

AID 4350-1X
(7-71)

DEPARTMENT OF STATE
AGENCY FOR
INTERNATIONAL DEVELOPMENT

1. Cooperating Country
TAB *Amey*

Page 1 of 4 Pages

PIO/T

PROJECT IMPLEMENTATION
ORDER/TECHNICAL
SERVICES

2. PIO/T No.
931-17-099-001

3. Original or
Amendment No. 2

4. Project/Activity No. and Title
Cost/Effectiveness of Controlling Vitamin
Deficiency **9310985 (4)**
Cornell University (AID/ta-c-1116) **PO-AAF-210-DI**
22p

DISTRIBUTION

5. Appropriation Symbol
72-11-1026

6.A. Allotment Symbol and Charge
426-31-099-00-22-61

6.B. Funds Allotted to:
 A.I.D./A Mission

7. Obligation Status
 Administrative Reservation Implementing Document

8. Funding Period (Mo., Day, Yr.)
From 2/15/76 To 7/15/77

9.A. Services to Start (Mo., Day, Yr.)
Between 2/15/76 and 2/30/76

9.B. Completion date of Services
(Mo., Day, Yr.)

10.A. Type of Action
 A.I.D. Contract Cooperating
Country Contract Participating Agency
Service Agreement Other

10.B. Authorized Agent

Estimated Financing		(1)	(2)	(3)	(4)
\$1,000=		Previous Total	Increase	Decrease	Total to Date
11. Maximum A.I.D. Financing	A. Dollars	15,735	19,060		34,795
	B. U.S.-Owned Local Currency				
12. Cooperating Country Contributions	A. Counterpart				
	B. Other				

13. Mission
References

14. Instructions to Authorized Agent

CM/COD/TAB is requested to amend the Cornell University contract AID/ta-c-1116 as follows: (1) extend the funding period and completion date of services to 7/15/77 instead of 6/1/76 and (2) add \$19,060 new funding. This is being done so that a closely related activity may be carried out under the existing project.

Philippines

15. Clearances - Show Office Symbol, Signature and Date for all Necessary Clearances.

A. The specifications in the scope of work are technically adequate

TA/N:SGKahn
TA/N:EHornstein

B. Funds for the services requested are available

TA/RES:MRchcipl

C. The scope of work lies within the purview of the existing and approved Agency Programs

TA/N:RJFornan

D.

TA/PPU:MMozynski

E.

TA/N:APound

F.

TA/PPU:EMcLeod

16. For the cooperating country: The terms and conditions set forth herein are hereby agreed to

17. For the Agency for International Development

18. Date of Signature

Signature and date:

Signature:

John Gunning

Title:

Title:

Chief, TA/PPU

AID 1350-1X (5-7*)	Cooperating Country TAB	PIO/T No. 931-17-099-001	Page 2 of 4 Pages
PIO/T	Project/Activity No. and Title Cost/Effectiveness of Controlling Vitamin A Deficiency (AID/ta-c-1116)		

SCOPE OF WORK

19. Scope of Technical Services

A. Objective for which the Technical Services are to be Used

The analysis and evaluation of cost/effectiveness of three interventions that are being used to prevent vitamin A deficiency in children in the Philippines.

B. Description

The data has been collected and requires sorting and transposing to computer cards. The data-base will include the following information (1) biochemical, (2) chemical, (3) anthropometric, (4) dietary consumption, (5) demographic, (6) economic, (7) household (health and nutrition knowledge attitudes and practices of subjects, use of social services, breastfeeding, etc.). Data will represent recently collected 1975 data and baseline information of 1973-1974.

Multiregression and other appropriate statistical analyses will be used in analyzing the data.

The analysis and evaluation will be regarded as a case study and submitted as a report.

C. Technicians

(1) (a) Number	(b) Specialized Field	(c) Grade and/or Salary	(d) Duration of Assignment (San-Months)
1	Research Associate	\$ 1600	
1	Computer Programmer	1800	12
1	Secretary	660	6

(2) Duty Post and Duration of Technicians' Services

Cebu, Philippines
17-18 months

(3) Language requirements

English

(4) Access to Classified Information

(not applicable)

(5) Dependents Will Will Not Be Permitted to Accompany Technician

D. Financing of Technical Services

(1) By AID - \$ 4060

(2) By Cooperating Country -

MEMORANDUM

TO: AA/TA, Erven Long

THRU: TA/RES, Miloslav Rechcigl

FROM: TA/N, Irwin Hornstein

SUBJECT: Cost Effectiveness of Controlling Vitamin A
Deficiency, Cornell University, Small Research
Project (AID/ta-c-1116)

Problem: It is requested that new monies (\$19,060) be added to complete the second objective of this small research project.

Purpose: This phase of the project is to analyze, evaluate and compare the cost-effectiveness of three interventions that are being used to prevent vitamin A deficiency in children in the Philippines.

Background: This project was initially funded at \$15,735 in June, 1974. In the spring of 1975 it was extended for one year without the addition of funds. The initial purpose was to support the statistical analyses of collected epidemiological data in determining the factors responsible for the high prevalence of vitamin A deficiency in children of selected Philippine populations in Cebu. This work has been completed and a satisfactory report submitted in the form of a pre-published paper.

Another objective of the Philippine research was to study the cost-effectiveness of intervention programs. To determine cost-effectiveness, a pilot project to test the feasibility of three alternative means of controlling vitamin A deficiency has been conducted jointly by the Cebu Institute of Medicine and Cornell University during the past 18 months. Funds are now required to complete this phase of the project.

Originally, funds were only allocated for the first phase of the project because of the \$25000 ceiling on small research projects. Currently, this funding limitation has been increased. Therefore, in order to maintain continuity of program activity under one contract, it would be most expedient to: (1) extend to June 1977 and (2) add \$19,060 to the existing small research contract.

The Office of Nutrition considers important the activity of analysis and evaluation of interventions to control vitamin A deficiency. For a small amount of funding, this activity will significantly contribute to the Agency's overall program to develop effective vitamin A delivery systems. TA/N urges that funding for this activity be included under the existing small research contract with Cornell.

Recommendation: That you approve both the addition of \$19,060 and the extension to June 1977 of the Cornell small research project No. AID/ta-c-1116.

Approved: _____

Disapproved: _____

Date: _____

Application to U.S.A.I.D.

for support for:

"Evaluation of Three Alternate Strategies to
Prevent Xerophthalmia in Children in the Philippines"

Principal Investigator:

Professor Michael C. Latham, M.D.
Director, Program in International Nutrition
Division of Nutritional Sciences
Cornell University
Ithaca, New York 14853

Abstract

Vitamin A deficiency is the major cause of blindness in many developing countries, including the Philippines. It also results in considerable illness and in many childhood deaths. Secretary Kissinger has pledged the U.S. to major support for research and programs to control vitamin A deficiency.

A study conducted in the Philippines by the Cebu Institute of Medicine and Cornell University has shown a very high prevalence of vitamin A deficiency and associated blindness. The research which was one of the most detailed conducted anywhere investigated the underlying and related causes of vitamin A deficiency so that appropriate control measures could be planned.

Three different control strategies (massive dose capsule to children; public health and horticulture intervention; and fortification of MSG) are each being tested in 4 areas, two urban and two rural. The three interventions in the 12 areas have been shown to be feasible. Both the prevalence study and the three interventions have attracted much international interest. The program has received considerable attention and has influenced work in other countries.

The request here is for funds to allow Cornell University, in cooperation with the Cebu Institute of Medicine, to conduct a detailed evaluation and analysis of the effectiveness and cost of the three interventions; to compare the relative cost and effectiveness; to prepare a case study, scientific publications and project reports; and to assist the Government of the Philippines and the Nutrition Center of the Philippines to plan a national program for the control of vitamin A deficiency.

A. Institution

Division of Nutritional Sciences, Cornell University, Ithaca, New York
14853.

September 10, 1975

B. Type of Organization

University--non profit.

C. Title of Proposed Research

Evaluation of three alternate strategies to control vitamin A deficiency in children

D. December 1, 1975 to May 31, 1977.

E. Research Plan and Objectives

1a. Summary and background

A pilot project to determine the prevalence of xerophthalmia (vitamin A deficiency) and to test the feasibility of three alternate means of control has been conducted in Cebu in the Philippines over the past 18 months. The research is conducted jointly by the Cebu Institute of Medicine (CIM) and Cornell University. CIM is one of the seven medical schools in the Philippines. The CIM director of the Program is Florentino Solon, M.D. who is now Director of the Nutrition Center of the Philippines, and the Cornell involvement is under the direction of Professor Michael C. Latham, M.D., Professor of International Nutrition and Director of the International Nutrition Program at Cornell University. Thomas Fernandez, M.D., of CIM directs the work of the project staff in the field, and Barry Popkin, Ph.D., a Research Associate at Cornell University but resident in the University of the Philippines, has responsibility for much of the data analysis.

The interventions were preceded by a large scale base-line survey of 1715 and 626 households in 12 separate locations, 6 urban and 6 rural.

The survey provided data on the prevalence of vitamin A deficiency, xerophthalmia and related factors, and allowed the design of three appropriate alternate intervention programs. These consisted of (1) a massive dose capsule of vitamin A given every 6 months to all children in 4 areas, two urban and two rural; (2) a public health and horticulture intervention designed to control related disease, to insure early treatment, and encourage greater production and consumption of vitamin A (carotene) rich foods in 4 areas, two urban and two rural; and (3) a fortification program in which commonly used packets of a popular seasoning, Monosodium glutamate (MSG), was enriched with vitamin A and supplied to families in 4 areas, two urban and two rural.

The project funded largely by the National Science Development Board (NSDB) of the Philippines, and with additional support from WHO and the participating institutions, namely CIM and Cornell University. A grant from U.S.A.I.D. allowed analysis of the base-line survey and related data.

The last phase of the project will consist of an in-depth analysis of each of these intervention approaches, the preparation of reports and papers, and the presentation of recommendations for national action. A repeated survey of each household and child is being conducted beginning in August 1975. A detailed evaluation of each program and a cost-effectiveness analysis will then be conducted. The survey data and other data collected during the project must be analyzed. This proposal requests support for the computerization of the data, its analysis, and the preparation of publications for this important study. The budget request is for \$19,910.00

1b. Objectives

The intervention programs being utilized in Cebu are the distribution

of a mass dosage capsule of 200,000 IU of vitamin A and 40 IU of vitamin E to children in 4 areas; an integrated delivery system of health, horticulture and nutrition components termed the public health intervention (PHI) in another 4 areas; and the fortification of MSG with retinol palmitate in 4 areas. The PHI utilizes paraprofessionals called family health aides to train local volunteer workers, to help with, inter alia, nutrition and health education, the deworming and immunization of children, a carotene-rich vegetable-oriented home garden program, and other activities. Our objectives in this proposal relate to these interventions which have been conducted for a period up to 18 months. We wish to:

1. Evaluate the impact of the various components of each program on household health and nutritional status and other behavioral and attitudinal issues.
2. Compare the effectiveness of each program on eliminating xerophthalmia and in raising serum retinol levels.
3. Conduct a detailed cost-benefit analysis of each of the three intervention programs. Included will be studies of the impact of each program on blindness and morbidity which may have been reduced by the elimination of xerophthalmia. Special studies of these issues have been conducted. The relative cost and effectiveness of each intervention will be determined.
4. Prepare a case study of the overall project and other project reports based on this experiment. Agricultural breeding to increase the carotene content of vegetables, the effects of xerophthalmia on morbidity and blindness, some of the nutrition education instruments, the planning

model utilized, the home garden program, some of the social change correlates with health and nutritional change and the fortification of MSG are among the unique aspects of this project which should be reported extensively, if the results of this project are to be available for the use of others.

5. Assist the government of the Philippines and the Nutrition Center of the Philippines to plan a national program for control of vitamin A deficiency.

2. Concepts and design

Xerophthalmia is known to affect a high percentage of children in many low income nations. In the base-line analysis of 1715 children aged 1-16, we found about 40% of them exhibited both clinical symptoms of xerophthalmia and had a serum A of less than 20 mcg/100 ml. Surprisingly a very high incidence was found among the school age group. This is one of the highest, if not the highest, incidence of xerophthalmia (X) so far in the world. Many of the positive clinical findings consisted of drying and wrinkling of the conjunctiva. It is realized that these are early signs and that it is difficult to be entirely objective with them. But very low serum retinol levels were found and many hospital cases of severe xerophthalmia are reported in Cebu. Based on a study of blindness in the 12 areas studied, we estimate that one out of 662 children aged 1-6 in Cebu will be blind from factors associated with X¹. Moreover, X is associated with increased mortality and morbidity. Thus, the social and economic cost of X in the Philippines is very high.

¹ A paper giving details of the study has been accepted for publication in the American Journal of Clinical Nutrition and a draft is attached as Appendix I.

A four part planning model was utilized for this pilot project. A survey was conducted in July-August, 1973 to help us understand the various socioeconomic, demographic, health and nutritional factors associated with X and to design the potentially most effective programs for eliminating this disease in our 12 sample areas. Four ecological zones --3 urban squatter areas, 3 urban fringe barrios, 3 rural coastal barrios, and 3 rural hinterland barrios--were selected to represent the important dietary, health, socioeconomic groupings. In other words, these were selected as our different planning zones. Each area is isolated from the other. The sample was selected to be representative of each of these ecological zones.

The important results of the survey were analyzed to help with the design of the intervention programs. The PHI and mass capsule distribution programs began in January-February, 1974. Technical difficulties forced us to delay the initiation of the vitamin A-fortified MSG program until 1975.¹ During the intervention period data collections were undertaken in certain of the various areas. The final base-line socioeconomic, demographic, health, dietary, anthropometric and biochemical survey instrument was designed to give us data to evaluate each program, to understand some of the key factors which might have prevented the effectiveness of a program (e.g., price changes, increase parasitic infestation in one area). Moreover, the elimination of X may have resulted from outside

¹ Because of the delay in the MSG program, it is possible that the "true" effects of the fortified MSG will not be felt in a half year. For this reason, we plan to continue the MSG fortification for an additional 6 months and will repeat the clinical examination and serum A analysis of these children if our evaluation results indicate the MSG may not have been effective.

changes such as increased income, better health care, and so on. In analyzing the effects of the various intervention programs on X, various statistical techniques will be used to control for those outside influences. The data collected in the original base-line and in the final evaluation surveys considered the need to understand these factors. For ethical and other reasons a decision was deliberately made not to have a control area where no intervention would be undertaken.

3. Methodology of the present study

a. Data Collection

Several months will be spent putting together the various types of data collected during the past two years of the project. This will include the specific data collected for evaluation in 1975. The family health aides, the project doctors and others collected other data while the interventions were being conducted and this will also be used. That data plus the project data collected during the original base-line will comprise the body of information to be used for the purposes of this analysis.

The data base will include:

1. Detailed biochemical and stool analysis from 1973 and 1975 for 1715 children plus some biochemical data collected on smaller subsamples.
2. Clinical and anthropometric data collected on each of the 1715 children at least three times.
3. Individual dietary intake data for the same 120-130 children in 1973 and 1975 plus an additional 240 children in 1975.
4. Demographic, economic, expenditure, health and nutrition

Belief, use of social services, breastfeeding, and other types of household data for each of the 626 households in 1973 and 1975.

The data base is extremely extensive and over 150 computer cards of data will have been collected for each household.

b. Computerization

The data collected in 1975 must be keypunched and set up for computer analysis. Since much of the household data must be analyzed in relation to each child, we will have two types of data files, household and child. The Statistical Package for the Social Sciences, SPSS, will be the main programmed package used but numerous programs will be written by Filipino programmers to save money and enhance the use of the data. A very sophisticated computer, the IBM 370-145, which is owned by Meralco, a Filipino utility firm; will be used. The estimated computer costs are based on the 1973 work of Dr. Popkin.

c. Data analysis

A multiequation model was previously employed to analyze the factors affecting X. Multiple regression models will be used for some of the key statistical work. At the same time, descriptive analysis will be used to help us to understand the uncontrolled relationships and changes. Dr. Popkin will conduct most of the basic statistical work in 1975-76 from his base, the University of the Philippines School of Economics, under the direction of Dr. Solon, and with assistance from Dr. Fernandez and Professor Latham.

4. Relevance of the study for A.I.D., I.D.C.'s and the Philippines

The Secretary of State, Mr. Henry Kissinger, in his address before the World Food Conference in Rome committed the United States to major assistance in solving some of the important world food problems. He specifically focused attention on nutritional anemias and vitamin A deficiency as examples of nutritional problems amenable to solution. Again at the U.N. on September 1, 1975 the U.S. Ambassador to the U.N. delivered a paper prepared by Secretary Kissinger in which a pledge to assist developing countries control malnutrition including vitamin A deficiency was made. The responsibility for fulfilling these commitments will fall largely on U.S.A.I.D.

The preliminary study in Cebu in the Philippines has been one of the most detailed ever conducted into the prevalence and underlying causes of xerophthalmia. This was recognized at a joint WHO/USAID International Conference on Vitamin A Deficiency held in 1974.

The plan to introduce three different strategies of control is also unusual. This is the only program of its kind anywhere. Yet it seems clear that there is a need to test the feasibility of more than one method of control before recommending the appropriate course for a national program. The research once analyzed will provide a rational basis for national policy decisions in the Philippines, but it will also contribute important knowledge concerning the epidemiology of vitamin A deficiency, and the relative cost and effectiveness of three strategies of control for other countries having a serious problem of blindness due to vitamin A deficiency. Undoubtedly in other countries certain underlying conditions will differ from those existing in Cebu, but the results of the present research will still be useful to them.

F. Available Facilities

The facilities of CIM, of Cornell University, and of the Nutrition Center of the Philippines are available for the project. Computers necessary for the analysis of the data are available both in Manila and in Ithaca. The laboratories of CIM have been and continue to be used for biochemical determinations. No equipment purchases are included in this grant application.

G. Personnel (this grant)

Principal Investigator - Professor Michael C. Latham, M.D.

Director of overall project - Florentino Solon, M.D.

Economist-data analyst (Research Associate at

Cornell, based in Philippines) - Barry Popkin, Ph.D.

Field director - Thomas Fernandez, M.D.

H. Indigenous Research Organizations

The Cebu Institute of Medicine, one of the seven medical schools in the Philippines, is the institution most involved. The nature of the involvement is given in the description of the research and in Appendix B, a report to NSDB. Dr. Florentino Solon is the project director and Dr. Thomas Fernandez is the field director. They are supported by a staff consisting of general physicians, a consultant pathologist with extensive training in the U.S. (Dr. Panopio), nutritionists, interviewers, and others.

The Nutrition Center of the Philippines whose new director is Dr. Florentino Solon is also associated with the project. This Center with its new large headquarters building in Manila provides support and will be concerned with national plans for control of vitamin A deficiency which result from the research.

I. Budget Information

1. Salaries

Principal Investigator (Dr. Latham)	Nil
Project Director (Dr. Solon)	Nil
Field Director (Dr. Fernandez)	Nil
B. Popkin - Research Associate:	
In Manila	Nil
4 weeks in Ithaca	\$1,600.00
Computer programmer in Philippines (12 person months @ \$150.00 p.m.)	1,800.00
Secretary in Philippines (6 person months @ \$110.00 p.m.)	660.00
2. Consultant fees	Nil
3. Nonexpendable equipment	Nil
4. Expendable equipment and supplies	
Stationery, office supplies	400.00
5. Travel and subsistence	3,500.00
6. Publication costs	
Journal articles, case study, reports to government and international organizations	2,000.00
7. Other direct costs	
Keypunching, verifying (60,000 cards)	1,800.00
Computer time (12 CPU hours in Manila)	5,200.00
Computer time (Cornell)	1,000.00

8. Indirect costs (53.4% of Cornell salaries)	Nil
9. Subcontracts (if any)	Nil
10. Contingency	<u>\$1,100.00</u>
 Total Estimated Budget	 \$19,060.00

J. Other Research Projects by Principal Investigator (approximate amounts)

(1) Lactose intolerance research sponsored by National Dairy Council 1973-1976 Amount \$14,000 and Hatch Fund 1973-1975 Amount \$3,300	Total	\$17,300.00
(2) Relation of nutrition to productivity in sugar cane workers in Jamaica 1972-1974 Babcock Fund, Cornell CIS funds		\$3,500.00
(3) Evaluation of Nutrition Rehabilitation Centers 1971-1973 Research Corporation funds		\$9,500.00
(4) Cost effectiveness for controlling vitamin A deficiency U.S.A.I.D. funds 1973-1974		\$15,735.00
(5) Ford Foundation support to International Nutrition Program 1973-1975		\$25,000.00

K. No other sponsors for this research. The field work as mentioned is supported by NSDB of the Philippines; WHO; Cornell; CIM

6
1. Salari

Principal Investigator (Dr. Latham)	Nil	
Project Director (Dr. Solon)	Nil	
Field Director (Dr. Fernandez)	Nil	
B. Popkin - Research Associate:		
In Manila	Nil	
4 weeks in Ithaca	\$1,600.00	
Computer programmer in Philippines (12 person months @ \$150.00 p.m.)	1,800.00	
Secretary in Philippines (6 person months @ \$110.00 p.m.)	660.00	
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3. Nonexpendable equipment	Nil	
4. Expendable equipment and supplies		
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Computer time (12 CPU hours in Manila)	5,200.00	
Computer time (Cornell)	1,000.00	
8. Indirect costs (53.4% of Cornell salaries)		Nil
9. Subcontracts (if any)		Nil
10. Contingency		<u>\$1,100.00</u>
Total Estimated Budget		\$19,060.00