

**I. PROJECT IDENTIFICATION**

1. PROJECT TITLE: **Development of Vitamin A Delivery Systems**

2. PROJECT NO. (H.O. 1025.1): **931-11-560-045**

3. RECIPIENT (specify):  
 COUNTRY  
 REGIONAL  
 INTERREGIONAL

4. LIFE OF PROJECT:  
 BEGINS FY: **74**  
 ENDS FY: **79**

5. SUBMISSION DATE: **1/23/74**  
 ORIGINAL  
 REV. NO.

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**II. FUNDING AND MAN MONTHS REQUIREMENT**

A. FUNDING BY FISCAL YEAR	B. TOTAL \$	C. PERSONNEL		D. PARTICIPANTS		E. COMMODITIES \$	F. OTHER COSTS \$	G. PACA/CNTR.		H. LOCAL CURRENCY CONTRIBUTION	
		III \$	IV MM	V \$	VI MM			VII \$	VIII MM	IX U.S. GRANT	X LOCAL CURRENCY
1. PRIOR THRU ACTUAL FY											
2. OPRN FY											
3. BUDGET FY <b>74</b>	<b>40</b>	<b>40</b>	<b>15</b>								
4. BUDGET <b>75</b>	<b>222.5</b>	<b>222.5</b>	<b>95</b>			<b>25</b>					
5. BUDGET <b>76</b>	<b>222.5</b>	<b>222.5</b>	<b>95</b>			<b>25</b>					
6. BUDGET <b>77</b>	<b>87.5</b>	<b>87.5</b>	<b>30</b>			<b>-0-</b>					
7. ALL SURG. <b>78</b>	<b>95</b>	<b>95</b>	<b>33</b>			<b>-0-</b>					
8. GRAND TOTAL	<b>667.5</b>	<b>617.5</b>	<b>268</b>			<b>50</b>	<b>-0-</b>	<b>-0-</b>			

9. OTHER DONOR CONTRIBUTIONS

(A) NAME OF DONOR	(B) KIND OF GOODS/SERVICES	(C) AMOUNT

**III. ORIGINATING OFFICE CLEARANCE**

1. DRAFTER	TITLE	DATE
Dr. Irwin Hornstein	Deputy Director, TA/N	
2. CLEARANCE OFFICER	TITLE	DATE
Dr. Martin J. Forman	Director, TA/N	4/25/74

**IV. PROJECT AUTHORIZATION**

1. CONDITIONS OF APPROVAL

A project narrative which summarized the proposed activity was distributed to all GTSC members on August 14, 1973. The GSTC review was held December 6, 1973. It was circulated to the GTSC members for optional comments on May 14, 1974 and recommendations for changes have been incorporated in this revision.

**2. CLEARANCES**

BUR/OFF.	SIGNATURE	DATE	BUR/OFF.	SIGNATURE	DATE
TA/N	A. Pound	4/24/74	TA/PM	Carl Fritz	4/13/74
TA/PM	E. McLeod	5/28/74			
TA/PM	Alfred Bisset	6/13/74			

**3. APPROVAL BY OFFICIAL DIRECTORS**

SIGNATURE	TITLE	DATE
Curtis Farrar	Deputy Asst. Administrator, AA/TA	4/14/74

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## INTRODUCTION

Vitamin A deficiency is said to be the biggest single cause of preventable blindness in many of the developing countries. Extensive studies have established the widespread distribution of this deficiency particularly in pre-school age groups in South East Asia, The Middle East and Latin America. It has been estimated that at least 80,000 children below the age of 4 become blind every year because of avitaminosis A. Furthermore blindness is but the "tip of the iceberg". Vitamin A deficiency inhibits growth, increases susceptibility to infection and can lead to death particularly when associated with protein/calorie malnutrition.

As a result of technological developments over the past several years, low cost approaches are now available to address the problem. The administration of massive periodic doses of Vitamin A is considered an effective emergency measure for overcoming the deficiency. Vitamin A fortification of food staples may be the most economical and socially acceptable long-term method for assuring that Vitamin A requirements are met. Vitamin A programs utilizing massive periodic doses and/or Vitamin A fortification have been equally under utilized on a national scale. Fragmented efforts have been made in the developing countries to establish programs but to date these efforts have been uncoordinated at the national level. This program is being proposed with the hope that AID can serve as the catalyst for coordinating and implementing world-wide efforts in Vitamin A programming.

### A. Statement of Goal

#### 1. The Goal

To minimize the effects of malnutrition by instituting appropriate systems for the delivery of Vitamin A to preschool children in LDCs.

#### 2. Measurement of Goal Achievement

Decrease in Vitamin A deficiency among preschool children.

#### 3. Assumptions About Goal Achievement

a. Methodologies for administering Vitamin A by the massive dose technique are available.

b. Techniques for fortifying food staples with Vitamin A are either available or can readily be developed.

c. Mass delivery of Vitamin A to target groups can either be "piggy-backed" on to existing distribution systems or new innovative systems can be developed.

d. LDCs and donor agencies are interested in eliminating blindness and caused by Vitamin A deficiencies.

e. The efforts of all concerned groups can be coordinated to achieve maximum benefits at relatively small costs.

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f. Cost estimates can be made from studies in Bangladesh and Pakistan. In Bangladesh, the one country where a nation-wide "massive-dose" program has been attempted, the yearly cost is approximately \$300,000. The program hopes to reach 15,000,000 children 0-6 years of age semi-annually. Vitamin A capsules containing 200,000 I. U. cost about \$10/thousand. The capsules are distributed by piggy-backing an existing malaria control system that reaches virtually every household in Bangladesh. The cost of distribution is absorbed by the Bangladesh government.

The cost of Vitamin A fortification is similar in magnitude. AID/W through its PASA with USDA has developed a technique for the fortification of tea with Vitamin A. Children drink tea at a very early age in India, Pakistan, Bangladesh, and Ceylon. Tea can therefore provide an appropriate vehicle for carrying Vitamin A to the target group in these countries. The cost of fortifying tea as a large scale on-going program in Pakistan has been calculated. The capital costs for providing sufficient capacity to produce all the Vitamin A/tea concentrate to fortify 90,000,000 pounds of tea per year is only \$60,000. The cost for fortifying the total supply of 90,000,000 pounds of tea per year is approximately \$500,000 and \$350,000 represents the import cost for Vitamin A. The increase in the cost of Vitamin A fortified tea per pound would be less than one percent the price of tea.

#### B. Statement of Purpose

1. To assist LDCs in implementing programs for alleviating Vitamin A deficiency.

#### 2. Conditions Expected at End of Project

a. An assessment of extent of Vitamin A deficiency in at least eight countries.

b. Development of the appropriate Vitamin A techniques to be utilized (massive doses, fortification, nutrition education or a combination) in these countries.

c. Implementation of appropriate programs in at least 2 of these 8 countries.\*

d. Coordination of efforts by donor agencies in implementing Vitamin A programs in LDCs. (This will be accomplished through an advisory group consisting of members from AID, WHO/PAHO, FAO, UNICEF, the World Bank and private donors such as the American Foundation for the Overseas Blind. The group would convene on an annual basis. The group would provide guidance (a) regarding needed research and field programs (b) possibilities for joint funding of major programs, and (c) the need for workshops or seminars. This coordinating activity would minimize duplication of research projects, encourage execution of major projects that would be beyond the financial scope of any one organization and insure dissemination of information and new knowledge to concerned organizations.)

#### 3. Basic Assumptions About Achievement of Purpose

a. Blindness caused by Vitamin A deficiency can be prevented by the use of one or more existing technologies for supplying Vitamin A to the vulnerable pre-schoolers.

\*This will be part of an integrated and planned national nutrition effort.

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b. Mass delivery of Vitamin A to the target group can in many instances be based on utilization of existing distribution systems. (e.g. use of malaria control systems for delivery of semi-annual massive doses of Vitamin A)

### C. Statement of Project Outputs

#### 1. Outputs

a. The development of country specific procedures for determining: (1) the extent of blindness due to Vitamin A deficiency, (2) the techniques to be implement for alleviating the deficiency, and (3) the methodology to use for evaluating effectiveness of programs.

b. LDC personnel trained to carry on in-country Vitamin A programs.

c. Information relative to the progress of Vitamin A programs disseminated to LDCs and other donor agencies.

d. Bio-Chemical method of detection of Vitamin A deficiency in target group

#### 2. Output Indicators

Established Avitaminosis A programs at the national level in several countries utilizing the methodologies developed for (a) assessing extent of deficiency numerically and geographically, (b) supplying Vitamin A in appropriate form to target groups and (c) evaluating effectiveness of program.

### 3. Basic Assumption About Production of Outputs

a. Each country must be considered as a separate problem. Analysis of needs and resources (government/private) will lead to the development of an appropriate system in a specific country for the mass delivery of Vitamin A to target groups.

b. Implementation of one or two projects will demonstrate that a relatively low-cost approach can be undertaken on a national scale and yield tangible and beneficial results by reducing blindness caused by Vitamin A deficiency within a relatively short period of time.

### D. Statement of Project Inputs

#### 1. Inputs

a. Expert groups to provide guidance to AID in determining program planning.

b. Team(s) of experts to develop specific country programs.

c. Seminars, workshops site visits to disseminate information to LDCs and coordinate efforts of donor agencies.

d. Training program for LDC personnel.

e. Development of bio-chemical method for determining degree of Vitamin A deficiency.

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## 2. Budget

	<u>FY 74</u>	<u>FY 75</u>	<u>FY 76</u>	<u>FY 77</u>	<u>FY 78</u>	<u>FY 79</u>
Conferences, workshops and follow up meeting with funding agencies	40,000			30,000		30,000
Clearinghouse for dissemination of information on Vitamin A activities		7,500	7,500	7,500	7,500	7,500
Surveys Vitamin A deficiency and program planning		90,000	90,000	50,000	50,000	
Field testing and evaluation of methodologies in selected countries		<u>125,000</u>	<u>125,000</u>			
TOTAL	40,000	222,500	222,500	87,500	57,500	37,500

Total - 667,500

## 3. Basic Assumptions About Management of Outputs

a. Existing technologies for delivering Vitamin A to target groups can be adapted to meet the diverse conditions existing in the LDCs.

b. USAID Missions, LDC public and private sectors, and donor agencies including WHO/PAHO, FAO and UNICEF will support programs designed to meet Vitamin A requirements of LDC populations.

## E. Rationale

The tragedy of blindness extends beyond the individual and his immediate family. It represents a loss of potential talent and creates an economic burden for society. Cumulatively, 80 to 100,000 new cases per year of blindness caused by Vitamin A deficiency may mean 2 to 3 million blind who must be cared for in the LDCs at any given time.

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Reduction of Xerophthalmia induced blindness would afford a dramatic demonstration of the effectiveness of improved nutrition on health and could serve to encourage LDC nutrition planning on a national scale.

This program is being proposed (a) with the knowledge that methods for alleviating Vitamin A deficiency worldwide are available; (b) with the belief that proper implementation of programs and coordination of efforts by the LDCs, AID and other donor agencies can lead to at least a 75% reduction in new cases of blindness attributable to Vitamin A deficiency, (This prediction assumes that at least 75% of the target group can be reached on a continuing basis in a given LDC within 3 years after the introduction of a comprehensive Vitamin A program. ), and (c) with the hope that AID can serve as the catalyst for coordinating worldwide efforts and for developing proper implementation procedures.

In addition, an all out effort to overcome Vitamin A deficiency ties in with AID's program on breeding cereals and legumes that are superior in protein quality and quantity. Children in the LDCs not only suffer from protein/calorie malnutrition but from concomitant vitamin and mineral deficiencies. Thus, if a new variety of grain, e.g. opaque-2 corn, is introduced, the available protein in the child's diet will increase appreciably. This increase in protein will tend to promote growth and increase the demand for Vitamin A. If the child is borderline in Vitamin A, this added stress could throw the child into a state of Vitamin A deficiency. If one looks at the entire food system it becomes obvious the one intervention may create problems that should be addressed simultaneously on other fronts. Thus, the proposed Vitamin A program could be a necessary adjunct to programs designed to improve dietary protein thru the introduction of new crop varieties.

In order to properly define AID's role in avitaminosis A program planning, an ad hoc expert group was convened on June 18, 1973. This group included representatives from donor agencies as well as experts in Vitamin A technology and programming. The group provided preliminary advice needed to initiate AID's proper role in the area. Their recommendations included:

-- AID, should support countries interested in initiating Vitamin A Programs. AID, through an appropriate mechanism, could provide a person or a team to determine in a given country any or all of the following: (a) incidence of Vitamin A deficiency, (b) geographical areas where the deficiency exists, (c) appropriate short and long term measures to be instituted, (d) the most appropriate delivery systems for bringing together the treatment and the target and (e) a methodology for evaluating the efficacy of the program.

-- Demonstration projects should be established, if needed, to evaluate the effectiveness of proposed intervention programs such as massive oral doses of Vitamin A. Evaluations should include a determination of the cost effectiveness of the program--and if possible a comparison with alternate intervention strategies.

-- AID should endorse and encourage the cooperation of Voluntary Agencies in adding a Vitamin A component to their nutrition programs.

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## F. Course of Action

The steps required to implement a program for the alleviation of Vitamin A deficiency in a country or region include the following:

- a. an analysis of the numerical and geographic extent of Vitamin A deficiency,
- b. adoption or development of suitable technologies for overcoming Vitamin A deficiency in the specified area, and
- c. developing Vitamin A delivery systems tailored to fit the specific constraints and opportunities existing with the area for reaching the preschool child.

The first step--the determination of the extent of Vitamin A deficiency--not only locates the regions in a given LDC where the Vitamin A problem is most serious but also serves to provide a baseline for measuring the decrease in avitaminosis A as the program continues. Quantitative base line data is however seldom available in the LDCs; and in most cases, it will be necessary to teach the survey teams how to recognize early clinical signs of Vitamin A deficiency in order to obtain the required data.

The second step--the mix of technologies to be utilized may include one or more of the following:

- a. Periodic distribution of high potency Vitamin A capsules to the most vulnerable groups.
- b. Fortification with Vitamin A of food staples which are widely available to vulnerable groups.
- c. Nutrition education to encourage the production and consumption of foods with high carotene content such as dark green vegetables.

The first alternative may be considered an effective emergency measure for overcoming existing deficiencies. Fortification is a preventive measure that if "doable" requires no action on the part of the consumer. Measures designed to modify food habits require understanding and cooperation on the part of the consumer and their major impact may be quite long range.

The third step--the choice of delivery system(s) may e.g. piggy back an existing health delivery system. Thus in Bangladesh distribution of high potency Vitamin A capsules was superimposed on an existing malaria control program.

## The Implementation Plan

### Background

Considerable spade work has been done by TA/N prior to the submission of this "PROP". The implementation plan per se is a follow up to these initial efforts. Work to date is summarized and implementation plan follows.

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a. In FY '74 a "Vitamin A expert group" was established on an ad hoc basis. Included in this group were individuals with specific expertise in Vitamin A research and development of applied programs plus representatives from the U.N., PAHO, and the American Association for Overseas Blind.

The provisional goals of the group are the following:

-- To encourage the coordination of Vitamin A programming activities worldwide.

-- To provide for the establishment of a clearinghouse for the collection and dissemination of information on Vitamin A activities.

-- To sponsor workshops, symposia and seminars that will help encourage the implementation of Vitamin A programs.

b. In FY '74 a comprehensive review of the "state of the art" with respect to Vitamin A requirements, deficiencies, diagnostic criteria, ongoing programs and available technology was prepared. The three-volume status report will serve as a base for future programming and is being made available to scientists, institutions and donor agencies engaged in Vitamin A programming.

A less technical monograph providing a condensed version of the contents of the three-volume set is in preparation. This will be made available to non-technical but concerned workers in the Vitamin A field.

#### Plan

a. In the latter half of 1974 a joint WHO/AID/FAO conference will be held. The goal is to develop specific recommendations that can serve as a basis for Vitamin A programming and research, both by AID and other funding agencies.

These recommendations will be submitted at a Fall meeting to the "ad hoc" group for discussion, modification, final approval and eventual implementation.

b. During FY '74 and '75 a determination will be made of LDCs interested in initiating Vitamin A programs, and a clearinghouse for dissemination of information concerning Vitamin A activities will be established.

c. A contract will be established with an appropriate institution to provide upon AID request an expert team to determine in a given LDC any or all of the following: (1) incidence of vitamin A deficiency, (2) geographical areas where the deficiency exists, (3) appropriate short and long term measures to be instituted, (4) the most appropriate delivery system for bringing together the treatment and target, and (5) a methodology for evaluating the efficacy of the program.

Two countries will be surveyed in each of FY '75, FY '76, FY '77, and FY '78.

d. Through an appropriate contract (not necessarily with the same institution) demonstration projects will be established to evaluate the effectiveness of the proposed intervention programs. It is assumed that a minimum of 3 years will be required for each study. Evaluation will include a determination of the cost effectiveness of the program.

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Two such demonstration projects will be initiated. One in FY '75, the other in FY '76. Each to run for 3 years.

At the completion of the first study (in FY '77) and second in FY '79 conferences will be held to summarize the results of the first two projects to concerned institutions and agencies to further promote implementation of Vitamin A projects.

Activity\* KPA # 2--Reaching the Pre-School Child.  
 Project Development of Vitamin A  
 No. New Title Delivery Systems

Contract/PASA  
 No. Name  
 Irwin  
 Project Manager Hornstein Extension 29771

Contract/PASA  
 Officer Extension

TAB - GENERAL TECHNICAL SERVICES

FY 1975 Interregional Program Budget Review  
 Project and Budget Analysis Matrix

Major Country/Countries

Worldwide

Obligation: Begin FY 1974 End FY 1979  
 Work Begin FY 1974 End FY 1979  
 PROP Status: PROP approved thru FY 19  
 New/Revised Required in FY 19

Estimated Submission Date Jan. 1974  
 Month Year  
 Evaluation Schedule March 1974  
 Month Year Type

Narrative	Objectively Verifiable Indicators	Important Assumptions and Progress to date																																																																																																																																		
<p><b>B1 PURPOSE:</b>            To assist LDCs in (a) analyzing the extent of Vitamin A deficiencies, (b) adapting and/or developing technologies for overcoming Vit. A deficiency, (c) adapting and/or developing delivery systems for reaching the target group and (d) implementing programs for alleviating Vit. A deficiency.</p>	<p><b>B2 End of Project Status:</b>            a. Assessment of extent of Vit. A deficiency in 8 countries.            b. Development of methodologies to be used in these 8 countries for combatting avitaminosis A.            c. Programs carried out in 2 countries.            d. Coordinated efforts by donor agencies in combatting Vit. A deficiencies in LDCs.</p>	<p><b>B3 Assumptions for Achieving Purpose:</b>            a. Blindness caused by Vit. A deficiency can be prevented by the use of techniques (adapted or developed) for delivering Vit. A to vulnerable pre-schoolers.            b. Mass delivery of Vit. A to the target group can in many instances be based on utilization of existing distribution systems.  <b>B4 Progress to date:</b></p>																																																																																																																																		
<p><b>C1 OUTPUTS:</b>            a. The development of country specific procedures for determining the extent of blindness due to Vitamin A deficiency, the techniques to be implemented for alleviating the deficiency, and the methodology to use for evaluating effectiveness of programs.            b. Indigenous personnel trained to carry on in-country Vitamin A programs.            c. Information relative to the progress of Vitamin A program disseminated to LDCs and other donor agencies.</p>	<p><b>C2 Output Indicators:</b>            Established Avitaminosis A programs at the National level in several countries utilizing the methodologies developed for assessing extent of deficiency, supplying Vitamin A in appropriate form to target groups and evaluating effectiveness of program.</p>	<p><b>C3 Assumption for Achieving Outputs:</b>            a. Analysis of needs and resources (government/private) will lead to the development of an appropriate system in a specific country for the mass delivery of Vit. A to target groups. b. Implementation of one or two projects will demonstrate that a relatively inexpensive approach can be undertaken on a national scale and yield tangible and beneficial results.  <b>C4 Progress to date:</b>            A compendium completed on the current state of the art in the technology, deficiency status and current worldwide programming efforts on vitamin A has been completed.</p>																																																																																																																																		
<p><b>D1 INPUTS:</b> Funding of:            a. Expert groups to provide guidance to AID in determining proper program planning.            b. Team(s) of experts who will develop specific country programs.            c. Programs for implementation(s) and evaluation of Vitamin A programs.            d. Seminars, workshops, site visits, etc. to disseminate information to and coordinate efforts of donor agencies.            e. Establishment of a clearinghouse for the collection and dissemination of information on Vitamin A activities.</p>	<p><b>D2 Budget Summary (in thousands of dollars)</b></p> <table border="1"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">(1)</th> <th colspan="2">(2)</th> <th rowspan="2">(3)</th> <th rowspan="2">(4)</th> <th rowspan="2">(5)</th> <th rowspan="2">(6)</th> <th rowspan="2">(7)</th> <th rowspan="2">(8)**</th> <th rowspan="2">(9)</th> <th colspan="2">Terminal</th> </tr> <tr> <th>Personnel</th> <th>Dollars</th> <th>MM</th> <th>MM</th> <th>Participants</th> <th>Commodities</th> <th>Other Costs</th> <th>Total</th> <th>Expenditures</th> <th>June 30 Pipeline</th> <th>Funding Date</th> <th>Month Year</th> </tr> </thead> <tbody> <tr> <td>All Prior Years</td> <td></td> </tr> <tr> <td>1. Thru FY 1972</td> <td></td> </tr> <tr> <td>2. Actual FY 1973</td> <td></td> </tr> <tr> <td>3. Estimated FY 1974</td> <td>40</td> <td>15</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>40</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4. Proposed FY 1975</td> <td>162.5</td> <td>72</td> <td></td> <td></td> <td></td> <td>20</td> <td></td> <td></td> <td>182.5</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>5. All other</td> <td>345.0</td> <td>78</td> <td></td> <td></td> <td></td> <td>20</td> <td></td> <td></td> <td>365.0</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>6. Total</td> <td>547.5</td> <td>165</td> <td></td> <td></td> <td></td> <td>40</td> <td></td> <td></td> <td>587.5</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		(1)		(2)		(3)	(4)	(5)	(6)	(7)	(8)**	(9)	Terminal		Personnel	Dollars	MM	MM	Participants	Commodities	Other Costs	Total	Expenditures	June 30 Pipeline	Funding Date	Month Year	All Prior Years															1. Thru FY 1972															2. Actual FY 1973															3. Estimated FY 1974	40	15							40						4. Proposed FY 1975	162.5	72				20			182.5						5. All other	345.0	78				20			365.0						6. Total	547.5	165				40			587.5					
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\*Key Problem Area, Area of Concentration, or Field Support.

\*\*Expenditures are to be computed on an annual basis.