

PD-ABK-249

92615

VITAMIN A FIELD SUPPORT PROJECT (VITAL)

**Final Report of Activities, Key Findings,
and Lessons Learned**

1989 - 1994

**Contract Numbers DAN-5116-C-00-9114-00
and DAN-5116-Q-00-9115-00
Project No. 936-5116**

Prepared by International Science and Technology Institute (ISTI), 1129 20th Street N.W.,
Washington D.C. 20036, for Office of Nutrition, U.S. Agency for International Development.

TABLE OF CONTENTS

LIST OF ACRONYMS	iii
EXECUTIVE SUMMARY	v
I. INTRODUCTION	1
A. Objectives and Scope of Work	1
B. VITAL's Approach	2
II. SURVEYS AND STRATEGY DEVELOPMENT	7
A. Survey Activities Undertaken	7
B. Survey Findings and Lessons Learned	8
C. Strategy Development and Planning	11
III. VITAMIN A INTERVENTIONS AND COLLABORATIVE INQUIRIES	15
A. Distribution of High Dose Supplements	15
B. Food Technology and Fortification	19
C. Horticultural Approaches	24
D. Social Marketing and Nutrition Education	27
IV. INFORMATION GATHERING AND DISSEMINATION	29
A. Library and Documents Acquisition	29
B. Training Materials	29
C. Mailing List	30
D. VITAL News	30
E. Reports/Documents Preparation and Distribution	30
F. Vitamin A Status and Programs Database	31
V. CONCLUSIONS	33
OVERALL LESSONS LEARNED	36

ANNEXES:

1. List of Publications
2. VITAL Activities by Country
3. VITAL Project Staff
4. Resource Cadre
5. VITAL Task Descriptions

LIST OF ACRONYMS

ADRA	Adventist Development and Relief Agency International
AFR	Africa Region
A.I.D.	Agency for International Development
APHA	American Public Health Association
C.I.	Collaborative Inquiry
CSB	corn soy blend
CSF	Community Systems Foundation
CeSSIAM	Center for Studies of Sensory Impairment, Aging and Metabolism
DHS	Demographic and Health Survey
EPI	Expanded Program on Immunization
FAO	Food and Agricultural Organization (United Nations)
FNRI	Food & Nutrition Research Institute (Philippines)
FSP	Foundation for the Peoples of the South Pacific
HKI	Helen Keller International
ICDS	Integrated Child Development Services (India)
ICN	International Conference on Nutrition
IEF	International Eye Foundation
IMPACT	Food Security and Nutrition Monitoring Project
INCAP	Institute of Nutrition in Central America and Panama
INMU	Institute of Nutrition at Mahidol University (Thailand)
INSAH	Institut du Sahel (Mali)
ISTI	International Science and Technology Institute, Inc.
IVACG	International Vitamin A Consultative Group
JSI	John Snow Inc.
LAC	Latin American and Caribbean Region
LAC/HNS	Latin America and Caribbean/Health and Nutrition Sustainability Project
MOH	Ministry of Health
NGO	non-governmental organization
NIN	National Institute of Nutrition (India)
NOVA	Nutrition, ORT and Vitamin A Project (Haiti)
NRDC	Nutrition Research and Development Centre (Indonesia)
OMNI	Opportunities for Micronutrient Intervention Project
ORANA	(Senegal)
PAHO	PanAmerican Health Organization
PATH	Program for Appropriate Technology in Health
PL 480	Public Law 480
PVO	private voluntary organization
RDO	Regional Development Office (USAID)
R&D/N	Bureau for Research and Development, Office of Nutrition (USAID)
REACH	Resources for Child Health Project (USAID)
SDA	Simplified Dietary Assessment

SEARO	Southeast Asia Regional Office of the World Health Organization
TDRC	Tropical Diseases Research Center (Zambia)
TFNC	Tanzania Food and Nutrition Center
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
UNICEF	United Nations Children's Fund
VAD	vitamin A deficiency
VITAL	Vitamin A Field Support Project
WHO	World Health Organization

EXECUTIVE SUMMARY

The Vitamin A Field Support Project (VITAL) was initiated by the Nutrition Office of the Research & Development Bureau (R&D/N) of A.I.D. to expand the application of known methodologies to combat vitamin A deficiency. The VITAL Project was the first coordinated and comprehensive phase of A.I.D. support aimed at a widespread application of known technologies, and development of linkages across a broad range of institutions and sectors, for the purpose of addressing the problem of vitamin A deficiency. It set the stage for a subsequent phase of activity, potentially consisting of an intensive or in-depth phase in pursuit of achieving documented reductions in micronutrient deficiency in specific countries. The nature and timing of VITAL's work complemented the orientation and priorities of A.I.D. at the time, and of growing international recognition that interventions to reduce micronutrient deficiencies are highly cost-effective.

The key instruments employed through VITAL were sensitization and awareness raising through large-scale information dissemination, assessments for a more systematic documentation of the prevalence of vitamin A deficiency, and support for concrete interventions and applied research in supplementation, fortification, food preservation, gardening, and nutrition communication. Technical assistance and training were provided in: prevalence assessments; strategy development and the development of related program plans, designs, and feasibility studies; and program management, monitoring and evaluation. Following completion of needs assessment and program definition, assistance was provided to countries to field test and implement the following priority interventions:

- Distribution of high dose supplements;
- Food technology and fortification;
- Horticultural approaches — vitamin A/carotene rich foods;
- Social marketing/community education.

VITAL's information gathering and dissemination activities were aimed at creating a central resource base for information related to the prevention and control of vitamin A deficiency and, concomitantly, the exchange of such information. The information obtained or developed was disseminated through networking, training, field trips, conferences, workshops, seminars and correspondence. Operationally-oriented field research or "collaborative inquiries" were conducted to test innovative ways of increasing the effectiveness, coverage, and sustainability of vitamin A interventions.

The need for these services was vast and resources modest in comparison with potential demand. Therefore, prioritization and focus was sought through Regional and Central Bureau input on A.I.D.'s emphasis and comparative advantage in each region and globally. A technical advisory group was tapped to obtain substantive focus.

Initially, the project received few requests for assistance from the field because few USAID missions were aware of the new evidence of the role of vitamin A deficiency in mortality and

morbidity and even fewer had a clear understanding of how vitamin A components could be integrated in their increasingly focused sectoral programs. Therefore, VITAL adopted a systematic, proactive approach and multiple strategies to achieve the objectives of the project. Considerable emphasis was placed on sensitization and awareness building. The project gathered key emerging information of policy and program relevance, for example about the linkage of vitamin A deficiency to increased child morbidity and mortality. A broad audience, consisting not only of USAID but also of host country institutions and individuals and other organizations engaged in vitamin A activities, was identified. This audience was reached on a regular basis through the project's *VITAL News* newsletter, special publications (Vital Nutrients, Fortification document, Solar Drying Manual, training modules, etc.), and professional contacts. **Information gathering and dissemination** was the project's second most important activity in terms of core budget resource allocation.

Regional strategies were developed and implemented. With the objective of working actively in a total of 12 countries in Africa (6), Asia (3), and Latin American and the Caribbean (3) over the life of the project, approximately 20 candidate countries were identified on the basis of 1) known or suspected prevalence of vitamin A deficiency, 2) selection by A.I.D. as "child survival" emphasis countries, 3) known or presumed interest of the A.I.D. mission and/or host government. Regional strategies were developed and implemented. In Latin America and the Caribbean, the existence of strong professional networks and a relatively high and uniform shared understanding of the subject and technical experience led VITAL to sponsor regional meetings as a means of identifying need and generating interest in expanding programs. In this region, experts in vitamin A and nutrition met three times with program planners and implementors to review the current situation in the region and recommend measures to deal with it. These meetings included technical updating and sensitization of participants, sharing of information and experiences among countries, and group discussions on technical and operational issues. In Asia, where many countries were already implementing national programs with A.I.D. support (Bangladesh, Indonesia, Philippines) and it was felt that there would be little demand for additional field support, the project initially emphasized the wide dissemination of information and printed materials. In Africa, where the level of awareness of vitamin A issues or the status of the vitamin A problem in individual countries was low, VITAL initiated needs assessments and sponsored follow-up country presentations on findings at workshops. Overall, the impetus for many of VITAL's country-specific program activities came from local counterparts. USAID mission concurrence was obtained for all activities, whatever their genesis, however, and, in many cases, USAID missions became active participants in the planning of these activities.

Eventually, VITAL assistance to countries in planning and conducting **vitamin A status surveys** became the most prominent type of activity. In all, assistance was provided to ten countries in the LAC region, and 12 countries in other regions. This activity accounted for over 40 percent of all expenditures during the four and one-half years of the contract.

The majority of the project's **program interventions** were developed as a result of survey findings. The results of surveys were presented and discussed in national workshops which also

focused on formulation of action plans. Through their involvement in these survey review and planning workshops, USAID missions in a number of countries, especially those with large national programs such as Bolivia, Honduras, Nepal, the South Pacific, and Haiti, became active participants in the planning of intervention activities.

VITAL adopted a variety of strategies to advance work on **collaborative inquiry** subjects. By working directly with in-country offices of several U.S. PVOs — Bolivia (Esperanza), Haiti and Dominican Republic (Save The Children), and Nepal and India (CARE) — VITAL was able to pursue a number of priority collaborative inquiries, gardening, solar drying and fortification — in a number of priority countries. Collaborative inquiries on several priority topics (gardening, effects of cooking on vitamin A activity) were also commissioned from nutrition research institutions in Thailand (INMU), Indonesia (NRDC), India (NIN), the Philippines (FNRI), and Guatemala (CeSSIAM).

This report provides a brief description of the activities undertaken, examples of program-related findings, and lessons learned during the four-year course of the contract. Under each type of activity, possible next steps are listed. Section 1 summarizes the objectives of the contract and the approach taken by VITAL to meet those objectives. Sections 2, 3 and 4 provide an overview of the activities undertaken in each of three components: surveys and strategy development, interventions and collaborative enquiries, and information dissemination. Each of these sections contains a synthesis of key findings and lessons learned. The Annexes provide listings of publications, VITAL project staff, and VITAL activities by country, as well as profiles of all VITAL activities and a roster of the project's resource cadre.

I. INTRODUCTION

A. Objectives and Scope of Work

The Vitamin A Field Support Project (VITAL) was initiated by the Nutrition Office of the Research & Development Bureau of A.I.D. in October 1989 to expand the application of known methodologies to combat vitamin A deficiency in A.I.D.-supported countries. A.I.D.'s pioneering work during the previous 15 years had demonstrated clearly that inadequate vitamin A status increased significantly the risk of mortality among preschool children. Consequently, A.I.D. sought a mechanism for disseminating this and related information to the field, and provide its field staff and their counterparts with the means to incorporate vitamin A nutrition interventions into their child survival strategies.

This "project" is the field support component of the broader R&D/N Vitamin A for Health Project, initiated in 1984, which also funds A.I.D.'s research on vitamin A. The objectives of the overall Vitamin A for Health Project are:

1. To determine the role which vitamin A deficiency plays in child morbidity and mortality;
2. To assist less developed countries assess the prevalence of vitamin A deficiency among their young child populations; and
3. To develop and implement programs to overcome the problem.

Prior to 1989, R&D/N had supported a number of activities with various entities to implement activities to achieve Objectives 2 and 3, which are primarily operational in nature. (Objective 1 was pursued primarily through grants or cooperative agreements with universities.) R&D/N established the VITAL "project" to concentrate its efforts in pursuit of those operational objectives in one implementor via a single contract. The field support objective includes three categories:

- **Technical Assistance and Interventions:** To provide short-term technical assistance in prevalence assessments; strategy development and related program plans, designs, and feasibility studies; program management, monitoring and evaluation; data collection and interpretation (epidemiological); logistics and supplies. Following completion of the program definition process to assist countries to implement specific interventions such as the following:
 - Distribution of high dose supplements;
 - Food technology and fortification;
 - Horticultural approaches — vitamin A/carotene rich foods;
 - Social marketing/community education.
- **Collaborative Inquiries:** To "test innovative ways of increasing the effectiveness,

coverage and sustainability of vitamin A activities in enhancing child survival and preventing childhood blindness." To develop a prioritized agenda for proposed collaborative inquiries.

- **Information Gathering and Dissemination:** To "create a central resource base for information related to the prevention and control of vitamin A deficiency, and concomitantly, the exchange of such information." A corollary objective "...is the coordination of programs related to vitamin A deficiency." Included are: the development of curricula and training materials; the acquisition or development of bibliographies and conducting computer searches for information; maintaining communications and contact with individuals and organizations (network) involved in vitamin A activities for purposes of information gathering and coordination; and the dissemination of information obtained or developed as described above through networking, training, field trips, conferences, workshops, seminars and correspondence.

The scope and substance of the contract objectives were comprehensive, and constituted a well integrated set of responsibilities for a field support program. The technical assistance, collaborative inquiries, and information components were very complementary and mutually reinforcing.

B. VITAL's Approach

Initially, the project received few requests for assistance from the field because few USAID missions were aware of the new evidence of the role of vitamin A deficiency in mortality and morbidity and even fewer had a clear understanding of how vitamin A components could be integrated in their increasingly focused sectoral programs. Therefore, VITAL adopted a systematic, proactive approach and multiple strategies to achieve the objectives of the project. This approach was developed with the active participation of the Office of Nutrition and the Regional Bureaus, a Technical Advisory Group, a number of USAID missions, U.S. and local PVOs, and nutrition research institutions. Considerable emphasis was placed on sensitization and awareness building. Regional strategies were developed and implemented. With the objective of working actively in a total of 12 countries in Africa (6), Asia (3), and Latin America and the Caribbean (3) over the life of the project, approximately 20 candidate countries were identified on the basis of 1) known or suspected prevalence of vitamin A deficiency, 2) selection by A.I.D. as "child survival emphasis" countries, and 3) known or presumed interest of the A.I.D. mission and/or host government.

Sensitization and Awareness Building

Core contract resources available through the project's Information Gathering and Dissemination component were used to gather key emerging information of policy and program relevance, for example, about the linkage of vitamin A deficiency to increased child morbidity and mortality. VITAL's information dissemination strategy targeted two groups: A.I.D. staff in Washington and the field, and the non-A.I.D. audiences included in the contract scope of work, i.e. "host

country institutions and individuals" and "other organizations engaged in vitamin A activities." These audiences were targeted aggressively through the *VITAL News* newsletter, special publications (Vital Nutrients, Fortification, Solar Drying Manual, training modules, etc.) and networking. The information component of the project quickly became a much larger activity than originally anticipated. Whereas one two-thirds time person was anticipated, the work under this component eventually required two full time staff and one to two part-time administrative assistants.

Regional Strategies

The sponsorship of regional meetings in each geographic region was considered as a means of identifying need and generating host country and mission interest in vitamin A activities. A meeting in the Latin America and Caribbean (LAC) region was proposed to PAHO, A.I.D., and UNICEF, and VITAL held the first of a series of LAC regional meetings in Guatemala in June 1991. This meeting was successful in raising awareness of the need to identify the vitamin A problem in the region, and five prevalence surveys followed. Contact with many of the participants at this first meeting were maintained through country-specific activities and regional communications, and many of these individuals participated in the project's second and third LAC regional meetings in 1992 (San Juan) and 1993 (Recife). In response to country (and PAHO) requests, the third LAC regional meeting was expanded to cover iron and iodine deficiencies as well as vitamin A deficiency. Thus, for the first time in this region, experts in each of the three priority micronutrients met with program planners and implementors to review the current situation in the region and recommend measures to deal with it. The LAC regional meetings included technical updating and sensitization of participants, sharing of information and experiences among countries, and group discussions on technical and operational issues.

These regional meetings were appropriate and productive because of LAC-specific factors, including common language, existing professional linkages and personal acquaintances among participants, relatively high and uniformly shared level of understanding of the subject and technical experience, and familiarity of VITAL staff with many of the LAC participants. It was decided not to adopt the same approach in Asia and Africa (AFR) where these factors were not present. In Asia, many countries were already implementing national programs with A.I.D. support (Bangladesh, Indonesia, Philippines), and it was felt that there would be little demand for additional field support. Therefore, the project initially emphasized the wide dissemination of information and printed materials. It was also felt that, in Africa, more preparatory work would be needed before regional or sub-regional meetings would bear fruit. This hypothesis was borne out by the West Africa Vitamin A Conference held in Ghana during the latter part of the project. Even at this late date, participants were not acquainted with one another, had no established professional networks, and were generally not well-informed about vitamin A issues or the status of the problem in their own countries. In Africa, therefore, VITAL initiated needs assessments and sponsored follow-up country presentations on findings at workshops. Overall, the impetus for many of VITAL's country-specific program activities came from local counterparts. USAID mission concurrence was obtained for all activities, whatever their genesis, however, and, in many cases, USAID missions became active participants in the

planning of these activities.

Prevalence Surveys

VITAL assistance to countries in planning and conducting vitamin A status surveys (vitamin A deficiency prevalence assessments) became the most prominent type of activity. In all, assistance was provided to ten countries in the LAC region, and 12 countries in other regions. This activity accounted for over 40 percent of all expenditures during the four and one-half years of the contract. There are several reasons for this.

- In the AFR and LAC regions, much less was known about the prevalence of vitamin A deficiency prevalence than in the Asia region. The logical first step for many countries in AFR and LAC was to conduct a survey to determine the existence and magnitude of the problem.
- In several AFR and LAC countries in which A.I.D.-funded vitamin A program work was not permitted, except that conducted by centrally-funded PVOs, USAID missions allowed VITAL to assist in the conduct of surveys, provided that these were specific and time-limited. In these cases, VITAL assistance was viewed by the mission as a useful, short-term service to the government, in that survey information could be used by the government to obtain program support from other donors, if needed. These countries included Cameroon, Uganda, the Dominican Republic, Ecuador, and Panama. In several other countries, particularly Nigeria and Bolivia, not only survey work but also program intervention work was supported by the mission, either directly (Nigeria) or through AID/W (Bolivia).

Program Interventions

The majority of the project's program interventions were developed as a result of survey findings. The results of surveys were presented and discussed in national workshops which also focused on formulation of action plans. Through their involvement in these survey review and planning workshops, USAID missions in a number of countries, especially those with large national programs such as Bolivia, Honduras, Nepal, the South Pacific, and Haiti, became active participants in the planning of intervention activities. In addition, more discrete intervention activities were undertaken in a number of countries.

- In the Dominican Republic, VITAL provided technical assistance to a local PVO funded through the PVO co-financing activities of the mission. VITAL was specifically identified as a source of technical assistance in the PVO's proposal to USAID, so the vitamin A activities were viewed as part of the PVO program, rather than separate nutrition interventions.
- In Ghana and Tanzania, VITAL supported in-country vitamin A activities because of their regional importance (Ghana West Africa Vitamin A Meeting; development of

TFNC's capacity as a regional solar drying resource).

Collaborative Inquiries

In order to begin work on priority collaborative inquiry subjects, such as home gardening, in advance of USAID missions' requests for assistance, VITAL approached several U.S. PVOs which had extensive child survival and gardening programs in Africa. Discussions with ADRA and Africare headquarters staff to identify ways for VITAL to collaborate with some of their Africa country home gardening projects were unsuccessful. A plan to work with World Vision on its home gardening projects in Mauritania did not materialize because of political problems in the country. The project had more success in working directly with in-country offices of several U.S. PVOs — Bolivia (Esperanza), Haiti and Dominican Republic (Save The Children), and Nepal and India (CARE) — providing expertise that complemented of the PVOs' staff. Each of these activities allowed VITAL to pursue a collaborative inquiry priority — gardening, solar drying and fortification — in a priority country.

Collaborative inquiries on several priority topics (gardening, effects of cooking on vitamin A activity) were commissioned from nutrition research institutions in Thailand (INMU), Indonesia (NRDC), India (NIN), the Philippines (FNRI), and Guatemala (CeSSIAM). USAID mission agreement was obtained in all cases. In fact, the missions in these countries were pleased to be able to support the work of these local organizations through the A.I.D./VITAL project, without drawing on their own program budgets and very limited administrative capacity, provided that VITAL would not press for any follow-on activity as a result of the C.I. projects.

Local Capacity Building

A cornerstone of VITAL's approach to supporting local initiatives to plan and carry out vitamin A activities was the provision of only as much external technical and financial support as required to ensure achievement of the activities' objectives. The services of local experts and managers were given priority, and when outsiders were required, the project tried to arrange for the services of resource persons or institutions from the same region. This approach was adopted for several reasons:

- By taking responsibility for planning and implementing their own activities, local counterparts (individuals and institutions) gain confidence in their capabilities, learn new skills from consultants required for planning and training, and take "ownership" of the activities, thus increasing prospects for follow-on actions. This is especially relevant for surveys for which follow-on actions are essential.
- Local and regional experts' understanding of local environments often facilitates their work and makes these consultants more effective than consultants from other regions.
- Salaries and travel expenses of local and regional experts are almost always less than for

consultants from the U.S. or Europe. The money saved enabled VITAL to do more work under the contract.

Reliance on local counterparts and consultants had costs to the project as well as benefits, the most significant of which was the considerable loss of control over actual implementation of activities. This relinquishing of control was most pronounced in the case of prevalence surveys, and in some cases the quality of the work and results suffered (Uganda, Cameroon).

Donor Coordination

In addition to working with A.I.D., VITAL worked closely with other donor agencies in all aspects of the project. This collaboration was important in that it maximized information exchange, served to enhance the technical expertise available to VITAL-assisted projects, and allowed other donors to leverage their resources with A.I.D.'s, thus enhancing the prospects for sustainability of vitamin A activities. WHO/Geneva experts participated actively in country-specific technical assistance visits and in national and regional workshops, reviewing technical documents, and preparing the measles module. The WHO Latin America regional office, PAHO, played an active role in LAC region workshops. PAHO's INCAP center in Guatemala performed serum retinol laboratory analyses for three VITAL-assisted surveys, and its Bolivia office assisted with initiation of the fortification and social marketing interventions there. Planning for the three-country carotene content studies project was conducted jointly with the WHO SEARO office under its Nutrition Research cum Action Network program. UNICEF country offices were active partners in activities carried out in Uganda (funded local costs of survey), Nepal (provided capsules among other inputs), Bolivia (funded dietary survey component and vitamin A palmitate for fortification intervention), and LAC for regional and national workshop support. Furthermore, UNICEF and WHO regularly requested multiple copies of a number of VITAL publications for distribution to their field offices. The Canadian Micronutrient Initiative collaborated with A.I.D. on sponsorship of the West Africa Vitamin A Conference in Ghana toward the end of the project.

The project was successful in leveraging other resources in other ways as well. As a result of the McKigney Guatemala national program evaluation, the A.I.D. LAC/HNS project conducted intensive cost effectiveness analyses of the fortification and gardening programs there. The A.I.D. REACH project adapted and applied the VITAL measles module for national training in vitamin A case management for measles. UNICEF/Uganda is funding the follow-on national vitamin A program there. USDA, PL 480 commodities producers and Roche Chemicals all made significant in-kind contributions to the India oil fortification study.

II. SURVEYS AND STRATEGY DEVELOPMENT

Needs assessments, including formal surveys to establish areas of high risk was, in many countries, the first step in developing country strategies for addressing vitamin A deficiency (VAD).

A. Survey Activities Undertaken

At the outset, the demand for assistance in conducting **vitamin A deficiency prevalence assessments** was underestimated. From its earliest days, the project received requests from the Indonesia MOH to assist with analysis and report preparation for its World Bank-funded Eastern Islands micronutrient survey, and from the A.I.D. RDO/South Pacific office to help to determine if VAD is a problem in the island nations of that region. Following the 1990 LAC regional workshop, in which the general lack of reliable prevalence information in the region was clearly revealed, requests for similar support came from Bolivia, the Dominican Republic and Panama. Subsequently, Ecuador and Nicaragua asked for assistance with similar surveys. In Africa, VITAL responded to expressions of interest in performing assessments from non-governmental organizations in Uganda, Cameroon, and Nigeria during 1991 and 1992 and then arranged for the participation or concurrence of the respective MOH and A.I.D. offices. The Ministries of Health in all of the countries were very receptive to conducting the surveys, although the degree of their actual participation varied considerably due to different human and financial resource capabilities. In general, the ministries played more active roles in Latin America and Asia than in Africa. (See Ross & Trowbridge, Review of VITAL Surveys, 1994, and descriptions of surveys in Annex 4).

The primary objective of each survey was to provide country-specific, reliable information upon which to base appropriate vitamin A nutrition strategies and programs. A secondary objective was to provide reliable prevalence information to international agencies (A.I.D., WHO, UNICEF) concerned with global programs and data bases. Those objectives were achieved, although some surveys encountered problems which somewhat diminished their final products. The many challenges and problems presented by the surveys yielded many useful "lessons learned" that are described in the Ross & Trowbridge report.

The primary importance to the countries themselves and to A.I.D. of the seventeen surveys supported by VITAL¹ is the fact that most of the countries in which a problem was found have either started follow-up intervention actions (Bolivia, the Dominican Republic, Panama, Uganda, Indonesia) or plan to do so (Ecuador, Nicaragua, Cameroon, Nigeria). The Solomon Islands have not taken action because of internal problems, and no problem was found in Tuvalu, Vanuatu and Cook Islands.

¹Bolivia-1992, Dominican Republic-1991 and 1993, Panama-1992, Ecuador-1993, Nicaragua-1993, Uganda-1992, Cameroon-1992 and 1993, Nigeria-1993, Indonesia-1991, Solomon Islands-1992, Cook Islands-1992, Tuvalu-1991, Vanuatu-1991 and Papua New Guinea 1993.

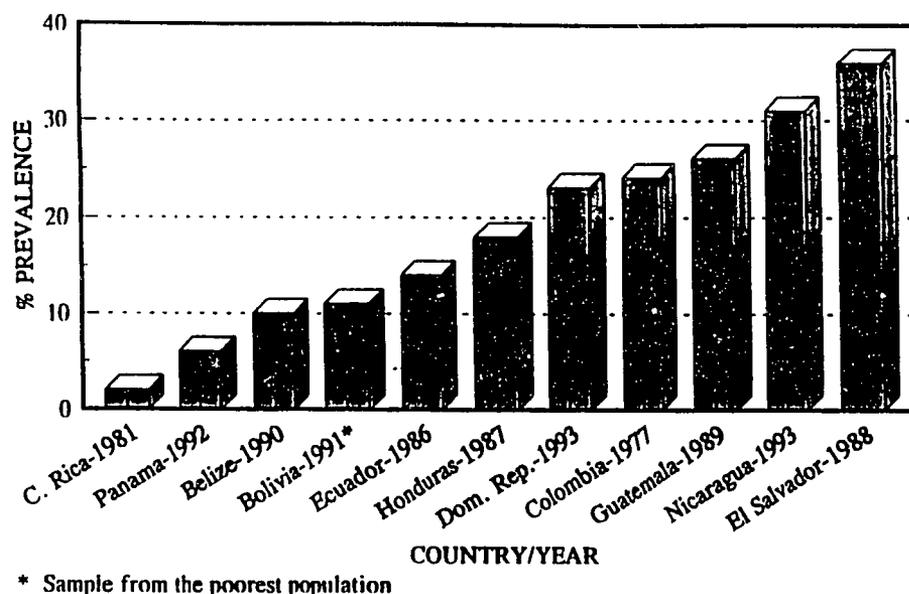
A high priority was placed on obtaining detailed dietary intake measures to assess risk of inadequate dietary intake of vitamin A as a complement to clinical and biochemical measures. The dietary intake information provided an immediate guide to planning dietary-based intervention strategies, including fortification. VITAL used the IVACG SDA in seven surveys and, in the course of doing so, made several adaptations and enhancements to the implementation and analysis methods which will increase ease and frequency of its use by others in the future.

B. Survey Findings and Lessons Learned:

Latin America and Caribbean Region: Prevalence assessments were performed in the Dominican Republic, Ecuador, Nicaragua, Bolivia and Panama.

All of the assessments used serum retinol and dietary adequacy as primary indicators, and all collected information on breast feeding and morbidity prevalence. Most took height and weight and two examined children for xerophthalmia. These assessments provided the most extensive information on vitamin A deficiency status in LAC countries. Figure 1 provides an overview of the findings from VITAL-assisted surveys and other surveys. A key contribution of the project was the documentation that vitamin A deficiency is a significant public health problem in A.I.D. "child survival emphasis" countries.

Figure 1. Prevalence of Vitamin A Deficiency in LAC Countries



Source: Mora and Omar Dari (INCAP) et al, in *The Prevalence of Vitamin A Deficiency in Latin America*, forthcoming.

Africa Region: Prevalence surveys were conducted in Cameroon, Nigeria, and Uganda. The surveys in Cameroon were actually two separate surveys: one in Cameroon's Extreme North Province that included xerophthalmia and vitamin A deficiency components, and another that measured serum retinal levels in blood samples in several very remote villages in the Bulu du Dja Canton. The Nigeria survey was national in scope and measured the prevalence of iron and iodine deficiency in addition to vitamin A, using clinical biochemical, Conjunctival Impression Cytology, and dietary assessment indicators. The results of the Nigeria survey would feed directly into Nigeria's national food and nutrition policy and programs that were formed by a multiministerial group supported by the World Bank, UNICEF, and USAID. The Uganda survey was limited to central Uganda's Kamuli District, using clinical and dietary assessment as primary indicators.

Asia Region: Xerophthalmia prevalence surveys were conducted in Tuvalu, Vanuatu, Solomon and Cook Islands and in the Far and Mid-Western regions of Nepal. Presence of clinical signs was the primary indicator in the South Pacific, because the purpose of the surveys was to determine if VAD was present at rates similar to those detected in Kiribati. Clinical signs were also the primary indicators in Nepal, where very high rates of clinical VAD were expected and the purpose was to prioritize districts for programming interventions.

LESSONS: Prevalence Surveys

1. To obtain comparability of survey results among countries, standardized indicators, as well as measurement and sampling methodologies, should be used. Some surveys in the LAC region used statistically selected nationally representative samples of the population under five years of age, while others used special samples of the poorest groups defined by geographical and/or socioeconomic criteria. Likewise, the IVACG/SDA methodology to identify groups at risk of inadequate intake of vitamin A was used in some surveys, while information on dietary intake including energy, protein, vitamins and minerals using the 24-hour recall method was used in others.
2. Training in blood specimens collection and handling should be given greater emphasis including more field practice in order to reduce the number of hemolyzed or insufficient blood samples to a minimum.
3. The use of portable hemoglobinometers with hemocue greatly enhanced community participation and response rates, provided rapid hemoglobin results, and eliminated the need for laboratory analysis for hemoglobin.
4. Survey reports should be prepared in simple, standard, easily comparable formats, particularly for data presentation (tables and graphs). The use of a standard software package similar to the one used for analysis and presentation of the DHS surveys would be desirable.
5. Local staff should be thoroughly trained in survey design, implementation and report writing, and adequate time and resources must be incorporated for appropriate pre-survey operations research, trials and field practice to ensure proper design and quality control. Candidates for conducting ocular clinical examinations for VAD must be carefully selected, trained, and standardized.
6. INCAP represents a valuable source of technical expertise in nutrition/micronutrient surveys that should be used in the future. The use of local, private sector organizations to handle administrative and financial aspects of surveys also proved advantageous.
7. Dietary information and anthropometry should be gathered so that the importance of Vitamin A for general nutrition and health is not over-shadowed by an emphasis on clinical eye signs. However, xerophthalmia surveys are useful as a "first cut" to detect the presence of clinical VAD, and where xerophthalmia is known to exist, to prioritize for programming.
8. The modifications made to the IVACG SDA methodology facilitated the identification of populations at high risk of inadequate vitamin A intake in Panama, Ecuador and Philippines, Nigeria, Uganda, Cameroon, Dominican Republic, Papua New Guinea, and Bolivia. It also allowed easier identification of most frequently and most widely consumed vitamin A foods as well as foods which contribute the most vitamin A to the diet.

What remains to be done:²

1. Completion of the Nigeria National Micronutrient Survey laboratory and data analyses and report preparation. Wide dissemination of survey result and recommendations in Nigeria.
2. Substantial VAD prevalence work in Africa in order to provide host country policy makers and donor agencies with a clear basis for decision making and resource allocation. Relatively low cost methods will have to be employed.
3. Documentation of the IVACG dietary assessment experiences of VITAL to enable further refinements of the methodology to be made.
4. A.I.D. should include simple measures for assessing micronutrient status with future DHS surveys as a means of greatly expanding micronutrient prevalence information at reasonable costs.
5. Further exploration of the validity of using school children as the survey population for vitamin A assessments. The results of the studies in the Dominican Republic suggest that, while VAD prevalence tends to be about 30 percent lower in school children than in preschool children, the correlation is high enough to suggest that the use of school children may be appropriate to obtain valid national prevalence of VAD, as they are for goiter and iodine deficiency. If so, surveys could be conducted more quickly and more cheaply due to easier accessibility of school children.

² Drawn in part from the report by Ross and Trowbridge.

C. Strategy Development and Planning

National dissemination seminars followed each survey. Each seminar included a discussion of the priority intervention strategies identified by counterparts. VITAL provided follow-on program design assistance in some cases, including Uganda (Kamuli District Pilot Project), Bolivia (National Vitamin A Program), Dominican Republic (Solar Drying), Kiribati (National Strategy design, planning and evaluation), the Solomon Islands (National Strategy). In Guatemala and El Salvador, VITAL's role was to assist host country counterparts to use the strategy development exercise as a catalyst that could be used to generate awareness and support for action in the future.

Program needs assessments were conducted in Honduras and Nepal, although neither country undertook a prevalence survey. In both of these countries, VAD prevalence had already been determined to be serious enough to warrant intervention, and the respective USAID missions and MOHs had made commitments and arranged for funding to support national program planning and implementation. Responsibility for funding and supporting the management of these two national programs was assumed by VITAL in early 1993. (See Annex 4 for detailed descriptions of these programs.) In both cases, local NGOs (one in Honduras and five in Nepal) were enlisted to implement the program assistance, and the MOHs in both countries played a direct and major role in implementation. In both cases, the programs were launched with sufficient operational experience to ensure their viability and acceptance by counterparts, and in good shape to be handed over for continued support by other A.I.D. nutrition field support projects, ISTI/IMPACT in the case of Honduras, and JSI/OMNI in the case of Nepal.

In Kiribati, VITAL engaged in a three year collaboration with the Foundation for the Peoples of the South Pacific (FSP) and the Ministry of Health of Kiribati for the National Vitamin A Deficiency Prevention and Control Program. VITAL provided technical assistance over the course of the three years, and the MOH has integrated the program into its service delivery strategies.

Program monitoring was a major element of the Honduras and Nepal programs. Outside consultants were used to prepare monitoring and surveillance systems, and these systems have been tested and put in place. VITAL also provided technical assistance to design and introduce monitoring systems in several other countries (Bolivia, Malawi, Haiti, Kiribati). Subcontractor CSF provided technical assistance to USAID/India to include vitamin A in the ICDS monitoring system.

Evaluations of several programs, including the NOVA project in Haiti, IEF Guatemala, and FSP Kiribati, were conducted at the request of the program implementors or USAID missions.

For several large activities, VITAL provided technical assistance in logistics and supplies. In Nigeria, various supplies and materials, totalling approximately \$100,000, were provided and delivered for many of the surveys.

In Nepal, the national vitamin A program focused in the first year on implementation of capsule distribution in priority districts through semi-annual campaigns. Implementation of these campaigns involved training over 20,000 community health volunteers in 12 districts to distribute capsules, teach nutrition education and record doses for monitoring.

LESSONS: Strategy and Program Development

1. Assistance is most effective when provided from inception of the strategy planning process, ideally immediately after an assessment of the situation is made through a survey or analysis of existing data. Program design assistance is welcomed when provided in the form of suggested options with full discussion of their pros and cons in contrast to presentation in a prescriptive manner which tends to generate passive resistance. Cultural sensitivities and respect for local counterparts' skills and experience are very important factors that must be observed. Program planning must be done with groups responsible for implementation to assure ownership and follow-through.
 2. Additional donors should be involved in the strategy and program planning process to assure continued access to technical and financial support and capsules, when called for.
 3. The responsibility for managing national vitamin A programs is a major undertaking that a centrally funded, Washington-based project should only take on if well represented and staffed in-country. The services of national private organizations with experience doing similar work, the commitment of the USAID mission and government agencies can greatly help.
 4. Program management in most countries involved continual education and lobbying of policy-makers. Over the course of VITAL's involvement in countries such as Bolivia and Nepal, governments changed and MOH staff implementing the vitamin A programs were replaced.
 5. Monitoring systems should be simple, brief and collect only data which can be utilized to improve the program and monitor impact. Data collection should be conducted by program implementors, to increase the investment of these workers in accurate reliable data and timely feedback. Computer systems, if used, should be simple and easily maintained by local staff. Report writing and data interpretation skills need to be developed by staff to make the data collected useable and accessible by the policy-makers in the form of clear reports and presentations.
-

What remains to be done:

1. Continued implementation of the Nepal National Vitamin A Program in order to maintain the considerable momentum achieved to date.
2. Implementation of the national strategy and program in Bolivia, planned and defined with VITAL assistance.
3. Design and implementation of effective national programs in Ecuador and Nicaragua, where vitamin A and iron status have been determined to be significant problems.

III. VITAMIN A INTERVENTIONS AND COLLABORATIVE INQUIRIES

Although VITAL's major areas of emphasis were sensitization, surveys and strategy development, assistance aimed at testing, refining, or expanding interventions was also provided to a number of field projects. Per the contract's mandate, emphasis was placed on dietary interventions, although technical support was provided to a broad range of intervention programs.

A. Distribution of High Dose Supplements

Distribution of high dose supplements to pre-school children was the principal intervention strategy employed in field programs when the VITAL project was established. The effectiveness of this intervention in preventing xerophthalmia had been clearly demonstrated, and its contribution in reducing the risk of mortality was becoming clear. However, there was strong debate among experts as to the degree to which countries and donor agencies should rely on supplementation in their efforts to combat vitamin A deficiency over the long term. Universal supplements distribution has been considered to be an appropriate short-term preventive intervention, whereas food fortification and dietary based interventions are generally considered to be more sustainable over the long term.

The VITAL project intended to support national efforts to initiate or strengthen supplementation programs where appropriate and to pursue some of the "collaborative inquiry" topics concerning supplement delivery methodologies that were identified in the contract. But, in concert with the Nutrition Office, VITAL placed higher priority on the pursuit and support of long-term dietary solutions to the problem, in part at least, because this aspect had received less attention in the past.

During the course of the VITAL project, research findings confirmed the efficacy of using high dose supplements in the case management of measles and diarrhea (less conclusive regarding acute respiratory infection). Consequently, a special effort was made to disseminate technical information about the use of supplements for case management of these diseases and to introduce the practice into national programs. This included the use of the supplements for treatment of xerophthalmia and severe malnutrition, a practice that had been recommended for some time. Assistance was also provided in support of large-scale universal distribution of capsules.

- As part of orientation and training materials on interventions, a review of current **supplementation protocols** was conducted. This revealed differences among WHO, IVACG, Johns Hopkins and country program guidelines. VITAL developed two sets of slide/overhead presentations — one on alternative protocols within the context of steps needed to develop a supplementation program, and another on measles case management. Through a process of extensive review and presentations/discussions with experts and practitioners, consensus was achieved on appropriate recommendations.
- In response to a need for training materials for the universal capsule distribution

component of Bolivia's national program, **supplementation program guidelines** were developed and adapted for use by district health staff. These materials were later adapted for use in Honduras.

- In Kenya, as part of the A.I.D. Measles Initiative, VITAL's measles case management guidelines were adapted for use by Ministry of Health staff in Kisumu and Siaya Districts and incorporated into a training module under the Kenya Expanded Program on Immunization. See Figure 2.

Figure 2. Adaptation of VITAL's Measles Module

April 1993
Measles Initiative
Kisumu and Siaya



TRAINING OBJECTIVES

- emphasizing the importance of measles control in Kenya;
- introducing the concept of a standard case definition for measles;
- reinforcing the principles and skills needed for effective measles case management;
- describing the purpose and instructing in the use of vitamin A for measles case management;
- outlining roles and responsibilities of staff involved in using vitamin A for measles case management.

Source: *Vitamin A for measles case management*, Measles Initiative, Office of Health, USAID, April 1993.

- VITAL's support to the Nepal National Vitamin A Program was directed primarily toward planning, implementing and monitoring universal distribution of high dose capsules to children 6-60 months through the MOH's community health volunteers. Over one million children were dosed in the first year of the program, even as operational issues were being encountered and addressed. Coverage rates for the October 1993 campaign were 90% for 522,000 children — a remarkable achievement for Nepal.
- Bolivian MOH staff were trained to plan, implement and monitor universal distribution to 30,000 pre-school children in selected high-risk districts that had been identified by the 1992 prevalence survey supported by VITAL. The La Paz Children's Hospital carried out a collaborative inquiry to define vitamin A treatment norms for hospitalized children.
- In Honduras, the training and implementation of universal distribution to preschool children and postpartum women in three high risk health districts as part of the national micronutrient program was implemented by the MOH with VITAL's support via IEF. In mid-1993, VITAL assisted the MOH (Divisions of Epidemiology and Food Control) to prepare a micronutrient monitoring and surveillance system which included the capsule distribution component.
- Based on findings from the Kamuli District Vitamin A & Blindness Survey in Uganda, the government prepared plans for a pilot project in this district to improve the vitamin A status of pre-school children. VITAL assisted the MOH team to design and prepare training materials and the curriculum for the supplement distribution component of this program. The component included universal distribution with the ongoing EPI program and use of capsules for case management of measles, diarrhea, malnutrition and xerophthalmia. The pilot project is proceeding with UNICEF support and is to be the precursor of a national micronutrient program.
- An evaluation of the universal supplement distribution program implemented by the PVO Eye Care in Haiti was conducted. In 1993, a review of the vitamin A supplement distribution programs of the U.S. PVOs coordinated by the umbrella organization PROVAX was conducted, and the preparation of an improved supplementation program monitoring system that PROVAX could use to plan and monitor these programs was developed.

LESSONS: Supplements

1. Supplements remain an important intervention strategy for countries where vitamin A deficiency is a serious public health problem. In addition to quickly addressing a documented problem, supplement programs are often a more concrete intervention strategy for governments to adopt, with measurable indicators of success, than many dietary interventions.
2. Successful implementation requires substantial resources in planning, training, and mobilization and commitment to an assured supply of capsules. Inadequate planning and poor implementation (procurement, distribution, training, monitoring and supervision) have prevented attainment of projected coverage. For example, transportation of field teams and timely distribution of training allowances can be critical (and costly) elements of the capsule distribution program. In Nepal, a subcontracted local agency provided invaluable assistance in managing the large numbers of small allowances provided at training, transport of materials and capsules to the field.
3. Non-medical staff can effectively and safely deliver capsules to the target population.
4. Pregnant and lactating women remain an under-served population at risk for vitamin A deficiency in many supplementation programs.
5. Where NGOs are providing supplements in the place of a government (i.e., Haiti), without effective coordination gaps in coverage are likely to occur.
6. Case treatment protocols are not well known by in-country health care providers. Training in treatment of xerophthalmia, diarrhea, malnutrition and measles with vitamin A should be conducted as an immediate strategy where vitamin A deficiency is found to be a problem. Availability of capsules also needs to be addressed.
7. There is an urgent need for updated guidelines from IVACG/WHO on the appropriate use of vitamin A supplements for treatment of related childhood illness.

What Remains to Be Done:

1. Testing in several LAC countries of the LAC Supplementation Program Guidelines (Mora, Eastman & Orellana) prepared for Bolivia and Honduras and now in their final form. Such testing would determine their suitability for use in multiple countries. Translation of these Guidelines back into English, and into French, for use elsewhere.
2. Promotion of the application of the Measles Case Management Module in all A.I.D.-supported countries in which measles cases still occur. This module has proven to be very suitable for use in many countries, and VITAL has distributed the module to all U.S. PVOs, all LAC country pediatric societies, many ministries of health and private health and nutrition professionals in less developed countries and other donor agencies.

B. Food Technology and Fortification

Two distinct avenues of inquiry were pursued under this component:

- a) The enhancement or extension of vitamin A availability in commonly consumed foods through drying and cooking methods; and
- b) The addition of vitamin A to foods through fortification.

Initially, demand for assistance with vitamin A fortification was limited, in part because VITAL was heavily engaged in supporting prevalence surveys and had not yet reached the point of program and intervention-specific activities in most countries. However, there was considerable interest in investigating improved methods of preserving or preparing vitamin A-rich foods to increase dietary intake.

- By 1992, VITAL identified a need to review the state of the art in vitamin A fortification in less developed countries as a prelude to initiating support for programs in Latin America. By then, the project was beginning to support a national program in Honduras, where the government wanted to strengthen and expand sugar fortification, and in Bolivia, where the government wanted to start fortifying sugar with vitamin A, based on findings of the survey.
- Solar drying projects were initiated in Haiti, Dominican Republic, Niger, and Tanzania; a weaning food made from dried sweet potato was developed in Guatemala; and a study of the effect of improved cooking, storage, and preservation techniques on the carotene content of foods and the seasonal variations of beta carotene content of the foods was conducted in three SEARO countries. This multicentric study was conducted by the National Institute of Nutrition (India), Nutrition Research and Development Centre (Indonesia), and The Institute of Nutrition at Mahidol University

(Thailand). Based on the findings of this study, these institutions intend to develop methodologies for communicating to the communities recommendations for adopting those practices which retain the most beta carotene. Results from the Thailand study are given in Figure 3 below. This study has generated tremendous interest. At the West Africa Region Vitamin A Conference in Ghana, for example, interest was expressed in replicating the SEARO study in the African context, and many requests for assistance were received. Unfortunately, since this conference was held near the end of the project, VITAL did not have the time or resources to provide the requested assistance. An assessment of the food preservation activities was conducted at the end of the project to identify lessons learned, to provide feedback on transferability of the technology and to indicate future efforts for use of the technology. Programs were found to be highly successful in terms of implementation strategies, transfer of skills, and sustainability.

Figure 3. Carotene Content of Raw and Processed Foods

Cooking	Temperature and Time	Vitamin A Content (RE/100g)		
		Raw	Cooked	% loss
Boiling				
Chicken liver	77c. 8'	8463.0	7585.2	10.4
Chicken egg	98c. 10'	275.9	232.7	15.7
Frying				
Chicken egg	184c. 2'	275.9	142.8	48.0
Swamp cabbage	190c. 3.5'	155.9	126.0	19.2
Blanching				
Swamp cabbage	100c. 5'	155.9	147.2	5.5

Source: *Effects of preparation and preservation techniques on vitamin A content of commonly consumed foods in India, Indonesia and Thailand*, VITAL Report No.TA-29, April, 1994.

■ In India, CARE developed a plan for field testing the **stability of vitamin A added to vegetable oil** as a vehicle for assuring adequate vitamin A intakes. The objective was to determine the stability of oil fortified with vitamin A under the transportation and storage conditions of CARE-India's program. Concurrently, analyses of vitamin A levels in corn soy blend (CSB) were undertaken at different times and points in the food delivery system, in order to compare the stability of vitamin A in CSB with vitamin A in oil. Thirty-five 20-liter pails of fortified soybean oil and 200 twenty-five kg. bags of CSB were tracked from their point of departure from U.S. packaging sites to their point of distribution in Indian villages. A high degree of variability was found in vitamin A levels in different batches of CSB arriving in India, with average values ranging from approximately 200 to 2,000 μg per 100 grams of CSB (compared with specified levels of approximately 600 μg per 100 grams). See Figure 4. Vitamin A levels in fortified oil samples taken at different times during transportation and storage showed that a high proportion of vitamin A activity was retained in oil through the five-month study period under conditions of high temperatures and humidity. Vegetable oil appeared to be a viable vehicle for vitamin A, both in terms of ease of attaining a uniform blending of vitamin A fortificant with the oil, and the stability of the vitamin A during storage and transportation.

Figure 4.
CARE/INDIA OIL FORTIFICATION STUDY:
Variability in Vitamin A Levels in Corn Soy Blend Samples

Ports	Laboratories			
	<u>Univ. Maine</u> mean \pm SD	n	<u>NIN</u> mean \pm SD	n
Madras 6/8/93	189 \pm 100	7	210 \pm 178	10
Vizag 6/12/93	479 \pm 270	5	674 \pm 119	10
Jamnagar 6/2/93	2169 \pm 888	9	2044 \pm 1298	10

Source: Sanghvi, Tina G., et al, *Stability of vitamin A in fortified vegetable oil and corn soy blend (CSB) used in child feeding programs in India*, VITAL, May, 1994.

LESSONS: Food Technology and Fortification

1. There is a lack of information about the impact of food processing and preservation activities on the nutrient content of foods which are consumed. Tremendous interest in obtaining this information exists in many countries.
2. Solar drying is an appropriate technology for preserving foods rich in vitamin A, such as mangos, papayas, sweet potatoes, carrots and green leaves. In areas where vitamin A-rich foods are seasonally available or expensive, small-scale gardening and simple food preservation can assure that important foods are available year round.
3. Building consensus among the public sector and the food industry is as critical as initiating legislation to achieve appropriate micronutrient fortification of foods. Past attempts to enforce legislation without building strong partnerships with industry have failed.
4. In dealing with the food industry about fortification governments must demonstrate the seriousness of the nutritional problem, describe options, highlight benefits for the industry (not only economic, but also image and social conscience) in order to generate their commitment to participate. Individual companies may decide to fortify to obtain a competitive advantage over others. This is now evident in Latin America.
5. Government agencies often expect, and stipulate, that fortification costs be absorbed by the food companies, from their profits. We have found that this is unrealistic, and unnecessary. Companies have successfully passed the marginal costs on to consumers, most easily when prices are already rising from inflation.
6. In order to obtain and maintain strong industry commitment to fortification, governments and donors must provide high quality, practical technical assistance, training and information.
7. Attention needs to be paid to attaining a more uniform and consistent vitamin A content in Title II commodities such as corn soy blend. Resources would be well invested in more systematic monitoring, and in additional product development and testing. If studies under more controlled conditions confirm that vitamin A is significantly better retained in vegetable oil than in CSB, there may be significant cost savings to using oil.

What remains to be done:

1. Aggressive pursuit of commercial and private sector initiatives. Production of vitamin A-rich weaning foods, preservation of seasonal foods and fortification of frequently consumed foods offer excellent opportunities to increase the availability and consumption of micronutrients, and encourage sustainability.
2. In solar drying, finding ways to incorporate dried foods into diet; development of weaning foods using dried products; finding ways to monitor consumption to assure impact; developing marketing strategies to encourage sustained production, and access by non-producers. With continued support, the promising initiatives begun in Haiti, Dominican Republic, Tanzania and Ghana could become self sustaining.
3. Strengthening of current monitoring and quality control of compliance by producers with USDA specifications in order to ensure that the potential of PL 480 Title II commodities to provide an important vehicle for delivering micronutrients to high risk populations is realized. Examination under controlled conditions of the consistent mixing of and stability of vitamin A in CSB. Vegetable oil may be a more cost-effective vehicle for vitamin A for programs in India, and possibly elsewhere.
4. Exploration of the suitability of the Bolivia sugar fortification initiative begun with VITAL support as a model for other South American countries that are contemplating a similar strategy, e.g. Ecuador.
5. Continuation of the work begun by the three SEARO Nutrition Research cum Action Network institutes (INMU, NIN, NRDC) to determine the effects of food preparation, preservation, and storage methods on the carotene content of commonly consumed foods. The preliminary findings of this study suggest that nutritive values of those foods varies widely by method and season. Wide dissemination of these and future findings to program planners and designers of nutrition communication messages in order to enhance the design and implementation of effective interventions.

C. Horticultural Approaches

Based on recommendations of the 1988 evaluation of the R&D/N Vitamin A for Health Project, the topic of gardens/horticulture approaches was identified as one of the priorities for "collaborative inquiries" or "interventions" projects. Essentially, two questions needed to be addressed: 1) Can gardens projects have significant impacts on consumption of vitamin A (beta carotene) rich foods, and vitamin A status? and 2) If yes, how should they be planned and managed to ensure the desired outcomes?

In 1990, VITAL reviewed the existing published and unpublished literature and gathered information on the program implementation experiences of U.S. PVOs, UNICEF, A.I.D., and Peace Corps through site visits and interviews with staff members. Findings were published in VITAL report TA-2, "The Tip of The Iceberg, Garden Assessment — Implementation Experience." The existence of multi-purpose garden projects, some nominally for vitamin A purposes, was found to be widespread, but while useful information and recommendations were found about implementation issues, very little evidence of consumption or nutritional outcomes was available. The projects had not been designed, or evaluated, to document these impacts.

VITAL subcontractor, The University of Arizona, conducted a review of the published literature on gardens and published a literature review and annotated bibliography (Home Gardening Bibliography, IN-1, and Home Gardening Synthesis Document, IN-2). The Arizona reviewers identified many gardens studies and projects, but very few that attempted to show a specific impact on vitamin A status, and most of these represented small-scale, pilot efforts to encourage gardening. Some projects showed that indigenous, non-project gardens provided significant amounts of vitamin A, while others showed that gardens improve household nutrition, although no specific reference is made to vitamin A nutriture.

While these review reports provide valuable information about garden project experiences, most revealing was the finding that project sponsors and implementors have rarely planned and carried out the projects in ways that could identify and quantify nutritional (especially vitamin A) impacts. It was concluded that the question "Can garden projects have a significant impact on consumption of vitamin A rich foods?" remained unanswered. Efforts then began to identify programs with an interest in evaluation which could lend themselves to an assessment of consumption impacts.

- In collaboration with FAO, a garden program was initiated in Niger. Other components included nutrition education and solar drying. The education component was designed by a Nigerien communications expert and utilized rural *animatrices* to deliver nine priority messages. Baseline and follow-up surveys were undertaken using the IVACG modified dietary methodology, and a monitoring system was designed to track progress.
- In **Bolivia**, the garden/nutrition education project reached several hundred families with community, school and community gardens which were immensely popular. The

agricultural effort was complemented by health fairs, radio spots and programs, recipe competitions and appropriate training and promotional materials. A seed bank was established at the local vocational school and students are to provide technical assistance to new communities in order to continue the project activities. The MOH evaluation of vitamin A activities in Bolivia found that the project was extremely promising and recommended that it be replicated throughout Bolivia by other NGOs.

- **A CARE - Nepal** activity began as a collaborative inquiry to determine if gardening activities could increase consumption of vitamin A-rich foods. Following a baseline survey in April 1992, CARE agriculture staff were trained in vitamin A nutrition, and became eager promoters of improved nutrition. CARE found the project so successful that it has been expanded into new districts, and CARE has developed primary health care initiatives around the nutrition activities, as part of the Nepal National Vitamin A Program. Gardens were found to be a useful entre to a new community, since in a few months there are products from the gardens and a rapport with the community can develop. An evaluation of the original sites is planned for April 1995.

- **The Food & Nutrition Research Institute - Philippines** requested assistance to evaluate the National Family Food Production Program's (agricultural extension) home gardening component. The objective was to evaluate the contribution of this intervention to consumption of vitamin A and other micronutrients. Over 400 preschool children in 210 gardening and non-gardening families were evaluated for vitamin A and iron consumption and nutritional status. Although households with gardens had significantly lower socioeconomic status indicators, the vitamin A intakes of preschoolers were similar across groups. Vitamin C consumption among garden households was significantly higher.

- **Project HOPE in Guatemala** promotes gardens in combination with nutrition education as one component of its child survival activities in Quetzaltenango and San Marcos districts in communities with a high prevalence of vitamin A deficiency. Assistance was provided to evaluate the impact in these districts through a household survey of 300 gardening and 300 non-gardening households in an adjacent area. Results suggest that significant improvements can result from a combined gardening and education program. Household availability of vitamin A rich vegetables produced in gardens, number of days on which the foods were consumed each week, and the reduced risk of vitamin A inadequacy in children's diets were consistently higher in project areas than in non-project areas. Factors which may have contributed to this positive outcome include the tendency of the garden households to retain the produce for consumption, and the effect of nutrition education which promoted consumption by children of vitamin A rich foods.

LESSONS: Gardens

1. Promotion of home and community gardens can increase consumption of vitamin A rich foods by preschool-age children and reduce the dietary risk of vitamin A deficiency.
2. The emphasis placed on nutrition education is an important factor in the impact of gardens on vitamin A consumption.
3. Nutrition education messages should promote consumption of both garden produce and other naturally available vitamin A sources.
4. Diligent and successful propagation and maintenance of gardens remains a critical issue.
5. The Simplified Dietary Assessment methodology can be successfully used for evaluating differences in dietary risk as part of garden program evaluations.

What remains to be done:

1. Documentation of the costs and impacts on consumption of nutrition education alone versus gardens plus education programs through operational research.
2. Documentation of the current experiences in Niger, Bolivia, and Nepal which were supported by VITAL. Continued support to those projects would likely enable them to demonstrate impacts on consumption of vitamin A rich foods and to become self-sustaining.
3. Determination of the feasibility of incorporating small-animal, fish and/or poultry production with garden programs. Questions to be answered include: What are the necessary conditions (Who? Where? When? How?)? What are the costs and the potential for sustainability?

D. Social Marketing and Nutrition Education

A.I.D.'s 1988 vitamin A portfolio evaluation had, among other things, identified nutrition education/social marketing as another potentially important vitamin A program intervention which had not yet demonstrated clear impacts on increased consumption and vitamin A status. The evaluators recommended that R&D/N issue, through its new Vitamin A Field Support Project, guidelines on the development and evaluation of such activities. As with gardening, the VITAL's first step was to conduct a review of all project experiences to date to identify those projects that had achieved these desired results. In 1990, VITAL subcontractor, PATH, conducted the assessment, which included an extensive review of reports of vitamin A nutrition education/social marketing projects and some site visits (*Getting Out The Message: A Review of Communications Strategies for Promoting Vitamin A Interventions*, Judi Aubel, IN-3). As in the review of gardens experiences, no project able to demonstrate concrete consumption and vitamin A status impacts resulting directly from the communications interventions was found. Furthermore, most projects were not even designed so as to be able to demonstrate impact. Nevertheless, the review concluded that full community participation was most important for success, and that projects should include strong interpersonal, community-based strategies, and use mass media where appropriate to support the interpersonal communications.

Nutrition education was an important component of all the long-term intervention activities in which VITAL was engaged. For example, nutrition education was a prominent component of the training and support activities carried out under the solar drying projects in Haiti, Dominican Republic and Tanzania. Nutritionists visited each project to coordinate and encourage recipe contests, the development of weaning food preparations and experimentation with ways to incorporate the foods into the diet. Likewise, gardening activities in Nepal and Bolivia included nutrition education as an important component of garden promotion. Training activities in supplementation and case treatment for measles and other childhood diseases with vitamin A (Bolivia, Nepal, Honduras, Kiribati) included a strong focus on appropriate foods and child feeding practices. Training/orientation modules focusing on these nutrition education strategies were developed.

In general, VITAL's strategy vis-a-vis this intervention was not to initiate new stand-alone nutrition education/social marketing projects but rather to incorporate nutrition education and communications components in the programs requiring them and then to provide appropriate technical inputs. However, opportunities for such inputs did not materialize until 1993 when VITAL was already winding down its activities in the face of severe level of effort constraints. Nevertheless, the project did support a number of local nutrition communications efforts in conjunction with intervention programs. Activities which specifically focused on nutrition communications were carried out in Bolivia (carrot consumption, vitamin A-fortified sugar), Niger (gardening), Nepal (promotion of vitamin A-rich foods), Honduras (fortification and nutrition education) and in Kiribati and the Cook Islands (promotion of vitamin A-rich foods). In Honduras, a local communications specialist was provided by VITAL to strengthen the MOH Health Education Division to enable it to develop and implement a micronutrient information, education and communication strategy including mass media and interpersonal techniques in

support of the capsule distribution and food fortification components.

LESSONS: Communications/Social Marketing

1. Stand alone nutrition education projects are not likely to have as much impact on dietary modification as nutrition education activities associated with, and supporting, more visible interventions, such as gardening or food preservation.
 2. Monitoring the impact of nutrition education activities alone, within a multi-component program is difficult and may be unnecessary.
 3. Nutrition education (i.e., promotion of dietary modification) is an important component of training in case treatment and supplementation; contacts with high risk families during supplement distribution have not been fully utilized for providing messages on dietary sources.
 4. Nutrition education activities were effectively conducted by agriculture workers and other non-health workers in a variety of settings. These field workers offer an important (an often untapped) network to promote increased knowledge and improved nutritional practices.
-

What remains to be done:

1. Careful monitoring of the impact of future nutrition education activities. Such careful monitoring was not undertaken by VITAL, due to the short length of time during which nutrition education activities were carried out. Development of tools to monitor the impact of nutrition education, especially for program implementors such as ministries of health and NGOs.

IV. INFORMATION GATHERING AND DISSEMINATION

This component emerged as an extremely important, integral part of VITAL's overall strategy for achieving project objectives. The contract scope of work and budget reflected the recognition that awareness of the importance of the VAD problem and of ways of dealing with it would have to be vastly increased among developing country and A.I.D. mission staff if vitamin A nutrition components were to be incorporated in country nutrition and child survival programs. VITAL thus employed its resources aggressively to sensitize and raise the awareness of critical target audiences.

A. Library and Documents Acquisition

So as to avoid unnecessary redundancy, VITAL first reviewed the collections of other organizations involved in vitamin A nutrition work (Johns Hopkins University, Helen Keller International, UNICEF and APHA) to identify the documents already being maintained. Although each institution had important materials of use to its specific needs, there was no comprehensive collection of vitamin A nutrition materials oriented toward supporting this project's objectives — a combination of programmatic, intervention materials and related technical literature. Thus, collection of such materials from numerous sources was undertaken, starting with the extensive and very relevant collection of the A.I.D. Nutrition Office. The collection was organized by topic, country and institution. The bibliography was maintained on PROCITE software for archiving and access. Almost 2,000 items, plus some additional acquisitions that were not yet entered into the bibliography, were in the collection as of March 1994. This library proved to be very useful to VITAL staff and consultants for project work as well as to many others who requested documents from it.

B. Training Materials

Although opportunities for direct support to program implementation did not, by and large, materialize until VITAL's fourth year, host country contacts brought to the project's attention the severe shortage of appropriate training materials for vitamin A nutrition programs during its earliest days. Such materials included awareness-building materials intended to inform policy makers and others of the nature and severity of the problem and measures that could be taken, and technical-skills oriented training materials for health and nutrition professionals and field workers.

Based on this feedback, VITAL proceeded to prepare materials that could be used in any country to increase understanding of key vitamin A issues and how to deal with them. The first such document was "Vital Nutrients," which explains issues in non-technical terms and has proven to be very popular for various audiences, technical and non-technical. VITAL distributed several hundred copies of this document in English, French and Spanish.

For more detailed training or orientation on specific aspects of vitamin A nutrition programs,

five training/orientation modules were prepared for use at workshops or for training of trainers courses, and adapted to suit country-specific requirements. The following modules were produced and distributed to specific targeted groups in English, French and Spanish: "Vitamin A Update," "Supplements," "Dietary Approaches," "Fortification," and "Vitamin A Case Management of Measles." These modules include technical reference materials, slide sets or overheads with text, graphs and photographs, accompanied with trainers' "talking points." The modules have been used by VITAL staff and consultants for orientation and training at national and regional workshops, (Cameroon, Uganda, West Africa Conference, Ecuador) and for training of national program staff (Honduras, Bolivia, Nepal). In addition, VITAL received and filled requests for over 1,500 modules from numerous countries. Some modules were distributed with slides and some with handouts and charts to be made into transparencies for use with overhead projectors.

C. Mailing List

A core mailing list was developed starting with A.I.D. staff in Washington and all overseas missions, and then expanding to other donor organizations, PVOs, and other organizations and individuals involved in vitamin A nutrition work in less developed countries. Subsequently, the list was expanded from contacts made through conferences and workshops, inquiries resulting from announcements about the project in *The Xerophthalmia Club Bulletin*, *Vitamin A Sieve*, *Vitamin A News Notes* (HKI) and other sources. By the end of the project there were over 1,300 names on the list. It formed the basis for the distribution of *VITAL News*, and was frequently used for more limited distribution of other documents. It was maintained on DBase3 software making it easily accessible by region, A.I.D., organization, and country.

D. VITAL News

The newsletter was first published in the spring of 1990 and served as the project's primary vehicle for disseminating information about vitamin A deficiency and methods for combating it. Nine issues were published, and distribution reached over 1,200 individuals in 86 countries. Lead stories included nutrition communications, vitamin A in measles case management, vitamin A status and programs in each of the target regions (Africa, Asia and Latin America and the Caribbean), important conferences such as the ICN, "Ending Hidden Hunger" and IVACG meetings, linkage of vitamin A to primary health care and to breast feeding, and the production and consumption of vitamin A rich foods.

E. Reports/Documents Preparation & Distribution

Synthesis of available literature and work performed by VITAL and others was widely distributed to developing country organizations, nutrition and health officials, programmers, and researchers, A.I.D. staff, NGOs and others about the vitamin A problem and programs.

Initially, the focus was on identification and distribution of available materials, including "Vitamin A Deficiency and Childhood Morbidity and Mortality: Scientific Background and Implications for Child Survival," Gadomski and Kjolhede, Johns Hopkins University, 1988; journal articles reporting on field trials findings from Indonesia (Sommer, et al), South India (Ramathula, et al), Hyderabad (Reddy et al), Nepal (Daulaire, et al), various IVACG publications, etc. As feedback was received from the field, the need for: a) documents that explained the problems and interventions in basic and clear terms; and b) "state of the art" reviews (gardening, social marketing, food fortification) became apparent. VITAL's most popular document was "Vital Nutrients." A complete list of reports and documents prepared by VITAL is attached as Annex 3.

Many thousands of copies of documents, reports and training modules were provided to a global audience, all of whom are included in the mailing list. VITAL distributed and showed demonstration copies of some of the documents at international meetings (IVACG, Montreal "Ending Hidden Hunger," LAC region meetings, West Africa meeting, and country-specific survey dissemination workshops. Each occasion yielded many requests for additional copies and to be placed on the mailing list. Also several international organizations requested multiple copies of some documents to distribute to their field offices and for workshops. UNICEF requested 400 copies of the two "Economic Rationale" booklets to send to all of its field offices. HKI/Philippines requested several hundred copies of "Food Fortification" for use at a government-sponsored conference on micronutrients. In addition, VITAL responded to several ad hoc requests for specific vitamin A and micronutrient information from individuals and institutions. These requests could usually be filled from VITAL's own document collection, but sometimes required contacting other organizations such as Helen Keller International (HKI), Johns Hopkins, National Library of Medicine or other libraries.

F. Vitamin A Status and Programs Database ("Vitamin A Facts")

Initially, a database was established to identify and track A.I.D.-funded vitamin A project activities, including projects managed by AID/Washington and overseas missions and implemented by host country governments, PVOs, universities and contractors. An important objective was to be able to inform A.I.D. about the size, location and content of its vitamin A program worldwide, and to enable the Nutrition Office to respond rapidly to inquiries about the program. This database proved difficult to maintain because the information was difficult to obtain and interpret and because the information needs of A.I.D. often did not match the way the information was maintained. VITAL attempted to maintain both program funding information and descriptive information, but was never able to develop an adequate system that could be regularly updated. As a result, the project usually had to respond in an ad hoc manner to program status information requests.

Establishment of a set of country "fact sheets" was more successful. These fact sheets included vitamin A status information, country policies and programs, A.I.D. and other donor agency programs, and the VITAL project activities in each country. These "Vitamin A Facts" were

distributed widely and proved to be useful to A.I.D. and other organizations and individuals around the world. In particular, UNICEF requested multiple copies each time they were updated.

LESSONS: Information Dissemination

1. There is a great demand in less developed countries, and among donor agencies and organizations, for educational and training materials about vitamin A nutrition which can be used directly, or adapted for use, to inform and/or train policy makers, program planners and implementation staffs.
2. Extensive identification, collection and maintenance of information, and the preparation and effective dissemination of information and materials is very demanding and requires considerable time of well trained staff dedicated exclusively to that function.
3. The periodic newsletter, *VITAL News* was an effective means of communicating with a large number of persons involved in vitamin A nutrition work worldwide. Feedback from readers confirmed the value of the communication, and greater interactive communications could have been achieved if more time had been devoted to it.

What Remains to Be Done:

1. Expansion of the information collection and dissemination work of VITAL to include appropriate micronutrient information.
2. Adaptation of the five training modules produced by VITAL for use in specific countries and their wide application in real program training settings. Review and document the experiences of the large number of donor and PVO organizations and developing country public and private sector institutions and individuals to which VITAL distributed the modules.

V. CONCLUSIONS

The VITAL Field Support project was the first coordinated and comprehensive phase of A.I.D. support aimed at a widespread application of known technologies, and development of linkages across a broad range of institutions and sectors, for the purpose of addressing the problem of vitamin A deficiency. It set the stage for a subsequent phase of activity, potentially consisting of an intensive or in-depth phase in pursuit of achieving documented reductions in micronutrient deficiency indicators in specific countries. The nature and timing of VITAL's work complemented the orientation and priorities of A.I.D. at the time, and of growing international recognition that reductions in micronutrient deficiencies are highly cost-effective. The key instruments employed through VITAL were sensitization and awareness raising, assessments for a more systematic documentation of the prevalence of vitamin A deficiency, large-scale information dissemination to increase the access of program and policy makers to new breakthroughs in this field, and support for concrete interventions and applied research in supplementation, fortification, food preservation, gardening and nutrition communication.

A brief summary of the project's principal accomplishments by region follows.

Latin America and Caribbean Region

- Unprecedented awareness of the significance of sub-clinical vitamin A deficiency (VAD) as a public health problem was generated, particularly among A.I.D. missions, governments, and the academic community. This was the result of systematic information dissemination through a number of channels, including *VITAL News* in Spanish, translation and distribution of many relevant documents, vitamin A training modules in Spanish, and technical presentations at three regional and ten national workshops in eight countries.
- As a result of such awareness generation, a number of countries carried out VAD assessments (including anemia and iron deficiency in some cases) followed by national workshops to discuss the findings and formulate action plans and strategies. VITAL provided substantial technical and financial assistance for these assessments, workshops and strategies in Bolivia, Ecuador, Dominican Republic, Nicaragua and Panama; and for preparing action plans in Bolivia, El Salvador, Honduras, and Guatemala. As of April 1994, Nicaragua and Ecuador were in the process of formulating detailed action plans.
- VITAL's technical and financial support for implementation action plans in Bolivia and Honduras has led to strong national commitments to combat VAD and to the initiation of concrete national programs in which A.I.D., PAHO, INCAP and UNICEF are participating. Both countries are pursuing fortification of sugar with vitamin A as a key part of their programs. These efforts will serve as pilot projects for other countries in the region.
- With active VITAL support, several NGOs in Haiti and the Dominican Republic demonstrated the feasibility of community-based solar drying of vitamin A rich foods as a sustainable

dietary intervention. With minimal continued assistance, A.I.D. could facilitate the dissemination of this simple technology to other countries in the region.

- The VITAL project made an important contribution toward making donor cooperation a reality in the region. It sought and worked out detailed arrangements for collaboration with WHO/PAHO, UNICEF and INCAP at the regional level, and most importantly at the country-specific project level. By so doing, the country programs received the best inputs available from each donor agency.

Africa Region

In the Africa region, the problem of vitamin A deficiency and how to deal with it were less well understood than in Asia and Latin America, and the human and institutional resources were less well developed. In the short time available, the VITAL project made the following contributions:

- Awareness among health and nutrition professionals, policy makers and scientists of the magnitude, severity and implications of vitamin A deficiency (VAD), and the need to develop interventions program was raised through dissemination of information and experience (ORANA, TDRC, INSAH), and the sponsorship of the participation of Africans in international or regional meetings.
- Evidence of the VAD problem and a basis for action was produced in Uganda, Cameroon, Nigeria, and to a lesser extent in Niger.
- Technical and institutional capabilities were strengthened through training for and experience in conducting surveys (Uganda, Cameroon and Nigeria) and planning intervention strategies and programs.
- VITAL demonstrated how appropriate uses of available, indigenous vitamin A rich foods can be used to improve vitamin A status through gardening with nutrition education in Niger and Uganda, and food preservation by solar drying in Niger, Tanzania and Ghana.

At this time, there exists a substantial group of African professionals interested in and prepared to participate in national efforts to address vitamin A deficiency and to collaborate with colleagues on a region-wide basis. However, many African governments are constrained from implementing serious intervention programs because of severe economic and financial problems, and will need external support for these efforts for some time. The VITAL experience demonstrated that substantial headway can be made despite severe constraints if the available and expanding local capacity to plan and carry out country-appropriate programs is tapped.

Asia Region

The nature of VITAL's contributions in the Asia region were, in large measure, determined by the circumstances peculiar to this region at the time. As noted earlier, most of the large Asian countries which had identified VAD as an important public health problem were already well engaged in national programs to address it, with technical and financial support from A.I.D. collaborators. This was the case with Bangladesh, Indonesia, and Philippines. India also had a national program underway, and, while Pakistan had no program, the A.I.D. mission was not interested in VITAL assistance.

Despite these circumstances, VITAL made four major contributions in the region:

- At the request of the RDO/South Pacific, VITAL helped to determine the extent of VAD in the South Pacific island nations supported by A.I.D. and generated considerable awareness of the potential problems it can cause.
- Because of the high level of nutrition research capacity in the region, VITAL was able to support several innovative applied research activities that contributed to attainment of the project's dietary agenda. The three-institute SEARO study not only generated important technical information, but perhaps more importantly, fostered a concrete collaboration among the three institutes which they intend to continue. The FNRI evaluation of the Philippines gardening program provided important information that can now be disseminated within and outside of the Philippines.
- With technical support from VITAL, CARE-India developed a plan for field testing the stability of vitamin A added to vegetable oil as a vehicle for assuring adequate vitamin A intakes by preschool-age children and pregnant and lactating women in its feeding programs. It was determined that vegetable oil is a viable vehicle for vitamin A — in addition to its stability during storage and transportation, there are physiological complementarities in combining vitamin A with oil, as the presence of fat in the diet enhances the absorption and utilization of vitamin A. Given the large scale of PL 480 Title II programs worldwide, this study makes an important contribution to the micronutrient status of children and women, while at the same time utilizing resources that are already allocated to these activities.
- With strong support from the A.I.D. mission and R&D/N Office, VITAL provided critical financial and technical support to the Nepal Ministry of Health to launch its national vitamin A program. The evolutionary process from research to operational research to national intervention program, supported by A.I.D. over a period of ten years, is perhaps instructive for other countries and donor organizations. The critical mass of technicians, planners and interested donor agencies, clear confirmation of the significance of the problem, and evidence that appropriate interventions could make an impact, all converged in 1993 to generate support for the national program. As of April 1994, the program reached eight districts, and successful models for planning, training, education and implementation were tested.

OVERALL LESSONS LEARNED

1. Strong support from A.I.D. missions is a key factor in fostering successful in-country activities. Active participation by the staff of the Nepal mission ensured continued support to the national program during disruptive government reorganizations. In Haiti, vitamin A was included as humanitarian assistance by the mission during the embargo on A.I.D. activities, ensuring that field support for capsule distribution and solar drying activities could continue.
2. The ability to respond quickly and effectively to field requests is, at least partly, dependent on the existence of flexible subcontracting arrangements with local institutions. Strong support and assistance from key Nutrition Office and Contracts Office staff early in the project's life facilitated some important strategies to overcome some of the contract constraints.
3. The time and staff required to plan and backstop field activities should not be underestimated. VITAL found that in order to provide consistent supervision and support for the field work, one staff member should be given responsibility for each region.
4. VITAL's experiences in several countries showed that sustainable national programs require:
 - Awareness of and interest in the VAD problem by many groups in society (government officials, academics, NGOs, general public);
 - Skills building through training, operations research, and technical assistance;
 - Systems for ensuring that responsibilities are maintained and tasks are performed as planned; and
 - A critical mass of involved program participants which generates results, commitment and ownership
5. Breaks in funding are hard to recover from. Time, people, commitment, and credibility are lost and results may be compromised. Counterparts need to understand the financial procedures and the consequences of delays. Institutions that have access to sufficient resources to carry on the work in spite of inevitable cash flow problems may be the best counterpart institutions.
6. The assumption that expertise will necessarily lead to uniform high quality work is not always correct. Guidelines and performance specifications should be provided to all consultants and counterparts. Quality control procedures should be developed, and collaborators should be taught how to use them. As much practice, training and operations research as necessary should be conducted before undertaking actual program activities.

VITAL PUBLICATIONS LIST

<u>No.</u>	<u>Title</u>	<u>Author</u>
TA-1	Final Evaluation for the NOVA Project Eye Care/Haiti	McKigney et al.
TA-2	Home & Community Gardens Assessment Implementation Experience: The Tip of the Iceberg	Peduzzi
TA-3	Vitamin A Deficiency in the South Pacific: A Fact Finding Mission	Hawley
TA-4	Guatemala Vitamin A Intervention Project NutriAtol I	Herrera
TA-5	IEF/Malawi Vitamin A Project Management Information System	CSF
TA-6	Strategy for Vitamin A Interventions in Child Survival Programs in El Salvador	McKigney, Sanghvi
TA-7	Tuvalu Xerophthalmia Survey	VITAL
TA-8	Solomon Island Xerophthalmia Survey	VITAL
TA-9	Food Nutrification with Emphasis on the Addition of Micronutrients to Wheat Flour (Eng & Span)	Arroyave
TA-10	Evaluation of Interventions for the Control of Vitamin A in Guatemala (Eng & Span)	VITAL
TA-11	Evaluation del Programa de Vitamina A en la Republica de Bolivia	Alvarez
TA-12	Vanuatu Xerophthalmia Survey, July 4 - Aug. 21, 1991	VITAL
TA-13	Uganda Kamuli Pilot Project Plan	Mansour, McKigney
TA-14	Estrategia para el Control de las Deficiencias de Vitamina A	Mora
TA-15	Report of a Survey on Low Vision and Vitamin A Deficiency in the Extreme North Province of Cameroon and Proceedings of a Follow-on Seminar - Workshop	VITAL
TA-16	Vitamin A Status of Bulu and Pygmy Children in Southern Cameroon	OCEAC
TA-17	Papua New Guinea Hospital-Based Cross-Sectional Xerophthalmia Survey	VITAL
TA-18	Report of Xerophthalmia Prevalence Surveys in Five Districts of the Far and Mid-Western Regions of Nepal	VITAL
TA-19	Cook Islands Xerophthalmia Survey	VITAL
TA-20	Columbia Micronutrient Strategy	Mora
TA-21	Honduras Micronutrient Program Support in End of Project Status	Mora
TA-22	Niger Baseline Study	Mansour
TA-23	Development of Vitamin A-rich Weaning Food and Child Cereal from Dried and "Instantized" Sweet Potato Buds (SPBII), Guatemala	IEF/VITAL
TA-24	Review of USAID/VITAL Supported Vit. A Def. Surveys	Ross, Trowbridge

VITAL PUBLICATIONS LIST (cont.)

IN-1	Vitamin A Nutrition and Gardens - Bibliography	Univ. of Arizona
IN-2	Gardens and Vitamin A	Univ. of Arizona
IN-3	Getting Out the Message: A Review of Communication Strategies for Promoting Vitamin A Intervention	Aubel
IN-4	IVACG Guidelines for the Development of a Simplified Dietary Assessment to Identify Groups at Risk for Inadequate intake of Vitamin A	Horner
IN-5	Vital Nutrients (Eng, Span, Fren)	Sanghvi
IN-6	Second Regional Workshop on Vitamin A Deficiency in LAC (Eng & Span)	VITAL
IN-7	Vitamin A Fact Sheets (Africa)	VITAL
IN-8	Vitamin A Fact Sheets (Asia)	VITAL
IN-9	Vitamin A Fact Sheets (LAC)	VITAL
IN-10	Measles Case Management & Vitamin A - Module (Eng, Span, Fren)	Sanghvi
IN-11	Vitamin A Deficiency: An Update - Module (Eng, Span, Fren)	Sanghvi
IN-12	Economic Rationale for Investing in Nutrition	Behrman
IN-13	Food Fortification in Developing Countries (Eng & Span)	Nestel
IN-14	Tercer Taller Regional Sobre Deficiencias de Vitamina A y Otros Micronutrientes en Americas Latina y el Caribe, (Recife, Brazil)	VITAL
IN-15	West African Conference on Vitamin A Deficiency, (Accra, Ghana) (Eng, Fren)	VITAL
IN-16	Suplementacion con Vitamina A Guia para Programas en America Latina y el Caribe	Eastman, Mora
IN-17	Evaluation of the Impact of Home Gardening	Florentino, et al
IN-18	Vitamin A Mortality and Morbidity Studies	WHO/USAID/NEI
IN-19	Economic Rationale for Investing in Micronutrient Prgm (Eng, Span, Fren)	Sanghvi
IN-20	Solar Drying for Vitamin A (Eng, Fren, Span)	VITAL
IN-21	Fortification of Foods with Vitamin A - Module (Eng, Span, Fren)	Sanghvi
IN-22	Improving the Vitamin Content of Diets - Module (Eng, Span, Fren)	Sanghvi, Tisa
IN-23	Vitamin A Supplement Distribution Programs - Module (Eng, Span, Fren)	Sanghvi
IN-24	USAID's Vitamin A Program, 1965-1993	VITAL
IN-25	The Carotenoid Content of Foods with Special Reference to Developing Countries	West
IN-26	Stability of Vit. A in Fortified Vegetable Oil & Corn Soy Blend (India)	Atwood, et al
IN-27	Gardening: Niger	Mansour
IN-28	Gardening: Guatemala	Nestel, et al
IN-29	Gardening: Synthesis	Sanghvi, et al
IN-30	Solar Drying of Vitamin A-Rich Foods	Linehan

VITAL PUBLICATIONS LIST (cont.)

TR-1	Panama Trip Report	Mora
TR-2	El Salvador Trip Report	Mora
TR-3	Dominican Republic Trip Report	Mora
TR-4	Guatemala Trip Report	McKigney
TR-5	Haiti Trip Report	Linehan, Paddock
TR-6	Uganda Trip Report	Mansour et al.
TR-7	Uganda Trip Report	Mwandu
TR-8	Senegal Trip Report	Mansour
TR-9	Niger Trip Report	Mansour
TR-10	Burkina Faso Trip Report	Mansour
TR-11	Uganda	Mansour
TR-12	Zambia	Mansour
TR-13	Cameroon	Mansour
TR-14	Mali	Mansour
TR-15	Brazil	Mora
TR-16	Cameroon	Mansour
TR-17	Mali	Mansour/Pratt
TR-18	Cameroon III	Mansour
TR-19	Haiti	Mansour
TR-20	Honduras	Mora
TR-21	Panama	Nelson
TR-22	Nigeria	Nelson
TR-23	Nepal	Linehan
TR-24	Haiti	McKigney
TR-25	Kiribati	Eastman
TR-26	Solomon Islands	Eastman
TR-27	India	Carolan
TR-28	Honduras	Castrillo
TR-29	Mali	Mansour
TR-30	Nigeria	Haggerty
TR-31	Bolivia	Nelson
TR-32	Uganda	Mansour/McKigney
TR-33	Niger	Rioux
TR-34	Cameroon	Mansour
TR-35	Niger	Mansour

VITAL ACTIVITIES BY COUNTRY

	Prevalence Assessments	Strategy Development	Program Management	Data Collection (EPI)	Logistics and Supplies	Distribution of Supplements	Food Tech/Fortification	Horticulture	Social Marketing/ Nutrition Education
Cameroon	✓								
Niger *						✓	✓	✓	
Nigeria *	✓			✓					
Tanzania						✓			
Uganda	✓	✓							
Ghana						✓			
Bolivia *	✓	✓	✓			✓	✓	✓	✓
Dominican Republic *	✓					✓			
Ecuador *	✓								
Guatemala *		✓				✓c.i.	✓		
Haiti *		✓	✓	✓		✓	✓		✓
Honduras *			✓	✓		✓	✓		
Nicaragua *	✓								
Panama	✓								
Peru *	✓								
El Salvador *		✓							
India *						✓c.i.			
Indonesia *						✓c.i.			
Nepal *	✓	✓	✓	✓	✓	✓		✓	✓
South Pacific	✓	✓						✓	✓
Thailand						✓c.i.			
Philippines									✓c.i.

* A.I.D. Child Survival Emphasis Countries

C.I.: Collaborative Inquiry

VITAL PROJECT STAFF

1.	Robert Pratt, MBA	Project Director, (FT)	10/89 - 04/94
2.	Abeba Gobezie, MS	Deputy Director (FT)	10/89 - 05/90
3.	Mary Linehan, MPH	Assistant Director (FT)	11/89 - 04/94
4.	Tina Sanghvi, PhD	Nutrition Advisor (PT)	12/91 - 04/94
5.	Nancy Carolan, MA	Program Assistant (FT)	12/92 - 03/94
6.	Mohamed Mansour, PhD	Africa Nutrition Advisor (PT)	04/91 - 04/94
7.	Patricia Haggerty, PhD	Africa Region Program Officer (FT)	10/92 - 03/94
8.	Joan Sullivan, MS	Africa Region Program Officer (FT)	11/91 - 09/92
9.	Charlotte Johnson Welch, MS	Africa Region Program Officer (FT)	11/90 - 11/91
10.	Hamady Tall, BS	Africa Region Program Assistant (FT)	06/92 - 02/94
11.	José O. Mora, MD, MPH	Latin America Nutrition Adv. (PT)	04/90 - 04/94
12.	David Nelson, DVM, PhD	South America Nutrition Adv. (PT)	07/90 - 04/94
13.	Michele Dreyfuss, MPH	Latin America Program Officer (FT)	06/91 - 12/92
14.	Juana Rodriguez, MA	Latin America Program Officer (FT)	01/93 - 12/93
15.	Subhi Mehdi, MA	Information Program Officer (FT)	11/89 - 06/91
16.	Karen Canova, MA	Information Program Officer (FT)	01/93 - 02/94
17.	Katarina Paddack, MA	Documents Production Specialist (PT)	07/90 - 11/93
18.	Joyce Jackson, BA	Clerk Typist, Information Assistant (FT)	11/89 - 01/93
19.	Dahlia Hayles, BA	Administrative Assistant (PT)	09/91 - 04/94
20.	Melanie Carolan, BFA	Administrative Assistant (FT)	01/94 - 04/94
21.	Jacquelyn Wallace, BA	Finance & Contracts Manager (PT)	02/90 - 03/94
22.	Christine Powell	Finance, Travel & Admin. Spec. (FT)	10/89 - 03/94
23.	Pamela Williams	Clerk Typist (FT)	09/93 - 04/94

RESOURCE CADRE

Dr. Elizabeth Adelski
Office of Air and Land Studies
845 West Park Avenue
Tucson, Arizona 85719

AGRICULTURAL RESEARCH
TEL: 602-621-1955
FAX: 602-621-3816

Conducted study design and data collection for evaluation of gardening project in Guatemala.

Dr. Paul Arthur
Department of Child Epidemiology Unit
London School of Hygiene and Tropical Medicine
Keppel Street
London WC1E 7HT
UNITED KINGDOM

EPIDEMIOLOGIST
TEL: 44-71-927-2089
FAX 44-71-436-4230

Designed vitamin A capsule distribution monitoring system for Nepal National Vitamin A Program; wrote report of the West Africa Vitamin A Conference.

Ms. Judy Aubel
B.P. 3746
Dakar, SENEGAL

COMMUNICATION SPECIALIST

Conducted review of vitamin A communications/nutrition education activities "Getting out the Message."

Lic. Susanna Barrera
Casilla 14874
La Paz, BOLIVIA

NUTR. IEC, SOCIAL MKTG
TEL: 591-2-374-126
FAX 591-2-379434

Conducted qualitative research into carrot consumption and ferrous sulfate use in Bolivia; designed promotion campaigns to increase consumption and use; supervised development and testing of promotional materials; designed media strategy.

Dr. Jere Behrman
University of Pennsylvania
3718 Locust Walk
Philadelphia, Pennsylvania 19104-6297

ECONOMIST
TEL: 215-898-7704

Conducted research and wrote "Economic Rationale for Investing in Micronutrient Programs."

42

Ms. Karen Canova
Director of Communications, ISTI
1129 20th Street, N.W., Suite 800
Washington, D.C. 20036

COMMUNICATION/
INFORMATION SPECIALIST
TEL: 202-785-0831
FAX: 202-223-3865

Directed VITAL's Information Dissemination Program. Coordinated Africa Regional Information Dissemination Project for anglophone and francophone African countries, and provided technical assistance on communication and information activities to the Tropical Diseases Research Centre (TDRC) in Zambia.

Ms. Nancy Carolan
37 East Rosemont Avenue
Alexandria, Virginia 22301

TEL: 703-519-8622

Conducted field visit for India oil fortification operations research activity, supervised sampling, data entry and analysis.

Dr. Dilli Dahal
CNAS T.U. Kirtipur
Kathmandu, NEPAL

ANTHROPOLOGIST
TEL: 4-18624

Worked as team member for baseline survey of CARE/Nepal gardening activity. Responsible for collecting data on agricultural practices and coping strategies.

Dr. Roro Daniel
Director, Dept. of Public Health
Box 109
Public Health Department
Cook Islands, SOUTH PACIFIC

PUBLIC HEALTH PHYSICIAN
TEL: 23-110 or 29-110

Supervised data collection during Cook Islands xerophthalmia survey. Conducted vitamin A promotions campaign in Cook Islands.

Ms. Dale Davis
P.O. Box 3255
Kathmandu, NEPAL

FIELD COORDINATOR

Coordinated NGOs collaborating in capsule distribution as part of Nepal National Vitamin A Program.

Ms. Michele Dreyfuss
1319 North Calvert Street #3
Baltimore, Maryland 21202

SURVEY MGT, DATA ANAL.
TEL: (410) 752-5390

In Panama, assisted in training of vitamin A, survey enumerators; conducted survey data analysis; designed automated analysis of dietary data in EPI-INFO. Set up and managed financial and administrative procedures for surveys in Panama and Ecuador.

Ms. Susan Eastman
470 Collingwood Street #5
San Francisco, California 94114

SUPPLEMENT PROGRAMS
TEL & FAX: (415) 824-5305

Prepared guidelines for capsule supplementation programs; prepared national vitamin A program strategy for Solomon Islands; evaluated Kiribati national vitamin A program.

Dr. Hernando Flores
Laboratorio de Bioquimica Nutricional
Universidade Federal de Pernambuco
Recife, BRASIL
Zip Code - 50670-901

NUTR. BIOCHEM, OPNS. RES
TEL: 55-81-326-5663/2718470
FAX: 55-81-2718473

Internet email hflores@npd1.npd.ufpe.br

Trained biochemist from Bolivia in retinol assay, assisted design and testing of survey procedures (field and lab) in Bolivia, assisted design and implementation of operations research activities in Bolivia and field implementation of supplementation and fortification interventions in Brasil.

Ms. Kathy Fry
FSP/Vanuatu
Country Director
P.O. Box 951
Port Villa, VANUATU

PROGRAM PLANNING
TEL: 678-22915
FAX: 678-24510

Coordinated logistic and administrative support for Vanuatu xerophthalmia survey. Participated in development of Solomon Islands national vitamin A strategy.

Dr. Guy Hawley
P.O. Box 5365
Raiwaqu
Suva, Fiji
SOUTH PACIFIC

OPHTHALMOLOGIST
TEL: 679-387101

Conducted fact finding mission in South Pacific to determine at-risk nations for vitamin A deficiency. Served as team leader and survey ophthalmologist for xerophthalmia surveys in Tuvalu, Vanuatu, Cook and Solomon Islands.

Dr. Guillermo Herrera
18 Norman Road
Newton Highlands, Massachusetts 02161

EVALUATOR
TEL: 617-969-4795

Conducted evaluation of IEF vitamin A activities in Guatemala.

Dr. Peter Heywood
University of Queensland
Clinical Sciences Building
Royal Brisbane Hospital
Queensland 4029
AUSTRALIA

PROGRAM PLANNING
TEL: 07-365-5400

Participated in development of Solomon Islands national vitamin A strategy.

Ms. Judy Hollander
c/o American Embassy Dental Clinic
Pani Pokhari
Kathmandu, NEPAL

FIELD REPRESENTATIVE
TEL: 9771-2-72976
FAX: 9771-2-21517

Provided administrative support for VITAL's vitamin A activities in Nepal conducted by the TAG, including liaison with USAID, VITAL office in DC, coordination of subcontractors and office management and supervision.

Dr. Emmanuel Kafwembe
Tropical Diseases Research Centre
P.O. Box 71769
Ndola, ZAMBIA

NUTRITIONAL BIOCHEMIST
TEL: 680712

Trained laboratory technicians at Pasteur Institute, Yaounde, Cameroon in serum retinol analysis method using HPLC, in support of the Extreme North Province vitamin A survey.

Dr. Nicholas Karunaratne
University of Queensland
Royal Brisbane Hospital
Queensland 4029
AUSTRALIA

OPHTHALMOLOGIST
TEL: 83442509

Served as survey ophthalmologist for Papua New Guinea East Sepik survey.

Ms. Mary Linehan
8602 Leonard Dr.
Silver Spring, MD 20910

PRGM DESIGN & MGMT, SOLAR
DRYING
TEL: 301-588-3662

Managed field support operations for Asia and Latin America regions. Team member in design of Kiribati Vitamin A program. Team leader for design of Nepal National Program. Conducted training in solar drying projects in Haiti, Dominican Republic, Ghana, and Nepal. Conducted operations research in retention of vitamin A activities in solar and direct sun-dried plant foods. Developed solar drying manual. Managed and participated in xerophthalmia surveys in South Pacific and Nepal.

Ms. Aissa Mamadoulaibou
B.P. 10655
Niamey, NIGER

NUTRITON COMMUNICATIONS
TEL: 735457

Designed nutrition education component for the FAO/VITAL assisted vitamin A gardens project in Niger.

Dr. Mohamed Mansour
15 Rue Ibn Jazar, Apt 15
Tunis-Belvedere 1002
TUNISIA

NUTRITIONIST, DIETARY
SURVEY METHODS
TEL: 216-1-791953
FAX: 216-1-793862

Served as VITAL Africa Region Nutrition Advisor. Modified the IVACG Simplified Dietary Assessment methodology and trained survey teams in Uganda, Cameroon, Niger, Nigeria, and Philippines to carry it out. Assisted with planning of vitamin A status surveys in Uganda, Cameroon and Nigeria; designed and implemented nutrition monitoring system for Niger vitamin A gardening project; performed project reconnaissance and planning visits to various Africa countries; assisted with design and monitoring of Africa region information gathering and dissemination program.

Dr. John McKigney
4434 S.E. 19th Ave.
Cape Coral, Florida 33904

NUTRITIONIST
TEL: 813-542-5923
FAX: 813-542-4882

Assisted develop national vitamin A strategies and/or design of intervention programs in Central America (through INCAP), El Salvador, Haiti, Honduras, Nepal and Uganda; prepared guidelines for vitamin A program management and monitoring in Haiti, Nepal and Uganda; and evaluated vitamin A intervention in Dominican Republic (solar drying), Guatemala (supplementation, fortification, dietary) and Haiti (supplementation).

Ms. Donna Nager
36 West 74th Street #2C
New York, New York 10023

PROGRAM EVALUATION
TEL: 212-724-9210

Conducted mid-term evaluation of Kiribati vitamin A program.

Dr. David Nelson
Casilla 17-21-538
Quito, ECUADOR

SURVEY DESIGN, PNS RES
TEL: 593-2-248-204
FAX 593-2-567-686
Internet email dnelson@pi.pro.ec

Served as VITAL South America Region Nutrition Advisor. Guided vitamin A survey design and implementation in Bolivia, Panama and Ecuador, including sample design and selection, data management and analysis, financial and administrative management; assisted with design and analysis of Nicaragua micronutrient survey; planned and facilitated operations research for survey design in Nigeria and for design of interventions in Bolivia; developed computer program using Epi Info for data entry and analysis of the IVACG Simplified Dietary Assessment methodology;

Dr. Penelope Nestel
John Snow, Inc.
1616 North Fort Myer Drive
11th Floor
Arlington, Virginia 22209

NUTRITIONIST
TEL: 703-528-7474
FAX: 703-528-7480

Prepared comprehensive review of micronutrient fortification of foods in developing countries; analyzed evaluation data from Guatemala home gardening project; analyzed data from CARE/India oil and CSB fortification trial; analyzed data and prepared final report of Uganda vitamin A survey; prepared micronutrient strategy for Office of Nutrition.

Ms. Carolyn Peduzzi
908 Hampshire Hill Road
Worcester, Vermont 95682

HORTICULTURIST
TEL: 802-244-4520
FAX: 802-244-5141

Prepared review of home gardening projects in less developed countries from unpublished literature and operational experiences of NGOs and other organizations.

Dr. Chet Raj-Pant
Vitamin A Child Support Project
P.O. Box 335
Kathmandu, NEPAL

OPHTHALMOLOGIST
TEL: 223-999

Conducted vitamin A nutrition education training for CARE/Nepal gardening project; planned Nepal National Vitamin A Program; trained prevalence survey ophthalmologists.

Mr. Alain Rioux
1319 Grimshaw Road
Franklin Center
JOS-IEO
QUEBEC

SOLAR DRYING
TEL: 514-827-2952
FAX: 514-373-2026

Conducted training in solar drying of vitamin A rich foods in Haiti and Niger.

Ms. Juana Rodriguez
Project HOPE
3910 Arcadia Road
Alexandria, Virginia 22312

PROGRAM MANAGEMENT
TEL: 703-837-2100

Worked as LAC regional officer, including financial administration, backstopping and field supervision visits to VITAL activities in LAC region. Conducted training in financial management to field projects in Bolivia, and coordinated regional meetings.

Dr. Edgar Rodriguez-Ospina
Calle 125 No. 40-28 Int.23
Bogota, COLOMBIA

SAMPLE DESIGN, SELECTION
TEL: 571-213-2068
FAX: 571-214-6668

Assisted design of national and sub-national, stratified, multi-stage samples for vitamin A surveys in Panama and Ecuador; defined sample frame and guided selection of sample.

Jean Sebastian Roy
La Boule 10
Petionville
Port au Prince, HAITI

SOLAR DRYING
TEL: 509-557291

Trained women's groups in solar drying of vitamin A rich foods in Haiti.

Dr. Mary Ruth-Horner
159 Park Street
Montclair, New Jersey 07042

NUTRITIONIST
TEL: 201-509-0259

Conducted a review of the use made in the field of the IVACG Simplified Dietary Assessment Methodology.

JA

Ms. Carol Soble
7441 Baltimore Avenue
Takoma Park, Maryland 20912

EDITOR
TEL: 301-589-4333

Provided technical and copy-editing support for VITAL publications and reports, including VITAL Nutrients, VITAL News, Economic Rationale for Investing in Micronutrient Programs and Review of VITAL Surveys.

Dr. Paul Sommers
San Diego, CA

GARDENING SPECIALIST

Provided technical assistance to FSP Kiribati for home gardening activities.

Dr. Iwan Sovani
Jalan Plaogan E-31
Kompleks Cibeureum Raya 40534
Bandung, INDONESIA

OPHTHALMOLOGIST
TEL: 022632681

Served as survey ophthalmologist for Papua New Guinea hospital-based survey.

Ms. Louise Sserrunjogi
UGANDA

NUTRITIONIST

Responsible for dietary component of Uganda vitamin A survey using IVACG SDA methodology. Conducted preliminary research, dietary survey component, data analysis and report writing.

Dr. Sally Stansfield
171 Minto Place
Ottawa, Ontario K1M 0B6
CANADA

PHYSICIAN, EPIDEMIOLOGIST
TEL: 613-745-5529

Evaluated vitamin A supplementation project of Haiti NGO Eye Care; participated in design of vitamin A program monitoring system for International Eye Foundation (IEF) project in Malawi.

Dr. John Szetu
PAPUA NEW GUINEA

OPHTHALMOLOGIST

Served as survey ophthalmologist for Solomon Islands survey.

Ing. Mario Telleria
c/o UNICEF
La Paz, BOLIVIA

FOOD TECH, FORTIFICAT
TEL: 591-2-783-230

Coordinated sugar fortification trials in several Bolivian sugar mills, including design and installation of pre-mix equipment, modification of production line, quality control procedures and commercial introduction of fortified product.

Mr. Benedict Tisa
John Snow, Incorporated
1616 North Fort Myer Drive
11th Floor
Arlington, Virginia 22209

NUTRITION COMMUNICATIONS
TEL: 703-528-7474
FAX: 703-528-7480

Assisted with design of nutrition communications component of Niger vitamin A gardens project; advised on nutrition communications program of the Haiti NGO vitamin A programs.

Agr. Ronald Toussaint
c/o Save the Children's Fund/Haiti
25 Babiole
Port au Prince, HAITI

SOLAR DRYING
TEL: 504-4-53795

Trained women's groups in solar drying of vitamin A rich foods in Haiti, Dominican Republic and Tanzania.

Dr. Emorn Udomkesmalee Wasantwisut
Institute of Nutrition Mahidol University
Solaya, Nakhon Chaisri
Nakhon Pathom 73170
THAILAND

VITAMIN A SPECIALIST
BIOCHEMIST

Conducted research on the impact of food processing and preservation techniques on vitamin A activity in locally consumed foods in Thailand. Coordinated collaborative research efforts of three institutes to conduct this research using the same research protocol.

VITAL TASK DESCRIPTIONS

ANGLOPHONE AFRICA REGIONAL VITAMIN A INFORMATION COLLECTION AND DISSEMINATION PROGRAM

Tropical Diseases Research Centre (TDRC)

1. Description

In the field of vitamin A nutrition, most program planners, researchers, and policy-makers in Africa have traditionally had to depend on technical information from developed countries, primarily from the United States and Europe. The process of obtaining important information has been difficult for African scientists, governments, and nongovernmental organizations, often forcing them to rely on outdated information to support their work. However, useful information not only resides in developed countries, but also in countries within the region, especially in the form of program intervention documents and training materials. The problem is one of access to these potentially useful materials.

In recognition of these problems and the fact that Africa is a region severely affected by vitamin A deficiency, the USAID/VITAL project arranged with The Tropical Diseases Research Centre (TDRC) in Ndola, Zambia in October 1991 to carry out the Anglophone Africa Regional Vitamin A Information Collection and Dissemination Program. The major objectives of the program were:

- 1) to raise awareness among policy-makers, health, nutrition, and agriculture professionals, program planners, and the general public in USAID-assisted countries about vitamin A and other micronutrient deficiencies;
- 2) to establish and maintain contact with a wide range of individuals and institutions in all participating countries to ensure the systematic collection of published and unpublished materials on vitamin A and other micronutrient deficiencies;
- 3) to distribute, on a regular basis, the vitamin A information which has been collected to all participating countries and the press in these countries to enhance the application of information in combating micronutrient deficiencies in target countries; and
- 4) to target the following A.I.D.-assisted anglophone Africa countries: Botswana, the Gambia, Ghana, Kenya, Lesotho, Liberia, Malawi, Namibia, Nigeria, Sierra Leone, Somalia, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe. The Portuguese-speaking countries of Angola and Mozambique were added in 1993.

2. Discussion

SV

TDRRC managed the Anglophone Africa Regional Vitamin A Information Collection and Dissemination Program with VITAL support beginning in October 1991. In this two and one-half year period, TDRRC built an impressive, balanced vitamin A collection, focussing on both vitamin A research and program-related materials, and consisting of over 1,600 items in both printed and audio-visual forms. As of February 1994, TDRRC was assisting 77 organizations in 17 countries. In the last year of the VITAL Project, TDRRC began to acquire important materials on other micronutrients in addition to vitamin A. TDRRC reported that requests for iron and iodine information increased significantly, especially in 1993-94.

The real value of the program is its information dissemination and exchange activity with the anglophone country participants. Beyond the building of a significant micronutrient collection, is the program's effort to distribute the best resources to an information-poor audience. An example is the distribution to 200 institutions of the "Ending Hidden Hunger" video, which was produced by UNICEF, WHO, IDRC, and USAID. TDRRC successfully disseminated all of the training materials, research reports, and program intervention documents produced under VITAL. And in its effort to reach a large audience, many of whom are illiterate, TDRRC used mass media campaigns to spread the vitamin A message, airing several vitamin A nutrition children's stories on Zambia National Broadcasting Company (ZNBC) radio, as well as interviews about the importance of vitamin A programming in Africa. TDRRC also produced numerous press releases on the importance of vitamin A programs. And TDRRC assisted all of the participating countries with their own mass media campaigns by sharing interview guidelines developed at TDRRC, along with other media tools and copies of the tapes that were aired on ZNBC.

TDRRC also provided a valuable micronutrient reference service to the program participants. For example, program participants from the various countries routinely wrote and faxed vitamin A and micronutrient information queries to TDRRC. As the word spread within the region of the existence of the vitamin A information program, TDRRC handled an increasing number of such requests. A recent example is from the Department of Nutrition of the Ministry of Health in Mozambique, requesting information on the relationship of geographic factors to iodine deficiency. TDRRC was able to supply the Mozambique MOH with appropriate references that helped to answer its question.

3. Next Steps/Recommendations

VITAL's involvement with the Africa Regional Vitamin A Information Collection and Dissemination Program demonstrated that a strong demand exists in the region for current high quality information on vitamin A. Because a firm foundation for micronutrient information collection and dissemination in Africa has already been laid at TDRRC, it is recommended that these programs be continued and expanded under the auspices of the OMNI Project beginning on or about April 1, 1994.

4. Lessons Learned

It takes some time for a regional information dissemination service to become established in a large region, especially one with a less than dependable communication infrastructure. Once such a service is established and proven reliable, as in the case of TDRC, its country collaborators will generally come to depend on the program to meet many of their information and education needs. In the case of TDRC, the initial response to the program was rather slow, but this situation changed considerably in two and one-half years. At VITAL's end, TDRC reported that, with the exception of those countries engaged in civil strife such as Namibia and Liberia, participation in the program has been extremely enthusiastic and successful.

From a consensus-building perspective, regional information and communication intermediaries, such as TDRC, make good programmatic and economic sense. In the micronutrients field, in which the program and research information is so new, often ground-breaking, it would seem almost impossible for a central project (in this case, OMNI) to communicate such information rapidly to all organizations and individuals, especially those within the targeted countries in the African region. Despite great strides in rapid electronic communications, not many African countries have experienced the benefits yet. For a large central project to work through a regional intermediary to disseminate information, thereby building important grassroots consensus around the issues, saves time and money in the long run. As far as the information collecting function is concerned, it is much more efficient and expedient to have a center within the region performing the actual logistics of gathering information, than it would be for a Washington-based headquarters to perform such a function.

BOLIVIA NATIONAL VITAMIN A SURVEY, STRATEGY DEVELOPMENT AND INTERVENTION ACTIVITIES

1. Description

VITAL provided assistance to plan and carry out the Bolivia National Vitamin A Survey, to develop a national strategy to reduce vitamin A deficiency, to support operations research and to assist NGOs to undertake vitamin A interventions in the community.

The survey was carried out between December, 1990 and December, 1991 with a dissemination seminar in September, 1992. VITAL support included technical assistance for survey design and management, biochemical analysis, data processing and analysis and report writing. Through VITAL, funds were also provided for the implementation of the community sensitization component and the final month of field work and consulting fees for the principal investigator and key local advisors. PAHO sent a biochemist from the central MOH laboratory for training in retinol assay at the laboratory in Recife, Brazil of VITAL consultant, Dr. Flores, and UNICEF supported the analysis of the 24-recall dietary survey.

While it was initially thought that VITAL technical assistance would be limited to a few trips, it proved necessary for the VITAL advisor to return visit Bolivia every other month to assist in organization, implementation and financial reporting.

Following the survey, VITAL funded the national dissemination seminar and three regional seminars from which the national vitamin A strategy was evolved. Subsequent technical assistance was provided to implement the strategy: assessment of the capsule distribution program and training in capsule distribution; qualitative research into carrot consumption factors and design of a promotion campaign; demonstration of the feasibility of sugar fortification. Communication prototypes were prepared to promote carrot and fortified sugar consumption.

In support of NGO projects, VITAL subcontracted with PROCOSI, the child survival coordinating agency, to administer subcontracts with NGOs interested in carrying out community vitamin A activities. Technical assistance was also provided to strengthen NGO capacity to plan and carry out such projects.

PROCOSI also funded several small, operations research projects to further capsule administration to sick children and post-partum women and to evaluate the potential of deparasitization as a vitamin A intervention.

2. Discussion

The principal investigator of the MOH administered the vitamin A survey with largely unsatisfactory results. Administration took too much of his time, to the detriment of technical concerns, and his unfamiliarity with financial management led to significant delays in reporting expenditures which, in turn, led to cash-flow crises, one of which interrupted field work for a

55

month and required replacement of the field teams.

MOH nutritionists were assigned to apply the IVACG methodology to develop a simplified dietary assessment for Bolivia. Their professional bias in favor of 24-hour recalls made the exercise quite difficult and, in the end, led to administration of both the SDA and 24-hour techniques. Unfortunately, because of field staff turnover and separate processing (sponsored by UNICEF) which ignored case identification codes, results of the two methods could not be compared.

The use of the MOH laboratory for retinol analyses resulted in a number of problems, initially because of dissention between the laboratory staff and the rest of the survey personnel and later, because laboratory staff claimed to be overworked and required additional compensation. In the long run, the analytical capacity developed has served several other vitamin A initiatives, including the NGO and OR activities mentioned above.

Questions of appropriate cut-off points for serum retinol concentration complicated the interpretation of results. Most survey sites had prevalence of "low" serum retinol (below 10 $\mu\text{g}/\text{dl}$) less than that suggested by WHO to constitute a public health problem. While VITAL felt constrained to observe then-current WHO guidelines, VITAL consultant Flores insisted, based on his extensive field experience in Brazil, that prevalence of levels between 10-20 and 20-30 $\mu\text{g}/\text{dl}$ were also relevant. WHO has recently modified prevalence criteria in line with Flores' position.

The MOH's third strategy was to promote consumption of vitamin A-containing foods. This rather amorphous objective became much clearer when it was found that carrots were the most frequently consumed food in all parts of the country (also, the cheapest source of vitamin A). From a communications perspective, it made more sense to promote consumption of one food which is already popular rather than a variety of foods, most of them unpopular.

The NGOs which participate in the PROCOSI network were initially interested in the vitamin A funds. However, only one presented a project within the funding and time constraints of the subcontract. Several indicated that they had sufficient funds to carry out their work and that adding a vitamin A component to ongoing child survival projects would be inconvenient.

The small OR projects have generated a level of enthusiasm and interest about vitamin A which will probably persist well into the future. The dosing study of sick children received the research award from the Bolivian Pediatric Society, will be published in the Journal of the Children's Hospital of Mexico, and will be widely disseminated to hospitals in Bolivia.

The reorganization of the government after the 1993 elections led to the formation of a Micronutrient Unit within the new Secretariat of Health and definition of a micronutrient policy which emphasizes fortification. However, momentum for vitamin A supplementation in high-risk areas was lost, and it is unclear whether the Unit will be as effective as the earlier Nutrition Department in carrying out service delivery related activities.

CAMEROON VITAMIN A SURVEY AND DISSEMINATION WORKSHOP

1. Description

In early 1990, Dr. Roy Wilson, head of the Ophthalmology Department at Charles Drew University, received funding from USAID R&D/RUR to carry out a blindness and visual impairment survey in one of the southern provinces of Cameroon. At the same time, VITAL was exploring with USAID Cameroon the need for and interest in a survey of vitamin A status in the country. USAID Cameroon suggested that VITAL and Drew University conduct a joint vitamin A and blindness survey and that the site for this survey be the Extreme North Province, thought to be a more relevant area for a study of xerophthalmia and vitamin A deficiency (VAD).

To formalize this agreement, VITAL and Charles Drew University representatives travelled together to Cameroon in December, 1991 to discuss with Cameroonian counterparts the design, plan and schedule for the survey. Following this visit, a Memorandum of Understanding (MOU) was drafted which described the roles and responsibilities of the three partners in the survey, i.e. the Cameroon Ministry of Public Health (MOPH), Drew University and USAID/VITAL.

According to the MOU, Charles Drew University was given overall responsibility for conducting and implementing the survey and specific responsibility for the clinical assessment of blindness, xerophthalmia and visual impairment. VITAL was responsible for the nutritional, dietary and biochemical assessments of vitamin A deficiency. The MOPH was responsible for overall coordination, identification of local workers for field operations and provision of cars and drivers.

The survey protocol was finalized following another visit by a VITAL consultant in March, 1992, during which census and provincial staff participated in discussions about sampling frame and procedures, mapping requirements, training needs, and team and field organization. The survey was a population-based investigation which used a multistage, stratified, random sampling procedure, with probability of selection proportional to the size of the strata. Stratification was by ecological zone (urban, mountainous, plains and "flooded plains"), department and census enumeration area (EA). To assess VAD, households with children 5 years of age and younger were selected from 60 EAs and a total of 5,372 children were examined for eye signs of xerophthalmia. Only households with children 0-5 years of age were included in this sample. A systematic subsample comprising every 10th child, xerophthalmia suspects and controls matched by age and sex to xerophthalmic suspects, had anthropometric and dietary assessments performed. The original study plan also called for serum retinol to be determined in the same 1/10 subsample, in order to allow for a comparison of these approximately 1,000 children's retinol levels with their xerophthalmia, dietary intake and anthropometric status. In practice, due to a major lapse in communication and other problems (see Discussion, below), only 173 serum samples were collected from all the children aged 2-5 years living in 5 EAs. These sera were not necessarily collected on the same children as had had the dietary and anthropometric assessment. The data collection for the study was conducted from April 17 to May 18, 1992.

31

2. Discussion

VITAL's support for the survey included funding and technical assistance, primarily for the VAD components. This included training of a field team in the use of a modified IVACG Simplified Dietary Assessment (SDA), collection of anthropometric and dietary data, blood collection and serum retinol analysis using an HPLC, data processing and analysis, and report writing with regard to nutrition, dietary and biochemical components.

Operationally, the survey involved the collaboration of five institutions:

The MOPH provided staff for the survey and logistic support. A national nutritionist was involved in the design, implementation and analysis of the nutrition and dietary component of the survey with support from a VITAL consultant and the *Organisation de Coordination pour la lutte contre les Endemies en Afrique Centrale* (OCEAC).

The Charles R. Drew University, through the Principal Investigator (PI), was responsible for the overall design, management and implementation of the survey, and had particular responsibility for the visual impairment aspects of the survey.

VITAL was primarily responsible for technical aspects of the dietary assessment component, provided part-funding for the survey and arranged for a consultant to visit and advise on the biochemical aspects of the survey during the planning stages.

OCEAC was responsible for the collection of the blood samples and overall management of the dietary and biochemical data.

The *Centre Pasteur* of Cameroon was responsible for the laboratory analysis of the serum retinol levels.

This rather complex set of institutional relationships, coupled with the lack of a manager to oversee field operations for the survey, the difficulty in communicating with the MOPH, and insufficient time allowed for preparation of the survey, led to several survey implementation problems, particularly with respect to the biochemical aspect. Data collection for the clinical and dietary components of the survey started without the biochemical team, and this resulted in a complete change of this component, such that only 173 children from 5 EAs in one ecological zone had blood samples drawn.

Clinical data were entered during the field operations (April-May 1992), and a preliminary data cleaning was done in Cameroon. Subsequently, all the ophthalmological data were analyzed at Charles Drew University in Los Angeles. Nutrition and dietary data were entered at OCEAC in June, 1992, and analyzed by the national nutritionist with assistance from VITAL. Retinol levels were determined at the *Centre Pasteur* in Yaounde, and the results interpreted at OCEAC.

The first report of nutrition and dietary results was drafted in October 1992 and refined in April 1993. Clinical data took a much longer time to be cleaned, analyzed and then merged with dietary, nutritional and biochemical data set. The first overall survey report was completed in

July, 1993, and several revisions took place before a nearly final report was produced at the end of October 1993. The elapsed time between completion of data collection and availability of results in a usable form was about 16 months. This lengthy time period was a reflection of the scientifically disunited institutional network responsible for the study, which produced a weak and ineffective management structure. The fact that all the clinical data were returned to the US and analyzed without input from the Cameroonians, as well as the fact that the national coordinator was not highly motivated or available to play his role, seem to have decreased local commitment to the survey and the potential for strengthening institutional and technical capacity. Moreover, there was little genuine scientific common ground between the PI's primary goals in conducting the blindness/visual impairment study and USAID/VITAL's primary goals and interests in the vitamin A/nutrition study.

Despite these problems, the study did reveal a problem of vitamin A deficiency of public health significance in the Extreme North Province. Clinical signs of xerophthalmia were at levels indicative of a significant public health problem, with the prevalence of Bitot's spots being 0.47% and that for corneal ulcers 0.12%, or 10 times the WHO established cutoff. Over half of the population of children 5 years of age and younger were at high risk of inadequate vitamin A intake. This corresponds to the finding that nearly a third of all surveyed children are chronically undernourished, and a high proportion (9%) suffered from acute malnutrition.

The results of the survey were presented at a dissemination symposium held November 4-5, 1993, in Maroua, Extreme North Province. The seminar brought together policy makers, managers, program implementors and provincial level NGOs interested in the survey results as well as their programmatic implications. The symposium was primarily funded by USAID/R&D/N. Additional funding was provided by Project Orbis International for the participation of the ophthalmological team, and by UNICEF/Cameroon for MOPH officials from Yaoundé. OCEAC was subcontracted by VITAL to assist the National Symposium Organizing Committee to organize the meeting and to provide logistical and technical support.

The symposium was attended by 62 participants from governmental and non-governmental health and development sectors, as well as from the bilateral and international agencies. Opening and closing sessions were chaired by an official representative of the political authority at the provincial level. With regard to vitamin A and nutrition, the participants recommended that breast-feeding, improved maternal nutrition, home gardening, food preservation, nutrition education and disease-targeted vitamin A supplementation be promoted to address the vitamin A problem in the Extreme North Province.

The participants called for an immediate meeting of an multi-sectoral committee composed of representatives of the Ministries of Public Health, Agriculture, and Social Affairs, as well as of CARE, Save the Children, CIM and the Pilot Nutrition Education Project, to assess the feasibility and implications of the vitamin A recommendations and to oversee their integration, to the extent possible, in existing provincial projects. The Provincial Health Delegate, under the auspices of the Governor, was given responsibility for convening the committee.

The symposium proceedings were jointly prepared by OCEAC and VITAL and published in the December 1993 issue of the OCEAC Bulletin. A full report of the survey results was also

published in French in a special OCEAC publication and distributed by OCEAC.

3. Next Steps/Recommendations

Diet diversification and disease-targeted supplementation interventions should be pilot tested. NGOs operating in the Extreme North Province, particularly Save the Children and CARE, should incorporate micronutrient interventions in their existing health, nutrition and agriculture projects.

Technical and financial assistance should be targeted to NGOs in the province to support their micronutrient initiatives in the nutrition, health and agriculture sectors. Any such support will need to be designed in light of the phasing out of the USAID mission.

Nutrition education programs to enhance micronutrient nutrition in general and vitamin A in particular should be encouraged through promotion of breast feeding in the second year of life, increased consumption of DGLV, mango, papaya and other locally available CRF, and increased oil consumption particularly for preschool children, pregnant and lactating women. The Pilot Nutrition Education Project (World Bank-funded) should integrate micronutrient messages into its strategy.

Planting of mango trees for local consumption should be promoted. Currently, most mango produced in the Extreme North Province is for sale.

Traditional food recipes containing vitamin A should be improved to enhance their palatability and increase their consumption by preschool children. Addition of oil is crucial because the fat content of traditional recipes is very low.

4. Lessons Learned

The joint conduct of activities by multiple organizations can result in technical and managerial problems, especially when there exist basic differences between the key collaborative partners in their main objectives. In this case, the original aim of the PI was to conduct a blindness and visual impairment study, and vitamin A deficiency was not included. Differences in essential priorities led to inconsistency in management techniques and changed field operation plans.

In similar studies, a full time administrative and field manager should be on board for effective preparation and smooth survey implementation at least 2 months before the start of data collection. The lack of a country-based field/administrative manager during the months prior to the start of field operations (February - April, 1992) led to poor coordination, delays and other implementation problems.

To increase the potential for strengthening local capacity, the participation of nationals at all stages (i.e. design, preparation, implementation, analysis and interpretation) should be maximal. In this study, a relatively high proportion of the ophthalmological team was from outside

Cameroon, and most of the data analysis took place without Cameroonian input as well.

Support to a survey is likely to be most effective when there is consistency and, ideally, a committed focal person within the national agency sponsoring the survey. Moreover, the need for the survey must be felt and expressed by government representatives. Concurrence is not a substitute for ownership. In this survey it was difficult to generate effective support because the MOPH lacked ownership and the commitment of a focal person. This lesson was valid for vitamin A as well as for blindness and visual impairment.

Technical assistance immediately before and during field work needs to be consistent and continuous.

Use of an in-country non-governmental entity (OCEAC) enabled effective financial management during the survey and a high level of organization during the symposium.

To increase data reliability and validity, survey questionnaires should be administered in the local dialect. Local terms for night blindness should be researched and pretested prior to finalizing questionnaires.

DIETARY ASSESSMENT GUIDELINES

1. Description

IVACG published guidelines for developing a simplified dietary assessment (SDA) of risk of inadequate vitamin A consumption. VITAL tested the methodology and made a number of contributions for improvement and widespread application in prevalence surveys supported around the world.

2. Discussion

VITAL consultant Mary Ruth Horner conducted a survey of users of the SDA methodology to quantify its use and detect problems or advantages which had occurred. The report found that the guidelines had been used in 20 projects in 14 countries (1992), although only 45% of the users had completed the analysis. "The users' level of satisfaction in applying the Guidelines...was attributable to factors such as previous experience in dietary assessment and resources available for the study." Reasons for use of other methods included availability of technical assistance, conceptual disagreement, complexity of application and difficulty in understanding the narrative.

VITAL consultants Drs. Nelson and Mansour further developed the SDA methodology in the course of application in Latin America and Africa. Dr. Mansour evaluated the impact of monthly consumption, i.e. 3 times or less per month, and determined that it did not alter either the Consumption Index (CI) or Usual Pattern of Consumption Index (UPC). He also found that the arithmetic involved in calculating CI and UPC was often confusing to field workers. Thus, he developed a simplified data collection instrument with pre-calculated indices for each food which eliminated the category of monthly consumption. This format has proven much more useful to field workers.

Dr. Nelson developed a computerized version of the SDA which, among its advantages, eliminates field calculations of CI and UPC, provides for automatic calculation of risk scores and allows analysis of the food consumption data base. This permits, for example, identification of most frequently and most widely consumed vitamin A foods as well as foods which contribute the most vitamin A to the diet.

3. Next Steps/Recommendations

The results of application of the Mansour/Nelson modifications should be published and incorporated in the IVACG Guidelines. Sensitivity and specificity analysis should be conducted to estimate the relative usefulness of CI and UPC under varying conditions.

DOMINICAN REPUBLIC SURVEYS

1. Description

The Dominican Republic representatives at the First Regional Vitamin A Workshop in 1990 reported lack of information on the vitamin A status of the population and suggested the need for a formal assessment. Early in 1991 the MOH requested USAID and VITAL assistance to conduct such an assessment. USAID/Santo Domingo recommended limited VITAL assistance due to other mission priorities, and agreed to VITAL support for a regional assessment through CENISMI, a local research group that had successfully conducted community health studies for USAID. Thus, a limited scope survey was planned, with USAID concurrence, to focus on the two highest health risk regions of the country (southwest health regions Nos. IV and VI, bordering Haiti). Dr. Mora visited the Dominican Republic in February and April, 1991 to assist CENISMI and the MOH in survey design and preparation, including the development of the local questionnaire for the IVACG Simplified Dietary Assessment (SDA). VITAL signed a subcontract with CENISMI for survey implementation and contracted INCAP to provide technical services for training in blood taking and handling, and laboratory analysis of serum retinol.

2. Discussion

The vitamin A survey was implemented during May - July, 1991 on a representative sample of about 600 children 1-6 years from the two southwest health regions. Survey components included a SDA in 648 children and serum retinol in 548 of them. Laboratory analysis was completed in August, and data analysis and a final report were completed by November, 1991. The survey indicated that vitamin A deficiency was a problem of public health significance in the two regions studied, with about 20% of the children having serum retinol levels under 20 ug/dl, and between 18% and 28% of them were at high risk of inadequate consumption of vitamin A according to the IVACG SDA. The question remained, however, as to what the situation was in the rest of the country. A national workshop was convened in January, 1992 to discuss survey results and outline an intervention strategy. Unfortunately, the government and the USAID Mission had other health sector priorities, so VITAL was not asked to provide any direct follow-on support. However, VITAL was authorized to assist an NGO with a solar drying of vitamin A rich foods pilot project in the affected regions. Therefore, to our knowledge, no significant action was initiated by the Dominican government.

By mid-1993, the MOH, with support from PAHO/WHO, UNICEF, the World Bank and UNDP, planned to conduct a national survey to assess iron and iodine deficiency (endemic goiter) in a representative sample of the school population. During the planning phase, the MOH asked VITAL to provide financial support to cover the cost of retinol analysis of blood specimens taken from the school sample selected for the iodine deficiency survey. VITAL agreed (with A.I.D concurrence) and suggested that the survey also collect blood specimens from an additional sample of preschool children (siblings or neighbors of the school

children), and contracted with INCAP to conduct the retinol laboratory assays. These analyses were completed by September, 1993.

The results of the study on the two national samples totaling 1,516 children revealed that vitamin A deficiency, as well as iron and iodine deficiency, is a serious problem of public health significance in the whole country and not only in the two western high risk regions. The prevalence of serum retinol levels under 20 ug/dl amounted to 22.7% in children 1-6 years and to 15.8% in school children.

3. Next Steps/Recommendations

Contrary to expectations, micronutrient deficiencies are important public health problems in the Dominican Republic and warrant government and donor agencies' intervention. Some donors (PAHO/WHO, UNICEF and UNDP) have expressed interest in assisting the government to design and implementation a national micronutrient strategy and plan. This is an excellent opportunity for A.I.D. nutrition/micronutrient initiatives. Unfortunately, the USAID Mission reported in January 1994 that it could not concur with any further A.I.D.-funded nutrition activities in the Dominican Republic.

4. Lessons Learned

Partial surveys, that is, those covering only selected geographical regions or socio-economic groups, are less useful for strategy formulation and planning purposes and less likely to generate commitment from central decision makers than national, population-based surveys. Highly selected samples cannot be used for inter-country comparisons and preclude comprehensive national planning and prioritization among regions within a country. National population-based VAD assessment surveys should be carried out whenever feasible.

The results of a VAD assessment can be used to generate political commitment for action. However, a minimum level of commitment from both the government and potential donors should be a prerequisite for conducting any VAD assessment for strategy and planning purposes.

Training in blood specimens collection and handling should be given greater emphasis and include more intensive practice to reduce the proportion of hemolyzed and insufficient blood specimens to a minimum.

The validity of utilizing school children as the target population for vitamin A assessment should be further explored. The results of the Dominican Republic studies strongly suggest that, while VAD prevalence tends to be about 30% lower in school than in preschool aged children, the correlation is high enough to propose that school children may be a useful target population for VAD assessment, as they are for endemic goiter and iodine deficiency. This is of great practical importance due to easier accessibility to school children at lower cost.

ECUADOR VITAMIN A SURVEY

1. Description

In December, 1990, VITAL and the San Francisco University of Quito sponsored a workshop on vitamin A. Results of the 1986 National Health and Nutrition Survey (DANS), which indicated a national prevalence of low serum retinol levels of 14.3%, were evaluated, and the possibility of deficiency problems in rural areas was discussed. A joint committee of the Planning Council (CONADE) and the MOH Health Research Institute (IIDES) was formed to further explore the problem.

During the XIV IVACG Meeting, held in Guayaquil, Ecuador in June, 1991, the Ecuadorian Minister of Health asserted that, based on the DANS and then-current WHO criteria, Ecuador did not have a national vitamin A deficiency problem of public health significance. However, he admitted that pockets of deficiency might exist and promised to undertake necessary studies to determine the location and severity, even though this was not a high priority for the Ministry.

A survey was designed by the joint CONADE-IIDES committee to investigate vitamin A levels in children in the poorest areas of the country. Initiation of the survey was delayed for more than a year while different GOE institutions vied for position. The Health Promotion and Protection Director insisted that the National Health Laboratory perform biochemical analyses and that VITAL provide all necessary equipment. When confronted with VITAL's contractual prohibition against equipment purchases, she had the Minister suspend the survey. When the government changed in August, 1992, the new Minister and the Director of IIDES resurrected the survey and requested A.I.D. and VITAL assistance.

VITAL provided assistance to plan and carry out the Ecuador Vitamin A and Iron Survey in the five poorest provinces of the country and to assist the GOE to define a national micronutrient program as well as to support operations research by interested investigators.

The survey was carried out between June and September, 1993 with a reporting-out seminar in February, 1994. Serum retinol assays (HPLC) were performed at the research laboratory of the Chemistry Faculty, Central University under an agreement with IIDES. A local management firm, SOTEM, was subcontracted by VITAL to handle procurement, personnel contracting and financial administration inasmuch as the MOH Project Administration Unit proved unable to handle the job.

VITAL support included technical assistance for survey design and management, sample design and selection, biochemical assay, data processing and analysis and report writing. VITAL also provided reagents and laboratory supplies (including vitamin A2 for MRDR studies) as well as portable hemoglobinometers and microcuvettes for field determination of hemoglobin. VITAL also provided an extensive bibliography on vitamin A for both IIDES and the University. UNICEF funded the laboratory assay of serum ferritin. As an adjunct to the survey, several complementary studies were conducted, including MRDR surveys in day-care centers of peri-urban Guayaquil and Quito.

Following the survey, VITAL funded the national vitamin A seminar at which results were presented and discussed and a national micronutrient strategy was proposed. A National Micronutrient Committee was formed under the direction of IIDES which is preparing a micronutrient status briefing book and further developing the strategies proposed at the national seminar.

2. Discussion

The WHO-recommended cut-off points for serum retinol concentration caused initial complacency in Ecuador about the significance of the vitamin A problem. The DANS had found 14.3% of children with "low" serum retinol (below 20 $\mu\text{g}/\text{dl}$) which, according to the 1991 cutoff (15%), did not quite constitute a national public health problem although regions were found with prevalence levels of 17%. The 1993 survey confirmed the DANS findings, and the revised WHO cutoff recommendations of 1993 signaled a problem of public health significance.

The Principal Investigator at IIDES/MOH was responsible for overall survey management, including design, recruitment and training, oversight and coordination of field work, control of data entry, cleaning and analysis. She also wrote the final report and organized the national seminar. In general, the management and administrative arrangements were very effective. On several occasions, SOTEM advanced its own funds to keep the survey operating, and field work was concluded according to plan.

The portable hemoglobinometers allowed teams to give immediate feedback to mothers about the blood of their children and proved immensely popular, so much so that demand for survey services sometimes outstripped the field teams' capacity. Baseball caps imprinted with the Vitamin A Project were also given to participants in recognition of their participation. These incentives were responsible for the excellent cooperation which the survey enjoyed in the field.

MOH nutritionists were assigned to develop a simplified dietary assessment for Ecuador according to the IVACG-recommended methodology. Some difficulty was encountered in establishing portion sizes, and discrepancies with field observations were encountered although these apparently did not affect outcomes. Questions also arose as to the credibility of informants about frequency and portion size fed, especially in Esmeraldas province. These problems were not discovered during pre-survey operations research or pilot tests. It may be necessary for IVACG to address the problem of truth when questioning about feeding practices. Consumption data from the simplified dietary assessment were processed by computer using software developed by VITAL. This enabled the analysts to evaluate dietary adequacy on a continuous scale and identify principal food sources of vitamin A in the diet by region and other factors.

During data entry/cleaning, errors in data collection were detected which should have been found and corrected in the field. These included one interviewer who, when asking about breastfeeding, failed to determine whether the mother was "currently" breastfeeding. This misinterpretation should have been corrected during training and/or pilot testing.

The decision to use the university laboratory for retinol analyses was appropriate in the face of

demands for equipment by the MOH laboratory. University staff worked directly on the assays and provided excellent working conditions, including modern equipment. Lack of familiarity with HPLC analysis of serum samples caused deviation of assays from quality control limits for several days, but the problem was rectified and deviated values were corrected. A "walking standard" for inter-laboratory quality control was provided by Dr. Nelson who left blood samples in La Paz, Recife, Managua and Quito, all of which assayed to within $\pm 5\%$ of the average. Such a method is to be recommended for future laboratory work.

The small OR projects which have developed around the national survey have generated a level of enthusiasm and interest in vitamin A which will probably persist well after VITAL activities have ceased. Currently, students and professors are determining retinol levels in cord blood of newborns, in mothers' milk and in school children to get a better idea of deficiency significance and distribution. At least one other laboratory has established a retinol analysis (Bessey-Lowry spectrophotometric) and inter-laboratory controls have been instituted. Two pediatric residents are planning to conduct a capsule dosing study at the Quito Children's Hospital. Several studies of anemia are being readied in IIDES which will use the portable hemoglobinometers provided by the survey.

3. Next Steps/Recommendations

The operations research studies already underway have sufficient laboratory resources. They need to be monitored to ensure completion. In addition, several other studies have been proposed, including modification of palm-oil processing to conserve carotene content, which need support - both financial and technical - in order to produce results.

The MOH is strongly interested in food fortification as a general solution to micronutrient deficiencies. Sugar fortification with retinol is a proven technology and should be explored with sugar mills and the government.

The GOE's nutrition monitoring system, SISVAN, does not currently monitor micronutrient status of the population. As micronutrient interventions are implemented, it will be necessary to establish their effectiveness and monitor deficiency prevalence.

Both Catholic Relief Services and Project HOPE are interested in carrying out vitamin A activities. HOPE works in two of the provinces which were surveyed by IIDES, one of which had the highest prevalence levels of low serum retinol (Azuay, 25%). CRS plans to conduct a deficiency survey in Imbabura province (which was not covered by IIDES) and provide capsules semi-annually to children in its project area. These efforts need to be followed, supported and expanded.

4. Lessons Learned

Extensive pre-survey preparation is critical. In spite of repeated advice from VITAL, survey managers did not develop sufficient pre-survey experience or standardization through OR, pilots,

etc.

Hemoglobinometers are greatly appreciated. The portable hemoglobinometers proved to be an unexpected boon in securing community participation in the survey, especially taking of blood specimens.

Computerized dietary analysis is highly advantageous. The computerized version of SDA allowed more flexible analysis of dietary data while reducing need for manual calculations and, thus, reducing likelihood for error.

Use of private firms allows for a ed smoother cash flow. Although not specified in the contract, the willingness of the financial administrative firm to advance funds was a major factor in finishing the survey on time and with minimum stress.

A "critical mass" of people interested in vitamin A makes it possible to build further support among researchers and decision makers.

Continuity of technical assistance builds a high degree of confidence in survey teams and assures consistency in work performed.

Inter-laboratory quality control is important. Even though competent biochemists mounted the analytical methods, doubt persisted as to the quality of their work until it could be shown that results compared favorably to those of other laboratories in the region.

STRATEGY FOR VITAMIN A INTERVENTIONS IN CHILD SURVIVAL PROGRAMS IN EL SALVADOR

1. Description

In response to a request from the Health Population and Nutrition office of USAID/El Salvador, VITAL provided technical assistance in formulating a vitamin A capsule distribution, nutrition education and home gardens strategy for three USAID-supported maternal health and child survival projects in the country.

All projects were designed to promote services in family planning, ORT, ARI, nutrition and vitamin A activities. Specific nutrition and vitamin A activities encompass growth monitoring, nutrition education, provision of anti-natal multi-vitamin tablets to pregnant women, multivitamin drops to young children, promotion of home gardens, and distribution of 200,000 IU vitamin A capsules to preschool age children and lactating mothers.

2. Discussion

The strategy of the Government of El Salvador to attack the vitamin A deficiency problem is based on a three-pronged approach having immediate, medium term and long term impact. Distribution of vitamin A supplements (capsules and multi-vitamin drops/tablets) represents the emergency measure which will provide immediate protection to those at greatest risk. Fortification of sugar was selected as the medium term approach. Nutrition education, along with promotion of increased production/consumption of vitamin A-rich vegetables and fruits, is the third approach which could over the long run resolve the problem entirely. The three A.I.D. projects were thus contributing to two of the three government strategies.

The three projects presented advantages and constraints to achieving the desired coverage of the maternal health and child survival components including vitamin A:

A. FHS: This is built on an established, well organized family planning service with an existing central referral clinic operated by the SDA. However, the project calls for a major shift of operations from urban to rural areas, re-orientation of over half of the present field staff (many of whom are illiterate) from family planning to preventive health and nutrition services. Also, the project calls for standardization of services and educational messages across the field staff, the referral network - which is to include 50 new private physicians - and 19 clinics country-wide. The possibility of incorporating capsule distribution and nutrition education in this program was discussed.

B. PROSAMI: Is being implemented by Salvadoran PVO's which are known to have highly motivated personnel and have been able to elicit strong community participation in their ongoing programs. However, they represent great diversity in organizational capacity, technical competence of staff and operational philosophies. PROSAMI staff has, to date, identified 114 eligible PVOs in the country of which some 35 will

eventually be incorporated into the project. These vary from organizations currently sponsoring health clinics (but with no outreach services) to those implementing integrated community development programs (but with no health component). Furthermore, each participating PVO may or may not at present be a member of the four existing PVO coordinating agencies in El Salvador, which currently have no coordinating mechanism among themselves. PROSAMI project patient referrals for more advanced medical and surgical services will be made to MOH facilities. Capsule distribution, nutrition education and gardening activities were identified as potential components in some of these PVO activities.

C. The MOH APSISA Project: The established Ministry network of 14 hospitals and 275 health posts and units and 580 health promoters is providing capsules according to MOH standards and will reach as many pre-school aged children as possible.

The technical assistance team provided detailed information on the following components of the vitamin A activities:

- Recommended protocols for vitamin A supplements
- Defining capsule needs
- Capsule procurement, logistics, monitoring of supply and distribution
- Training
- Home gardens
- Nutrition education and communications for:
 - A. Program managers and providers of referral services
 - B. Community health workers and their supervisors
 - C. Home gardening promoters
 - D. TBAs
 - E. Women of reproductive age and members of the community
- Monitoring and evaluation of the vitamin A components

This assignment was undertaken by Drs. John McKigney and Tina G. Sanghvi.

3. Next Steps/Recommendations

The VITAL team recommended further technical assistance and provided education and training materials for local adaptation.

ESPERANZA GARDEN AND NUTRITION EDUCATION PROJECT

1. Description

The Esperanza Project began its gardening project in 1989 in Villamontes, Bolivia (Tarija Department of the Bolivian Chaco) with vitamin A-earmark funding provided by the USAID mission to PROCOSI. Since the original, two-year project was only funded for 12 months, Esperanza requested an extension from VITAL funds. Review of project documentation and visits to Villamontes revealed that the main objective was to organize communities for general health and nutrition activities and that gardens were a focal point around which to congregate mothers. Little or no effort had been made to raise vegetable crops rich in vitamin A or to orient educational messages or radio spots/programs toward consumption of vitamin A-rich foods. Furthermore, no effort had been made to determine whether consumption of garden produce had changed as a result of the project.

In 1992, the Ministry of Health reported the results of the VITAL/USAID assisted vitamin A deficiency survey and defined three strategies to eliminate the deficiency as a public health problem by 2000. One of the strategies proposed "increasing the consumption of vitamin A-rich foods..." through increased production and nutrition education.

The new garden and nutrition education project was proposed by Esperanza for communities in the Yacuiba area, also Bolivian Chaco, 1.5 hrs. south of Villamontes. The project, funded by VITAL through a subcontract with the PVO umbrella organization, PROCOSI, began in mid-1992. A base-line survey was conducted in July which included a dietary assessment of vitamin A intake, based on the IVACG methodology as applied in the Bolivia vitamin A survey conducted in 1990-91. However, Esperanza personnel were not able to process the survey data until a VITAL consultant assisted in early 1993. By this time, communities had already been selected, and garden promotion work was underway. Unfortunately, the communities most at risk of inadequate vitamin A consumption had not been selected for project activities while those selected had very low rates of inadequate vitamin A intake. Only after the fact was it determined that the Mataco Indians had the highest risk of low vitamin A consumption, and these groups were the hardest to reach with a garden project because of their nomadic, hunting life and unfamiliarity with Spanish. The communities with the second highest risk were urban neighborhoods on the outskirts of Yacuiba. Esperanza began working with these communities in 1993 after results of the base-line survey were known.

Field workers developed project activities in some 20 communities, especially women's clubs, and promoted community gardens as a focal point for health and nutrition. Community garden and nutrition promoters (32) were selected and trained by the project. Esperanza staff provided seed and technical assistance in organic farming methods during biweekly and, later, monthly visits. Promoters became seed distributors and community organizers (although not really garden extension agents). A mid-term assessment in January, 1993 showed that an average of 12 women participated per community and that participation increased with the length of exposure to the project, from 20% after 6 months to 35% at 12 months.

Many participants planted their own, family gardens (270) and involved husbands and children in gardening tasks. Anecdotal reports indicate family approval and appreciation for the new vegetables in the diets. Some families sell or trade produce from their gardens, either in the community or at nearby markets. At least 4 school gardens were also cultivated with project assistance, and it is reported that families from outside project communities buy and plant seeds in "spontaneous" gardens.

A monthly recipe competition was held to come up with new, vitamin A-rich dishes; a different vitamin A vegetable was featured each month. Esperanza organized annual "Health Fairs" at which produce was exhibited and judged and during which vitamin A (and other health and nutrition) messages were communicated. Esperanza produced radio spots and programs for a one-hour weekly slot on a regional radio station, "Ahora, Chaqueños" with vitamin A content. Gardening manuals, recipe books (featuring novel dishes using vitamin A-rich foods) and vitamin A promotional brochures were printed and distributed to facilitate adoption of the desired behavior.

2. Discussion

VITAL expressed concern for the sustainability of the project once funding ceased. As of VITAL's end, only two of the original community gardens in Villamontes and 18 family gardens were reported functioning. Esperanza trained a Peace Corps volunteer and placed him among the Mataco Indians. He also began working with a local, agricultural vocational school to develop a seed packaging and distribution service, and the school may continue the technical assistance originally provided by Esperanza staff.

The director of Esperanza who initiated the garden projects left Bolivia in late 1992, and the project coordinator left Esperanza in April 1993. Field workers continued promoting gardens according to plan until late 1993 when a final, consumption survey was conducted in February, 1994. Food intake data were entered into a data base similar to that used to analyze the baseline survey, and results were compared for participating villages before and after the project. Unfortunately, data were collected during the month of worst drought, when no gardens were producing. Thus, consumption of garden produce was at its lowest point and could not be compared to the baseline.

3. Next Steps/Recommendations

A seed bank should be established and technical assistance provided by the local, agricultural school. The MOH evaluation of vitamin A activities in Bolivia found that the project was extremely promising and recommended that it be replicated all around Bolivia by other NGOs.

4. Lessons Learned

Baseline and evaluation surveys should be conducted during the same months.

Seed banks should be built in from the beginning of gardens projects.

"Spontaneous" gardens should be measured as part of project outcome.

FOOD FORTIFICATION REPORT

1. Description and Discussion

There has been recent renewed global interest in food fortification as an effective way to eliminate dietary micronutrient deficiencies. One of the greatest challenges to fortifying foods in developing countries is finding suitable food vehicles as well as appropriate micronutrient compounds. Other challenges in food fortification are maintaining a commitment to quality assurance by manufacturers and government agencies, cost considerations or who will pay for fortification, and generating the necessary political will to start and maintain a fortification program.

Based on the strong interest in food fortification by donors and governments, VITAL recognized that there was a lack of useful information that documented the experience and lessons learned with food fortification efforts to date and that, although not great in number, there are fortification success stories in several countries as well as less successful fortification attempts that could usefully be shared. Therefore, under VITAL's information gathering and dissemination component, VITAL consultant Dr. Penelope Nestel produced the report "Food Fortification in Developing Countries", reviewing the literature on vitamin A, iron, and iodine fortification efforts worldwide. The final report covers the following topics: how fortification levels are determined and the different fortificants available; the issues related to fortifying different foods, such as potency, stability, trial results, technical and distribution problems, constraints, and cost; quality control and assurance; how to monitor and evaluate food fortification programs; the economic aspects and sustainability of food fortification programs; the political and legal dimensions; and suggestions for future directions.

"Food Fortification in Developing Countries" was published in English in March 1993, and was translated and published in Spanish in August 1993 to use and distribute at the Latin America and Caribbean Micronutrients Workshop in Recife, Brazil. Following this workshop, VITAL received and filled numerous requests for the document. Some of the more significant requests include: The Ministry of Health in the Philippines used this document (100 copies) at a Micronutrient Workshop held by a Ministry task force investigating the possibility of food fortification in the Philippines; the Program Against Micronutrient Malnutrition at Emory University incorporated this document into its training program for host country professionals; the World Health Organization's Nutrition Unit requested 100 copies for WHO Headquarters and Regional Office staff; and UNICEF's Micronutrient Program requested multiple copies for distribution to UNICEF's Field Offices.

2. Next Steps/Recommendations

Based on the positive feedback VITAL received from nutrition program planners, "Food Fortification in Developing Countries" will be a useful document for the OMNI Project to incorporate in some of its micronutrient fortification efforts and discussions. VITAL

recommends that OMNI retain the surplus of fortification documents and incorporate them into its information dissemination program. Since the document was not translated into French, OMNI may want to consider doing so, especially if interest in food fortification grows in West Africa.

4. Lessons Learned

There is a great demand for more knowledge about micronutrient intervention experiences such as food fortification. Program planners and governments are especially anxious to obtain practical experiential information that demonstrates the entire process of fortification, from the technical, political, legal, and economic perspectives. As the first attempt at recording the micronutrient fortification experience in one document, "Food Fortification in Developing Countries" has filled an important information vacuum within the nutrition community.

Program documents, such as "Food Fortification in Developing Countries," are most valuable when they are incorporated in training programs, workshops, or meetings where that specific topic, in this case food fortification, is discussed. In the case of the Philippine Micronutrients Workshop cited above, the document was an integral part of the workshop curriculum materials and was used and discussed in actual sessions with MOH staff. The MOH reported that the document stimulated lively and valuable discussion about the pros and cons of food fortification and was viewed as an asset to the workshop. Designing program documents from the very beginning with their intended uses and audiences in mind is critically important. Otherwise the documents run the risk of becoming mere academic exercises with a very limited audience.

74a

FOOD TECHNOLOGY: SOLAR DRYING IN HAITI

1. Description and Discussion

Food processing and preparation techniques hold promise for improving vitamin A consumption. Simple means of food preservation are a logical means of extending the period of availability of seasonal vitamin A-rich fruits and vegetables. This is particularly so in regions of the world where there is an extended dry period each year.

The Save the Children Foundation (SCF) began promoting vegetable gardens in a community development project in Maissade, Haiti in 1989 in an effort to improve vitamin A consumption in this rural community. Initial efforts were directed toward the men. It was found that interest of male farmers was based on perception of solar drying as a cash crop activity. Promotion of western style gardening through women's clubs was also only moderately successful in that setting. Analysis of the family diets showed that a fairly constant, but seriously inadequate amount of vitamin A was coming from traditional foods growing around the home. It was also found that vitamin A consumption by all family members increased substantially during the mango seasons and that, each year, the supply was so abundant that large amounts of mangos were lost.

SAVE therefore approached and received funding from VITAL for a collaborative inquiry to introduce and implement a community solar drying project to preserve mangos for consumption during the dry season.

Project activities were oriented to the women both as individuals and as members of the women's groups. Construction of a community dryer was the initial step. While receiving training in the construction and operation of the dryer and in food preparation techniques as members of the group, individuals were encouraged to build their own household dryers. A SCF revolving fund was established to provide capital for individuals. A portion of the output of the community dryer was destined to be marketed to provide incomes for the groups, and to provide additional incentive to individuals. The project included a strong nutrition education component to assure that the primary objective of improving the vitamin A status of the target population would not be overlooked.

The project included an operational research element to develop a variety of recipes based on dried mangos. Preservation of other vitamin A foods allowed the dryers to be used during most of the year, broadening the number and increasing the amount of foods available for the drought season. The project also provided assistance to the women in locating local and regional market outlets and in getting marketing underway.

FRANCOPHONE AFRICA REGIONAL VITAMIN A INFORMATION COLLECTION AND DISSEMINATION PROGRAM

ORANA and INSAH

1. Description

In the field of vitamin A nutrition, most program planners, researchers, and policy-makers in Africa have traditionally had to depend on technical information from developed countries, primarily from the United States and Europe. The process of obtaining important information has been difficult for African scientists, governments, and nongovernmental organizations, often forcing them to rely on outdated information to support their work. However, useful information not only resides in developed countries, but also in countries within the region, especially in the form of program intervention documents and training materials. The problem is one of access to these potentially useful materials.

In recognition of these problems and the fact that Africa is a region severely affected by vitamin A deficiency, the USAID/VITAL project arranged initially with the Office de Recherches Sur L'Alimentation et la Nutrition Africaines (ORANA) in Dakar, Senegal and later with the Institut du Sahel (INSAH) in Bamako, Mali to manage the Francophone Africa Regional Vitamin A Information Collection and Dissemination Program. The scope of work for the Francophone Vitamin A Information Collection and Dissemination Program included the following:

- 1) raise awareness about vitamin A deficiency problems among policy-makers, implementors, health professionals, and the general public in A.I.D.-assisted Francophone African countries, through systematic dissemination of information related to vitamin A deficiency and strategies to combat it;
- 2) fill in the knowledge gap by collecting information on studies and programs related to vitamin A from the target countries, specifically information on vitamin A deficiency prevalence, vitamin A nutrition programs and projects, national policies concerning vitamin A deficiency, and persons and institutions engaged in vitamin A related work; and
- 3) target the following A.I.D.-assisted Francophone countries: Algeria, Angola, Benin, Burkina Faso, Burundi, Cameroon, Cape Verde, Chad, Central African Republic, Congo, Cote D'Ivoire, Gabon, Guinea-Bissau, Haiti, Mauritania, Morocco, Mali, Niger, Rwanda, Senegal, Togo, Tunisia, and Zaire.

Deliverables were to include quarterly dissemination of technical and programmatic information on vitamin A to policy-makers and health professionals, quarterly dissemination of an updated acquisitions list to the same audience, three times a year publication of vitamin A news briefs in the local press of selected countries, and the establishment of a photo bank related to vitamin A interventions.

2. Discussion

From February 25, 1991 until June 30, 1992 ORANA managed the program. Beginning in March 1993, the program was managed by INSAH in Bamako, Mali. INSAH made exceptional progress in disseminating vitamin A information within Sahelian Africa during the one-year period of its activity. Because INSAH has a far-reaching, well-established information network in multiple sectors, adding vitamin A and other micronutrient information to its existing database was a logical expansion. INSAH was successful in expanding its pre-existing network of important institutions in the region to include a larger number of nutrition and health-related organizations. INSAH distributed VITAL-produced training materials, research reports, and program intervention documents translated into French, some of which address not only vitamin A but also the other major micronutrients, iodine and iron. INSAH also distributed copies of the French language version of the "Ending Hidden Hunger" video to approximately 250 organizations in the Francophone Africa region.

3. Next Steps/Recommendations

Given the scarcity of quality vitamin A and other micronutrient information in the Francophone Africa region, a region severely affected by vitamin A deficiency, INSAH served an important programming need there. In one year, INSAH laid a solid foundation for micronutrient information collection and dissemination in Francophone countries. VITAL recommends that the program be continued and expanded under the auspices of the OMNI Project.

4. Lessons Learned

INSAH's initial work plan was far too ambitious for a one-year period. This plan emphasized INSAH's setting up the equivalent of subproject arrangements with the participating country collaborators, with each collaborator having its own account set up through INSAH so that it could carry out its own transactions related to information dissemination. This arrangement had the potential to result in a rather unwieldy financial accounting system, although INSAH has set up such subproject accounts under some of its other programs with some degree of success.

Given the timing of this activity, all French language translations were performed at VITAL, rather than at or through INSAH in Mali. It would have been beneficial for INSAH's budget to include a translation line item in order for it to exercise some judgement in translating some of the shorter vitamin A materials, such as journal articles. VITAL translated several important resources, such as "VITAL News," all of the training modules, "Vital Nutrients," the "Solar Drying and Vitamin A" manual, and the 1993 West Africa Vitamin A Workshop Proceedings. Otherwise, most of the materials that VITAL sent to INSAH were in English. Obviously, the optimal solution would have been to have a greater number of French

language vitamin A materials available for INSAH to distribute within the region. With translations, there is also the question of control over the translation, i.e., who has control and say over the final product. While VITAL was very satisfied with the quality of the translations it completed in the U.S., there are cases when it makes more sense for a translation to be done within the region where it will be disseminated, to allow for regional language variations. Given more project time, INSAH and VITAL would have negotiated on translations of additional resources.

18

GETTING OUT THE MESSAGE: A REVIEW OF STRATEGIES FOR PROMOTING VITAMIN A INTERVENTIONS

1. Description

In response to a recommendation of the "Evaluation of the Vitamin A Deficiency Project" conducted out in April 1988 for the Office of Nutrition, VITAL carried out an assessment of nutrition communication interventions and prepared a report "Getting out the Message: A Review of Strategies for Promoting Vitamin A Interventions." The purpose of this assessment was to examine the universe of experience in nutrition communication for vitamin A to draw together the lessons learned, to highlight what had been accomplished and to give direction to A.I.D. and VITAL for future vitamin A nutrition communication efforts.

The assessment was carried out during the period March-October, 1990, by VITAL sub-contractor, Program for Appropriate Technology for Health. The research, site visits and analysis of the data collected were conducted by PATH Consultant Dr. Judi Aibel. The assessment methodology involved a review of existing literature on nutrition education and social marketing, collection and review of all documentation on vitamin A nutrition communication projects, and visits to several project sites.

Meetings were held at the outset of the assessment and following the completion of the site visits with representatives from the Manoff Group, AED, A.I.D. and Helen Keller International (HKI) to discuss the assessment's methodology and findings.

2. Discussion

The major findings of the assessment were that two of the most important aspects of nutrition communication program development and implementation are community participation and appropriate data collection. Community participation at every level of program design, development, implementation and evaluation is essential for appropriate interventions and sustainability. Likewise, accurate, useful and adequate data collection is necessary for successful program design, implementation and evaluation. The assessment concluded that vitamin A communications activities should include strong interpersonal, community-based strategies, and use mass media where appropriate, and as a support for other activities.

3. Next Steps/Recommendations

Based on the assessment, VITAL decided that, rather than conducting stand alone social marketing activities, it would emphasize integrated nutrition education and mass media promotion activities as supports for program interventions.

GUATEMALA MICRONUTRIENT STRATEGY

1. Description

In the mid-1960s vitamin A, iron and iodine deficiencies were found to be significant public health problems in Guatemala. Legislation for compulsory fortification of sugar with vitamin A was passed in 1974 and implemented from 1975 to 1977 using technology developed by INCAP. Salt iodization was also established. As a result of sugar fortification, vitamin A deficiency (VAD) was significantly reduced in selected communities. Fortification was discontinued after 1977. Studies conducted in the mid-1980s showed that VAD continued to be a significant problem. A national VAD strategy was developed in 1986 which included supplementation to high-risk populations, improvement of sugar fortification, and nutrition education combined with actions to promote production and consumption of vitamin A-rich foods. The strategy has been partially implemented.

Sugar fortification was formally re-established in 1987. However, in 1988 about 22% of a sample of preschool aged children attending a national immunization campaign were found to have low serum retinol levels (under 20 ug/dl), and small scale dietary, biochemical and CIC studies in rural communities revealed relatively high rates of vitamin A deficiency. Over the past 2-3 years, vitamin A supplementation has been implemented in high risk rural communities not reached by fortified sugar, mostly by non-governmental organizations (NGOs), some of which have also promoted rural home gardens. In 1991, VITAL, INCAP, UNICEF and the Ministry of Health (MOH) conducted an assessment of the implementation process of vitamin A sugar fortification, supplementation, and nutrition education activities, and provided specific recommendations for improvement. Since then, significant progress has been made in improving sugar fortification.

The assessment report stimulated the Latin America Bureau of A.I.D. to commission an analysis of the cost effectiveness of the three intervention approaches being carried out in Guatemala. The study was performed through the Latin America and Caribbean Health and Nutrition Sustainability Project. Technical papers will be published in appropriate nutrition and development economics publications in English and Spanish.

Guatemala was the first country in Central America to reduce goiter prevalence to below 10% prevalence (it no longer constitutes a significant public health problem) by means of a national salt iodization program. However, this success was not maintained over time. Salt iodization monitoring weakened, consumption of non iodized salt increased, and by 1988 the prevalence of endemic goiter reached 21% among preschool children. Salt iodization monitoring was then resumed by the Ministry of Health, with INCAP assistance.

In 1992, the Ministry of Health convened an informal Inter-institutional Micronutrient Committee (IMC) that met periodically to carry out a situation analysis of micronutrients and discuss options to improve it. The Ministry also asked USAID/Guatemala for assistance with vitamin A activities. They in turn asked AID/W for VITAL's services in response to the Ministry's request, but the services could not be provided until after mid-1993 due to AID

administrative problems and Guatemalan political events. In 1993, the Committee prepared a draft strategy and action plan for the control of micronutrient deficiencies. The draft was reviewed by INCAP and VITAL, and areas for potential improvement were identified, including a more realistic action plan with emphasis on strengthening existing interventions.

Dr. Jose Mora and VITAL consultant Dr. Guillermo Arroyave, who had previously reviewed the micronutrient strategy draft prepared by the IMC, visited Guatemala in November, 1993 to provide technical assistance to the IMC in strategy formulation and development of an action plan. After discussions with IMC and MOH staff, a revised strategy was agreed upon and an action plan outlined. VITAL issued a purchase order to INCAP to assist the MOH in assembling the revised strategy document on the basis of consensus reached. A final draft strategy document was completed in January 1994. In February, 1994 Dr. Arroyave assisted the MOH with preparation of a National Micronutrient Workshop to discuss the strategy, formalize institutional commitments and set the stage for coordinated implementation of a plan of action. The workshop was held in March, 1994.

2. Discussion

It is unfortunate that, after USAID/HPN efforts to generate commitment from the mission for assistance in micronutrients to Guatemala, bureaucratic delays, coupled with local political events, precluded the timely provision of significant assistance to the country. This was compounded by weak government political commitment and serious financial difficulties, as well as failure of the MOH to play a strong leadership role in nutrition and micronutrients. This is expected to improve significantly under the current Minister.

3. Next Steps/Recommendations

The currently high level of political commitment on micronutrients at the MOH provides a unique opportunity to foster more effective action. The emphasis should be on strengthening current intervention programs, particularly sugar fortification, salt iodization, vitamin A supplementation (disease targeted countrywide and universal prevention in some areas not reached by fortified sugar), and home gardening in isolated rural communities where consumption of fortified sugar is uncommon, as well as relatively new activities such as iron supplementation of pregnant and lactating women and young children and, if feasible, iron fortification of staple foods. A communication/education strategy and a functional micronutrient monitoring and surveillance system should also be contemplated.

USAID/Guatemala has been strongly interested in providing support for the implementation of the micronutrient strategy and program activities, and was disappointed that VITAL's support could not have been started earlier in 1993. USAID/Guatemala may soon request assistance from OMNI.

4. Lessons Learned

INCAP represents an excellent technical resource that is in a position to promote action and assist programs in Guatemala, and it has been largely effective in providing assistance to the sugar and salt industries to improve the fortification process. INCAP's effectiveness in providing assistance to the MOH is substantially strengthened when coupled with outside technical and financial assistance.

GUATEMALA SWEET POTATO PROJECT

1. Description:

Through a subcontract with the International Eye Foundation (IEF) VITAL funded a series of studies in Guatemala during 1992-93 to explore the potential of powdered dried sweet potatoes as a food for young children. Sweet potato is a seasonal, widely available but underutilized source of vitamin A in many countries.

IEF collaborated with two organizations in Guatemala - The Center for Studies of Sensory Impairments, Aging and Metabolism (CESSIAM) and the Agricultural Science and Technology Institute (ICTA) - and with the Department of Food Sciences of North Carolina State University (NGSU). ICTA was responsible for preparing and processing the sweet potatoes and for testing packaging alternatives. NCSU carried out carotenoid analyses of the product after different storage times and under different packaging conditions. CESSIAM field tested the product to determine its acceptability and usefulness to consumers.

2. Discussion

It was found that one ounce of the dried sweet potato contains sufficient beta-carotene to provide 49% of the recommended vitamin A intake for a 4 year old child. Thus, it could be a good source of vitamin A for feeding children in the form of beverages, gruels, paps or mixed dishes. While progressive deterioration of the beta-carotene content occurred over time in air-permeable packaging, storage in a sealed plain opaque plastic bag was found to result in only very slow deterioration after the first month. The presence of metal compounds (iron and zinc) with or without anti-oxidants (vitamin E, BHT) did not influence the rate of degradation.

Acceptability and usefulness of the product was tested over a five-month period in four separate low-income communities. Four distribution formats were used:

- sold at 100% of the price of comparable food products- 58 households
- sold at 50% of the established price- 60 households
- free of charge on the basis of one pound weekly per eligible preschool child- 32 households
- free of charge in unlimited quantities- 41 households

Basic recipes for preparation of gruels and purees for young children were given to mothers. Mothers were also encouraged to develop their own recipes using the product. Each distribution format required a different level of effort and funding to obtain the product. Consumption was roughly inversely related to the degree of sacrifice required, being used regularly throughout the entire period by essentially all the families receiving the product at no cost. A larger variety

of recipes was also created by mothers of these families. In communities paying 100% and 50% of the commercial price, consumption was 14% and 25% respectively, and fewer recipes were developed.

3. Next Steps/Recommendations

This collaborative inquiry was an important developmental activity with reference to the marketing of dried food sources of vitamin A. The acceptability and usefulness to low income families of dried sweet potato flour for young child feeding has been demonstrated. Important information on beta-carotene content and the relationship between combinations with other micronutrients, packaging and deterioration during storage has been determined. In addition, the substantial number of recipes using sweet potato flour which evolved during the study will be useful in promoting increased use of home produced sweet potatoes and by consumers who purchase dried sweet potatoes from community or commercial drying facilities.

4. Lessons Learned

The development and testing of a novel food product requires multi-disciplinary effort.

Inter-sectorial discussion and collaboration, specifically between private industry and non-profit research organizations, is critical for developing a consensus about the way that food-based, and presumably sustainable, solutions to endemic nutritional deficiency problems can be developed.

Motivational and behavioral factors are key in determining the use or non-use of a new food product by target communities.

VITAMIN A CAPSULE DISTRIBUTION AND TRAINING IN HAITI

1. Description and Discussion

Haiti suffered a severe drought from early 1976 until late 1978. Under the predecessor project to the Vitamin A for Health Project, R&D/N made a grant to Helen Keller International to conduct a national vitamin A deficiency survey of preschool-age children. The clinical survey, implemented January-March 1978, confirmed that the prevalence of xerophthalmia far surpassed the WHO definitions of a public health problem. R&D/N then funded a follow-on grant to HKI to initiate vitamin A capsule distribution, vitamin A education at the community level and sensitization of policy makers and health professionals. This was done through the MOH.

Within a few years, USAID/Haiti began funding vitamin A activities carried out by MOH and HKI. From the outset, UNICEF provided the vitamin A capsules. When activities under the MOH structure became untenable in the late 1980s, the mission set up its own project, PROVAX, to distribute capsules to and through PVOs/NGOs implementing child survival activities, provide technical assistance in vitamin A to the PVOs, and monitor and evaluate capsule supply and coverage by each of the collaborating PVOs/NGOs.

In October 1986, Eye Care (a U.S. PVO) in collaboration with the Child Health Institute (a Haitian NGO) initiated a three-year child survival project in the northwestern area of the country under an FVA/PVC grant. Emphasis was to be placed on promotion of ORT and vitamin A supplementation of nearly 14,000 children 6-83 months of age and their mothers. Piggy-backing on this project, USAID/Haiti made a separate grant to Eye Care/CHI to conduct a randomized, double-blind, controlled study of the impact of vitamin A supplementation on diarrheal and respiratory disease morbidity/mortality among this same population of children.

At the request of USAID/Haiti, VITAL provided two consultants who, together with a CHI consultant, carried out a final evaluation of the combined project in February 1990. VITAL subsequently provided follow-on funding and consultant services to assist in the analysis and interpretation of results from the research component of the project.

A collaborative effort between MOH, PAHO, UNICEF and USAID/Haiti to assess the national vitamin A capsule distribution program was planned for October 1991 but was aborted due to a coup in September 1991 and resulting embargo. Vitamin A was included in the waivers for humanitarian assistance programs in Haiti, beginning in September 1992. USAID/Haiti immediately requested VITAL assistance in planning for FY 1993 vitamin A activities in the country. This was provided by a VITAL staff visit in early October 1992. Primary emphasis in the plan was placed on improving the vitamin A distribution system, increasing coverage, coordinating capsule distribution with EPI, and arranging for the essential drug program to be the sole vitamin A capsule supply source in the country. The focus of vitamin A activities was to be through PVOs and NGOs since USAID was not permitted to work with government institutions.

Considering that child survival activities in the country had been restricted for over a year due to the embargo, the long postponed national assessment was viewed as a priority need. PAHO and UNICEF concurred, agreeing that this be done under USAID auspices. At USAID/Haiti's request, VITAL funded and assisted PROVAX to carry out the assessment during October-December 1992. In all, the PROVAX Director and two Haitian consultants visited the field sites of all eighteen NGOs/PVOs collaborating with PROVAX. The VITAL "Guidelines for Assessment of Capsule Distributions" served as the basis for the questionnaire used for gathering information.

The assessment report identified two elements of the system which could benefit from technical assistance from VITAL:

- Training, because there had been substantial turnover in PVO/NGO staff since PROVAX had initially trained several of the agencies. Also, seven additional NGOs planned to initiate capsule distribution during FY 1993.
- Monitoring and evaluation. The collaborating NGOs/PVOs proposed that the capsule distribution reports be re-formatted to satisfy their program management needs as well as those of PROVAX. Feedback of results from PROVAX was also frequently tardy, in part because the forms in use make analysis difficult.

Monitoring/evaluation technical assistance was provided by VITAL in mid-April. In addition to assisting in reformatting the reporting forms, the consultant worked with PROVAX to develop standardized information feedback formats which could be computer generated. Arrangements were also made for PROVAX and PROMESS (the central drug programs) to jointly monitor the capsule supply of each collaborating PVO/NGO. A communications/training consultant, also funded by VITAL, assisted in revising the training modules and identified feasible communication/education interventions in late April-early May 1993.

2. Next Steps/Recommendations

A follow-on visit by a communications/training consultant would be appropriate in mid-1994 or as soon as the current embargo is lifted.

3. Lessons Learned

Haiti is an excellent example of how an AID/W field support resource can play an important role in assisting A.I.D. missions to sustain a commitment to resolving serious health/nutrition problems under difficult conditions. In several instances, VITAL was able to serve urgent and unforeseen mission needs for technical assistance under exceptional circumstances.

HONDURAS NATIONAL MICRONUTRIENT STRATEGY

1. Description

During the first LAC Regional Workshop on Vitamin A in 1990, the Honduran representative, while describing the seriousness of the vitamin A situation in the country, emphasized the lack of government commitment to solve the problem and showed no interest in USAID assistance. In 1991, the Director of Nutrition at the MOH, Dr. Maria del Carmen Miranda, requested VITAL assistance in conducting a clinical assessment of VAD ocular signs in two high risk regions of the country. VITAL consultant Dr. Jesus Bulux found a high incidence of clinical ocular signs among children attending health services in the two regions. This prompted Dr. Miranda, who was invited to the second regional VAD workshop, to request USAID assistance to assess the problem and design interventions to deal with it.

However, it was not until mid-1992 that USAID/Honduras, responding to government interest and commitment, requested financial and technical services from the VITAL Project to help the GOH address vitamin A and other micronutrient deficiencies.

From this time until the project's end, VITAL provided substantial technical and financial assistance to the Ministry of Health for the design and implementation of a micronutrient strategy and program. The strategy was completed by late 1992 with assistance of VITAL and INCAP staff, following two national planning workshops in August and October of that year.

Based on the Mission's recommendation, VITAL arranged with the International Eye Foundation for its Honduras program office to serve as in-country manager of the VITAL assistance to the MOH. In addition to administrative support, IEF agreed to provide the services of a technical coordinator and a communications specialist. Because of delays in provision of "buy-in" funding, VITAL started the work by executing an interim "core" funded subcontract for January - May 1993 with IEF. A nine-month subcontract was then executed for the period June 1993 - February 1994.

2. Discussion

The coordinated micronutrient strategy and program in Honduras is the first attempt in the LAC region at the implementation of an integrated effort, under MOH leadership, to address the three main micronutrient deficiencies of public health significance in the country (vitamin A, iron and iodine), as shown in the 1987 National Nutrition Survey. The strategy encompasses five major elements: (1) strong government commitment at central, regional and local levels; (2) constant search for consensus between the public and private sector, particularly the food industry; (3) intensive training of MOH, industry and PVO personnel; (4) a communications/education strategy; and (5) a monitoring and epidemiological surveillance system. The program has three major intervention components: (1) therapeutic and preventive vitamin A and iron supplementation; (2) fortification of sugar with vitamin A,

salt with iodine and, eventually, wheat flour with iron; and (3) a dietary diversification component focused on promotion of production, preservation and consumption of vitamin A-rich foods through home and community gardening projects implemented by PVOs.

USAID/VITAL provided technical and financial assistance in strategy implementation, monitoring and evaluation, in close coordination with other donors, particularly PAHO/INCAP and UNICEF. Implementation was initially targeted to three high-risk regions. Priority areas in 1993 were: (1) implementation of an intensive training program, in collaboration with INCAP; (2) planning and implementation of a vitamin A and iron supplementation program; (3) support for consensus building and technical assistance to the food industry to secure improved fortification of sugar and salt (UNICEF specifically assists salt iodization); (4) formulation of a communications/education strategy (formative research, development and field testing of educational messages/materials); and (5) design and establishment of a micronutrient monitoring and surveillance system.

3. Next Steps/Recommendations

VITAL prepared a formal report of activities, accomplishments and lessons learned in support of the Honduran micronutrient strategy. USAID/Honduras requested IMPACT to continue the technical assistance to the GOH for continued implementation of the micronutrient strategy and program as soon as VITAL phased out. Priority areas for IMPACT assistance will be: (1) monitoring and evaluation of the supplementation program; (2) continue support to the food industry, with emphasis on quality control and monitoring, to secure optimal food fortification; (3) implementation and evaluation of the communications/education strategy; and (4) implementation of the micronutrient monitoring and surveillance system, with a formal impact evaluation to be conducted in 1995.

The need for continuity of technical assistance in support of implementation of the national micronutrient strategy is fully recognized by USAID/Honduras and local counterparts. To the extent possible, such continuity should be secured through long-term institutional commitment and involvement.

4. Lessons Learned

Strong government commitment is critical for the implementation of effective strategies to confront micronutrient deficiencies. The international community is in a good position to stimulate such commitment, after which effective response from development assistance and international donors is critical to sustain it.

Despite the bureaucratic and operational difficulties and requirements involved, implementation of a coordinated micronutrient strategy is feasible and probably more effective than single nutrient, isolated interventions. Furthermore, governments are often more interested in integrated or coordinated approaches than in vertical interventions.

A permanent search for consensus between the public and private sector has shown to be more effective in securing effective food fortification of staple foods than law enforcement alone.

Coordination with other donors is facilitated if positive personal relationships are established rather than relying solely on institutional commitments. Each donor may have specific priorities and particular interests that can be accommodated and channeled toward common purposes.

The need for a capable, credible and efficient local agency to provide administrative and financial services in support of donor-funded micronutrient efforts should be well recognized, as government institutions are not often the best choice. The agency may well be a local PVO with experience in community health and/or nutrition, appropriate management and administrative capacity, and good standing with the central government. In providing such services, the administrative agency should be able to recognize and give precedence to implementation needs and technical requirements over administrative expediency.

THE IMPACT OF HOME GARDENING ON DIETARY RISK OF INADEQUATE VITAMIN A INTAKE IN GUATEMALA

1. Description

A VITAL assessment of the status of vitamin A interventions in Guatemala first identified the large scale and apparent success of Project HOPE's gardening program conducted as part of a package of child survival services being provided in two under-served states of San Marcos and Quetzaltenango (see McKigney et al, 11/92). Project HOPE is a private, non-profit organization that has been assisting the Guatemalan Ministry of Health (MOH) to deliver basic health services in these two states since 1976. Starting in January 1991, HOPE added promotion of gardens and vitamin A supplementation to its program of activities in the two departments, aided by financing from a USAID grant, technical assistance from the Central American Institute for Nutrition (INCAP), and the collaboration of DIGESA and the MOH. Project HOPE was in the process of planning an evaluation survey for 1993 when VITAL began a search for sites to assess the consumption impact of gardening as part of a case study, and it was decided that the VITAL case study would attempt to capture the effects of two and one-half years of garden promotion and nutrition education initiated by Project HOPE in 1990 and collaboratively continued and expanded by the project with other entities, on household availability and consumption of vitamin A foods.

A cross-sectional design was used in which 300 gardening households in the project areas of San Marcos and Quetzaltenango were compared with 300 households in adjoining non-program areas of Totonicapan, in terms of their dietary patterns, local vitamin A sources, experience with program activities, and understanding of the importance of vitamin A. Consumption of vitamin A was estimated for children 6-72 months of age and pregnant and lactating women using the number of days vitamin A foods were consumed during the preceding week and a 24-hour recall questionnaire based on IVACG Guidelines (1989). Two complementary methods for collecting information were used: a series of focus groups and follow up visits which were used for constructing the questionnaires, training interviewers, and interpreting the survey data; and a cross-sectional survey of 300 gardening households and 300 non-project households to obtain quantitative estimates of each variable.

The study was funded collaboratively through the USAID/VITAL Project and FY 1990 vitamin A grant funds provided to Project HOPE by USAID/FHA/PVC/CSH. Dr. Elizabeth Adelski (VITAL consultant) and Dr. Victor Calderon (Project HOPE) led the questionnaire design and data collection efforts. Dr. Penelope Nestel (VITAL consultant) conducted the data analysis. Dr. Bettina Schwetthelm, Director Child-Survival HOPE, Virginia, and Dr. Francisco Pineda, HOPE Country Director for Guatemala, provided information and critical support, and helped design the evaluation. Dr. Robert Magnani, Associate Professor of Biostatistics at Tulane University assisted in sample size determination and design. Ing. Gustavo Castro, Computer Programmer, HOPE was responsible for data entry. Dr. Mohamad Mansour, Nutrition Advisor, VITAL provided insights into the application of IVACG guidelines for the evaluation.

2. Discussion

The results show that project households had planted and consumed significantly more dark green leafy vegetable (DGLV) than non-project households. Overall, the number of days on which food sources of vitamin A were consumed in the project area was significantly higher than in the non-project area. Multivariate analyses showed that younger children (age 6-11 months), children from larger households, children from households that get their water from a well or open-air sources (versus tap water), as well as children from the non-project households who did not plant or harvest DGLVs were at significantly greater risk of having low vitamin A consumption.

Data collected on knowledge of the importance of vitamin A in the diet and awareness of food sources of vitamin A tended to support the consumption data. One-quarter of mothers in the non-project area were not able to state why vitamin A is important in the diet, which was three times the level for the project area. In addition, one-quarter of mothers in the non project area did not know any food sources of vitamin A, which was double the level found in project areas.

Based on the consistency of evidence regarding a positive impact (greater availability of vitamin A foods, improved knowledge and awareness of mothers, and improved consumption of vitamin A foods by children) the study concluded that a significant reduction in the risk of vitamin A inadequacy is attributable to the garden and education project.

Factors that worked in favor of producing this positive effect include the synergistic effect of nutrition education, which promoted consumption by children of vitamin A rich foods, the tendency of the garden households to retain their produce for consumption, and no taboos against the consumption of vegetables by young children. A unique characteristic in the design of this project was the careful geographic targeting undertaken at baseline to focus resources in the highest prevalence areas. The success of the large-scale establishment of gardens in the project area is also unique in terms of garden promotion activities vis-a-vis those reported in the literature, and makes gardens as an intervention worthy of serious consideration within a broader strategy for addressing the problem of vitamin A deficiency in Guatemala.

3. Next Steps/Recommendations

The findings of this study are being used by Project HOPE to design the next phase of its program in Guatemala. Data on the non-program group are expected to provide the basis for a follow-up evaluation in Totonicapan - a third state in which Project HOPE is now expanding its activities.

4. Lessons Learned

The findings suggest that the promotion of home gardens can reduce the dietary risk of vitamin A deficiency, although other factors such as infant feeding practices, primary health care, and per capita availability of nutrient rich food also need to be addressed, certainly in the context

of Guatemala.

Other insights into issues related to the effectiveness of the garden and nutrition education programs were also obtained, in particular how similar projects may achieve even higher impact, and recommendations for future evaluations of garden activities. Responses to questions regarding the importance and sources of vitamin A were disappointing and suggest that greater impact may be possible if higher nutrition education coverage can be achieved. In general, the approach followed for this evaluation was found to be satisfactory and feasible for a routine, minimum assessment that can be repeated every two to three years. Some lessons learned on evaluating similar projects include: the need to strengthen evaluation capacity in implementing agencies; the importance of obtaining a comparable baseline; further development of a qualitative and quantitative methodology for evaluating dietary vitamin A interventions (the IVACG approach has not been validated in the context of evaluating program effects, and food frequency completely misses the possibility that larger amounts of the same foods can contribute to significantly better intakes); and adding (not a substitute for measuring food consumption) outcome measures such as serum retinol (a sample of 250 children in project and 250 in non-project areas would have been sufficient) especially in programs with a health component.

For project monitoring purposes in this project, the use of planting and harvesting data (obtained through household level interviews) can be used as surrogates for consumption.

INDONESIA MICRONUTRIENT DEFICIENCY PREVALENCE SURVEY

1. Description

VITAL subcontractor, Community Systems Foundation (CSF) was requested by the MOH of Indonesia to provide technical assistance in data entry, cleaning, management, analysis and report writing for the Eastern Islands Micronutrient Deficiency Prevalence Survey, October 1990-October 1991.

2. Discussion

The results of the survey indicate that the risk of malnutrition, vitamin A deficiency (VAD), anemia and iodine deficiency disease (IDD) tend to cluster and are concentrated in certain areas, and continue to exist in the eastern part of Indonesia.

Prevalence of Bitot's spots was lower than the WHO cut-off for a significant public health problem and significantly lower than the 1978 survey rates. Overall prevalence was 0.14%, with the highest rates found in Irian Jaya (0.25%) and Timor Timur (0.27%). Xerophthalmia was found to be a significant public health problem in Timor Timur only. Mean serum retinol level was $19.04\mu\text{g}/\text{dl}$, with 12.25% $< 10\mu\text{g}/\text{dl}$. High prevalence of goiter was found in each of the four provinces. The highest prevalence was found in Timor Timur (25.2% of children with some sign of goiter). The highest prevalence in pregnant women was found in Maluku (38.6%). Highest prevalence of anemia was found in Timor Timur (60.6% children, 64.7% pregnant women). Lowest prevalence of IDD was found in Irian Jaya (35.8% children, 38% pregnant women).

3. Next Steps/Recommendations

Despite a documented decrease in the prevalence of xerophthalmia in Indonesia, micronutrient deficiencies still exist. Nutrition programming to address these is still required.

LAC VITAMIN A WORKSHOPS

1. Description

Convening a regional meeting on vitamin A was adopted as a major strategic approach to beginning VITAL work in the LAC region. The First Regional Workshop on Vitamin A was held in Guatemala at INCAP headquarters in June, 1990. It was organized in collaboration with PAHO/WHO, UNICEF, FAO and the Latinamerican Nutrition Society (SLAN). The workshop was attended by 50 participants from 15 countries, including some from non AID-assisted countries supported by UNICEF and PAHO/WHO, and a number of local professional and INCAP staff. Dr. Frances Davidson and Dr. Barbara Underwood were especially invited to the workshop. Country representatives were selected in consultation with USAID missions and PAHO/WHO or UNICEF country offices. They were asked to prepare country reports summarizing relevant data (dietary, biochemical, clinical, etc) on the vitamin A status of the population, as well as on existing strategies, programs and/or activities, if any, that were implemented for the prevention and control of vitamin A deficiency (VAD). The workshop allowed VITAL staff and invited speakers to update and sensitize the participants about new developments in vitamin A research and interventions, as well as to have a sense of the vitamin A situation in the region, identify priorities and human and institutional resources available, and begin planning field support activities.

Holding successive periodic regional meetings was foreseen as a means to keep in touch with key individuals and institutions from the whole region, discuss progress made and formulate new strategies and actions. Thus, a second smaller regional workshop was convened in September, 1991 in San Juan, Puerto Rico, with participants from 11 countries, in collaboration with PAHO/WHO and SLAN, at the close of the SLAN Regional Nutrition Congress. Countries reported on the progress made since the previous workshop and plans for the future. Noted speakers presented reports on recent experience in specific vitamin A interventions. Topics discussed in this workshop were mainly related to activities carried out or planned with VITAL assistance in a number of countries. Thus, participants were mostly VITAL counterparts. The reports of the workshops provided clear guidelines and priorities for action to clarify the status of vitamin A in the region and undertake actions to remedy it.

A third workshop was held in Recife, Brazil in August, 1993. This workshop focused not only on vitamin A but also on iron and iodine. For the first time in the region, experts in the three major micronutrients got together to discuss common issues, review the micronutrient situation in the region and outline coordinated national strategies and programs. Workshop participants were 70 representatives from 15 countries of the region. The meeting was organized in collaboration with PAHO/WHO, UNICEF, SLAN and the University of Pernambuco. Featured speakers, including members of IVACG, INACG and ICCIDD, as well as Dr. Barbara Underwood from WHO, presented up-to-date information on diagnostic technics, intervention methods and experience with national programs. A number of panels were scheduled to discuss critical issues in generating political commitment on micronutrients and in specific intervention approaches. Country representatives spoke about their country situation and deficiency eradication programs. Participation by representatives from PAHO, UNICEF and Roche was

active and effective. The Brazilian delegation shared their extensive experience in vitamin A programs, including the novel rice fortification efforts in Recife.

2. Discussion

When VITAL started in 1990, very little was known about the status of vitamin A in Latin America, neither the deficiency situation in the various countries nor the programs being undertaken to deal with the problem. The WHO deficiency map, prepared in 1988 mostly on the basis of available clinical evidence, listed Brazil, El Salvador and Guatemala as countries with a definite vitamin A deficiency problems of public health significance, and Bolivia as a country with probable problem. It was clear at the first regional workshop that there was insufficient information on the current status of vitamin A in most countries of the region. The available information came from national vitamin A surveys in Central America (conducted by INCAP) in the 1960s, in Colombia in 1977/80, in Ecuador and Honduras in 1987, in El Salvador in 1988, in Guatemala in 1988 (on a national sample of children participating in an immunization campaign), and from partial assessments, in some cases only dietary, made in limited areas of Haiti, Brazil, Bolivia and Mexico in the 1970s or 1980s. No recent (less than ten years old) national information was available from countries other than Ecuador, El Salvador, Honduras and Guatemala. This lack of information led VITAL to assign relatively high priority to undertaking national VAD assessments in the region.

Contractual limitations initially precluded expanding the scope of the regional workshops to cover micronutrients other than vitamin A, as desired by USAID missions and local counterparts interested in coordinated strategies.

3. Next Steps/Recommendations

It would be useful to take advantage of the network already created throughout the region, among other means by continuing to hold periodic meetings to exchange information, share successes and failures and stimulate actions around the hemisphere.

4. Lessons Learned

Regional workshops, in addition to national meetings, are excellent means for information exchange and experience sharing that is critical for strengthening the capability of local institutions and individuals to formulate and carry out sound vitamin A and other micronutrient strategies and programs. They also represent one of the very best strategies for maintaining a constant network of individuals and institutions interested, motivated and capable of implementing effective action in the countries.

Although other donors are willing to collaborate in the workshops, AID should continue taking a leadership role in convening program-oriented micronutrient workshops to discuss strategic and programmatic issues, as opposed to highly technical nutrient specific workshops held by

other agencies (e.g. on iodine, convened by ICCIDD).

NEPAL NATIONAL PROGRAM

1. Description

At the request of USAID/Kathmandu, VITAL supported a National Vitamin A Workshop in February 1992 to report out on the findings of three vitamin A research activities conducted in Nepal. At this meeting His Majesty's Government of Nepal (HMG) stated its commitment to implement a national vitamin A program, and a Vitamin A Task Force was formed. The National Vitamin A Deficiency Prevention and Control Program was initiated in November 1992 following the development of "Guidelines for Implementation of National Vitamin A Deficiency Control Programme" for vitamin A deficiency. USAID/Kathmandu agreed to provide support to HMG for the National Program from January 1993-July 1997. A buy-in to VITAL was the mechanism used by USAID/Kathmandu to provide technical assistance for the period April 1993-April 1994. Additional assistance for the program is provided through UNICEF.

The main objective of the program is to reduce child mortality through reduction of vitamin A deficiency in Nepal to a level that no longer constitutes a public health problem. Secondly, the program aims to bring about a change in dietary behavior among the target group through nutrition education, increased home production, consumption and preservation of vitamin A-rich foods, improved breastfeeding and child feeding practices. This is being achieved through a multi-sectoral approach, involving the Ministries of Health, Agriculture, Education, Local Development, and several NGOs. The program focuses on implementation of short-term (supplementation) and long-term strategies (dietary behavior change and literacy promotion, phased in over the five year period. The program activities are implemented through the Ministry of Health with the assistance of a Vitamin A Technical Assistance Group (TAG).

2. Discussion

Activities during the first year of the program focused on design, planning and start-up of a capsule distribution campaign, training in case treatment for vitamin A deficiency, assessments of districts in the Far and Mid-Western regions, and support for pilot NGO strategies to address the long-term strategies.

Supplementation

The first capsule distribution campaign of the program took place in eight districts in the central terai region of the country October 18-19, 1993. Nearly 500,000 children received protective doses of vitamin A supplements through the mobilization of 7,000 Community Health Volunteers. Training in the importance of vitamin A for child health and the program's intervention strategy was provided to 13,000 workers from various agencies in the months leading up to the campaign, to assure multi-sectoral support and assistance for mobilizing and educating mothers. Logistic support for the training, promotion and supervision of the capsule campaign were provided by a local subcontractor. Coverage rates of 90% were achieved during this campaign. The second capsule distribution campaign, covering 12 districts, occurred April

18-19, 1994.

Monitoring

VITAL consultant Dr. Paul Arthur assisted in the development of a capsule monitoring system in October 1993. The system includes four components: observations recorded during the campaign by supervisors; tabulations of registers used by Female Community Health Volunteers; a mini-survey of 5% of the target population; and a final impact evaluation. All three of the first components were successfully implemented during the first campaign round. Modifications based on use of the system were incorporated in time for the second capsule campaign.

Assessments

Five districts in the Far and Mid-Western regions were surveyed between June and October 1993 to determine the prevalence of xerophthalmia. The surveys were conducted under a subcontract with New ERA. The findings of the surveys indicate that vitamin A deficiency is a public health problem in parts of all five districts. High rates of severe malnutrition were also found. These districts will be considered priority districts for the purposes of the National Program, and interventions will be phased into these areas. Plans were made to survey ten additional districts from the western regions beginning in April 1994.

Case Treatment

Because of the very high prevalence of xerophthalmia in many parts of Nepal, an immediate strategy of the National Program was to disseminate guidelines on appropriate case treatment to all hospitals, health posts and clinics. This is followed up with training workshops and meetings conducted by the TAG to assure that proper case treatment for measles and xerophthalmia are utilized by health care providers. The Nepal Medical Association is collaborating with the MOH and TAG to conduct regional meetings of its members to further educate physicians in the MOH treatment schedule, the importance of vitamin A for child survival, and the goals of the National Program. A Nepali language protocol card has been printed and distributed to all districts and NGOs working in vitamin A.

NGOS

In its eighth five-year plan HMG stated its intent to rely increasingly on NGOs to support activities such as the National Vitamin A Program. Many NGOs were distributing vitamin A supplements in Nepal prior to the initiation of the National Program, and they have been invited and encouraged to continue and expand their cooperation. Coordination of the NGOs was achieved through a subcontract with HKI/Nepal, to assure that NGOs were informed about the National Program and that their activities were documented in order to provide lessons learned to the National Program. A one-day vitamin A meeting was held for the NGOs in December 1993. This was a very successful effort to educate, coordinate and encourage exchange between the various partners in the program. In all districts where the capsule campaign was held NGOs participated in the activity.

95

In addition to supporting the supplementation campaign, several NGOs were subcontracted to conduct pilot activities focusing on the long-term strategies.

CARE/Nepal is conducting gardening activities and nutrition education and training in Bajura, Solokhumbu and Mahottari districts. This activity began in April 1992 with a baseline study in Mahottari and Bajura districts, conducted by CARE with technical assistance from VITAL subcontractors, University of Arizona. The purpose of the activity was to determine the impact of home garden interventions on consumption of vitamin A-rich foods. CARE staff were trained in vitamin A nutrition education and promote improved consumption by the target populations. A final evaluation is planned for April 1995. However, after the first year, CARE found that the demand for gardens was so great that it wanted to expand into new districts and new areas of districts in which it was already working. In Solokhumbu, CARE found gardens an excellent way to build relations with a new community, since products were available in a relatively short time.

United Mission to Nepal (UMN) conducts non-formal adult nutrition education and literacy classes in Jajarkot district. NNJS implements a nutrition communication activity using radio spots.

An annual meeting was held March 2-3, 1994 to report on the status of the program, the outcome of the last capsule campaign and to strategize for campaigns in April and October 1994. Multi-sectoral staff from districts where the campaign will be held met in Kathmandu and discussed the experience of the first campaign, lessons learned and made plans for the next campaign.

3. Next Steps/Recommendations

By VITAL's end, the Nepal National Vitamin A Program had completed only the first of the planned four and one half years. This period was viewed as a start-up phase in which many of the proposed strategies would be tested. Because of the intensive effort required to initiate the activity, capsule distribution was the primary initial focus of resources, and several other important components of the program still remain to be fully undertaken, especially the long-term strategies.

The monitoring system needs to be refined and integrated into the Ministry of Health's newly designed health information system. Implementation of program activities in the hill/mountain areas will require operations research to determine appropriate service delivery mechanisms. The nutrition communication component needs to be developed, and initiated, including identification of local technical assistance. Promotion of maternal literacy, an important component of the National Program, will require the collaboration and leadership of non-health sectors. Strengthening the capacity of the MOH to implement the Program must continue to be a major focus of activities by the TAG, to assure sustainability.

4. Lessons Learned

Because of a long delay in the execution of the delivery order under which the Nepal activities were conducted, activities conducted prior to mid-April 1993 were limited to those that the VITAL core budget could bear. This resulted in a very short period in which a great deal had to be done to assure capsule distribution in 8 districts, and forced certain short-cuts to be taken. It was clear from this experience that a break in funding causes serious problems in implementing an activity with fixed dates, such as capsule distribution.

A major reorganization of HMG in July had a deleterious effect on the National Program. The Nutrition Section, which had previously been the home of the vitamin A program was eliminated, and a new division took responsibility for the National Program. It took many months to get the strong support of the new government counterparts, who had no knowledge of the vitamin A program, and had not been involved in any of the design, planning or implementation. This caused a major set-back for many TAG activities, including nutrition education activities and materials development, finalization of case treatment protocols, concurrence with the annual workplan, and monitoring. HMG has undergone several important reorganizations during the years since democratization began. It is likely that this instability will continue, and programming efforts (and plans for sustainability) should take this into account.

In July 1993 there was a serious flood in the terai which devastated many areas where training was taking place for the October capsule distribution. This resulted in very difficult logistic problems for the TAG and MOH. For the surveys this was an especially serious constraint, resulting in delays and increased cost. Nepal's terrain is difficult and there are frequent environmental obstacles which will hinder program plans. Planning should take these factors into account and not be too ambitious in goal setting.

Developing a nutrition education strategy in Nepal was extremely difficult due to the number of agencies interested in participating and developing materials. Each agency wished to be very involved in the production aspect of materials development (such as posters and pamphlets) and this caused tremendous delays, development of many poor materials, waste and duplication. The absence of understanding basic education principles or materials development methodology resulted in changes to visual materials based on the personal preferences of committees in Kathmandu, rather than based on field testing and sound methodologies.

NGOs, especially international organizations have their own agendas and have operated with little control in Nepal for a long time. They found it difficult to accommodate the strategies outlined by the National Program, and some declined to participate in the Program. In addition, communications between the TAG, the NGO coordinating group and NGO home and field offices were difficult and sometimes confused. Future coordination of the NGOs should be conducted more closely with TAG operations.

The census data available in Nepal is quite inaccurate and caused difficulties in planning. The National Program's monitoring system includes registration of target children and will provide valuable information to the government for a variety of other services.

NICARAGUA VITAMIN A AND IRON DEFICIENCY SURVEY

1. Description

Late in 1992, the Nicaraguan MOH requested USAID assistance to carry out a vitamin A and iron deficiency assessment. USAID asked VITAL to provide such assistance. After two exploratory visits by Dr. Jose Mora in February and May, 1993, an agreement was reached with the MOH and USAID to design and implement a population-based survey in a national sample of about 1,600 children 1-5 years of age and their families, taken from the sample previously used for a USAID-supported Family Health Survey implemented by CDC and managed by PRGFAMILIA, a local family planning NGO. Final survey planning and preparation occurred during a subsequent visit of Drs. Mora and Nelson in July. Survey components included assessments of hemoglobin, serum ferritin and retinol, and an ocular clinical examination for vitamin A deficiency signs in the entire population sample, and a 24-hour recall child dietary intake assessment of the family and individual child using the 24-hour recall method on a randomly selected subsample. Hemoglobin was also measured on all mothers of children in the sample.

2. Discussion

USAID/VITAL assistance to the Nicaragua vitamin A and iron survey was provided very close to the end of the VITAL project (July, 1993 to February, 1994). Two VITAL subcontracts were let, one to INCAP for laboratory analysis of ferritin and serum retinol and management of the dietary assessment, including staff training in blood taking and dietary intake data collection and analysis, and one to PROFAMILIA for provision of financial management assistance. VITAL provided supplies, including four portable hemoglobinometers, and technical assistance in survey and questionnaire design, data analysis and report preparation. VITAL also assisted with some additional training of field teams and early field supervision.

Some problems with blood collection were corrected early in survey implementation. While PROFAMILIA has an enviable record conducting population surveys as an A.I.D. contractor, it found the role of servant to the public sector too confining and bridled at the restrictions and demands. It also rejected advancing its own funds when cash flow problems arose, which caused some transitory problems for VITAL and the MOH.

The survey technical director, MOH Director of Nutrition, was fully responsible for survey planning and implementation, including data collection, analysis and report preparation, with VITAL assistance. Field work began late August and was completed in the national sample by mid-November. An additional small sample from the underpopulated Atlantic regions was surveyed afterwards. Biochemical analyses were completed by INCAP in December, 1993 and reported early in January, 1994. The dietary data were analyzed with the assistance of a local consultant trained and supervised by INCAP. The entire data files were analyzed and the survey report prepared by the MOH staff, with VITAL assistance, in January, 1994. A reporting-out workshop was held with VITAL support in February, 1994.

The 24-hour dietary recall showed low consumption of vitamin A and iron, as well as energy, in a large proportion of families and children. The laboratory data indicated that about 31% of the children have low levels of serum retinol (below 20 $\mu\text{g}/\text{dl}$), a percentage that is far above the 10% WHO cutoff point, thus revealing a significant public health problem. Yet no clinical signs of deficiency were found. The prevalence of anemia, about 30% in children (70% in those aged 12-23 months) and 20% among their mothers, and the percentage, about 37%, of the children with low ferritin values (deficient iron liver stores), are indicative of iron deficiency being also a significant public health problem in Nicaragua.

3. Next Steps/Recommendations

Based on the high prevalence of iron deficiency anemia and low serum retinol concentrations, the MOH proposed a strategy that was discussed, revised, and agreed upon at the national workshop. The strategy includes vitamin A and iron supplementation, exploring the feasibility of vitamin A and iron fortification, and dietary diversification through promotion of production and consumption of vitamin A rich foods, and general nutrition education. Assistance will be required for planning and implementation of the strategy and interventions. The MOH will establish technical norms for iron and vitamin A therapeutic supplementation in health facilities and eventually for preventive supplementation, train health workers and ensure adequate supply of supplements. The feasibility of food fortification will be explored shortly. A surveillance system will be designed and implemented to monitor coverage and effectiveness of the intervention programs.

4. Lessons Learned

Practical training in blood specimens collection and handling before preservation and transportation should be given greater emphasis, as this has been a persistent problem in all surveys, including that in Nicaragua (11.0% of the specimens were insufficient and 3.3% hemolyzed).

The use of portable hemoglobinometers greatly enhanced community participation and response rates in the survey, and proved not to be costly. Development and use of such type of instruments for on-the-spot laboratory assessments should be a top priority in micronutrient research and development. The use of Ramco radio-immune-assay kits for ferritin assessment produced accurate results and substantially reduced the cost of iron assessment.

The importance of a local private institution in charge of effective financial management was also demonstrated in Nicaragua. This was critical for the timely implementation of the survey, despite less than desirable flexibility by PROFAMILIA. The choice of a highly motivated, committed and capable technical counterpart was also crucial.

PROMOTION OF PRODUCTION AND CONSUMPTION OF VITAMIN A RICH FOODS IN NIGER

1. Description

In October 1990, VITAL participated with the United Nations Food and Agriculture Organization (FAO) office in Niger in the process of designing a vitamin A project focussing on the promotion of production and consumption of beta-carotene rich foods (CRF). Areas of food technology, nutrition education and communications and monitoring and evaluation (M & E) were identified as good opportunities for VITAL/FAO collaboration. VITAL subsequently proposed a "Nutrition Impact Plan" outlining the strategy and methods for measuring the nutritional impact of home gardening and other project interventions. After the Nutrition Impact Plan was reviewed and accepted by the government of NIGER (GON), FAO and USAID/Niger, FAO and VITAL agreed in May 1991 on a joint collaboration plan by which VITAL would provide technical assistance in food technology and nutrition education and communications, and would make available to FAO its Africa Region Nutrition Advisor Dr. Mohamed Mansour for the design, planning, implementation and support of the M & E system.

The project was implemented in July 1992 following a long process of review and approval by various GON agencies, FAO technical divisions and UNDP, the main funding agency. The project, supervised by the Ministry of Agriculture in collaboration with the Ministry of Public Health and the Ministry of Education and run by FAO/Niger, was implemented as a pilot project in six villages in the Arrondissement of Bouza, the eastern Department of Tahoua for a duration of two years.

VITAL support included technical assistance in project design, baseline and follow-up survey design and analysis, orientation and dissemination workshops, planning, preparation of nutrition education messages, training, development of a communication strategy and training in solar drying and other food preservation procedures. VITAL also provided guidance and effective support in data analysis and interpretation, and in report writing. As part of a GON/FAO/UNDP tripartite review of the project, VITAL sent its nutrition advisor to participate in the review and in the discussion of a possible extension phase for the project. Overall, VITAL's input into the project field operations approximated 5.5 person months not counting additional office and staff time for backstopping, communications, and reports review.

2. Discussion

The project was implemented in 6 villages in Bouza area located approximately 650 km east of Niamey and managed by a chief of party, a nutritionist from Zaire, and a Nigerian agronomist with previous experience in horticulture as a national director, both of them based in Bouza. The project target beneficiaries were members of 9 women's groups (WG) and their families, ranging from 30 to 70 women in each group.

The project supported production of four main traditional green leaves (red sorrell, jute, drumstick and amaranth leaves) as well as mango and papaya during both rainy and dry seasons.

Project inputs included seeds and seedlings, fences, fertilizers, pesticides and technical know-how. Other project interventions were nutrition education and communications, solar drying and other improved traditional preservation procedures, natural fortification of common food recipes and culinary contests.

To bring new skills to communities, develop their food and micronutrient security and increase awareness about nutrition for their health, the project focused on training of agriculture extensionists, school teachers and headmasters, nurses and health workers and female voluntary rural animators and WG leaders. Training was provided in the following areas: home gardening and seed production: compost making, solar and improved sun drying, improved food preparations, and development of communication skills of village committees.

The project encountered several implementation problems: women's access to land, water scarcity during the rainy season, lack of seeds of indigenous varieties, difficulty of finding female animators with a minimal degree of literacy, and demand for incentives by government personnel to carry out project activities. In view of these constraints, the project had to make significant strategic changes such as moving from community gardens and irrigation wells to home gardens and multi-purpose village wells, reliance on illiterate female volunteers for community mobilization, technical supervision and monitoring, etc. However, the project still had to pay transportation allowances for agriculture extensionists and other government personnel during field supervision which were initially budgeted as a part of national contribution.

A major focus of the project concentrated on monitoring the nutritional effect of home gardening and nutrition education activities. Project staff were trained in the use of simplified dietary assessment methods using a simple food frequency and the modified semi-quantitative IVACG methodology. Dr. Mansour conducted training in both methods and assisted with analysis and interpretation of baseline and follow-up survey data. The outcomes of these surveys were very critical to strategy development and project implementation and to the evaluation of project impact in terms of food consumption and dietary intake of vitamin A.

By its end, the project had achieved a great deal of progress. In the first production season prepared during the dry months of February to May 1993, results of village gardens, run by WG were very disappointing. Only one village had established vegetable gardens planted primarily with lettuce, cabbage and tomato. Women were unable to provide enough water and to protect their crops against pests and insect attacks. The level of technical supervision provided by agriculture extensionists and rural animators was very weak. However, in the next rainy season and due to a significant strategy change, the project had established 240 home gardens with the four main traditional leafy vegetables and a few mango and papaya trees. Production and consumption of green leaves were observed in households visited by the review team. More recent data from the follow-up survey are very promising with regard to the positive effects of this project on mothers' knowledge about vitamin A nutrition and on reported frequency and levels of consumption of vitamin A containing foods. Full analysis of these data is not yet finished. Results of the Niger project were presented in the West Africa Vitamin A Meeting in Ghana, August 9-11, 1993, and the project was deemed to be a successful example of the dietary diversification approach to control and prevent vitamin A deficiency problems.

3. Next Steps/Recommendations

Progress made during the second year of the project demands an extension of the project both in coverage and duration. Other areas of technical assistance in horticulture production, plant husbandry, water management, nutrition education and communication, and home economics should benefit from locally or nationally available experts. Expatriate resident advisors should be avoided as much as possible to reduce cost and to insure integration of project activities into the government system. They should be limited to technical assistance in project and operational research design, food preservation and development of marketing strategies.

Pilot testing of alternative strategies should be continued:

- Testing of village wells for the dual purpose of drinking water and home garden irrigation;
- Testing of various income generating activities in addition to home gardening to sustain the latter;
- Testing of various marketing strategies for vitamin A-rich foods and vegetable oil;
- Testing of other improved food recipes to enhance the taste and increase the consumption by preschool children.

The successful elements of the project should be strengthened during the extension phase:

- Support and reinforce the mixed traditional/exotic vegetables in the home gardens (Jardins de Case) during the dry season;
- Strengthen the monitoring of the nutritional impact of home gardening and nutrition education strategies;
- Maintain the baseline and follow-up/final evaluation surveys for program development, monitoring and impact evaluation;
- Support home gardens (Jardin de Case) as the main production strategy and traditional green leaves as the main crops;
- Alternate solar drying and improved sun drying for food preservation.

4. Lessons Learned

Agriculture consultants (horticulture) not exposed to nutrition and with high research profiles are not suitable for community-based, small scale, consumption-oriented projects.

Communication specialists with a focus on mass media are not appropriate to plan, develop and

105

initiate nutrition education activities.

Use of national consultants in areas of nutrition education, communications and home economics is very effective in developing appropriate culturally sensitive program interventions and creates confidence and good rapport with project staff and communities.

Continuity of technical assistance by single consultants in the areas of food technology, nutrition and M & E system built a high degree of confidence and good rapport and assured consistency in work performed.

Simplify and reduce the scope of baseline and follow-up surveys as much as possible in order to reduce the field work for project staff, shorten the gap between data collection and data analysis and make immediate use of survey results.

Avoid having too many consultants at the same time and for long duration; overlapping for a few days can be useful, however.

NIGERIA NATIONAL MICRONUTRIENT SURVEY

1. Description

In early 1991 the USAID Office of Nutrition, with support from the Africa Bureau, encouraged USAID/Lagos to use the services of VITAL to address the problem of vitamin A deficiency and its effects on child survival in Nigeria. This was in response to a rising level of interest in vitamin A deficiency within Nigeria, sparked by an HKI-sponsored Workshop on Vitamin A Deficiency and Child Survival held in Nigeria in Ogun State in late 1990. At the end of that workshop, attended by 78 Nigerian representatives of the Ministry of Health at the federal and state levels, participants issued a statement recommending that a national vitamin A deficiency program be implemented and that a detailed problem assessment be undertaken. The workshop highlighted the scarcity of data that could be used to determine the prevalence or other parameters of the vitamin A problem in Nigeria. Supporting the concerns raised at the workshop were letters received from numerous health professionals working at all levels of the health care system.

Plans for conducting a national vitamin A, iron, and iodine deficiency survey were developed in 1991 and 1992. By December, the study protocol and budget were finalized. Once all necessary approvals were obtained, a subcontract with the Federal Ministry of Health (FMOH) to conduct the survey was executed in March 1993.

The survey was implemented by a technical committee composed of national experts in the fields of nutrition, ophthalmology, pediatrics, biochemistry, statistics and epidemiology. This committee was chaired by the Principal Investigator (PI), Professor Tola Atinmo, also the project director. The project headquarters was at the Medical College, University of Ibadan (MCUI). VITAL provided financial and technical support, mainly through Drs. Patricia Haggerty, Mohamed Mansour and David Nelson. USAID/Lagos provided substantial in-country logistic and management support.

The field work for the survey was conducted between June and September, 1993, following operational research (OR) conducted in January and February, training of the survey teams in March, and a pilot study conducted in May. VITAL recommended OR because of the ambitious size and nature of the NMS, in order to test and refine the survey methods, procedures and organization. The main survey was executed in two phases. Phase I was conducted in the South, between June and July, and phase II was conducted in the North between August and September. A midsurvey review meeting was held between Phase I and Phase II to resolve operational problems, to review the experience of field work in the South and to ensure adherence by the survey teams in the North to standard procedures and operations.

Data entry and cleaning began at the project headquarters in Ibadan in October 1993. Data analysis from the survey questionnaires, including all data except TSH, SF, SR and CIC (see Discussion), began in mid-January 1994 and was ongoing at VITAL's end.

In February 1994, recognizing that delays in commencing the survey caused by political

upheaval in Nigeria as well as to serious delays in retinol analyses would require data analysis to be completed and the national dissemination seminar, originally planned to be held in early 1994, to be organized under the auspices of the OMNI Project, representatives of VITAL, OMNI, USAID/Lagos, and the FMOH made plans for the termination of the ISTI-FMOH subcontract and a transition to OMNI support.

2. Discussion

Being a critical first element in the formulation of a national food and nutrition policy for Nigeria, the NMS was intended to obtain baseline information about the prevalence of micronutrient deficiencies nationally and in each of the 4 health zones, which would then be used to develop control strategies and programs. Specifically, the study sought to assess the magnitude and distribution of vitamin A, iron and iodine deficiencies, to identify risk factors associated with the development of micronutrient deficiencies, and to identify groups at risk.

The survey was a community-based, cross-sectional point prevalence survey of the vitamin A, iron and iodine status of children aged 6 to 71 months and their mothers or principal caretakers. A multi-stage stratified random sampling design was used, with the aim of providing representative and precise results for each of the 4 health zones, i.e. the South East, South West, North West and North East. Within each health zone, the 2500 Enumeration Areas (EAs) identified by the Federal Office of Statistics for the National Integrated Household Survey (1990) as an accessible sample of the 200,000 EAs of the country, comprised the sampling frame. These EAs were stratified by "type" as urban, peri-urban, or rural, and 30 EAs were selected by systematic sampling within each health zone. 35 eligible households (households with at least one child aged 6-71 months) were selected within each study EA by systematic sampling, and only one child was included per study household. The aim was to sample 4200 children within 120 EAs (30 per health zone).

According to the study protocol (dated February, 1993) all study children were to be assessed for clinical xerophthalmia, and both they and their mothers/guardian were to have blood taken for serum retinol measurement. Mothers were asked about the presence or absence of nightblindness both in themselves and in their child, using local terms for nightblindness. In addition, in a subsample of children and mothers in one southern and one northern zone, Modified Relative Dose Response (MRDR) and conjunctival impression cytology (CIC) were also to be used. (VITAL supported the training of the principal Nigerian survey biochemist in the MRDR at Iowa State University and the refresher training on CIC methodology of the main survey ophthalmologist at Johns Hopkins University.) This latter "enriched" subsample was intended to provide an opportunity to examine the relationships between the various vitamin A indicators in at-risk groups. However, after the pilot study, it was decided to drop the CIC assessment of mothers/guardians as this was found to be too time consuming in the field. Dietary intake of vitamin A containing foods of every second child was to be measured using the IVACG simplified dietary assessment method.

For the estimation of iron status, hemoglobin level was to be measured on all 4200 study children and their mothers/guardians using hemocues, and serum ferritin level also measured on

all blood samples whose hemoglobin level was below 10g/dl, and on a 20% sub-sample of the specimens with hemoglobin of 10g/dl or more. Approximately 2400 serum ferritin tests were expected in total.

To assess iodine status, all study children and their mothers/guardians were to be checked for visible goitre, and be asked to provide a urine specimen for subsequent analysis of iodine content. In addition, all the study children and their mothers were to have their serum thyroid stimulating hormone (TSH) level measured. However, after the pilot study, it was decided to drop the urine collection because of the difficulty of obtaining specimens from children.

In addition to measuring micronutrient status, weight and height measurements were to be made on all study children and their mothers/guardians. Other background information was collected, e.g. mother's age, education, occupation and pregnancy status; birth position of study child; recent illness of children and mothers/guardians; drinking water source.

Due to HPLC equipment breakdown, shortage of spare parts and related delays, retinol analysis did not begin until December, 1993. By February 1994, at which time less than 5% of the retinol samples had been analyzed, it was agreed that, instead of analyzing all samples collected in each zone, 300 samples per zone, or a total of 1200 samples nationally, should be selected systematically from all EAs and analyzed first. It was felt that this number of retinols would provide estimates of vitamin A deficiency with an acceptable level of precision, and that if, after the completion of these 1200 samples, adequate time and resources remained, analysis of the remaining samples could proceed.

Similarly, lack of appropriate reagents and laboratory set-up caused a delay in the start of the CIC analysis until January 1994. Analysis of the TSH and SF began in November and proceeded relatively smoothly until their completion in February 1994.

3. Next Steps/Recommendations

As of VITAL's end, basic geographic, sociodemographic, anthropometric and health descriptive analyses had been completed. Dietary data were still being cleaned and prepared for focused analysis and eventual merging with main survey data. Multivariate analyses on some of these data still need to be done. An outline of the survey report had been prepared, and background introductory/descriptive chapters drafted. Since the biochemical data had not yet been made available to the epidemiologist, the most important micronutrient analyses could not be undertaken. Results of TSH and SF analyses were being entered onto computer in Nigeria. Analysis of serum retinol samples was delayed again due to a strike in March at the MCUI. However, the Nigerians projected that these would be completed by May, and that the national seminar could be held in September, 1994. A post-survey data check was planned for March in a 10% sub-sample, during which anthropometric remeasurements would be made. The goal of the data check would be to validate (or invalidate) NMS anthropometric results which suggest a 20% decline in the prevalence of stunting among Nigerian children since the 1990 DHS.

109

4. Lessons Learned

Due to the intense maintenance requirements of the HPLC machine, a large number of retinol samples should not be analyzed using this method. A less precise, but acceptable and more rapid method, would have been spectrophotometry.

A smaller overall sample size, which would have yielded somewhat less precise but acceptable vitamin A and iron deficiency prevalence estimates, would have been preferable. This would have saved considerable time and money.

The inclusion of clinical assessment of iodine deficiency is pointless in national surveys of sub-clinical iron and vitamin A deficiencies, as the sampling requirements are vastly different. In Nigeria, accurate assessment of iodine prevalence nationally using only clinical signs would have required a much larger sample size due to the large geographic variability of iodine deficiency. Conversely, urinary iodine should have been measured in adults.

In national surveys as large and complex as the NMS, where a wide variety of political and academic interests must be accommodated, much more time and attention need to be paid to core team building and strategizing prior to start-up. Donors should be strict in adhering to scientific principles which guide study design.

Where donors invest large sums of money to conduct a national survey, a resident technical advisor with substantial field experience should be hired for the duration of the project.

PERU REGIONAL VITAMIN A WORKSHOPS

1. Description

The Peruvian Institute of Nutrition Research (INR) undertook two regional vitamin A deficiency prevalence surveys in 1990 with a grant from the USAID/Lima mission. The surveys were conducted in Puno (altiplano) and Piura (coast) and revealed very high prevalence of low serum retinol, especially in Piura, > 35%. VITAL was requested to support the regional workshops at which results were presented.

2. Discussion

VITAL consultant Dr. David Nelson, met on several occasions with INR staff to organize the workshops and discuss funding requirements. No further participation by VITAL was possible due to stringent security limitations imposed by the US Embassy and USAID mission. The workshops were held in each of the two regions where the surveys had been conducted and in Lima.

Although strategies to deal with the vitamin A deficiency problems revealed by the surveys were discussed at the workshops, it appears that no commitment was made to implement any of them. INR is a private institution, and the Peruvian government has not considered vitamin A deficiency a priority. Unless the GOP defines a micronutrient policy, it seems unlikely that the workshops will lead to concrete actions to reduce vitamin A deficiency.

3. Next Steps/Recommendations

INR must sensitize the MOH concerning the severity of the deficiency problem, possibly via UNICEF and PAHO. The MOH should immediately establish vitamin A treatment norms for measles (as was done in the most recent epidemics), diarrhea and malnutrition, and ensure availability of high-dose capsules in all service units. Survey results should be given a wide airing to ensure that international donors are cognizant of the vitamin A situation in Peru.

If the mission decides to support micronutrient interventions, as in other Latin American countries, sugar fortification may be considered as one of the most promising means for dealing with the deficiency problem.

4. Lessons Learned

Results from the surveys were communicated to the organizations working in nutrition in both regions. However, the lack of connection between INR and the GOP probably is the reason that no concrete steps have been taken to deal with the problem. If government policy-makers are not committed to researching and solving a problem, the likelihood of action seems greatly

diminished. USAID mission backing for the VITAL activities was nil in spite of early support of the surveys. Thus, the mission was reluctant to press the (already stressed) MOH to consider the vitamin A problem and possible remedies and could not request RD/N VITAL support for follow-on action because of the security problems which prevailed at the time.

SEARO NETWORK PROJECT - VITAMIN A CONTENT OF PREPARED FOODS

1. Description and Discussion

A collaborative activity to investigate the effects of food preservation and preparation techniques on the vitamin A activity of locally-consumed foods in the Asia region was initiated. The purpose of the investigation was to determine the effects of traditional methods of food preparation and processing on beta-carotene levels in food in order to provide guidance for future implementation programs, especially those involving nutrition education and promotion of the consumption of vitamin A-rich foods. The expertise and resources of the three Southeast Asia Regional Office (SEARO) Network institutions - the National Institute of Nutrition, Hyderabad, India (NIN); the Nutrition Research and Development Centre, Bogor, Indonesia (NRDC); and the Institute of Nutrition, Mahidol University, Thailand (INMU) - as well as the mandate of the WHO/SEARO Nutrition Research-cum-Action Network, offered a unique opportunity to conduct this research. Although it was originally planned as a two-year, joint WHO/SEARO-USAID/VITAL activity, contractual difficulties resulted in long delays. The final protocol was abbreviated to take place during one year, and VITAL provided funds to only two of the institutions (NRDC and INMU).

The three institutions utilized the same research protocol, standardizing their research methods and equipment at several meetings throughout the year of the activity.

A meeting of the three institutions was held in September 1993 during the International Congress of Nutrition in Adelaide. At that time, preliminary findings from INMU and NRDC were presented.

2. Next Steps/Recommendations

Because of the delays in getting the research activity started, the original plan was shortened. Next steps include development of a calendar of appropriate foods to be promoted during the year and incorporation of the findings into nutrition programs in all three countries.

3. Lessons Learned

Although collaboration with other donors is important, the delays caused in trying to find a way to work with WHO/SEARO in this activity impacted adversely on the activity. Future efforts of this kind should more carefully investigate the administrative barriers to collaboration when funds must pass from one donor to another.

SLAN/LAC PUBLICATIONS

1. Description

From its inception, VITAL looked for potential means to disseminate information on vitamin A issues worldwide and within each region. One of the possibilities considered in the LAC region was to utilize existing communication channels to disseminate technical information to professional and technical people, as well as to the general population. The official journal of the Latinamerican Nutrition Society (SLAN), "Archivos Latinoamericanos de Nutricion" (ALAN) was seen as one of the promising options. ALAN is a quarterly peer-review food and nutrition journal distributed to the 400 members of SLAN plus a large number of institutions (university libraries, research centers, etc.) in the region and elsewhere. ALAN is delivered to subscribers paying annual society fees, most scientists, academicians and other health, nutrition and food related professionals. In 1991, VITAL entered into a subcontract with SLAN to secure a 20-page Vitamin A Section in ALAN, to be initiated as soon as the issues of the journal began to be delivered in a timely manner. This condition was deemed necessary in view of the existing problems with the production of ALAN, whose editorial office was in the process of being transferred from Guatemala to Venezuela.

2. Discussion

Unfortunately, production of ALAN was not up to date until late 1993; thus only two issues of ALAN included a Vitamin A Section. Scientific and technical material on vitamin A was included, such as brief reports or reviews prepared by VITAL staff and Spanish translation, with due permission, of scientific papers originally published in English.

3. Next Steps/Recommendations

No regional food and nutrition peer-review journal in Spanish other than ALAN is published in the region. Unfortunately, until recently, ALAN experienced financial and other difficulties. Now that the journal is being published on a more regular basis, it may be a useful dissemination channel for micronutrient information to food and nutrition professionals. However, some countries have periodic medical, agricultural, educational and other publications that can be tapped to transmit information to the general scientific and professional community on a regular basis.

4. Lessons Learned

Whenever there is a need for conveying new information to different audiences, it is important to make use of as many effective channels of information dissemination as possible. Each of them may approach different audiences and each may be appropriate for transmitting specific types of information to a particular target group. Channels other than

scientific journals may be more useful for dissemination of micronutrient information to relevant audiences in developing countries.

THE STABILITY OF VITAMIN A IN FORTIFIED VEGETABLE OIL
AND CORN SOY BLEND
INDIA

1. Description

VITAL and CARE/India conducted a study to determine the feasibility and effectiveness of fortifying PL 480 - provided cooking oil with vitamin A to compensate for vitamin A losses detected in fortified CSB (corn soy blend) used for child feeding in India.

Following the publication of the Rahmathullah et al. study on the impact of vitamin A on mortality, CARE/India began exploring ways to provide small, frequent doses of vitamin A through its ICDS child feeding programs. Tests in India by the National Institute of Nutrition (NIN) on the vitamin A content of CSB showed that half or less of the desired amounts of vitamin A was present. Recent trials in Brazil suggested that oil may be a better vehicle than flour products due to better vitamin A stability. This led CARE/India to request VITAL assistance to undertake research into stability of vitamin A in oil and CSB.

CARE conducted the fieldwork in India, the University of Maine and National Institute of Nutrition in Hyderabad, India conducted the laboratory analyses. ROCHE Chemicals provided vitamin A fortificant for the oil samples. USDA and USAID/FFP arranged for their shipment to India. Lauhoff Grain and Louisiana Filling companies provided assistance in fortifying CSB and oil, obtaining baseline samples at U.S. port, packaging and transportation. VITAL consultant Dr. Penelope Nestel conducted the statistical analysis. CARE/India, and VITAL staff designed the study and collaborated in preparing the final report.

2. Discussion

Under the PL 480 program, United States Department of Agriculture (USDA) support was obtained for fortifying and shipping to CARE/India 35 twenty-liter containers of soybean cooking oil, which arrived in India in May and June 1993. The Louisiana Filling Co. added vitamin A donated by Hoffman La Roche to the oil. Two sets of samples of the oil were taken before it was shipped. One set was sent to the University of Maine Food Science Department (UMFSD) for laboratory analysis. The analysis confirmed that the vitamin A was added and did not appear to be destroyed to any significant degree. However, there was a somewhat greater variation in vitamin A content among the sample bottles than expected (about 50% of the samples are in the expected range, with several higher levels and some low). The second set of samples was sent to CARE/India.

Meanwhile, the Lauhoff Grain Company took a random sample of vitamin A-fortified CSB from bags being shipped to CARE/India for arrival in May/June 1993 and tested them for vitamin A. These samples were also sent to CARE/India for a comparative analysis of vitamin A between the CSB and cooking oil.

During July and August, India's hottest and most humid months, CARE/India gathered approximately 274 samples of the oil and CSB in duplicate and refrigerated them at predetermined intervals in an effort to track the stability of vitamin A during the hot and rainy season. A laboratory analysis of the vitamin A content of the two sets of samples drawn from different points in the delivery system (Indian port, storage, and feeding centers) was conducted by researchers at the University of Maine and the National Institute of Nutrition, Hyderabad, India.

The implications of the study's results are of great significance not only for the CARE/India program, but for other programs as well, including the PL 480 program. The Food for Peace office and the FHA Bureau have been investigating micronutrient levels of PL 480 commodities, and there is Congressional interest in assuring that these food items have adequate levels of vitamins and nutrients.

SOUTH PACIFIC PROGRAM

1. Description and Discussion

In 1989, a study conducted on six of the most populated islands in Kiribati found that 14.7% of the target population had one or more signs or symptoms of xerophthalmia, nearly ten times the WHO cut-off level. A review of existing literature and reports from surgical camps conducted by visiting eye care teams in the South Pacific was conducted in 1990 by VITAL consultant, Guy Hawley, to determine if additional South Pacific nations might be at risk for vitamin A deficiency. This report indicated that it was likely that vitamin A deficiency would be found in Tuvalu, Vanuatu, the Solomon Islands and the Cook Islands. Because no data existed to indicate the extent or regional distribution of xerophthalmia in these nations, it was recommended that xerophthalmia surveys be conducted to establish the existence and severity of vitamin A deficiency in each nation.

Based on these findings VITAL was requested by the Health, Population and Nutrition Office of the USAID Regional Development Office/South Pacific in Suva to conduct xerophthalmia surveys in selected areas of Tuvalu, Vanuatu, the Cook Islands and the Solomon Islands to determine if vitamin A deficiency poses a public health problem in these countries. The assessment protocol for each of the surveys was based on the protocol developed by the Foundation for the Peoples of the South Pacific, Helen Keller International and the Dana Center for Preventive Ophthalmology of Johns Hopkins University, for the Kiribati Vitamin A Deficiency Assessment. Modifications were made to the survey data collection forms for each of the other island nations, to accommodate nutritional and cultural practices. The surveys were all conducted in collaboration with the Ministries of Health of each country. In both the Solomon Islands and Vanuatu, logistic support was provided by local office of the Foundation for the Peoples of the South Pacific (FSP).

In these surveys, vitamin A deficiency was not found to be a public health problem in Tuvalu, Vanuatu or the Cook Islands. No clinical xerophthalmia was seen in Tuvalu or the Cook Islands, and in Vanuatu, only a single case of Bitot's spots was detected. In all three countries, average consumption of vitamin A-rich foods was greater than nine times per week. The findings of the xerophthalmia survey in the Solomon Islands indicated that vitamin A deficiency was a significant public health problem in some parts of the Solomon Islands.

Two surveys were also conducted in Papua New Guinea in collaboration with the JSI child survival project. The first included a vitamin A component in a baseline nutrition survey in the East Sepik region. No cases of xerophthalmia were detected, and high rates of consumption of vitamin A-rich foods were found. The second survey was a cross-sectional hospital-based survey conducted in nine provincial hospitals and nearby clinics. Although several cases of xerophthalmia (mostly nightblindness) were seen, the report did not conclude that vitamin A deficiency was a significant public health problem.

Kiribati

VITAL provided technical assistance to the Ministry of Health and FSP/Kiribati for the National Vitamin A Deficiency Control and Prevention Programme from January 1991-March 1994. This assistance included five consultant visits to assist with program design, evaluation, training, and monitoring. In addition VITAL supported the nutrition education and gardening components through provision of the nutrition educator, and marketing specialist.

VITAL supported the participation of a Kiribati representative to the XIII IVACG Meeting in Guayaquil, Ecuador, to present the findings of the Kiribati xerophthalmia survey.

Solomon Islands

Following the completion of the Solomon Islands xerophthalmia survey, VITAL provided technical assistance to the MOH for the development of a national strategy to address the problem. A team of consultants visited the country in May 1993 and worked with Ministry of Health and FSP/Solomons staff. A program plan was produced and provided to the government of the Solomon Islands; however, political events resulted in a withdrawal of USAID support for the activity. Planned closure of the regional office in September 1994 has resulted in the decision not to follow-up on this activity.

Cook Islands

Although no xerophthalmia was detected in the Cook islands, the Department of Public Health undertook a vitamin A nutrition education campaign to promote vitamin A food consumption for preschool children. Workshops to report out the survey findings and promote vitamin A nutrition were held on each of the islands surveyed; pamphlets, television spots and interviews, and radio messages were developed and aired.

2. Next Steps/Recommendations

Except for the Solomon Islands, xerophthalmia was not found to be a serious problem in the South Pacific countries surveyed. Subclinical vitamin A deficiency was not determined, and the USAID regional office continues to be interested in conducting a survey in Papua New Guinea to determine the prevalence of subclinical VAD.

A plan for a vitamin A program in the Solomon Islands has been drafted which could be implemented by the government of the Solomon Islands. USAID/Suva has indicated a desire to support such an effort, but this has been curtailed by the planned closure of the mission and unstable relations with the government.

4. Lessons Learned

The surveys were conducted using a very simple methodology, which allowed local MOH staff to actively participate, and which were relatively brief to conduct. This resulted in a great deal of interest and increased awareness on the part of in-country counterparts, a strong sense of

ownership and continued interest in promoting vitamin A nutrition in their respective countries.

The support of the USAID regional office was a very important factor in conducting the work in the South Pacific region. The request for services, the availability of buy-in funds, their direct participation in identifying appropriate activities and support of the activities made working in the South Pacific region easy for VITAL.

VITAMIN A SUPPLEMENTATION GUIDELINES FOR LAC REGION

1. Description and Discussion

Vitamin A supplementation has been selected by a number of countries in the LAC region as one of the short-term interventions for VAD control. Before VITAL, supplementation activities had been implemented in a few countries, i.e., Haiti, Bolivia, Brazil, Guatemala. These activities were mostly supported by UNICEF donations, sometimes through EPI campaigns, but more commonly as part of small scale PHC and child survival projects carried out by PVOs, some of them funded by USAID. As the results of vitamin A supplementation trials on child mortality were disseminated and as new information from VAD assessments became available, increased concern with preventing and controlling VAD led to more interest in supplementation.

New or expanded supplementation activities were considered in a number of countries, such as Bolivia, Guatemala, Honduras, El Salvador and Panama, and it was foreseen that other countries with a significant VAD problem might need to address it in the short term by means of universal or targeted supplementation. In addition, the need for disease targeted supplementation has been recognized, and specific recommendations were made by WHO and UNICEF. VITAL decided to meet the need for technical and operational guidelines for planning and implementation of vitamin A supplementation programs, with particular emphasis in the LAC region.

In 1992, VITAL asked consultant Susan J. Eastman to prepare a draft of Vitamin A Supplementation Guidelines, with particular attention to the needs of the LAC region. The consultant report, suggesting a sequence of planning and implementation steps, was originally prepared in English and reviewed by VITAL/LAC staff. A Spanish version of the guidelines was prepared and field tested in Bolivia by VITAL consultant Dr. Noe Orellana. As a result of the review and field test, a revised version of the guidelines was prepared in Spanish by Dr. Jose Mora, using a more appropriate format, updating the technical content and including additional sections dealing with assessing the need and potential for vitamin A supplementation and providing a basis for policy decisions. The revised guidelines were widely distributed to local counterparts and other professionals responsible for decision making, planning and implementation of vitamin A supplementation programs and activities.

2. Next Steps/Recommendations

Follow-up is needed to assess the utilization and usefulness of the guidelines in several countries of the LAC region engaged in vitamin A supplementation programs. Periodic updating and eventual revisions for improvement may be needed.

The Vitamin A Supplementation Guidelines may be expanded and adapted to cover other micronutrient supplementation activities, such as iron, iodized oil, flour, etc.

TRAINING AND ORIENTATION MATERIALS

1. Description

Early technical assistance experiences of VITAL staff and consultants revealed the need to widely disseminate program-relevant materials related to new findings in vitamin A. The slide/overhead format was identified as a suitable vehicle for providing synthesized information on special topics, to be accompanied by reference documents. Topics were mostly identified by field implementing agencies for specific conferences and seminars. The need for Spanish and French translations was considered a priority.

2. Discussion

VITAL's approach was to gear training assistance to specific needs of programs in the field. Interest expressed by implementing agencies led to the development of the following packages or modules:

1. Overview/Orientation Module:

- a) Slides/overheads
- b) Text to go with slides
- c) Copy of VITAL-NUTRIENTS
- d) Economic Rationale publication

2. Case Management of Measles and Vitamin A

- a) Introduction
- b) Annotated Bibliography
- c) Slides/overheads
- d) Text to go with slides
- e) Estimating Vitamin A Supplement Requirements
- f) Kenya measles initiative: Example of how to use the package.

3. Improving the Vitamin A Content of Diets

- a) Slides/overheads
- b) Text to go with slides
- c) Copy of Thailand publication
- d) Copy of Solar Drying Manual
- e) Copy of Guatemala Home Gardens evaluation
- f) Other publications (e.g. Kuhnlein et al)

4. Food Fortification

- a) Slides/overheads
- b) Text to go with slides
- c) Copy of Fortification/Nestel monograph
- d) Muhilal et al paper

5. Vitamin A Supplements Distribution
- a) Slides/overheads
 - b) Text to go with slides
 - c) Copy of G. Beaton summary
 - d) Copy of D. Ross paper on cost-effectiveness

Presentation of these modules was made at seminars and conferences occurring at the global, regional, sub-regional, country and local levels. Packages were mailed out in response to requests and to each USAID mission.

3. Next Steps/Recommendations

The demand-driven approach for training and information materials should be continued. Materials development should be linked more closely with technical assistance and in-country training activities.

It would be useful to announce in newspapers and other publications materials developed by local implementing agencies as part of country activities. These materials should also be used as examples for other countries.

A training-information package on vitamin A deficiency assessments should be developed. Both the options for dietary assessments - simple frequencies and semi-quantified/IVACG - should be included until field validation of dietary methods has been completed.

Institutions located in host countries should be identified and their capacity in vitamin A training in the following areas strengthened:

- assessments, analyses of associated factors, and identification of high risk groups
- prevention and treatment protocols
- planning, implementation and evaluation of each type of intervention
- sensitization, awareness workshops and meetings.

Training needs to be provided to service delivery staff drawn from various sectors in diagnosis, prevention and treatment of vitamin A deficiency. Hands-on skills-building opportunities need to be identified first.

4. Lessons Learned

There is an enormous information gap between what is known about vitamin A program-relevant topics and what is available to program development and implementation entities in developing countries. The gap is particularly serious for French and Spanish speaking countries. Training needs remain to be addressed.

UGANDA BLINDNESS AND VITAMIN A DEFICIENCY PREVALENCE SURVEY

1. Description

In late 1990, VITAL was approached by the head of Ophthalmology Department of Makerere University, Dr. Medi Kawuma in late 1990, who drafted a survey protocol and requested assistance to carry out a blindness and xerophthalmia survey in northern Uganda from where the majority of cases were seen in his clinical practice.

In October 1990, VITAL's director and a Zambian consultant in vitamin A and biochemistry made a reconnaissance visit to Uganda to explore with the Ministry of Health (MOH), Makerere University, UNICEF and the AID mission the interest in and feasibility of conducting a survey. The chief of the MOH nutrition unit expressed a strong interest in the survey and the Child Health Development Center (CHDC), a Makerere University nutrition research and rehabilitation center, agreed to lead the nutrition and dietary survey component. UNICEF was interested in obtaining information for program planning purposes.

In April 1991, a survey design team composed of the VITAL director, Zambian consultant and VITAL's Africa nutrition advisor visited Uganda and, with input from MOH, Makerere University Department of Ophthalmology and CHDC, prepared a draft proposal and a preliminary budget for the survey. A decision was taken to limit the survey to Kamuli District in Central Uganda, the main reason being that the originally identified northern districts were considered insecure and Kamuli was shown to be reasonably representative of the central and northern parts of the country. UNICEF agreed to participate in the survey, to purchase laboratory equipment, field work supplies and materials, and to pay for local costs. VITAL was responsible for paying for the serum retinol analysis using HPLC facilities available at the Tropical Disease Research Center in Zambia.

Prior to the field work in October 1991, collaborative mechanisms were clarified. VITAL agreed to provide technical assistance for analysis of blood samples at TDRC; to send a Zambian consultant to assist with training, plans for the serum retinol component, overall logistics, and supervision of field work; and to provide a nutrition advisor to train field workers in the dietary component. UNICEF agreed to pay all in-country costs, procure supplies and provide transport. Dr. Kawuma was designated Principal Investigator (PI) and placed in charge of clinical and biochemical components. CHDC Chief nutritionist, Mrs. Sserunjogi, was designated Co-PI and placed in charge of the nutrition and dietary components. The Chief of the MOH Nutrition Unit was appointed as the national coordinator for the survey. Except for the Zambian consultant, whose time in Uganda was greatly reduced because of a new job he took in Zambia, these arrangements and institutional collaborations were maintained until the end of the survey.

The survey took place from October to December 1991. A two-stage, stratified sampling procedure was used and 50 rural enumeration areas (EA) were randomly selected proportional to the number of EAs in each of the four counties of the district. The aim was to examine approximately 100 children aged 0-5 years in each EA to give a total sample of

5,000 children. Xerophthalmia and visual impairment were assessed in all the children, while 2,545 people aged 6 years and above residing in 25 EAs were examined only for visual impairment. Serum retinol was assessed in a systematic 1 in 20 subsample of all the children in addition to all cases of xerophthalmia and one age-sex matched neighborhood control for each case. Assessment of anthropometric status was made on a systematic 1 in 5 subsample of children, and morbidity and socio-economic information was collected on all children. Assessment of dietary vitamin A intake was made in 210 children aged 0-5 years using a modified version of the IVACG simplified Dietary Assessment Methodology.

2. Discussion

Organization, planning and implementation of this survey presented many challenges for VITAL. No single in-country entity took full responsibility for the survey. As a result, several problems arose which may have compromised the quality of the survey data. First, exact sampling procedures were not documented and therefore were unclear. In particular, the over 6 year old sample was selected independently of the under 6 year old sample. In the dietary sample, one EA was selected from the 25 EAs selected for the adult ocular survey in each county, meaning it was impossible to match the dietary data to the anthropometric and xerophthalmia data. A second problem was that, due to the purchase of incorrect vials and inadequate blood collection and storage techniques, retinol in the serum samples degraded. This was compounded by the fact that, for the case-control study, there were several cases for whom a control could not be found, data were not collected on which child was the control for each case, and the age distribution of the cases was markedly different from that of the controls, which could have led to serious bias. Given these outcomes, it was decided that the retinol results should be discarded. Third, no preparatory work was done regarding local words for nightblindness. Fourth, anthropometric remeasurements were not done, and over 25% of eligible children did not have their height measured, making the anthropometric results questionable.

Despite these problems, the survey showed that xerophthalmia was a significant public health problem in Kamuli District. This was also confirmed by the dietary assessment results. The survey suggests that xerophthalmia and VAD are likely to be prevalent throughout much, if not all, of northern and central Uganda, and possibly more extensively in the country.

Survey results were first presented at a national dissemination and feedback meeting which took place in Jinja in February, 1993. The national workshop was very successful in promoting awareness and stimulating action. With technical and financial assistance from VITAL and UNICEF, a planning workshop was subsequently held in February, 1993. This resulted in the preparation of an action plan to eliminate VAD as a public health problem in Uganda by the year 2000. The workshop identified five strategies to reach this goal, including: awareness raising at all levels of society about the importance of preventing micronutrient deficiencies; education about micronutrient nutrition and capacity building within relevant ministries; public health measures to reduce morbidity; diet diversification to increase production and consumption of vital micronutrients; and high dose capsule supplementation to groups most at risk of micronutrient deficiencies.

In June 1993, VITAL provided assistance to Uganda MOH and UNICEF to design a vitamin A pilot project focusing on disease targeted supplementation and diet diversification as priority interventions for the Kamuli District Vitamin A Program. The other three strategies (awareness, education/capacity building, and public health measures) were included as essential supportive activities. This resulted in a draft "Detailed Implementation Plan" which was submitted to UNICEF and accepted for funding. A second visit of two VITAL consultants in November, 1993, helped advance the preparatory phase of project implementation.

3. Next Steps/Recommendations

The Kamuli District survey built local technical and institutional capacity within the MOH. After the pilot project in Kamuli District, the MOH nutrition unit will be able to design, plan and develop program interventions in other parts of the country with no need for external technical assistance. UNICEF/Uganda is committed to expand the vitamin A intervention program and to assist in the attainment of the government target to control VAD by 1995.

4. Lessons Learned

Overall, this study suffered from several technical and managerial problems which decreased the likely accuracy of its results. There is little point in undertaking expensive surveys unless senior investigators understand the importance of sampling procedures and of following the survey design.

For similar studies, it would be worth ensuring that study investigators fully understand the importance of documenting all procedures, techniques and definitions used during sampling, training of field workers, field operations and laboratory/data analysis. Documentation is especially important when changes are made to procedures and components described in the original protocol.

Adequate time and appropriate expertise for training field workers is an essential requirement prior to field operations. During field operations, monitoring and supervision of procedures is critical. In studies including anthropometry, anthropometric remeasurements should be done.

For similar projects involving biological sampling, a prerequisite should be the existence or provision of in-country capability and resources to appropriately handle, transport, store and analyze biological specimens and instructions.

Conducting an operations research phase to test the equipment, supplies and various field arrangements before the main survey would have avoided many of the pitfalls of this study.

WEST AFRICA VITAMIN A CONFERENCE

1. Description

At the XIV IVACG Meeting in Arusha, Tanzania, VITAL was requested to provide assistance in organizing and support for participants to a West Africa Vitamin A Conference. VITAL provided support for 21 key presenters and resource persons for the meeting held in Accra, Ghana in August 1993.

2. Discussion

The meeting was attended by over 120 participants from 16 West African countries. Key presentations were made on the status of vitamin A deficiency in the region, appropriate intervention strategies, case treatment and policy issues as well as presentations of research conducted in the region. Recommendations from the meeting were as follows:

There is a lack of information on magnitude and distribution of the problem in the subregion, and an urgent need to improve upon the level of knowledge regarding the prevalence and distribution of VAD in West Africa. Except for Nigeria, no national prevalence surveys have been undertaken in the subregion.

The development of a specific national policy for micronutrient deficiencies may not be needed. Rather, it is important to examine and build the various policies already in existence that affect food availability and nutrition. The need to integrate micronutrient deficiency control and overall nutrition programmes makes both intuitive and economic sense and provides more sustainable long-term approaches to overcoming VAD.

Key sectors that must be involved in developing national policy include health, agriculture, education, information, industry, social welfare, academia, and research institutes.

Preference for long-term interventions, especially dietary interventions such as increased production, preservation and consumption of appropriate foods, was clear among participants. Food preservation through solar drying has not been widely used in the region but appears to be a viable option for increasing the availability of β -carotene-rich foods in the off-season months, at least in areas that experience a seasonal glut of such foods. Ways need to be found to incorporate such foods into children's diets, particularly into weaning foods.

Fortification was not considered a feasible programme option because few foods in the subregion are centrally processed. Potential food vehicles such as rice may not be accessible to the poorer segments of the population and fortified foods will likely be consumed only by those who already eat sufficient quantities of vitamin A-rich foods. However, immediate policy on fortification could be formulated with respect to both import restrictions on nonfortified vegetable oil and fat used in supplementary feeding programmes, and the inclusion of vitamin

A-fortified foods in emergency relief packages.

3. Next Steps/Recommendations

Conference participants identified the following research needs:

- identifying the constraints that prevent the translation of policies into programmes;
- determining the perceptions of decision makers on nutrition issues and the nutrition information needs of policy makers;
- developing alternative models for vitamin A deficiency control that incorporate cost-effectiveness and benefit analyses, particularly as the analyses relate to long-term productive contributions to economy;
- improved systems for marketing produce to encourage the production of vitamin A-rich foods;
- an inventory of existing traditional methods of food preservation, an assessment of the effect of processing on the β -carotene content of foods, and the conduct of applied research to improve various processing methods in terms of energy efficiency, conservation of β -carotene content, and the hygienic quality of foods;
- development work to specify appropriate solar dryer technology and identifying dryer construction materials;
- the acceptance of solar-dried foods, particularly with respect to weaning diets; and
- initiatives targeted to the production of concentrated palm oil in capsules or other forms that populations could be encouraged to consume.

There was a consensus on the need to hold a similar meeting in the future to evaluate individual country progress toward the elimination of vitamin A deficiency in the sub-region.

4. Lessons Learned

There was tremendous interest within the West Africa region for vitamin A and other micronutrient program and research activities. This meeting served as an important introduction to the importance of vitamin A for child health for many meeting participants.

Compared to other regional meetings, few of the participants knew one another or had worked together. There was no existing regional network of nutritionists on which to build, and this meeting was an important first step in developing such a network.

There is a dearth of literature in the subregion, resulting in poor transmission of research findings and programmatic lessons learned. Continued expansion of regional information centers would be a very important role for USAID.

ZIMBABWE VITAMIN A INFORMATION DISSEMINATION

1. Description and Discussion

The severe drought in Southern Africa in 1991-92 resulted in food stocks that the Government of Zimbabwe considered dangerously low in vitamin A content. As a result, the Zimbabwe Ministry of Health and Child Welfare decided to undertake vitamin A capsule distribution in early 1993 to prevent vitamin A deficiency, particularly in young children and pregnant and lactating women. The MOH requested assistance from USAID/Harare on vitamin A supplementation protocols, as well as appropriate materials to educate community health workers about the clinical signs of vitamin A deficiency and nutritional blindness, as well as their prevention and treatment. USAID/Harare requested technical assistance of two types from VITAL through the Office of Nutrition: 1) technical input on vitamin A supplementation protocols and feedback on the existing "Guidelines for Vitamin A Capsule Distribution During Drought," which the Zimbabwe MOH Nutrition Unit had previously developed; 2) multiple copies of appropriate materials for community health workers on treatment for and prevention of vitamin A deficiency to use in clinics nationwide.

Completing the first component, input on vitamin A supplementation protocols, required that the VITAL Nutrition Advisor consult with the World Health Organization (WHO) Nutrition Unit which is currently revising its vitamin A supplementation protocols. Upon examining the Zimbabwe MOH guidelines, VITAL found that they were generally well thought out and consistent with current thinking, although there were several points that needed to be rewritten for better clarity and operational feasibility. VITAL also suggested several points for the later stages of program development, such as exploring the possibility of immunization activities as a delivery system if evaluations in the early phases of the distribution program indicate that the younger children (6-24 month age group) are being missed through the other delivery systems in Zimbabwe; i.e., its Child Supplementary Feeding Programme (CSFP) and regular MCH services. Another suggestion was that toward the end of the drought it might be worthwhile to explore the feasibility of providing specific messages on the consumption of locally available vitamin A sources in lieu of, or as a complement to, the capsules, as well as having CSFP add vitamin A-rich foods to its regular distribution.

To complete the second component, materials for community health workers to use in clinics, the VITAL Information Program Officer contacted Helen Keller International (HKI) to inquire about high quality, field-tested materials. HKI produces different versions of a pamphlet titled "Health Workers Find, Treat, and Prevent Vitamin A Deficiency," which has been used successfully in numerous community health settings worldwide. Various versions of the brochure are targeted to specific regions. The English language, Africa-focused pamphlet proved especially appropriate for the Zimbabwe MOH uses. VITAL sent a sample 50 copies to the Zimbabwe MOH, which, after review and use in the field, requested 2,000 additional copies to use in every health clinic in the country. VITAL provided funding for the purchase and shipment of these 2,000 pamphlets.