2

QUANTITIES OF INGREDIENTS REQUIRED PER INFANT
TO SUPPORT BREAST FEEDING

Mixture: Dried Fish Powder-Sweet Potatoes Mash-Oil/Sugar

Age (Mos.)	Per Day	Per Month	Quantity (grams) Per Day: Fish Powder	Sweet Potato	Oil	Sugar	Quantity (grams) Per Month: Fish Powder	Sweet Potato	Oil	Sugar
4-5	15	450	0.4	9.0	0.2	0.3	12	270	6	9
5-6	35	1,050	0.9	20.9	0.5	0.8	27	627	15	24
6-7	150	4,500	3.9	89.5	2.3	3.3	117	2,685	69	99
7-8	255	7,650	6.6	152.1	3.9	5.6	198	4,563	117	168
8-9	360	10,800	9.3	214.9	5.5	7.9	279	6,447	165	237
9-10	475	14,250	12.3	283.5	7.2	10.4	369	8,505	216	312
10-11	575	17,250	14.9	351.4	8.7	12.6	447	10,542	261	378
11-12	660	19,800	17.1	394.3	10.0	14.5	513	11,829	300	435
					TOTALS		1,962	45,468	1,149	1,662

Mixture: Skim Milk Powder-Banana-Oil-Sugar

Quantity (grams) Per Day				Per Month			
SMP	Banana	Oil	Sugar	SMP	Banana	Oil	Sugar
0.9	7.4	0.2	0.3	27	222	6	9
2.1	17.2	0.5	0.8	63	516	15	24
9.1	73.6	2.3	3.3	273	2,208	69	99
15.5	124.3	3.9	5.6	465	3,729	117	168
21.9	176.5	5.5	7.9	657	5,295	165	237
29.0	233.2	7.2	10.4	870	6,996	216	312
35.1	281.0	8.7	12.6	1,053	8,430	261	378
40.3	323.0	10.0	14.5	1,209	9,690	300	435
			TOTALS	4,617	37,086	1,149	1,662

Mixture: Bean, Rice, Milk Powder with Oil and Sugar

Quantity (grms) Per Day					Per Month				
Bean	Rice	SMP	Oil	Sugar	Bean	Rice	SMP	Oil S	Sugar
0.7	2.3	0.3	0.2	0.3	21	69	9	6	9
1.6	5.4	0.8	0.5	0.8	48	162	24	15	24
6.6	23.3	3.2	2.3	3.3	198	699	96	69	99
11.4	39.6	5.6	3.9	5.6	342	1,188	168	117	168
16.1	55.9	8.1	5.5	7.9	483	1,677	243	165	237
21.2	73.9	10.6	7.2	10.4	636	2,217	318	216	312
25.5	89.4	12.7	8.7	12.6	765	2,682	381	261	378
29.4	102.7	14.7	10.0	14.5	882	3,081	441	300	435
				TOTALS	3,375	11,775	1,680	1,149	1,662

Mixture: Skim milk Powder, Rice, with Oil and Sugar

Quantity (grams)							
Per Day				Per Month			
SMP	Rice	Oil	Sugar	SMP	Rice	Oil	Sugar
0.5	2.9	0.2	0.3	15	87	6	9
1.1	6.8	0.5	0.8	33	204	15	24
4.5	29.0	2.3	3.3	135	870	69	99
7.5	49.3	3.9	5.6	225	1,479	117	168
10.7	69.6	5.5	7.9	321	2,088	165	237
14.1	91.9	7.2	10.4	423	2,757	216	312
17.0	111.2	8.7	12.6	510	3,336	261	378
19.6	127.7	10.0	14.5	588	3,831	300	435
			TOTALS	2,250	14,652	1,149	1,662

Mixture: Beans, Fish Powder, Cassava Flour with Oil and Sugar

Quantity (grams) Per Day					Per Month				
Beans	Fish Powder	Cassava Flour	Oil	Sugar	Beans	Fish Powder	Cassava Flour	Oil	Sugar
0.9	0.3	2.1	0.2	0.3	27	9	63	6	9
2.1	0.5	4.9	0.5	0.8	63	15	147	15	24
9.9	3.3	21.0	2.3	3.3	297	99	630	69	99
15.2	5.6	35.8	3.9	5.6	456	168	1,074	117	168
21.4	8.1	50.5	5.5	7.9	642	243	1,515	165	237
28.2	10.6	66.6	7.2	10.4	846	318	1,998	216	312
34.2	12.7	80.7	8.7	12.6	1,026	381	2,421	261	378
39.2	14.8	92.7	10.0	14.5	1,176	444	2,781	300	435
				TOTALS	4,533	1,677	10,631	1,149	1,662

Mixture: Beans, Rice, Fish Powder, with Oil and Sugar

Quantity (grams)									
Per Day					Per Month				
Beans	Rice	Fish Pwd.	Oil	Sugar	Bean	Rice	Fish Pwd.	Oil	Sugar
0.5	2.6	0.2	0.2	0.3	15	78	6	6	9
1.2	6.1	0.5	0.5	0.8	36	183	15	15	24
5.7	26.0	2.0	2.3	3.3	171	780	60	69	99
9.6	44.1	3.3	3.9	5.6	288	1,323	99	117	168
13.5	62.3	4.7	5.5	7.9	405	1,869	141	165	237
17.8	82.3	6.2	7.2	10.4	534	2,469	186	216	312
21.5	99.5	7.3	8.7	12.6	645	2,985	219	261	378
24.7	114.3	8.5	10.0	14.5	741	3,429	255	300	435
				TOTALS	2,883	13,116	726	1,149	1,662

Mixture: Beans, Gabi, Skim milk with oil and sugar

Quantity (grams)										
Per Day					Per Month					
Beans	Gabi	SMP	Oil	Sugar	Beans	Gabi	SMP	Oil	Sugar
1.0	5.4	0.5	0.2	0.3	30	162	15	6	9
2.3	12.6	1.2	0.5	0.8	69	378	36	15	24
10.0	54.4	5.4	2.3	3.3	300	1,632	162	69	99
17.1	92.4	9.2	3.9	5.6	513	2,772	276	117	168
24.2	130.5	13.0	5.5	7.9	726	3,915	390	165	237
31.9	172.2	17.1	7.2	10.4	957	5,166	513	216	312
38.6	208.2	20.8	8.7	12.6	1,158	6,246	624	261	378
44.3	239.0	23.9	10.0	14.5	1,329	7,170	717	300	435
				TOTALS	5,082	27,441	2,733	1,149	1,662

Mixture: Nutribun Powder with Oil and Sugar

Quantity (grams) Per Day			Per Month		
Nutribun Powder	Oil	Sugar	Nutribun Powder	Oil	Sugar
3	0.4	0.3	90	12	9
7	0.8	0.7	210	24	21
29.8	3.7	3.3	894	111	99
50.7	6.4	5.6	1,521	192	168
71.5	9.0	8.1	2,145	270	243
94.3	11.8	10.6	2,829	354	318
114.1	14.3	12.7	3,423	429	381
131.1	16.4	14.7	3,933	492	441
		TOTALS	15,045	1,884	1,680

Mixture: Corn Soy Blend with Oil and Sugar

Quantity (grams)					
Per Day			Per Month		
CSB	Oil	Sugar	CSB	Oil	Sugar
2.9	0.4	0.3	87	12	9
6.6	0.8	0.7	198	24	21
28.6	3.7	3.3	858	111	99
48.7	6.4	5.6	1,461	192	168
68.8	9.0	8.1	2,064	270	243
90.9	11.8	10.6	2,727	354	318
110.0	14.3	12.7	3,300	429	281
126.4	16.4	14.7	3,792	492	441
		TOTALS	14,487	1,884	1,680

Mixture: Fish Powder, Rice Flour, Oil/Sugar

Quantity (grams)							
Per Day				Per Month			
Fish Pwd	Rice	Oil	Sugar	Fish Pwd	Rice	Oil	Sugar
0.4	3.0	0.3	0.3	12	90	9	9
0.8	6.6	0.6	0.6	24	198	18	18
3.5	28.3	2.8	2.8	105	849	84	84
5.9	48.2	4.7	4.7	177	1,446	141	141
8.3	69.1	6.6	6.6	249	2,073	198	198
11.0	89.8	8.8	8.8	330	2,694	264	264
13.3	108.7	10.6	10.6	399	3,261	318	318
16.5	125.0	12.2	12.2	495	3,750	366	366
				1,791	14,361	1,398	1,398

Supplementary Calorie...

Table 3

Total Quantities Required and Costs of Various Mixtures To Supplement Breast Milk During the First Year

(Based on Retail Prices, Manila, August, 1974)

Mixture	Amount (Kg)	Cost (₱)
Mini-shrimp powder	1,791	12.54
Rice Flour	14.361	27.29
Sugar	1.398	1.82
Oil	1.398	8.39
T o t a l s	18.948	50.04
Cost Per Day		0.21
Mini-shrimp powder	1.962	13.74
Mashed Sweet Potatoes	45.468	54.56
Sugar	1.662	2.16
Oil	1.149	6.89
T o t a l s	50.241	77.35
Cost Per Day		0.32
Mini-shrimp powder	4.617	65.56
Mashed banana	37.086	108.89
Sugar	1.662	2.16
Oil	1.149	6.89
T o t a l s	44.514	183.50
Cost Per Day		0.76
Bean flour	3.375	20.25
Rice flour	11.775	22.37
Skim milk powder	1.680	23.86
Sugar	1.662	2.16
Oil	1.149	6.89
T o t a l s	19.641	75.53
Cost Per Day		0.32

Supplementary Calorie...

Table 3 (contd)

Mixture	Amount (Kg)	Cost (₱)
Skim milk powder	2.250	31.95
Rice flour	14.652	27.84
Sugar	1.662	2.16
Oil	1.149	6.89
T o t a l s	19.713	68.84
Cost Per Day		0.29
Bean flour	4.533	27.20
Mini-shrimp powder	1.677	11.74
Cassava flour	10.631	12.76
Sugar	1.662	2.16
Oil	1.149	6.89
T o t a l s	19.652	60.75
Cost Per Day		0.25
Bean flour	2.835	17.01
Mini-shrimp powder	0.726	5.08
Rice flour	13.116	24.92
Sugar	1.662	2.16
Oil	1.149	6.89
T o t a l s	19.488	56.06
Cost Per Day		0.23
Bean flour	5.082	30.49
Skim milk powder	2.733	38.81
Gabi	27.441	68.60
Sugar	1.662	2.16
Oil	1.149	6.89
T o t a l s	38.067	146.95
Cost Per Day		0.61

Supplementary Calorie...

Table 4

Retail Price of Supplementary Food Ingredients
(Manila, August, 1974)

Items	Per Kg.
Mini-shrimp powder	₱ 7.00
Dried Dilis	9.50
Skim milk powder (Carnation)	14.20
Dried legumes	6.00
Rice	1.90
Gabi	2.50
Sweet potatoes	1.20
Cassava	1.20
Corn Grits	1.40
Bananas	2.94
Sugar/brown	1.30
Oil (cooking)	6.00

Attachment P

Section B

NUTRITION, POPULATION, AND FAMILY PLANNING[1/]

INTRODUCTION

Without food, nutrition is meaningless. It is food shortages that create the under-nutrition problems all over the world, but more particularly in the developing countries. These same countries also have rapid growth in their populations, a problem equally as important as the under-nutrition problem. These two problems, the over-population problem and the under-nutrition problem, are separate and distinct, but they are also related. The solutions are, likewise, separate and distinct as well as related. There is still a tendency to think of intensified food production and contraception as alternative solutions, and this is dangerously misleading. The two problems of food and population imbalance have a feature which seriously complicates the changes of success. The feature is that millions of individuals must be convinced that they must take individual action. This means that traditional societies must be reshaped. Traditional methods of farming must change, as must traditional methods of procreation. The choice is not one or the other; both of these problems must be solved. This is an absolute necessity.

For a farmer to adopt new technology for rice production, or for himself or his wife to adopt new contraception technology, convincing arguments must be put forward. Convincing arguments are developed mainly through an indepth analysis of the problems.

Your public leaders have recognized the twin problems of food and population imbalance. A Philippine Population Commission has been established as well as a National Nutrition Council and a National Food and Agriculture Council. To fortify or enhance the effectiveness of these public agencies, a Population Center and a Nutrition Center have been established (adjacent to each other to emphasize their close relationship) to mobilize the collective private sector.

[1/] R. W. Engel, Nutrition Advisor, USAID/Philippines and Professor, Bio-chemistry and Nutrition, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, and Ma. Minda Caedo, Program Specialist, USAID/Philippines. Presented at the Nutrition Forum, "Nutrition in National Development", University of the Philippines at Los Banos, January 6-7, 1975.

Programs for combating over-population and under-nutrition have been developed during the past decade. There have thus far been quite distinctly separate programs although there have been special projects initiated to explore possible more unified efforts.

MUTUALLY REINFORCING PROGRAM OPPORTUNITIES

From the nutrition point of view, it is becoming increasingly clear, as research information is accumulating, that the question is no longer "Will there be a family planning component in the nutrition program?" but rather "How soon can the family planning component in the nutrition program be implemented?"

Dr. Florentino Solon, the Executive Director of the National Nutrition Council and the Nutrition Center of the Philippines, has stated repeatedly, in the last few months, that convincing evidence for the need for family planning in the nutrition program exists and a family planning component will be organized as soon as possible. He is also hopeful that a similar view will be taken by the leaders in the Population Program for a nutrition component.

This is as it should be. There is clearly a need for the two programs, each with its own major focus but with auxillary components emphasizing the food and population imbalance.

Why is there such urgency in the nutrition program for a family planning component? The data in Table 1 supplements and reinforces data collected by the Food and Nutrition Research Center and the School of Public Health, U.P., as well as others. It emphasizes that with increasing family size the quality of diet deteriorates, and the prevalence of malnutrition increases.

I should emphasize that these are families which have only one to three children--young families with high aspirations for their children, yet with hunger and misery clearly in evidence.

With as many as three preschool children there must also have been narrow birth intervals, which is also known to intensify the malnutrition problem, particularly in those who are removed from breast feeding early in life, to make way for the next infant.

Table 2 summarizes data on child spacing and its impact on nutritional health. It is obvious that a significant reduction in malnutrition prevalence can be achieved through family planning. Those families which delayed arrival of the second baby 30 months or longer reduced malnutrition to one-half that seen in families where the second baby came within 18 months of the first. Again, these are young families with only two children--families who, with better planning, could more readily achieve their high aspirations for healthy, happy children.

It should be noted that nearly one-third (200 out of 635 families) of these families obviously did not practice family planning and allowed the baby to arrive before provision was made for the first to be adequately nourished.

These observations on over 600 young families reveal an obvious and strong positive correlation between malnutrition and family size and a negative correlation between child spacing or birth interval and malnutrition.

Table 3 summarizes additional data on all the families covered by a survey which yielded the data reported in Tables 1 and 2. It is obvious that nearly one of every four families are young families, having only infants or preschoolers. It is also obvious that the infants in Bulacan are concentrated in such families, the prevalence of infants being more than twice that among the families with children beyond preschool age. These young families are obviously an important target for the family planner and, as can be seen in Table 4, these young families also need a nutrition program. Note, at six months of age, infants are still within 10% of the normal weight for age. They averaged 93% of normal. By 9 months, however, they have declined to 86% of standard; by 12 months, to 80%, where they seem to plateau throughout the preschool age range. These infants are mainly breast fed. Obviously after 6 months, breast milk is no longer adequate. Supplementary feeding is probably seriously inadequate, often limited to overly diluted milk formulations or thin rice gruel.

Nutrition education of the mother is obviously to be improved, which could and should be done simultaneously with family planning motivation and education. There may be other important factors that influence the health and well-being of

the infant during the weaning period. Their impact should be studied and quantified along with the impact of an adequate diet. These other factors include potability of the water supply and environmental sanitation, immunizations against infectious diseases, and medication for serious infant or childhood diseases.

The argument is often used that nutrition programs do not appeal to family planners because the life-saving accomplished through better nutrition increases the population and, therefore, defeats the family planning objective. In Table 5, a hypothetical example is given to show that nutrition programs do not seriously affect the family planning objective. In the example, it is assumed the family planning program has the goal of reducing the crude birth rate by 10% a year and the nutrition program has the goal of reducing deaths among the age range 0-4 years by 10% a year.

Other assumptions are based on recent Philippine statistics, namely, that the infant deaths account for 23% of all deaths; deaths among 1-4 year olds account for 22%; that the crude birth rate is 3.8%; the crude death rate is 0.7% of the total population; and that the population of the Philippines was 43,900,000 in January, 1975.

From the example shown, it is very clear that the lifesaving effects of the nutrition program has only a minor effect on the population change. In one year the nutrition program reduces the impact of the family planning program from about 12% to 11%, an overall negative effect of about 8%.

Another important reason for linking nutrition with family planning activities is that lives saved through better nutrition can and often is a strong reason for parents to become receptive to family planning practices. This motivational impact may be strong enough to entirely negate the small negative effect of a nutrition program on the family planning program shown in Table 6.

Surveys conducted by the Economic Research Unit, National Food and Agriculture Council, reveal that about one-third of Filipino families receive incomes only slightly higher than the minimum ₱2,496 per year and the average size of these families is 7.6. Thus, nearly a third of all Filipino families subsist on diets that can, at best, represent only 50-60% of the recommended dietary standard.

Information relating income to subsistence requirements for the family is one of the most obvious tools useful in motivational programs for both the nutritionist and the family planner. This should be used far more widely than is now the case.

Table 6 summarizes some estimates of the percent of minimum wages required to feed various size families at minimum subsistence level or at recommended dietary levels. The recommended diet can probably be afforded only by families with no more than four members (2 parents and 2 children) if the income does not exceed the minimum. The minimum subsistence diet of rice alone for a family of 4 would require 51% of the minimum wage.

With a birth interval of 2.5 years the family would grow to 7 (parents plus 5 children) in 10 years. During the 10 years the amount of the minimum wage needed for food would go from 41% to 101%, or 6% a year. It is unlikely that wages will increase 6% each year. Without this increase in wages, the quality of the diet will no doubt suffer.

But the birth interval is not 2.5 years. For over 80% of young Filipino families in Bulacan, the birth interval was 1.5 years or less (see Table 2). Assuming the birth interval averages 1.5 years for all families, a typical family would grow to 7 in only six years. This, then, means that the amount of minimum wage needed for the family food supply will increase 10% a year. Few countries anywhere in the world have been able to launch economic development programs that would sustain such a 10% increase in personal incomes for a sustained period of time. Longer birth intervals and other family planning procedures are obviously very important or else the quality of the diets of many families will worsen rather than improve in the years ahead.

One way to alleviate the pressure of the large family on the family food budget is to provide food assistance. This is

currently actively done for about 300,000 low-income Filipino families through a targeted maternal child health (TMCH) program. The supplementary food is targeted to malnourished preschool children and infants and to their pregnant or lactating mothers. The food is donated through United States Voluntary Agencies under agreements between the Government of the Philippines and the U.S. Government and the cooperating voluntary agencies.

This supplementary food is bringing about the rehabilitation of malnourished preschool children as well as protecting against the development of malnourishment in infants. It is considered a temporary measure since it is recognized that the long-term solution is to improve home food production and to implement family planning as the means of bringing the population and the food supply into balance.

The food in this program is delivered to TMCH centers every three months. From the TMCH center food stores, issues to enroled families are made on a once-a-month schedule. The food issue is coordinated with a nutrition education program where mothers receive instructions on how these foods can be used in local recipes as a supplement to local foods to best advantage and how home garden food production can eventually take the place of the donated food. This monthly outreach to participating families also provides an ideal opportunity for education in family planning since the processes of conception also operates on a monthly schedule.

Family planning education should be greatly expanded in the TMCH program because it provides an ideal setting for focusing the home-makers' mind into the seriousness of the population problem, the seriousness of the food problem (entailing shipment of food halfway around the world), and how these two problems are eroding the quality of life.

SUMMARY

The Philippine food/nutrition and population imbalance is recognized as one of the most serious impediments to national development. Major programs have been implemented by the government in food and nutrition to achieve self-sufficiency in dietary staples and to improve diets through more diversified production of protective foods (green revolution).

Nutrition is receiving increasing emphasis both through supplementary feeding, using both home-produced and donated foods, to rehabilitate the malnourished children, as well as to prevent malnutrition from developing in the infant.

A major program has also been launched to control population growth. Each of these programs should continue to have its own major focus. In no way should such major focus be diverted. Rather, strategies should be developed that would mutually reinforce the major focus of each of these efforts. This can be done in all activities in the food/nutrition sector or population sector that focus on the young families. These represent a major portion of all families and also represent those families which can profit the most from happier, healthier, offspring through better nutrition arising from either more food and better production or more and better family diets through better spacing of babies and to better planning of family size. In turn, a focus on these young families affords them the opportunity of participation in the national development process.

The urgency of the task ahead is clear. Recently, the government instituted a subsidy program for imported wheat so as to protect against rising prices of wheat products, the result of which would be increasing pressures on the limited reserve of the most important food staple--rice-- a pressure already acute because of the population increase.

Recently, the government focused attention on the population problem by installing a population clock in the Rizal Park. This clock needs adjusting. It is adding two more Filipinos to the population every minute whereas in fact the present population is increasing by 2.5 every minute. There will be over 44 million Filipinos by the end of this month, almost exactly the population for 1975 predicted by the Population Institute at the First Conference on Population in 1965 on the assumption that fertility would remain largely unchanged during the decade.

Table 1

PREVALENCE OF MALNUTRITION AMONG PRESCHOOL CHILDREN ACCORDING TO NUMBER OF PRESCHOOL CHILDREN IN THE FAMILY

No. of Children in Family	Total No. of Children	MALNOURISHED	
		No.	%
1	256	91	35.5
2	476	186	39.0
3	303	147	48.5

Table 2

PREVALENCE OF MALNUTRITION BY INTERVAL UNTIL NEXT SIBLING
(Families with 2 Children Only)

Spacing Interval (months)	No. of Children in Interval Group	% of Total Population in Interval Group	Malnourished Children	
			No.	%
18 or less	200	31.5	110	55.0
19 - 30	330	52.0	117	35.4
31 or more	105	16.5	30	28.5
T O T A L	635	100.0	257	40.5

Table 3

INFANT AND PRESCHOOL CHILD COMPOSITION
OF FAMILIES IN BULACAN PROVINCE
(Families are from about 60 barrios in the 24 municipalities)

Family Type	No. of Families	Ave. No. Infants (5-11 Mos.) Per Family	Ave. No. Preschoolers (12-71 mos.) Per Family	% Malnourished
Infants (5-11 mos.) and Preschoolers (12-71 mos.) only	1017	0.415	1.74	36.2
Infants, Preschoolers, and older children	3315	0.178	2.16	42.1

Table 4

NUTRITIONAL DETERIORATION IN NURSING INFANTS*

Age of Infant (Month)	Percent of Standard Weight
6	93
7	90
8	88
9	86
10	84
11	82
12	80
15	79
24	79
48	79

*Approximately 100 infants (or preschoolers) are represented in each month.

Table 5

IMPACT OF NUTRITION AND FAMILY PLANNING PROGRAMS ON POPULATION GROWTH

Program	Births	DEATHS			Population Growth (in number)	Changes in Population Growth (%)
		Infant	1-4 years	all ages		
Control	1,712,100	80,776	77,264	351,200	1,360,900	0.0
Family Planning	1,540,890	72,698	77,264	343,122	1,197,768	-11.99
Family Planning and Nutrition	1,540,890	65,428	69,538	328,126	1,212,764	-10.88

Table 6

FAMILY SIZE AND SUBSISTENCE COSTS

	Birth Interval of 2.5 Years				
	Jan. 1975	July 1977	Jan. 1980	July 1982	Jan. 1985
No. in Family	3	4	5	6	7
Ave. Daily Caloric Requirement[1]	5,350	6,650	8,250	10,150	13,150
Minimum Daily Food Cost[2]	₱ 2.82	₱ 3.51	₱ 4.35	₱ 5.36	₱ 6.94
% of Minimum Wage[3]	41	51	64	78	101
Minimum Daily Food Cost[4]					
1971[5]	₱ 3.75	₱ 5.00			
1975[5]	₱ 5.63	₱ 7.50			
% of Minimum Wage					
1971	55	73			
1975	82	110			

[1] Recommended dietary allowance, Philippines, Revised, 1970.
[2] Based on milled rice, 3600 calories/kg; price, ₱1.90/kg.
[3] Minimum wage of ₱8/day, 312 days per year of ₱2496/yr. income.
[4] Based on recommended food intake, recommended dietary allowance, Philippines, Revised, 1970.
[5] Assumes food costs increased 50% between 1971 and 1975,

Attachment Q
Section B

NUTRITIONAL IMPROVEMENT THROUGH THE GREEN REVOLUTION--- BACKGROUND INFORMATION

R. W. Engel, Nutrition Advisor, USAID

There is general agreement that the average Filipino daily per capita food energy intake is 1,700 kcalories. This is 15% less than the average recommended energy intake of 2,000 kcalories per capita per day. The amount of food available for consumption is equal to about 2,000 kcalories of food energy per capita per day. Thus, about 15% of the food supply is lost as food, wasted in the homes or as food wasted in the market place, or in the market chain to the consumer. Average data are not too meaningful. For example, high income households probably dispose of 25-35% more food per capita than low income households--thus, the food energy deficit in low income families may be as much as 25 to 30%. For these reasons the food supply available for consumption probably needs to be at least 15% higher in food energy than the recommended daily intake. It is recognized that such production levels will probably not come about unless there is an increased market demand, which is not likely to occur unless the income or purchasing power of low-income families is improved.

For the 70% of Filipino families who reside in the rural areas, one very obvious way in which incomes can be improved, and family diet also can be improved, is through home gardening. Intensive home gardening can improve incomes by substitution of home-grown produce for purchased food items, thereby releasing some funds for purchasing other necessities such as clothing, medicines, school supplies, etc. Liberal use of home-garden produce in planning the family meals can obviously improve nutritional health

of the family members. For many low-income rural families this may be the most logical way of improving the family diet.

Since the average Filipino family is composed of about 8 members, and the average daily food energy requirement is 2,000 calories, about 16,000 kcalories per day are needed to satisfy nutritional requirements. This paper will now attempt to analyze the contributions home gardens can make to meet the family food requirements in food energy. Energy or calories are used as a basis for food production requirements because a deficiency of food energy is widespread. Generally, if the calorie deficiency of the Filipino diet is corrected with home garden produce, the protein requirement will be met before the energy requirement is satisfied.

Table 1 contains data showing the average yields for the major sources of food energy and average daily quantities of edible food energy that are produced by a 10 M^2 area under cultivation. An area of 10 M^2 is used because it is probably the smallest useful plot for attempting home food production--a vegetable producing bed that is 1 meter wide and 10 meters long (or 2 beds, 1 meter wide and 5 meters long). Data is also included on yields of protein although our discussion will focus on calories for the reason already mentioned. Major cereal crops have been included in Table 1 to compare with average yields of typical home garden crops. Based on yield data of 1971, which probably is applicable in 1975, root crops (mainly sweet potatoes) appear to have the best potential for increasing the family food energy supply. Dry beans, such as mecan (cowpeas) or mongo, produce about the same food energy daily per 10 M^2 area as cereals; vegetables as a group are about

25-30% lower in food energy yield than cereals or dry legumes. Bananas, as traditionally produced, are a very uneconomical use of land.

Current yields of all crops are considerably below yields attainable with improved agronomic practices. Table 2 presents data to show how daily food energy yield per 10 M^2 garden can be improved for cereal crops as well as for garden crops. Improved yield in food energy per 10 M^2 garden appears to be most promising for corns and least promising for vegetables other than dry legumes. Except for vegetables, a four-fold improvement appears possible if improved agronomic practices can be implemented. Table 3 is included for more detailed information on specific crops and their yield of calories and protein per 10 M^2 plot, if recommended agronomic practices are followed. The leafy vegetable crops are generally the lowest in food energy yield. Root crops and dry legumes are generally the best in energy yield while leguminous pods and other pulpy vegetables are intermediate. Table 4 is included to show edible portion of vegetable crops and their content of calories and protein.

An important consideration is available land for home gardens. One survey conducted among over 600 families in Cebu Province is shown in Table 5, indicating that for rural families, the average land available for home gardens is about 20 M^2. Only about 7% of households had as much as 50-100 M^2 for a home garden.

Table 6 reveals the average food energy that can be expected daily from various vegetable crops on a 20 M^2 garden plot, assuming improved agronomic practices are used.

A combination of sweet potatoes and legumes could produce 200 to 300 calories of food energy per day on a 20 M^2 home garden plot, if it is continuously and intensively cultivated. Table 7 compares this production with the food energy requirements of various size families. It is clear that even with only small families, the average size home garden of 20 M^2 will provide less than 10% of the family food energy needs.

A more practical and realistic approach is that of examining how a home garden can contribute toward correcting the estimated average food energy deficiency. This is shown in Table 8. Small families obviously can correct nearly 50% of the averaged estimated food energy deficit but large families can at best correct only 10% of the deficit through home gardens of 20 M^2.

Table 9 is shown to summarize the home garden areas required under intensive cultivation to correct average food energy deficit in various size families.

Nearly 200 M^2 of garden area will be needed by large families to produce the food energy required merely to correct the estimated average national daily per capita food energy deficit. As indicated earlier, large families are likely to have low incomes and actually have food energy deficits as high as 25-30%. For such low income families up to 350 or 400 M^2 garden areas would be needed to correct deficits.

From these calculations, it is very clear that home gardens of a 100 M^2 or more are needed to make a significant contribution toward correcting food energy deficiencies that are now prevalent. The one recent survey referred to earlier indicates that only 4 or 5% of rural families have home garden areas as large as this.

Home gardens can make very significant contributions toward correcting other nutritional deficiencies. Table 10 is included to illustrate how easily Vitamin A and C requirements can be corrected through intensive production of leafy vegetables. A home garden area of 2 M^2 of kangkong will supply all the Vitamin A and C requirements of a family of 8. But this area would supply only 5 calories of food energy--less than 0.03 of 1% of the family food energy requirements.

SUMMARY

Based on current estimates of home garden space available, and yields possible with intensive production practices, the caloric deficit in the average rural family will be difficult to correct. Alternatives would be to identify land available that could be brought into production on a communal basis. Particularly, this might be desirable to assist low income families with minimum home garden space and possibly also limited productive land to produce crops for the market.

Since home garden space is generally inadequate to produce food energy requirements, a more intensive cropping system (multiple cropping) of the 2 to 3 hectares of land available to low income rural families offers the best prospect of correcting family food deficits, and improving family incomes through sale of surplus production. Perhaps a system could be developed whereby each family would be encouraged to:

(1) Set aside 100 to 400 M^2 of the farm area for intensive gardening to satisfy home food needs for protective crops and food energy supplement.

(2) Inter-plant high energy and protective crops with staples (rice, corn, cassava) to augment the yield of traditional crop land as a contributor to an improved family food supply.

More specific information is needed on the relative costs and benefits of intensive cultivation of limited land around the dwelling versus more intensive cultivation and multiple cropping of the small farmers land holdings traditionally used only to produce staples for home use or sale. It is possible that the limited land area around the home would best be utilized entirely for tree or shrub-like fruit-bearing crops (malunggay, guava, papaya, banana) which would require a minimum of attention and which would not require protection against roving animals or playing children--both of which are generally hazards to home vegetable production.

GREEN REVOLUTION GOALS

Unless specific goals are established, it will always be difficult to evaluate the contribution of green revolution effort toward correcting malnutrition and toward improving family food supplies.

The following are possible specific goals or objectives of a typical rural barangay.

All families: One malunggay bush

One papaya bush

One guava or avocado bush

One banana bush

All families: Minimum production of 400 kcalories per day of food energy through a 20 to 30 M^2 home garden plot, or an equivalent area,

home garden area, in the farming area available and cultivated for food staples for home use or for sale. If this 400 kcalories of green revolution produce can be directed primarily at the most vulnerable members of the family, malnutrition prevention would become a reality. As evidence of this, nutritional improvement is being achieved through the current Targeted Maternal Child Health Program with a daily food supplement of about 400 kcalories.

Table No. 1

AVERAGE YIELDS OF FOOD, ENERGY & PROTEIN FROM MAJOR FOOD CROPS

(Yield Data as Reported in the 1971 Statistical Handbook of the Philippines, Bureau of the Census & Statistical, Manila)

Crop	Yield/10M^2 (kg): Gross	Edible	Nutrients/10M^2: kcal.	Prot.(gm)	Days to Harvest	Nutrients/10M^2/day: kcal.	Prot.(gm)
Rice	1.681	1.093	3,930	76.4	135	29	0.6
Corn, Shelled	0.829	0.829	2,984	74.6	115	26	0.7
Beans & peas/day	0.460	0.460	1,610	101.2	65	25	1.6
Peanuts in Shell	0.544	0.397	2,230	119.0	110	20	0.9
Root Crops	4.122	3.628	4,930	40.0	100	49	0.4
Vegetables*	4.99	3.144	1,370	72.0	75	18	1.0
Bananas	4.0	2.6	2,600	29.0	360	7	0.1

*Based on the average calorie and protein content of 29 leafy, green, or yellow vegetables, 9 leguminous pods and 24 other vegetables varieties as reported in NEDA Food Balance Series November 1, 1973, Manila

1 kg. = 436 kcal.

1 kg = 23 gm. Protein

Table No. 2

AVERAGE CURRENT FOOD ENERGY YIELDS & AVERAGE YIELDS NECESSARY FOR ECONOMICAL PRODUCTION

CROP	KCalories/10 M^2/Day		Current Production as % of Economic Production
	Current* Production	Economic** Production	
Rice	29	86	34
Corn, Shelled	26	155	16
Dry Beans	25	102	25
Peanuts in Shell	20	75	27
Root Crops	49	179	27
Vegetables	18	32	56

*Yield Data as reported in 1971 Statistical Handbook of the Philippines, Bureau of Census and Statistics, Manila

**For rice & corn economic production = 99 cavans per hectare; for all other crops the vegetable training manual, UPCA, minimum economic production recommendations were used.

Table No. 3

VEGETABLE PRODUCTION: Yields of Food Energy and Protein

(Yields are those Recommended by UPCA, Los Baños, Vegetable Training Manual, 1969)

Crop	Yields Per 10 M^2 (kg.)				Nutrients Per 10 M^2				Days to Harvest	Nutrients Per 10 M^2 Per Day			
	Gross		Edible		kcal.		Protein (Gm.)			kcal.		Protein (Gm.)	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
Sweet Potatoes	15	20	13.2	17.6	17952	23936	145.2	193.6	100	179	239	1.45	1.94
Mungo Beans	2	3	2	3	7120	10680	488.0	732.0	65	110	164	7.51	11.30
Navy or Red Beans	2	3	2	3	6800	10200	446.0	669.0	90	76	113	4.96	7.43
Cowpeas	2	3	2	3	7120	10680	408.0	612.0	60	119	178	6.80	10.20
Peanuts	2	3	1.46	2.19	8205	12308	441.0	661.0	110	75	112	4.01	6.01
Sweet (ears) corn	8.1	10.8	3.0	4.0	5640	7520	147.0	196.0	75	75	100	1.96	2.61
Garlic	8	12	6.8	10.2	8296	12444	476.0	714.0	120	69	85	3.96	5.95
Sweet Peas	3	5	2.8	4.7	1596	2679	92.4	155.0	40	40	67	2.31	3.88
Snap Beans	8	12	7.7	11.5	2618	3910	154.0	230.0	45	58	87	3.42	5.11
Lima Beans	7	12	3.1	5.3	3999	6837	257.0	440.0	55	73	124	4.67	8.00
Carrots	4	8	3.3	6.6	1815	3630	42.3	85.8	55	33	66	0.77	1.56
Onion, bulb	6	15	5.5	13.8	2640	6624	99.0	248.0	120	22	55	0.83	2.06
Onion, green	10	15	6.9	10.4	2001	3016	124.0	187.0	70	29	43	1.77	2.67
Squash	5	15	3.5	10.5	1190	3570	67.0	199.0	50	24	71	1.34	3.98
Cauliflower	8	15	4.7	8.8	1457	2728	113.0	211.0	85	17	32	1.33	2.48
Okra	10	15	9.0	13.5	3060	4590	162.0	243.0	65	47	71	2.49	3.74
Eggplant	15	25	13.5	22.5	3240	5400	135.0	225.0	100	32	54	1.35	2.25
Sweet Pepper	5	15	4.2	12.4	966	2852	29.0	87.0	100	10	29	0.29	0.87
Tomatoes	10	30	9.5	28.5	1805	5415	95.0	285.0	100	18	54	0.95	2.85
Radish	5	15	3.4	10.2	714	2142	20.0	61.0	65	11	33	0.31	0.94
Bitter Melon	8	15	6.6	12.3	1452	2706	59.0	111.0	80	18	34	0.74	1.39
Cantaloupe	10	20	6.3	12.6	1386	2772	38.0	76.0	90	15	30	0.42	0.84
Chinese Cabbage	6	10	4.9	8.2	1029	1722	88.0	148.0	40	26	43	2.20	3.70
Mustard	6	10	5.2	8.6	1144	1892	114.0	189.0	50	23	38	2.28	3.78
Lettuce, Leaf	6	10	4.9	8.1	931	1540	64.0	105.0	60	15	26	1.06	1.75
Kangkong	6	10	3.6	6.0	1080	1800	140.0	234.0	70	15	25	2.00	3.34

Table No. 4

FOOD ENERGY AND PROTEIN CONTENT,
EDIBLE PORTION OF GREEN REVOLUTION FOOD CROPS

	Edible Portion (%)	Edible Portion KCalories (Per Kg.)	Edible Portion Protein (Gm./Kg.)
Tubers			
Kamote	88	1,350	11
Cassava	76	1,411	7
Ubi	86	1,030	19
Gabi	81	850	24
Legumes, Dry			
Peanuts	100	5,620	302
Mungo Beans	100	3,560	244
Navy or Red Beans	100	3,400	223
Cowpea or Sitao	100	3,560	204
Vegetables & Fruits			
Sweet Corn	37	1,830	49
Sweetpea or Baguio Beans	93	570	33
Eggplant	91	240	10
Okra	90	340	18
Upo (Green gourd)	84	150	5
Patola (Green Gourd)	71	210	6
Ampalaya (Bitter Melon)	82	220	9
Sweet Pepper	83	230	7
Radish	68	210	6
Cauliflower	59	310	24
Squash (Calabasa)	70	340	19
Carrot	82	550	13
Garlic	85	1,220	70
Onion	92	480	18
Tomatoes	95	190	10
Cantaloupe	43	220	6
Leafy Vegetables			
Pechay	82	210	18
Kamote Leaves	53	530	28
Mustard	86	220	22
Lettuce	41	190	13
Kangkong	80	360	39

Table No. 5

LAND USE FOR HOME GARDENING*

Location:	% of Households with no home garden	% of Households with Home Garden of:				
		1-10 M^2	11-25 M^2	26-50 M^2	50-100 M^2	+100 M^2
Urban Slum	55	29	12	1	2	1
Urban Barrio	34	47	10	7	1	1
Rural Coastal Barrio	16	31	28	13	7	5
Rural Hinterland Barrio	28	24	29	9	6	4

*The total study involved about 625 households, slightly over 150 from each location (Data collected by CIM, Cebu City, in connection with CIM/Cornell Vitamin A Project).

The overall average garden size per household with gardens is 18.5 M^2. Since 1/3 do not have any, the average becomes 12.4 M^2 for all households.

The average garden size for rural areas was 26 M^2. Since 20% had no gardens, the average becomes about 20 M^2.

Table No. 6

VEGETABLE CROPS: Edible Portion, Food Energy and Protein Content and Daily Production Per $20M^2$

(Calculations Based on Minimum Yields of Table 3)

Crop	Edible Portion (% of Total Yield)	Nutrient Content/gm. Edible Portion		Daily Yield/$20M^2$ Garden	
		kcal.	Protein (gm)	kcal.	Protein (gm)
Sweet Potatoes	88	1,360	11	358	2.9
Cowpeas	100	3,560	204	238	13.6
Mungo Beans	100	3,560	244	220	15.2
Navy or Red Beans	100	3,400	223	152	9.9
Peanuts in Shell	73	5,620	302	150	8.0
Sweet Corn	37	1,880	49	150	3.9
Lima Beans	44	1,290	83	146	9.3
Garlic	85	1,220	70	138	7.9
Snap Beans	96	340	20	116	6.8
Sweet Peas	93	570	33	80	4.6
Okra	90	340	18	94	5.0
Carrots	82	550	13	66	1.5
Eggplant	91	240	10	64	2.7
Tomatoes	95	190	10	36	1.9
Onions, bulb	92	480	18	44	1.6
Squash	70	340	19	48	2.6
Pechay	82	210	18	52	4.4
Mustard	86	220	22	46	4.6
Lettuce, Leaf	81	190	13	30	2.1
Kangkong	80	300	39	30	4.0
Onions, Green	69	200	18	58	3.5
Bitter Melon	82	210	9	36	1.6
Cantaloupe	63	220	6	30	0.8
Radish	68	210	6	22	0.6
Sweet Pepper	83	230	7	20	0.6

Table 7

DAILY FOOD ENERGY REQUIREMENTS OF VARIOUS SIZE FAMILIES & THE CONTRIBUTION FROM 20M^2 HOME GARDENS

Size of Family No.	Daily Food Energy Requirement kcal.	Daily Food Energy From 20M^2 Home Garden kcal.	% of Daily Food Energy from Home Garden
2	4,000	250	6.25
4	8,000	250	3.13
6	12,000	250	2.08
8	16,000	250	1.56

Table No. 3

ESTIMATED DAILY FOOD ENERGY DEFICITS IN FAMILIES OF VARIOUS SIZES AND THE CONTRIBUTION OF HOME GARDENS TOWARD ALLEVIATING THESE DEFICITS

Size of Family No.	Daily Food Energy Requirement	Estimated Daily Food Energy Deficit (15% of Total)	Food Energy Produced Daily in 20 m^2 Home Garden	Deficit Corrected by Home Garden
	kcal.	kcal.	kcal.	%
2	4,000	600	250	41.7
4	8,000	1,200	250	20.8
6	12,000	1,800	250	13.8
8	16,000	2,400	250	10.4

Table No. 9

ESTIMATED DAILY FOOD ENERGY DEFICITS IN FAMILIES OF VARIOUS SIZES AND THE HOME GARDEN AREA REQUIRED TO CORRECT THESE ENERGY DEFICITS

Size of Family No.	Daily Food Energy Requirement	Average Daily Food Energy Deficit (15% of Total)	Garden Area Required to Produce Food Energy Deficit
	kcal.	kcal.	Production = 250 kcal./ per $20M^2$
2	4,000	600	48
4	8,000	1,200	96
6	12,000	1,800	144
8	16,000	2,400	192

Table No. 10

DAILY VITAMIN A & C REQUIREMENTS OF VARIOUS SIZE FAMILIES & HOME GARDEN AREAS REQUIRED TO MEET THESE REQUIREMENTS

Family Size	Daily Vit. A Requirement	Daily Vit. C Requirement	M^2 of Home Garden Required to Satisfy Vit. A & C Requirement with Kangkong	
No.	I.U.	mg.	Vitamin A	Vitamin C
2	10,000	150	0.33	0.5
4	20,000	300	0.66	1.0
6	30,000	450	1.00	1.5
8	40,000	600	1.3	2.0

Attachment R
Section B

The Nutrition, Food Science, Agriculture Interface in Nutritional Goals for Sectoral & National Planning

One metric ton of milled rice contains 3,600,000 kilo calories, enough to correct the daily 300 calorie deficit for 12,000 Filipinos. For the 44,000,000 Filipinos, it would require 3,667 metric tons of rice each day to correct the deficit or 1,338,455 metric tons annually.

Because of the calorie deficit, my government is accepting food assistance from food surplus countries particularly the U.S. The amount donated for such purposes annually has been about 30,000 metric tons a year or 82 metric tons per day. Since this donated food has about the same caloric density as milled rice, it is easy to calculate the fraction of the total deficit that would be corrected each day with donated commodities: $82 \div 3,667 = 2.2\%$.

Although the contribution of the donated food appears small in terms of the total calorie deficit, it is making a significant impact because it is specifically targeted to malnourished infants and young children, and to pregnant or lactating women whose calorie deficit is greater than that of the remainder of the population. Thus, the food assistance is impacting on 15-20% of the food calorie deficit for young children, even though the total amount donated is only 2.2% of the total deficit.

It is often stated that donated foods should be considered only as a last resort since it acts as a disincentive for increasing domestic food production. Would a supply of donated food which corrects only a little over 2% of the total required for good nutrition, particularly when much of it is directed to the urban poor who have no means of entering agricultural

production, actually have much of an impact that would discourage local production? It is doubtful that donated food targeted to the malnourished poor has any significant impact as a disincentive to increasing local production.

Nevertheless, nutritionists who are responsible for promoting use of any and all commodities that can be assembled to combat calorie malnutrition, have an obligation to encourage increased local food production, particularly in a country such as the Philippines where 65-70% of the population still resides in the rural areas and the opportunity for increasing production is large, both in terms of improving yields and improving use of available usable lands.

The obligation of the nutritionist does not end by simply encouraging the agricultural sector to produce more. There is an obligation for the nutritionist to become actively involved with agriculturists in devising food production interventions as integral components of nutrition programs, particularly programs which involve the use of donated commodities and particularly where such programs operate in rural areas when increased production is feasible and where national food and agricultural policies are such that the producer will have an incentive to expand production.

The Philippines offers a rich opportunity for integrated food production and nutrition activities. The National Food and Agriculture Council and the National Nutrition Council are both chaired by the same cabinet officer, the Secretary of Agriculture. In the Food and Agriculture sector, a package of production technology including supervised credit has been evolved which is bringing about very significant increases in rice and corn yields among cooperating producers. In the Nutrition sector, a national coordinating infrastructure manages a nationwide network of nutrition

activities that is highly respected by many who have come here for observations. Significantly, nutrition interventions include the development and promotion of appropriate technology for processing food for nutrition programs at provincial, municipal and village or barrio level. The stage has been set for exploring integrated food production and nutrition models.

As a nutritionist actively supporting a food assistance program which reaches into perhaps as many as a million families all over the Philippines, I am somewhat disturbed that I really don't have precise data as to the number of families reached who have the land resources to produce their own food. This simply illustrates again the need for us to evolve, through the nutrition/agriculture interface, inter-sectoral information systems to guide us in future planning.

The Philippine Nutrition Program achieves its linkage with agriculture in its present implementation plan through the Green Revolution. In preparation for a more intensified effort in generating food production, particularly vegetable production, in programs where food is being donated, we have developed some background information which is attached hereto.

NTR:RWEngel:yvg:2/3/77

Name _____
Date of Birth _____

PHILIPPINE NUTRITION PROGRAM
NUTRITION HEALTH CHART FOR BABIES

PROVINCE: _____
MUNICIPALITY: _____
BARANGAY: _____

MONTH	Birthmonth	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
WEIGHT (Kg)																			
NUTRITION LEVEL	*(PLOT MONTHLY WEIGHT IN CORRECT BLOCK TO DETERMINE NUTRITION LEVEL)*																		
GREEN ZONE 1 HEALTHY	3.1	3.8	4.5	5.1	5.7	6.2	6.7	7.1	7.6	8.0	8.3	8.6	8.9	9.1	9.3	9.5	9.7	9.9	10.1
WHITE ZONE 2 MILDLY MALNOURISHED	2.9	3.6	4.2	4.8	5.4	5.9	6.3	6.7	7.1	7.6	7.8	8.2	8.4	8.6	8.8	9.0	9.2	9.4	9.5
WHITE ZONE 3 MILDLY MALNOURISHED	2.7	3.4	4.0	4.6	5.0	5.5	5.9	6.3	6.7	7.1	7.4	7.7	7.9	8.1	8.2	8.5	8.6	8.8	9.0
WHITE ZONE 4 MILDLY MALNOURISHED	2.6	3.2	3.8	4.3	4.7	5.2	5.6	5.9	6.3	6.7	6.9	7.2	7.4	7.6	7.7	8.0	8.1	8.2	8.4
YELLOW ZONE 5 MODERATELY MALNOURISHED	2.4	2.9	3.5	4.0	4.4	4.8	5.2	5.5	5.9	6.2	6.4	6.7	6.9	7.1	7.2	7.4	7.6	7.7	7.8
YELLOW ZONE 6 MODERATELY MALNOURISHED	2.2	2.7	3.2	3.7	4.1	4.5	4.8	5.1	5.5	5.8	6.0	6.2	6.4	6.6	6.7	6.9	7.0	7.2	7.3
YELLOW ZONE 7 MODERATELY MALNOURISHED	2.0	2.5	3.0	3.4	3.8	4.1	4.4	4.7	5.0	5.3	5.5	5.8	5.9	6.1	6.2	6.4	6.5	6.6	6.7
RED ZONE 8 SEVERELY MALNOURISHED	1.9	2.3	2.8	3.1	3.5	3.8	4.1	4.3	4.6	4.9	5.1	5.3	5.4	5.6	5.7	5.8	5.9	6.1	6.2
RED ZONE 9 SEVERELY MALNOURISHED	1.7	2.1	2.2	2.8	3.2	3.4	3.7	4.0	4.2	4.6	4.6	4.8	5.0	5.1	5.2	5.3	5.4	5.5	5.6
RED ZONE 10 SEVERELY MALNOURISHED																			

2 – 3 YEARS BETWEEN BABIES MEANS HEALTHIER FAMILIES

PHILIPPINE NUTRITION PROGRAM

YOUR BABY'S FOOD

Developed by the Food and Nutrition Research Center

(X= MOST IMPORTANT FOR GOOD GROWTH)

This table shows what foods should supplement milk in amounts suggested at specific ages. But you may give other foods earlier than recommended. You may start at the third month with dalanghita, kalamansi or orange juice (1/2–1 teaspoon juice in 1 tablespoon cool boiled water) so long as you boil bottle, nipple and water for dilution.

Age in Months	X CEREAL	FRUIT-mango, banana, papaya, avocado	VEGETABLES (cooked)	EGG (hard-boiled)	X MUNGGO or other dried beans	X MEAT, LIVER, FISH or POULTRY	X FAT (cooking oil, butter, margarine)
4	5 tbsp lugaw strained	2 tbsp scraped or mashed[3]	1 tbsp water in which vegetables were cooked				
5	8 tbsp thick lugaw[2]	3 tbsp mashed	1 tbsp mashed	1/2 yolk	1 tbsp strained		
6	8 tbsp thick lugaw	3 tbsp mashed	2 tbsp mashed	1 whole yolk	2 tbsp mashed	1 tbsp finely ground	1/2 tsp
7	8 tbsp thick lugaw	3 tbsp mashed	3 tbsp mashed	1 whole yolk	3 tbsp mashed	1-1/2 tbsp diced	1-1/2 tsp
8	3/4 cup thick lugaw	4 tbsp finely diced	4 tbsp mashed	1 whole yolk	3 tbsp mashed	1-1/2 tbsp finely diced	2 tsp
9	3/4 cup thick lugaw	4 tbsp finely diced	4 tbsp mashed	1 whole yolk	4 tbsp mashed	2 tbsp finely diced	2 tsp
10	1 cup soft rice	6 tbsp sliced	4 tbsp mashed	1 whole yolk	4 tbsp mashed	3 tbsp finely diced	2 tsp
11	1 cup soft rice	6 tbsp sliced	4 tbsp mashed	1 whole yolk	4 tbsp mashed	4 tbsp finely diced	2 tsp
12	1 cup soft rice	6 tbsp sliced	4 tsp mashed	1 whole yolk	4 tbsp mashed	4 tbsp finely sliced	2 tsp

MOTHER'S MILK IS BEST - BREASTFEED YOUR BABY

(SEE OTHER SIDE FOR BABY'S NUTRITION HEALTH CHART)