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MID-TERM EVALUATION
OF
VITAMIN A FOR HEALTH PROJECT
936-5116

OFFICE OF NUTRITION
RESEARCH AND TECHNOLOGY BUREAU
AGENCY FOR INTERNATIONAL DEVELOPMENT

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VITAMIN A FOR HEALTH PROJECT EVALUATION

Executive Summary

An external mid-term evaluation of project 936-5116 "Vitamin A for Health" of the Office Nutrition, Research and Development Bureau, Agency for International Development, was conducted between May, 1992 and January 1993. An evaluation committee comprised of Drs. Harriet Kuhnlein, John McKigney and Zak Sabry met in Washington, D.C. in May to review documents and conduct interviews with the various implementors and pertinent A.I.D. Bureaus and Offices. Field site visits were conducted in Nepal - July 1992 - by Dr. Zak Sabry, and in Bolivia - September-October 1992 - by Drs. Harriet Kuhnlein and Guillermo Arroyave. A visit to Uganda scheduled in November was canceled due to Mission concerns with other issues. A desk review of documents from relevant projects in Africa was conducted by Drs. McKigney and Kuhnlein in January, 1993.

Drs. McKigney and Kuhnlein presented the evaluation findings from the interviews in Washington, D.C. and the field site visits to the Office of Nutrition in January, 1993. The purposes of the evaluation were to assess: (1) the progress and experience gained from the Vitamin A for Health Program to date, with particular emphasis on activities since the last project review (1988); (2) the need for any modification to the current project design; and (3) the potential future directions for the project.

The objectives were: To evaluate the procedures and achievements completed or current under the contractual agreements between R&D/N and its cooperators in order to assess: (1) compliance with contractual agreement objectives; (2) managerial and technical effectiveness of the entities involved in providing oversight and guidance, research, technical assistance, field support and training, and information collection and dissemination; and (3) gaps in project activity.

In its preliminary findings, the evaluation committee concluded that the project is moving successfully toward its objectives, is on schedule and that the various contract entities are making impressive contributions to the project in fulfilling its role as a mechanism whereby A.I.D. is assisting developing countries to successfully implement programs for the prevention of vitamin A deficiency.

The highlights of the evaluation findings include:

1. The current Vitamin A for Health Project has provided substantial support to several replicate studies which have confirmed that vitamin A supplementation of at risk children has a significant effect on mortality and morbidity in different regions and

countries. These results have been a deciding factor in the now generalized acceptance that 200,000 IU capsule distribution is an effective short-term intervention for the prevention of vitamin A deficiency.

2. As illustrated in the body of this report, vitamin A capsule distribution is effective in the short term. However, vitamin A supplementation has not been proven as a viable institutionalizable approach in the context of government programs for the prevention of vitamin A deficiency in large populations. Governments have been slow to institutionalize vitamin A distribution.
3. The project has been very influential in bringing about a shift in thinking from distribution of capsules to dietary diversification and foods for vitamin A deficiency control. Experience has been limited in increasing vitamin A availability from food to improve vitamin A status. Success stories of applied research to improve nutritional status through dietary diversification are greatly needed.
4. The Vitamin A for Health project through the creation of VITAL and its approach to improved field implementation has rapidly stimulated interest in several new countries to initiate vitamin A activities and has added new dimensions to vitamin A activities in all three target regions of the world.
5. This new dimension to the R&D/N vitamin A project has resulted in increased bridging and cooperation between regions, regional institutions, governments of targeted countries, sectors of governments, and other organizations. Experiences of this project are exemplary for the design of future approaches to improved nutrition.
6. Other endeavors carried out through Florida State University, Helen Keller International, International Center for Research on Women, International Eye Foundation and in-country research activities at such places as Mahidol University are proving to be important avenues in developing and implementing vitamin A related activities.

Thirteen recommendations were made. These include: that care be used in integrating vitamin A with other nutrient programs so as to not lose the current momentum; that stress be placed on assisting countries in developing strategies for interventions and their implementation for the alleviation of vitamin A deficiency through food use and for effective evaluation of dietary patterns to assess this; and for sustained support of the current portfolio of implementors who are so successfully addressing the methodologies necessary for these interventions.

Background and Project Description

The Vitamin A for Health Project serves as the Office of Nutrition's mechanism for assisting developing countries in the prevention and control of vitamin A deficiency. Its purpose is to determine the role which vitamin A deficiency plays in child mortality and morbidity; to assist less developed countries assess the prevalence of vitamin A deficiency among children; and to develop and implement programs to overcome vitamin A deficiency.

The project assists participating countries to:

- a. define the geographic distribution, and the public health and economic significance of vitamin A deficiency and xerophthalmia;
- b. formulate the conceptual framework and appropriate strategies for intervention approaches;
- c. design, implement and evaluate vitamin A programs; and
- d. train vitamin A program staff.

The project channels scientific, technical, and planning expertise to host country institutions, PVOs and AID field staff through cooperative agreements with Johns Hopkins University International Center for Epidemiologic and Preventive Ophthalmology, Department of Public Health (ICEPO, IIP), and the Nutrition Foundation International Vitamin A Consultative Group (IVACG), as well as through a contract Vitamin A Field Support Project (VITAL) with the International Science and Technology Institute (ISTI), and other avenues. Florida State University, Helen Keller International (HKI), the International Center for Research on Women (ICRW), the International Eye Foundation (IEF), and the Academy for Educational Development (AED), have implemented activities in cooperation with the Vitamin A for Health Project.

The Office of Nutrition has had a continuous vitamin A project since 1975. In its earlier days this project emphasized the scientific basis of vitamin A and its relationship to childhood blindness and mortality in a development context. As case controlled studies in a variety of settings have been completed and have validated the role of vitamin A in preventing blindness and death, the focus has shifted to an implementation and field support mode, applying the scientific findings in field situations. To this end, current work includes documentation of the extent of vitamin A deficiency and the location of the problem nationally and subnationally; refinement of assessment methodologies and continued exploration of field appropriate non-invasive techniques; operational research to explore ways in which vitamin A interventions can be integrated into already existing public health activities; exploring ways to extend the seasonal availability of vitamin A rich foods;

developing communications strategies for behavior change in dietary habits to increase consumption of vitamin A rich foods; and work with agriculturalists to increase the availability of vitamin A rich foods. State-of-the-art scientific knowledge and program experience is collected and disseminated in order to assure advances are made available to field missions and host country counterparts. This is accomplished through workshops, seminars, international meetings and publications.

The project has provided funding and technical assistance in program planning and evaluation on an ongoing basis. Through several grants, contracts and cooperative agreements during the initial years, the project has sponsored a series of interrelated activities to expand the sum of knowledge and strengthen institutional bases and human resources required to undertake a worldwide attack on vitamin A deficiency.

The most recent external review was of the predecessor project and took place in 1988. The current review is being conducted at mid-point of the project, which was recommended for continuation for at least a 5-year period. In addition to continuation, the primary recommendations of the 1988 review included:

- a. funding to demonstrate that vitamin A is a significant factor in child survival, well-being and in the prevention of nutritional blindness;
- b. funding of studies to show the relationship between vitamin a status and morbidity, emphasizing development and use of indicators of marginal vitamin A status;
- c. defining the relative risk of morbidity from vitamin A deficiency in concert with inadequacy of other nutritional factors; eg. iron, zinc, selenium and vitamin E;
- d. a new institution to plan, manage, and evaluate programs and the impact of social marketing, communication and education programs as well as gardening activities by providing field support to AID missions;
- e. additional 5 years of funding for IVACG and ICEPO, with the former to expand its role in organizing meetings, workshops, and regional conferences;
- f. streamlining of the funding procedures to facilitate the project planning execution;
- g. funding for research on the unique biological action of carotenoids, such as their role as antioxidants and stimulators of the immune response in addition to their activity as precursors of vitamin A;
- h. continued support for the Xerophthalmia Club Bulletin.

SPECIFIC EVALUATION ISSUES

ISSUE I: Is the project design consistent with its objectives?

(a) catalyze worldwide efforts toward the prevention of vitamin A deficiency; (b) expand the sum of knowledge regarding vitamin A deficiency and methods for its control; (c) develop and test intervention approaches; (d) encourage and assist affected countries to define and attack the problem of vitamin A deficiency in a sustainable fashion.

The project has established an extensive network of collaborators through contracts and cooperative agreements. These included: International Science and Technology Institute (ISTI)/VITAL, International Life Sciences Institute (ILSI)/IVACG, and Johns Hopkins' ICEPO and IIP, all operating worldwide. In addition there are activities in the Philippines and Indonesia through HKI, in Guatemala through IEF, in Benin through ICRW, in Senegal through Florida State University and the now completed work in Sudan through the Harvard Institute for International Development (HIID). All activities, whether assessments or interventions have proven effective in focusing attention on the role of the importance of vitamin A deficiency prevention in reducing child mortality and morbidity.

ISTI/VITAL is considered to be particularly valuable to AID missions and regional bureaus in responding to their needs for field support. Under this contract, a considerable amount of country-specific information has been gathered through compilation of data from existing published and unpublished sources. VITAL is proving to be a valuable resource that is crucial to meeting country and regional needs and to making effective use of the interest generated in the area of vitamin A deficiency control. The concept of VITAL and the dedication of its staff make this innovative service a model for other projects.

ILSI/IVACG continues to meet its objective of coordinating the flow in information and new knowledge in the area of vitamin A deficiency control. The series of IVACG publications is extremely useful to health professionals and program staff working in this field. The support that IVACG is giving to the Xerophthalmia Club Bulletin has been particularly valuable in vitamin A activities and broadens the forum of information dissemination worldwide. The IVACG meetings have also been more accessible than ever before to a larger professional audience through a call for abstracts of papers for presentation at the meetings. Also, the membership of IVACG and its Steering Committee now including more members from Africa have provided an effective forum for coordination of efforts among UN agencies and the ACC/SCN, bilateral donors and others involved in the global effort to prevent and control vitamin A deficiency.

The Johns Hopkins University's ICEPO has contributed greatly to the elucidation of the relationship of vitamin A deficiency to increased infant and child mortality and morbidity. This was initially demonstrated in the earlier studies in Sumatra, West Java and Tanzania. Since then, this group has conducted controlled trials in Indonesia and Nepal with fortified MSG and with high dose vitamin A supplement. In both cases, mortality rates were reduced drastically. In the course of these epidemiological studies, methods of vitamin A assessment were developed (CIC) and standardized (HPLC serum retinol). This group also collaborated with population assessment and surveys in Indonesia, Micronesia, Nepal, Malawi, Zambia, Bolivia, Belize and Papua New Guinea.

The Johns Hopkins University's IIP has focused on exploring the relationships between vitamin A and childhood morbidity. In the Morvita project in Indonesia, the severity, incidence and duration of infectious diseases were carefully assessed and their response to vitamin A status documented. Additionally, validation of dietary assessment methods were undertaken in the same cohort (Dietvita project). Also biochemical assessment with MRDR was standardized. These activities contributed significantly to the knowledge base and the methodology needed for vitamin A deficiency control. Contacts with scientists involved in vitamin A work in Zambia, Bangladesh, Guatemala, Tanzania, Thailand and Peru were particularly effective in transfer of needed technology expand the network of expertise in this field. IEF has undertaken field activities in Guatemala aimed at increasing the availability of vitamin A to the under-six-years-old through increased consumption of foods high in beta and other carotenoids. (PROVITA Project). The various components of these activities at CeSSIAM include: standardization and training of laboratory personnel for HPLC analysis of serum retinal, the analysis of total vitamin A activity in plant sources, and the standardization of all dietary methodology in order to assess the biological and behavioral consequences from the increased availability of foods high in beta and other carotenoids. These activities include the training of personnel involved in the project and the development of nutrition education material for the intervention.

The ICRW activities in Benin explore the relationship of vitamin A and morbidity in women. Methods of dietary assessment recommended by an IVACG Task Force are being used. Laboratory methods of HPLC for serum retinol and of RDR are also being used. This standardization of assessment methodology presents a valuable resource for this and future activities on vitamin A status work in Benin.

The Harvard University HIID study was a masked trial of high dose vitamin A supplementation carried out in Northern Sudan where vitamin A deficiency is common. The differences in mortality associated with improved vitamin A status were collinear with the household SES and sanitary conditions. However, vitamin A supplementation did not reduce child mortality. The investigators suggested that deprivation in these communities was so severe and the burden of disease so high as to render the expected positive effect of vitamin A supplementation statistically insignificant.

The Florida State University work in Senegal has developed community-based mango drying activities as a method of ensuring regular consumption of vitamin A. This kind of food technology with appropriate local application is key to the success of the Vitamin A Project.

HKI and IEF are two organizations which have historical ties with ophthalmological groups and government-sponsored eye care activities in several countries where vitamin A deficiency is a serious problem. Thus, they served the predecessor project well by being in a unique position to re-orient thinking of key persons in government and the medical profession from the curative to preventive approach when the efficacy of vitamin A capsules became established. Both organizations continue to play key roles, with support from the present project, A.I.D. bureaus in Washington and A.I.D. Mission - HKI in Indonesia, the Philippines, Bangladesh and Haiti, IEF in Malawi, Guatemala and Honduras.

Clearly, the Vitamin A for Health Project has achieved considerable strides in catalyzing global interest and support for the need to control vitamin A deficiency. Emphasis on research to elucidate the relationship of vitamin A and mortality, morbidity and growth has been a strong feature of the project. In so doing, the project has advanced the frontier of knowledge in this field. It is providing impetus to develop valuable methodology for the assessment and evaluation of vitamin A interventions. The project activities also afford many countries the opportunity to train personnel and potentially to strengthen scientific capabilities for vitamin A work. IVACG and VITAL have played major roles in the successful dissemination of knowledge, experience and technological achievements among the professional groups working on the control of vitamin A deficiency in various countries. All this points to a successful record for the project.

ISSUE II: Is the project making an impact consistent with the resources available? If so, has the rate of progress been satisfactory?

The major new thrust of the current project has been the establishment of VITAL. The evaluation team thus felt that due to time constraints of this evaluation, this issue could best be addressed by considering the impact of VITAL during its initial 2 and 1/2 years of activities.

It is quite impressive that in Asia, where vitamin A programs have long been established in several countries, the field support component has nevertheless made a major impact. An early activity in India, assistance in developing a vitamin A supplementation monitoring system, was so successful that the government of India is now extending it to six states. Technical assistance of various types has been provided to seven islands of the South Pacific - including prevalence surveys of six islands. A prevalence survey of the Eastern Islands of Indonesia has also been completed. Studies on the nutritional impact of home gardens, and vitamin A supplementation through immunization programs are underway in Nepal.

In addition, VITAL has played a key role in laying the groundwork for an applied research endeavor which will provide critically needed information for vitamin A programs throughout the world. In collaboration with SEARO and WHO, VITAL is funding a network of Thai, Indian and Indonesian universities to determine the effects of cooking and preparation techniques on the nutrient content of foods consumed by target populations of those countries.

VITAL has provided a major stimulus to vitamin A activities in Africa and Latin America. At the present time, field support activities are being carried out in several African countries including Mali, Tanzania, Cameroon, Malawi, Niger, Nigeria, Senegal, Uganda and Zambia. These are being implemented with collaboration of regional institutions from Senegal, Tanzania, and Zambia, FAO and two US PVO's.

In Latin America and the Caribbean, vitamin A activities are underway in Bolivia, Dominican Republic, Ecuador, Guatemala, Haiti, Honduras and Panama. One regional and four host country institutions are collaborating. Two US PVO's are also collaborating.

Thus, it was felt that a major impact has been achieved in each of the three target regions through the new project resource. The rate of progress has been more than satisfactory.

ISSUE III: Are the needs of the developing countries being adequately responded to within the constraints under which the project operates?

The project is utilizing two mechanisms to respond to needs of the vitamin A target countries. Assistance to carry out applied research or vitamin A program development activities in several countries is being provided through cooperative agreements with US PVO's, and in one case (Thailand) a grant with a national university. Global assistance to countries is available from the project through IVACG, two cooperative agreements with Johns Hopkins University (ICEPO, IIP) and VITAL.

In response to the 1988 external review recommendation that the project develop a new entity to concentrate on providing field support to improve vitamin A program implementation and evaluation, VITAL was created in October, 1989. VITAL has sponsored workshops in the Latin American and the Caribbean, and Africa - the two regions where little previous vitamin A intervention was underway. The workshops were effective in stimulating sufficient interest that requests for assistance were soon forthcoming from several countries of each region. Third Country experts and institutions from the region were involved in the workshops. Thus, VITAL has the capability of providing appropriate technical assistance rapidly from within each region, along with technical assistance from its roster of US experts. This approach also permits cost savings to the project. In addition, it contributes to the goal of institution building within each region. The VITAL presence and response capability is reinforced by having a full time technical advisor based in each of these two priority regions, and a full time regional coordinator each for Africa and LAC in the home office.

VITAL has also been anticipating and responding to country needs by placing emphasis on those aspects of vitamin A programs where the need is most urgent or methodology least developed. In conjunction with prevalence surveys (the initial field activity in most countries) emphasis has been placed on testing and using assessment techniques which detect subclinical status in addition to clinical signs of vitamin A deficiency. Much emphasis is also being placed on developing appropriate methodologies and promoting and strengthening dietary and nutritional strategies for combating vitamin A deficiency in the collaborating countries. Promotion of vitamin A-rich food preservation is underway in several countries. Operational research on issues associated with integration of vitamin A supplementation into existing EPI programs are underway in Latin America and Asian settings.

VITAL is also fulfilling a coordinating function by collaborating closely with other donor groups, particularly the other entities funded under this project and VITAP (funded by FHA) in workshops, training and technical assistance activities. The VITAL newsletter (1,000 copies/issue) serves as a mechanism for information exchange, with emphasis on program implementation and evaluation activities, issues and experiences.

On the basis of information available to the team in Washington and considering that direct ongoing assistance of various types is currently being provided to 13 countries in Africa, 6 countries in Asia, 7 countries in LAC and to several regional institutions, the evaluation team considers that the project is responding adequately to client country needs. This issue was explored more thoroughly during the country site visits to Nepal and Bolivia and in the desk review of projects in Africa.

Nepal and Bolivia

The trip reports to Nepal and Bolivia are attached as Appendix A and Appendix B. These reports clearly show how the needs of the countries are being met. In Nepal, an applied research study (NNIPS-I) funded by R&D/N and implemented by ICEPO and a Nepali PVO counterpart, demonstrated a 30% reduction in early childhood mortality when vitamin A was administered at 4 month intervals. This study was based in the Terai, the ecological zone where the Nepali population is concentrated. These results stimulated the government to plan a national vitamin A intervention program. In the case of Bolivia, the Vitamin A for Health Project funded a vitamin A deficiency prevalence survey, which has led to USAID Mission funding of short/medium/long term interventions in priority areas.

Nepal

The Nepal site visit (6/30-7/7, 1992) was carried out during a period when an interministerial task force was developing a five-year national vitamin A prevention and control program. Due to unsettled conditions in the country, Dr. Sabry did not meet with the task force. As mentioned in his report, their planning was based on the results of two national xerophthalmia surveys (1975, 1981), and three large scale intervention studies (NNIPS I, VACSP, Jumla) which had been presented at a national vitamin A workshop funded by the Vitamin A for Health Project (February 1992), and recommendations stemming from the workshop. Subsequently, USAID/Nepal has requested and received \$2.5 million of vitamin A earmark funds to be used in support of the national program. USAID/Nepal has decided to channel funding and technical assistance to the national effort through a buy-in to VITAL, which was already collaborating with two U.S. PVO's promoting home gardening in the country. At the Mission's request, a two-person team was sent to Nepal in November, 1992, to assist in defining the most appropriate use of mission funds in conjunction with UNICEF/Nepal support.

The five-year national program will be carried out by the Nutrition Cell of MOH, backstopped (manpower and technical assistance) by a secretariat based in Nepal Netra Jyoti Sangh (NNJS), a Nepali Eye Care NGO which served as the collaborating agency for the NNIPS I and VASCP intervention studies. The Nepali director of the VASCP study will serve as the program director of the NNJS secretariat. Thus, the experienced leadership, trained staff and methodologies developed during the research studies will be available during the developmental stage of the national program.

The program will be based on three implementation strategies:

- Immediate - dissemination of vitamin A capsules, treatments, protocols and xerophthalmia, recognition cards to all health facilities to assure treatment of clinical cases;
- Intermediate - distribution of 200,000 IU capsules to children on a semi-annual basis as a preventative measure; and
- Long term - changes in dietary behavior through nutrition education, increased maternal literacy, improved breastfeeding and childfeeding practices, and increased production of vitamin A rich foods.

The MOH will be assisted by the Ministries of Agriculture, Education and Local Development in working toward broad implementation of the long term strategy; the activities of these ministries will be included in the monitoring/evaluation component of the program. Capsule distribution will be carried out by community health volunteers (CHV) selected by village health committees, and supervised by MOH village health workers (VHW) and maternal and child health workers (MCH). The CHV's will receive one-day refresher training within two weeks prior to each semi-annual distribution campaign. Nepali and international PVO's will be invited to collaborate with the MOH and other ministries among populations they are serving. USAID/Nepal will fund a PVO coordinating mechanism.

Nepal has 75 health districts. Initially, district-wide capsule distributions will be implemented in 6 districts where the NNIPS and VACSP studies were based, plus populations receiving health services from PVO's in 4-5 additional districts. Prioritization of additional districts to be included in the program will be determined by the results of multi-district xerophthalmia assessment surveys carried out across ecological zones, moving from heaviest populated (known to be high-risk) to least populated areas of the country. The program will have strong training and monitoring/evaluation components, with feedback of results to all levels through the MOH system and a vitamin A newsletter, which will be read to illiterate CHV's during the semi-annual training sessions. Additionally, the monitoring/evaluation component will be phased into a new MOH and standardized Nepali government MIS which has been developed and will be implemented with DANIDA assistance.

The Nepali National Plan has enthusiastic and broad support from within the government; builds on a base of seasoned staff and the existing NGO's/PVO's national and community health services; will have adequate financing; and ready access to technical assistance as needed. It is structured in a manner which best facilitates concurrent implementation of the intermediate and long term strategies and gradual progress toward the objective of eliminating vitamin A deficiency in the country. The prognosis for success is good.

Africa

The first R&D/N vitamin A activity in Africa was sponsorship of the 1981 IVACG meeting in Kenya. Seven African countries presented results of rapid vitamin A deficiency assessment surveys which had been carried out under WHO auspices through an R&D/N grant. Five of the seven countries were considered to have high risk areas. A collaborative working relationship between ICEPO, the Tanzanian Food and Nutrition Center (TFNC) and the Zambian Tropical Disease Research Center (TDRC) developed from this meeting. During subsequent years, ICEPO technical and financial assistance (with R&D/N funding) was a major factor in establishing the first national xerophthalmia surveillance system in Africa (Tanzania), the first population-based xerophthalmia survey in Africa (Malawi), the Lua Pula Eye Disease survey in Zambia, and the first report that vitamin A supplementation brought about a 45% reduction in measles case fatality. This report was the stimulus for the 1987 WHO and UNICEF joint statement recommending vitamin A supplementation of children with measles in high risk areas.

The current Vitamin A for Health Project has funded the HIID study on Vitamin A Supplementation and Child Survival in the Sudan, as described on page six. The new R&D/N vitamin A field support resource which has been initiated under the current project, together with FHA/PVC support of PVO vitamin A interventions in Africa has led to a very rapid increase in (a) numbers of host governments requesting support and (b) opportunities to add new dimensions to vitamin A interventions in the continent. VITAL alone has received requests from eight governments for assistance in planning/implementation of vitamin A surveys or analysis of samples from prior surveys, from five countries for support of activities to increase production/consumption of vitamin A rich foods (and monitoring/evaluation of these activities), from 10 countries for training and technical assistance in vitamin A food preservation, and from 15 countries for training of various types. Even though these activities will be carried out in collaboration with five regional institutions (TFNC, TDRC, IOTA, RCSE, KMRI) the workload could easily become overwhelming.

There has been an impressive array of activities related to improving the availability of vitamin A-rich foods by enhancing production, processing, and KAP for consumption, and for the measurement of dietary intake, particularly as related to vitamin A foods. Activities

have been developed or are currently under development in cooperation with several national and regional institutions. Production activities have centered or are currently under development on gardening/horticulture projects which include efforts in nutrition education in Niger (the Niger Gardening and Food Preservation Project) and Malawi (for school and community gardens). Attention on food processing has had a focus on solar drying - in 5 Sahel countries (Mauritania, Niger, Chad, Mali, Burkina Faso) FAO requested participation in a food solar drying project including nutrition education, applied at the community level; in Mali, consultants will also collaborate on solar drying of mango, papaya, pumpkin and several dark green leafy vegetables with the Ministry of Agriculture and the Regional Center for Solar Energy (RCSE); R&D/N provided funding for Florida State University to implement production of dried mango powder to use as a weaning food in Senegal; studies were done in Chad on the techniques used by Indigenous Peoples for food preparation and preservation; the TFNC in Tanzania has worked with VITAL for an exhibit on solar drying of vitamin A rich foods at the XV IVACG meeting in Arusha, in 1993, additional work following the meeting, as well as on a project for the fortification of tea with vitamin A. Some of these projects included components on nutrition education to enhance use of the food. Projects assessing dietary intake have been developed and/or assisted in the following: in the Kamuli District of Uganda using the IVACG guidelines; in Kenya a project is underway to show the effects of dietary intake on later vitamin A status of children and the determinants of intake with Johns Hopkins, IFPRI and the Kenya Medical Research Institute (KMRI); assistance was given with the analysis of nutrition and dietary data for the Extreme North Province of Cameroon; and in Burkina Faso, nutritionists were trained in the IVACG dietary methodology to monitor FAO projects on horticulture and solar drying. Assistance from the Vitamin A for Health Project has also been requested to conduct a survey on prevalence of vitamin A, iron and iodine deficiency in Nigeria which includes validation of the IVACG dietary methodology. Additionally, assistance has been given by through Vitamin A for Health Project funds to the Tropical Diseases Research Centre in Zambia for workshops on food security (among other workshops) for 15 Anglophone countries in Africa.

As can be seen, VITAL has devised a strategy for prioritizing African countries for resource allocation. The evaluation team is supportive of the concept and suggests that the scope of the number of (a) implementors, (b) participating countries and (c) major endeavors underway may have reached the point that such a strategy should be considered for the Vitamin A for Health Project.

ISSUE IV: Should changes be made in the emphasis which is placed on each of the project components, i.e., basic research, as opposed to operations research, as opposed to intervention program management? Is there more need currently for training workshops, or greater information collection and dissemination?

The Office of Nutrition and the Vitamin A for Health Project deserve much of the credit for the most recent advances of knowledge on the relationships of vitamin A to mortality, morbidity and growth. It is now uniformly accepted that even after accounting for all the variables that contribute to the death of infants and children in developing countries, vitamin A can spare one out of every three or four. Massive clinical trials, including rigorously controlled studies, have provided convincing evidence to this effect.

It is time to focus resources on the development of effective means of increasing the vitamin A intake of people in developing countries, particularly those most at risk. Much needs to be done to develop strategies and interventions to achieve effective control of vitamin A deficiency. The pressing need for the remaining years of the project and beyond points in the direction of giving higher priority to intervention program design, implementation and evaluation. In emphasizing intervention program management, there continues to be a pressing need for training workshops and short courses for professional and field staff in developing countries.

ISSUE V: Has the balance between research, field support, training and technical assistance provided to collaborating countries and USAID missions been sufficiently supportive of project activities?

As is to be expected, the balance of these components varies between USAID missions, host countries, and to projects within countries. This variability depends in large part on the other resources available, such as other international, bilateral and PVO support.

The capacity of the Vitamin A for Health Project to provide field support has been greatly enhanced by VITAL, and the assistance given through this contractor has been well received and in great demand for disseminating information on vitamin A and for assisting intervention efforts toward the eradication of vitamin A deficiency.

Some areas have received intensive research assistance from ICEPO and IIP (i.e. Indonesia, Nepal, some countries in Africa, and LAC) usually accompanied by in-country training and specialized short-term training in the US. In the view of the evaluation team, both research and field implementation assistance from all project implementors has always included an important element of training. Training can also be defined as participation in workshops or short courses for those involved in the design, implementation and evaluation of interventions and on-going in-country (nutrition, health, agriculture or community development) programs. It has not been possible to assess all of the training efforts that have taken place in the various contracted projects in this regard. Given that training is so essential to build in-country regional and local capacities for effective interventions and their evaluation, this should be an important commitment for each of the contractors. Training events should be appropriately conducted and carefully documented, so that each contributes to the sum of knowledge. A special training need in all regions is that associated with defining family and individual dietary intake and the creation and use of accurate and locally-relevant food composition data for assessing dietary adequacy.

ISSUE VI: Have A.I.D. resources been adequate to support the planned activities?

The Vitamin A for Health Project Paper projected that \$19 million of R&D/N funding would be needed for the five-year period of August 25, 1988, through September 30, 1993. It further anticipated that mission buy-ins of \$9.626 million would be forthcoming, or a total of \$28.626 million. As a result of increased demand for project activities, the project was amended in August 1989 to provide a one year extension and in July 1992, the authorized amount of R&D Nutrition was increased to \$29 million.

Cumulative R&D Bureau obligations through March 31, 1992 (the mid-point of the project) were \$15.736 million. In addition, there have been \$2.174 in mission/bureau buy-ins and OYB transfers of \$1.125 up to the mid-point; i.e. total available funds of \$19.035. This is 66% of the total project funding requirements.

To date, available funds have been more than adequate to support the planned activities as evidence by the amount of \$5.682 million in the pipeline as of March 31, 1992. However, the pace of project activities has accelerated rapidly during the past year and the current rate of expenditure is \$570,430 monthly. It is anticipated that this spending level will remain fairly constant for the remainder of the project. The evaluation team was informed that subsequent to March 31, 1992, the approved A.I.D. funding for FY 1994 includes a large congressional earmark of monies for vitamin A activities. In addition, there have been AID mission buy-ins to VITAL of approximately \$4.0 million and funding has been assured for the follow-on R&D/N micronutrients project. Thus, it appears that the funding pipeline for the Vitamin A for Health project is adequate.

ISSUE VII: Are there management issues or practices which may be adversely affecting progress of the project?

No management issues or practices which are currently adversely affecting progress of the project were identified during the evaluation. However, a number of pertinent issues which merit discussion did surface.

1. The project manager and contract entities are to be complemented for effecting a noticeable shift from capsules to food in peoples' perceptions. It is noteworthy that even the in-depth field research now being initiated under the project addresses dietary sources of vitamin A and improved dietary practices. However, there is no doubt that the current enviable status of the Vitamin A for Health Project and impressive recent achievements in the vitamin A field are due to the singular attention to this one nutrient. It must be remembered that the vitamin A endeavor, in even its most simple form is only 15 years old. The scientific and field operations research are still raising more questions than they are answering. Thus, the potential risks to this project - by diverted attention and diluted resources - through its being folded into the proposed multi-micro-nutrient initiative need to be seriously considered. It is the opinion of the evaluation team that every possible effort should be made to continue the momentum of the Vitamin A for Health Project.
2. While the exact percentage cannot be quantified, it is common knowledge that a very high proportion of the vitamin A capsules being distributed in the world are donated by UNICEF and the Sight and Life Foundation. Most of the country programs and, indeed, several of the AID-supported field research and intervention studies would come to a sudden stop if these donations were to cease. Many of the country programs would not be sustainable even if capsules were permanently available from UNICEF at the subsidized price of less than 2 cents per capsule. Indeed, changes in legislation would be required in some countries before the governments could initiate procurement of the 200,000 IU capsule. Is the project giving adequate attention to this issue?

3. The five-year grant by FHA to HKI to fund the VITAP project is an atypical activity of that Bureau. VITAL and VITAP provide similar services to the AID-targeted vitamin A deficiency countries. VITAL services are channeled to the host government through the AID mission; VITAP services are channeled to the host government through US PVO's. One must wonder if FHA support of VITAP will continue beyond the current five-year period, even if the Bureau continues to receive vitamin A earmark funding. Although VITAP's direct clientele (US PVO's) is different than that of VITAL, the indirect clientele of VITAP (host country governments) would certainly soon find a way of directing a substantially increased number of requests for assistance to VITAL if VITAP were terminated. While VITAL could probably successfully respond to the increased work load, this would require substantial additional funding. R & D/N needs to prepare for, or take appropriate action to forestall this eventuality.

ISSUE VIII: Do the project achievements and potential appear to justify its continuation?

With the increased resources allocated to this project since 1988, there has been an impressive assemblage of achievements and the AID project manager is to be sincerely congratulated. Project contractors have made significant strides in the understanding of the causes and effects on populations of vitamin A deficiency, and in the dissemination of this information. As well, new and important strategies for the alleviation of vitamin A deficiency have been developed and tested. These efforts are just coming to fruition, and much remains to be done to achieve sustained availability of vitamin A-rich foods to prevent childhood nutritional blindness, and to enable survival, growth and development of hundreds of millions of children throughout the less industrialized world.

Thus, the project's achievements and the promise for eradication of this significant nutritional problem justify the continuation of the activities of the "Vitamin A for Health Project".

RECOMMENDATIONS

1. The Agency has determined that the Vitamin A project will be incorporated into a broad micronutrients for health project. The successful vitamin A intervention activities and national programs in several A.I.D. assisted countries has provided a logical base for this expanded approach for micronutrient interventions. However, caution should be used in this integration effort so as to assure the momentum gained from this project serves the new initiative to the maximum possible extent.
2. It is felt that considerable progress has been made to demonstrate the relationship of vitamin A deficiency to infant and child mortality and that mortality testing trials should be given a low priority for funding under this project in the future. The possibility of integration with concerns about other micronutrients using this approach should be examined fully.
3. The project should enhance communication among concerned and interested A.I.D. offices with R&D and other bureaus, in order to review progress and identify opportunities for further collaboration. This is particularly necessary because of the relatively fast pace of activities and the diversity of A.I.D. staff who share an interest in vitamin A deficiency control.
4. The project should assign a high priority to the design, implementation and evaluation of interventions aimed at the alleviation of vitamin A deficiency through increased consumption of vitamin A foods by women and young children.
5. Attention should be given to develop the necessary strategies to enhance the availability and to ensure a sustainable supply and use of vitamin A-rich foods at the local and household levels.
6. The project should implement local efforts to improve dietary patterns at the community level to promote the intake of vitamin A-rich foods by vulnerable groups. Training at the local level should be given so that dietary patterns can be monitored and enhanced where needed in a timely manner. This involves the development of understanding of local beliefs and behaviors by all those involved.

7. The project should introduce the necessary technology and encourage the fortification of appropriate foods with vitamin A and/or carotenes. Food fortification with other limiting micronutrients may be considered within the scope of this strategy. It will be necessary to specify corresponding standards for food fortification in the national food laws and regulations and in the Codex Alimentarius International Food Standards. The latter will insure the fortification of imported foods.
8. The importance of training programs is likewise emphasized to develop locally appropriate methods and techniques for those involved in the design, implementation and evaluation of food and nutrition interventions to eradicate vitamin A deficiency.
9. It is important to recognize that a capsule procurement system will be needed for countries involved in the project where a supply of vitamin A capsules is required for distribution. This is particularly crucial in the event that the current donation and subsidization of the cost of capsules by UNICEF and the Sight and Life Foundation be interrupted.
10. The project should assist countries where a supply of vitamin A capsules is required in developing effective capsule delivery systems that are consistent with national drug laws and regulations. This is necessary to ensure compliance with capsule intervention protocols for the control of vitamin A deficiency.
11. Bearing in mind that termination of VITAP would result in a considerable pressure on R&D/N for additional support of field implementation under the Vitamin A for Health Project, appropriate action to foster continuation of VITAP activities or the development of contingency plans to carry out their activities should be instituted at this time.
12. It is important to sustain the activities of the Vitamin A for Health Project and to strengthen its capabilities in field support. The concept of this organization and the dedication and competence of the project implementation staff have proven extremely valuable to missions and regional bureaus. Field support activities hold a key potential of enhancing the effectiveness of interventions aimed at controlling vitamin A deficiency.
13. ICEPO, IIP, IVACG and the Xerophthalmia Club Bulletin are providing excellent services to the project and to vitamin A programming worldwide. Continued funding should be provided to them at approximately current levels.

ACRONYMS

- ACC/SCN** - Advisory Committee on Coordination, Sub-Committee on Nutrition, United Nations Agencies
- AID** - Agency for International Development
- CeSSIAM** - Center for Studies of Sensory Impairment, Aging and Metabolism
- CHV** - Community Health Volunteer
- CIC** - Conjunctival Impression Cytology
- CIDA** - Canadian International Development Agency
- CS** - Child Survival
- DANIDA** - Danish International Development Agency
- EPI** - Expanded Program on Immunization
- FAO** - Food and Agriculture Organization of the United Nations
- FHA/PVC/CS** - Bureau for Food and Humanitarian Assistance, Office of Private and Voluntary Cooperation, Child Survival Program
- FHA/PPE** - Bureau for Food and Humanitarian Assistance, Office of Program Planning and Evaluation
- HIID** - Harvard Institute for International Development
- HKI** - Helen Keller International
- HPLC** - High Pressure Liquid Chromotography
- ICEPO** - International Center for Epidemiologic and Preventive Ophthalmology, The Johns Hopkins University
- ICIDD** - International Center for Iodine Deficiency Diseases
- ICN** - International Conference on Nutrition
- ICRW** - International Center for Research on Women
- IDRC** - International Development Research Center

IEF	- International Eye Foundation
IFPRI	- International Food Policy and Research Institute
IIP	- Department of Public Health, The Johns Hopkins University
ILSI	- International Life Sciences Institute
IOTA	- African Institute of Tropical Ophthalmology (Mali)
INACG	- International Nutritional Anemia Consultative Group
ISTI	- International Science and Technology Institute
IVACG	- International Vitamin A Consultative Group
LAC	- Bureau for Latin America and the Caribbean, AID
MCH	- Maternal/Child Health Worker
MIS	- Management Information System
MRDR	- Modified Relative Dose Response
MSG	- Monosodium glutamate
NNIPS	- Nepal Nutrition Intervention Project, Sarlahi
NNJS	- Nepal Netra Jyoti Sangh
ORANA	- Organisme de Recherches Sur L'Alimentation et la Nutrition Africaines
PID	- Project Implementation Document
PROCOSI	- Programa de Coordinacion de Supervivencio Infantil (Program for the Coordination of Infant Survival) (Bolivia)
RCSE	- Regional Center for Solar Energy
RDR	- Relative Dose Response
R&D	- Bureau for Research and Development, AID
R&D/N	- Office of Nutrition, Bureau for Research and Development, AID

- SCN - See ACC/SCN
- SEARO - Southeast Asia Regional Organization
- TDRRC - Tropical Disease Research Center (Zambia)
- TFNC - Tanzania Food and Nutrition Center
- UNICEF - United Nations Children's Fund
- USAID - AID mission
- VACSP - Vitamin A Child Survival Project
- VITAL - Vitamin A Field Support Project
- VITAP - Vitamin A Technical Assistance Project
- WB - World Bank
- WHO - World Health Organization

Persons Interviewed During the Evaluation

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ANNEX A

REPORT ON SITE VISIT TO
BOLIVIA: VITAMIN A NUTRITION ACTIVITIES

AGENCY FOR INTERNATIONAL DEVELOPMENT
RESEARCH AND DEVELOPMENT BUREAU, OFFICE OF NUTRITION
"VITAMIN A FOR HEALTH" PROJECT

BOLIVIA: September 27 - October 3, 1992

Dr. Guillermo Arroyave
Dr. Harriet Kuhnlein

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I. Acknowledgements

Thanks are due to the many staff in Bolivia who kindly gave part of their committed time to honor the schedule of interview with the evaluation team, to describe their ongoing programs, and to answer questions and discuss their plans for future activities. The team wishes to express special appreciation to the Office of the Director, Nacional de Atencion a las Personas, the staff of the Departamento de Nutricion y Alimentacion, and the Laboratorio de Salud of the Ministry of Prevencion Social y Salud Publica, UNICEF, OPS and PROCOSI. The generous assistance from Ing. Mario Telleria, consultant of VITAL for the sugar fortification program calls for a special citation. Particularly valuable was the briefing from Dr. David Nelson, VITAL representative at the beginning of the visit.

II. Introduction

This site visit was conducted as one portion of an external mid-term evaluation of the "Vitamin A for Health Project" of the Office of Nutrition, Research and Development Bureau, of the Agency for International Development (A.I.D.). The overall evaluation was carried out by a committee chaired by Dr. John McKigney, and included Drs. Zak Sabry and Harriet Kuhnlein. The committee met in the Washington, D.C. area May 11-14, 1992. Dr. Guillermo Arroyave was to assist the with field site in Bolivia. Other site visits were to take place in Nepal and Uganda.

The terms of reference of the field evaluations placed emphasis on activities for vitamin A deficiency control carried out with project support since 1988, and included views on project activities by the Mission and Host-Country interests and plans, and how activities fit into the Regional context. The site visit in Bolivia was conducted by Drs. Guillermo Arroyave and Harriet Kuhnlein from September 27, to October 3, 1992, in LaPaz and areas near-by.

In Bolivia, there is a strong political commitment within the Ministry of Social Welfare and Public Health (MPSSP) to improve vitamin A status and general nutrition. Surveys were conducted on vitamin A in serum and anthropometry of children less than 5 years of age who were classed as socioeconomically deprived, and on food consumption using two survey techniques: the IVACG procedure (vitamin A) and a 24-hour recall (general nutrition). In the latter, nutrition of family members was also assessed. The surveys were completed, and workshops were held this year to report the results, which generally indicated the need to improve vitamin A status. The Ministry, and in particular the Direccion Nacional de Atencion a las Persona (DINAP) and the Departamento Nacional de Nutricion y Alimentacion (DNNA) recognize and promote three strategies for vitamin A deficiency control: short-term, medium-term and long-term. In this context, programs for megadose vitamin A capsule distribution (short-term), fortification of sugar (medium-term) and the PROCOSI-VITAL program (long-term), especially as conducted for community gardens, was promoted. These three intervention strategies are described in the report.

Other regional activities supported by the "Vitamin A for Health" project are summarized in Section V.

The terms of reference for the site visit in Bolivia were:

1. Evaluate the progress and experience gained from activities carried out by the project.
2. Assess the suitability of planned activities for this country area and determine changes that might be made.

3. Make an initial determination on future directions for the project in terms of activities for the specific country as well as region and subject.
4. Determine if the project activities are making an impact consistent with the resources available - is the rate of implementation satisfactory.
5. Has the project identified the key vitamin A deficiency problems in the geographic area and are plans being made to implement activities to control the problem.
6. Is the implementation of activities being carried out in concert with USAID Mission focus and interest; is the Mission being kept aware of activities and potential impact for other Mission interests.
7. Are other donors (NGOs, etc.) involved, at what level(s); is sustainability of activities being considered in design and implementation. Are local qualified person engaged.
8. Are the activities being carried out in concert with host-country plans and interests; do they assist affected countries to define and attack the problem of vitamin A deficiency in a sustainable fashion.
9. Are there subject areas in vitamin A deficiency control that are being neglected.

The itinerary of the site visit was as follows:

Sun. Sept. 27	am	Arrive in LaPaz
	pm	Meet with Dr. David Nelson
Mon. Sept. 28	am	Visit to USAID Office. Meet briefly with Paul Hartenberger. Security briefing with Sr. Enrique Cassal.
	pm	Meet with Lic. Magaly de Yale and Ernest Schoffelen, UNICEF Meet with Dr. Juan Rocha, PROCOSI
Tues. Sept. 29	am	Meet with scientists at Lab. Bioquimica Nutricional: Dra. Juana Terjerina, Dra. Leonora Mejia, Dra. Esperanza Guillen and Juana Miranda. Meet with Dr. Roberto Bohrt, Director, Direccion Nacional de Atencion a las Personas, and Lic. Rosario Lopez and Lic. Ma. Eugenia Lara, Departamento de Nutricion y Alimentacion.

pm Meet with Lic. Rebecca Cabrera, consultant to UNICEF on food consumption survey.

Wed. Sept. 30 am Meet with Dr. Adhemar Botelho, Lic. Lopez, Lic. Lara regarding nutrition survey
Meet with Ing. Mario Telleria regarding sugar fortification.
pm Review documents. Outline report.

Thurs. Sept. 31 am Visit to urban and periurban communities with Lic. Lara
pm Prepare report
Discussion with Dr. Alan Berg

Fri. Oct. 1 am Prepare report.
Meet with Lic. Maria Teresa Reynoso, PAHO
Meet with Lic. Lara
pm Finalize report
Meet with Dr. Annamaria Aguilar

Sat. Oct. 2 am Depart LaPaz

The site visit provided the opportunity to discuss the activities ongoing for vitamin A deficiency control. The team had good discussions on host-country views with Ministry of Health (MOH) and PROCOSI-VITAL staff, but we were not able to have similarly thorough discussions in the Mission office due to time constraints.

III. Bolivia Vitamin A Deficiency Survey

During 1991, The Ministry of Public Health of Bolivia carried out a vitamin A deficiency prevalence survey in a random sample of children between one and five years of age living in the poorest areas of the country. The sample of 1000 was stratified by ecologic zone (altiplano, valle, llano) and by urban/rural/remote location. The survey evaluated serum retinol by the method of Bessey and Lowry and risk of inadequate vitamin A consumption per the IVACG Simplified Dietary Assessment Guidelines. UNICEF and PAHO provided supplementary grants to add additional questions to the survey, including a 24-hour recall, and for analysis by Lic. Rebecca Cabrera.

VITAL has provided technical assistance and financial support to the survey in collaboration with USAID/LaPaz, which also provided Mission funds for survey implementation. Dr. Barbara Underwood (consultancy sponsored by PAHO) of the National Eye Institute of NIH visited Bolivia in July, 1989, to initiate preliminary planning and design of a vitamin A deficiency survey. Technical assistance was provided by VITAL's South American Representative, Dr. David Nelson, for survey planning, training, administration, implementation, and analysis. VITAL consultant Dr. Hernando Flores of the University of Pernambuco in Recife, Brazil, trained field personnel in the collection, handling, processing, storage and transport of serum samples. He also trained the MOH's Nutrition Laboratory personnel in analysis of retinol in serum samples, standardized their analysis, and conducted repeated quality control checks. Local consultants were used for the sample design and development of the logistics plan.

Data collection was completed in December, 1991. The retinol analysis and data entry were carried out during January and February, 1992. Preliminary data analysis was done in March with assistance from Drs. Flores and Nelson, and a presentation was made by the survey's director, Dr. Adhemar Botelho, to the Minister of Health and other senior MOH officials in order to appropriately orient further analysis. A final report shows an overall prevalence of serum retinol below 10 ug/dl (deficient) of 0.1% and below 20 ug/dl (low) of 11.3%; 48.3% had serum retinol concentrations below 30 ug/dl. The highest prevalence of deficiency was found in the rural areas of the "altiplano", 17.6%, low, and the "llanos", 12.9%. (Appendix A)

The results of the survey were presented during a national seminar and three regional workshops, attended by personnel of public and private institutions. Components of a comprehensive national program to reduce vitamin A deficiency are now being developed by the National Department of Nutrition and the National Committee on Deficiency Diseases, and will be implemented in coordination with the regional sanitary units, NGO's and local units of the Ministries of Education and Agriculture. Possible

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activities being considered are strengthening the vitamin A supplement distribution system to target designated high-risk areas, development of a management and information system, and nutrition education to encourage the increased consumption of vitamin A-rich foods. Fortification possibilities are also being discussed.

Recommendation: This survey was a tremendous investment and effort, and a fine example of the partnership approach to have a job well done. This being the case, the evaluation team recommends that the small amount of additional resources needed be provided for the data to be thoroughly treated and cross-analyzed to uncover additional useful information (i.e., lactation history of the children with serum vitamin A; if a subgroup of children are found who received megadose capsules, these data can be cross-analyzed with the children's serum retinol levels, etc.)

IV. Major Strategies in Bolivia for Vitamin A Deficiency Control

The government of Bolivia plans to attack the vitamin A deficiency problem by implementing three main intervention strategies. These are periodic vitamin A megadoes (capsule) distribution, food fortification, and by encouraging the use of natural food sources of vitamin A.

A. Periodic Vitamin A megadose (capsule) Distribution Program

This strategy falls into the category of short-term intervention. Its aim is to correct as quickly as possible a situation of relatively severe vitamin A deficiency and is addressed specifically to regions or localities and to selected age groups known to be most seriously affected.

Scattered information obtained since 1962 in various partial studies in some localities around the country pointed to a deficient dietary intake of vitamin A and some evidence of clinical effects, mainly reports of nightblindness. Although the data were not sufficient and were not systematically collected, the government recognized the existence and importance of the problem of hypovitaminosis A. In 1989 the National Program against hypovitaminosis A was incorporated as a specific component of the National Health Plan. The program's main concern was the children of preschool age (1-5 years) of low socioeconomic strata, where the highest risk of vitamin A deficiency seemed to occur.

1. Objectives: The general objective is to prevent and control vitamin A deficiency in children 1-5 years of age. The specific objective of this intervention, and the planned activities relevant to the objectives are systematically summarized as follows:

a. Related to Program Effectiveness

<u>Objective</u>	<u>Planned Activities</u>
Increase Vitamin A intake of children 1-5 years	Admin. 200,000IU capsules to 1-5 yr olds every 6 mo. during mass immunization campaigns
Reach at least 80% coverage in both urban and rural areas nationwide	Implement the program in the Health Services as an integral part of primary health care
Develop and increase awareness among the population regarding the benefits of consuming food sources of vitamin A, especially for children	Distribute 10,000 posters and 800,000 fliers, plus TV videos and radio messages
Reduce blindness, morbidity and mortality, associated with vitamin A deficiency	Implement a nutritional surveillance system to determine impact

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b. Related to Operational Efficiency

<u>Objective</u>	<u>Planned Activities</u>
Train all health workers in all aspects of the program to attain a coherent integration of activities	Twenty workshops at <u>district</u> level to include also community health workers
Educate Medical doctors, nutritionists & nurses of the 11 health units in the country	Print and distribute 500 manuals for health workers and 10,000 for community workers.

2. Logistics:

a. Organization of the Program. A department of the Health Minister's Office (Departamento de Programmas y Proyectos) is responsible for the planning, programming, coordination and supervision at the central level. For the distribution of the vitamin A capsules it utilizes the strategies of the Extended Program of Immunization (PAI).

- The estimated requirements for vitamin A 200,000 IU doses are determined by the Department of Nutrition and requested from UNICEF.
- UNICEF acquires and provides the required amount of capsules
- A center for distribution of supplies (Centro de Abastecimiento de Suministros, "CEASS"), ships the capsules to the regions, according to the requirements. The theoretical amounts needed may be reduced by CEASS when the supply is not sufficient for covering the total requested. CEASS ships the capsules every 6 months to the Unidad Sanitarias and these, in turn, supply the districts, according to the programmed immunization rounds in each area and sector.

CEASS-->Unidad Sanitarias-->Distritos-->Areas-->Sectores

NGO's

CEASS also supplies NGO's with capsules.

b. Operational evaluation. The program was started in 1989 with the central action being the distribution of vitamin A supplements to children 1-5 years. The distribution was integrated into the logistics of the mass immunization campaign. From 1989 to 1992, 6 campaigns have been completed, distributing 2,350,000 capsules of 200,000 IU, averaging about 650,000 capsules per year to an estimated number of 325,000 children per year.

The "gross" estimated coverage falls short of 50% of the target population. In addition, the coverage is irregular and heterogeneous with a marked tendency to favor urban areas.

From records obtained at the Departamento de Nutricion y Alimentacion, the following coverage data are reported.

<u>Year</u>	<u>Urban</u>	<u>Rural</u>	<u>No. of campaigns</u>
1989	60%	40%	2
1990	60%	30%	2
1991	47%	20%	1
1992	57%	*	1

* Incomplete data

Discussion

A serious basic limitation of the logistics of the program is that the distribution is heavily skewed towards urban populations, this being an intrinsic problem (limitation) of the periodic campaign model of the Expanded Program of Immunization (EPI). The evaluation team was informed by agencies involved, that formal plans are being made to drastically modify the delivery system of the capsules in order to attain a uniform and universal coverage. Basically, the present system will be replaced by a multi-channel approach, utilizing the logistics of the following existing health delivery sub-systems: 1) in-service vaccination: the target children would receive the capsule at approximately 6 month intervals at the time of one of their visits to a health center or clinic; 2) for children who are not reached by (1), the capsules would be delivered to them by a mobile unit of the Expanded Program of Immunization; (3) the remaining children, the most difficult to reach, usually in the most remote rural areas, would be reached by a house-to-house approach; and (4) taking advantage of the existing health delivery system being used by child health care PVO's. In all instances, however, the target children would receive only 1 capsule every 6 months.

At this very preliminary stage, the information obtained was much too vague and incomplete to permit an intelligent judgement about the merits of the proposed modified plan. Nevertheless, the opinion of the evaluation team is that the supervision, monitoring, coordination and control would be a gigantic task.

Recommendations: 1. This intervention strategy should be continued until fortification of sugar with vitamin A reaches full

implementation at the nation level. At this point, systematic dephasing should be carried on. The distribution of vitamin megadoses (capsules) should continue only for selected areas or population groups where sugar consumption proves not to be enough to ensure the desirable level of intake of vitamin A.

2. Very specific recommendations have been made already by a VITAL consultant, Dr. Edmundo Alvarez, (VITAL Informa No. 11, Bolivia, May, 1992) (Appendix B of this report), regarding the need to improve the systems of supervision and monitoring of this operation, particularly at the point of actual administration of the vitamin A capsule to the children. One of these recommendations, however, is of most importance; this is, to review and revise the methods of record-keeping that requires use of the "carnet" of immunization issued for each recipient child which records whether or not and when the capsule has been taken. This step is essential to ensure that the target children in fact get the dose on schedule and that no overdosing occurs. Compliance with this record-keeping is particularly relevant, since there are significant quantities of capsules distributed to various other agencies by UNICEF for administration to selected children under their care, independently and outside the main program.

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B. Food Fortification

Policy makers and key professionals of the vitamin A program who were interviewed recognized the merits of this medium-term approach for the correction of a number of micronutrient deficits affecting extensive groups of populations, and insisted that eventually, that will be the way to conceptualize and implement the program in Bolivia. The program should be considered for selected nutrients that are deficient in the diets whenever appropriate technology is available.

Constrained by the impossibility to "solve all the problems at once", the government has decided to start with vitamin A in view of the magnitude of the problem. Based on a mode previously developed in Central America, VITAL suggested the fortification of white table sugar with retinol palmitate.

With the financial and technical assistance of VITAL, planning and implementation work was initiated in August, 1992. A recent report has been completed and submitted to the Director of DINAP and is attached as Appendix C. The activities began with a series of meetings of DINAP and the sugar manufacturing sector of Santa Cruz, personnel of the health unit of the region, a VITAL consultant and a UNICEF consultant. This effort resulted in the planning and implementation of a pilot trial to test some technological aspects of the process at the industrial level, which was carried out at a cooperating sugar factory (Ingenio Guabira) in the first week of September, 1992. Sufficient kilograms of fortified sugar were prepared to perform various tests including organoleptic and acceptability characteristics. This successful activity was carried out with financial support of VITAL, and the contribution of a temporary consultant from UNICEF.

The evaluation team was informed that in a follow-up meeting of representatives of DINAP, the AID Mission and VITAL on September 24, guidelines were developed for immediate steps to be taken for the implementation of the program in large scale, and proposed a time schedule, as well as an estimated budget for VITAL support from October 1992 through March 1993. In addition, the meeting analyzed the roles that the Ministry of Social Welfare and Public Health (MPSSP) and various agencies could play as well as present efforts being made to arrive at the most adequate way to finance the program which would be agreeable to all parties concerned in its implementation.

Comments:

- Sugar consumption data recently collected indicate that the coverage of sugar fortification would be satisfactory even for rural areas.
- Because of its very extended coverage, sugar fortification with vitamin A has shown to have a much more favorable cost-effectiveness ratio than other

"targeted" distribution programs, and this should also be true for Bolivia.

- The results of this first phase are very encouraging, pointing at the feasibility and acceptance of the intervention.
- The project has the fullest support and commitment from the Minister, and from other decision makers and relevant professional personnel of the MPSSP.
- Because of their professional excellence and motivation, some key persons can be identified in this development at the local level, namely Dr. Roberto Borht, Director of DINAP, Ing. Mario Telleria R, available as temporary consultant, and Dr. David Nelson of VITAL.

Recommendations: If the development of the fortification plan is successful, it is strongly recommended that the Office of Nutrition, Research and Development Bureau of A.I.D., through VITAL, continue appropriate technical cooperation. Implementation of sugar fortification with vitamin A in Bolivia as a national program should be encouraged with emphasis on the need for long term financing for the fortification and monitoring components.

One of the most important aspects, essential to ensure the efficiency and the nutritional effectiveness of interventions is a rigorous system of monitoring and quality control. In the particular case of food fortification with vitamin A, a critical component for this purpose is the availability of adequate laboratory facilities for the determination of vitamin A in the food vehicle and in serum of individuals from the target population. Thus, the evaluation team recommends that full consideration should be given to guarantee that the laboratory responsible in the Bolivian context (MPSSP) receives due professional recognition, appropriate financial and technical support, as well as sufficient equipment and supplies. Unfortunately, more often than not, this has been overlooked in programs in other countries.

C. Natural Food Sources of Vitamin A - PROCOSI-VITAL

The Programa de Coordinacion en Supervivencia (PROCOSI) is a network of private voluntary, non-profit organization (PVO's) from Bolivia and the United States that implement and sponsor child survival projects in Bolivia. PROCOSI is a Bolivian organization financed by USAID (1988-91, \$1,1M) to coordinate activities, technical assistance, personnel training and research among 10 PVO's (see PROCOSI brochure in Appendix D). VITAL has subcontracted funds to PROCOSI for vitamin A specific projects (see diagram in Appendix D). To date, one main project in vitamin A food sources has been supported by PROCOSI: the Esperanza Project on community gardens and nutrition education in el Chaco. At the moment, a serum retinol study in the Children's Hospital is also being supported by PROCOSI. (See Section D) Three other projects are under consideration for funding with PROCOSI-VITAL monies.

Community Gardens and Nutrition Education

The Esperanza project began in December, 1991, and submitted it's second trimester report in July, 1992 (Appendix D). Essentially, this project addresses the long-term objective of improving vitamin A status through the availability of natural sources of vitamin A. The research component will/is now address(ing) a dietary and anthropometric evaluation of children under 5 years and a knowledge-attitudes-practices (KAP) focus-group survey of mothers. Seven communities have been selected for implementation of community garden promotion with education activities for women in agriculture, food preparation and nutrition. The gardens are intended to provide vegetables rich in vitamin A for home consumption. Vegetables harvested from the gardens to date include swiss chard, carrots, lettuce, radishes, and parsley. The program also includes training for the project's 14 promoters and preparation of education materials. It is anticipated that with continued funding, the impact of this project can be documented with improved dietary and anthropometric status of children.

It was unfortunate that this project could not be visited in Santa Cruz during the site visit.

Recommendation: This promising program may benefit from attention to traditional cultural practices of agriculture and food use. A nutritional anthropologist consultant may find ways to use focus groups/interviews with mothers and/or community elders to define indigenous food species highly appreciated in the local culture of the communities (other than cabbage, cauliflower, see Appendix D) which can then be adapted to more contemporary agricultural practices. Coordination with interested staff with the MOH-DNAA laboratory, or others, can be done to define the carotene/vitamin A content of the identified species, if they are not already on record.

Even if this strategy does not prove to be feasible in its present form to become a national strategy for vitamin A deficiency control, valuable knowledge and experience are gained by assessing traditional local knowledge, and having local people participate in management and development of the program for their specific use.

V. General Comments/Discussion

As stated previously, there is a strong political commitment by the Bolivian government to issues of maternal and child health, which includes nutrition, and within it, vitamin A nutrition (see Appendix E). The MOH recognizes the issues of malnutrition, including that of vitamin A, and has clearly accepted responsibility to improve the situation. There is a high degree of understanding and commitment to solve problems with appropriate technology. Within the National Plan for Health, nutrition activities are incorporated within programs for children under 5 years of age, school children and adolescents, and women of childbearing age. Dr. Roberto Bohrt, Director of DINAP, Lic. Rosario Lopez, Director of DNNA, and Lic. Ma. Eugenia Lara, Head of the Vitamin A program, are committed individuals working toward these goals. The DINAP and DNNA see a clear and continuing role for VITAL programs within MOH.

The VITAL South American representative has played a central role in the successes of VITAL in Bolivia. He is well-liked, recognized as a skilled technical resource, and has built strong links among the various agencies contributing to vitamin A deficiency control -- for example, he worked extensively toward the success of the Vitamin A survey, with PROCOSI in building the Esperanza project, and toward the goals of sugar fortification. The evaluation team was quite impressed with his efforts. The Vitamin A for Health Project through its regional representative can play a key role in defining the vitamin deficiency problem, defining country strategy and getting programming underway.

Through discussion with Dr. Nelson, the team was informed of other regional activities of VITAL: (1) a vitamin A survey in Panama that is now nearing completion; (2) a review of vitamin A data from Peru with assistance for community workshops, especially where serum levels are low; (3) development of a communications network (E-mail) within Latin America and probably to the United States; (4) the need for program development in Ecuador; (5) the Current Contents alert on vitamin A topics developed by Dr. Hernando Flores in Recife which can also enhance efficient communication of recent research results.

The "Vitamin A for Health" project conducted in Bolivia obviously contribute to the Office of Nutrition's aims and goals. Projects generally fit within the nutrition program interests of the Mission in Bolivia, as shown in Appendix F. It appears that VITAL's ability to respond quickly to needs expressed in Bolivia reflects good management structure.

PAHO/WHO and UNICEF have each contributed to the efforts of vitamin A deficiency control, in the form of technical and financial assistance for the vitamin A capsule distribution program and assistance with the food consumption survey.

Generally speaking, the three strategies (short-, medium-, long-term) for vitamin A deficiency control would benefit greatly from reconnaissance with a nutritional anthropologist to define relevant local knowledge that would enhance program participation and success. It was previously mentioned that horticultural and nutrition education within the Esperanza project would benefit from efforts to define local traditional knowledge and priorities. The acceptability and availability of "sources" of vitamin A, be they capsules, fortified sugar, or natural indigenous foods from community gardens, is essential information for program success. Such information is most effective when defined prior to program initiation.

Recommendations: 1. That community-level local traditional knowledge, values, and priorities be incorporated into all program planning, and that strong effort be made to define local acceptability and availability of all "sources" of vitamin A.

2. That funding for VITAL in Bolivia be continued and strengthened.

VI. Final Comment

The manner in which the vitamin A deficiency control program has developed in Bolivia has generated an exemplary model that should be emulated in AID's future endeavors of this nature in other countries of the region. While all such programs cannot be expected to be perfect in every respect, the program in Bolivia has many successful elements that are a credit to the "Vitamin A for Health" program.

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VIII. Acronyms

The acronyms listed here are those contained in the body of the report, and not all these listed in the Appendices.

CEASS	Center de Abaslecimiento de Suministros
DINAP	Direccion General de Atencion a las Personas
DNNA	Departamento Nacional de Nutricion y Alimentacion
IVACG	International Vitamin A Consultative Group
MOH	Minister of Health (Same as MPSSP in Bolivia)
MPSSP	Ministerio de Provision Social y Salud Publica (Ministry of Social Welfare and Public Health)
NGO's	Non-Government Organizations
NIH	National Institute of Health, USA
PAHO	Panamerican Health Organization
PAHO/WHO	Panamerican Health Organization/World Health Organization (Same as OPS)
PAI	Programa Ampliado de Immunizacion (Same as EPI - Expanded Program of Immunization)
PROCOSI	Programa de Coordinacion de Supervivencio Infantil (Program for the Coordination of Infant Survival)
PVO's	Private Voluntary Organizations
S&T/N	Bureau of Science and Technology/Office of Nutrition, A.I.D./Washington
VITAL	Vitamin A Field Support Program
UNICEF	United Nations Emergency Children's Fund

IX. List of Appendices

- A. Encuesta de Vitamin A y Encuesta de Consumo
- B. Evaluacion de Programa de Vitamin A en La Republica de Bolivia, Al varez, 1992
- C. Report of activities on fortification of sugar
- D. PROCOSI brochure, Esperanza flow diagram and trimester report, 1992
- E. MOH directive from government
- F. Mission statement, USAID/LaPaz

ANNEX B

REPORT ON SITE VISIT TO
NEPAL: VITAMIN A NUTRITION ACTIVITIES
NEPAL NUTRITION INTERVENTION PROJECT - SARLAHI

AGENCY FOR INTERNATIONAL DEVELOPMENT
RESEARCH AND DEVELOPMENT BUREAU/ OFFICE OF NUTRITION
"VITAMIN A FOR HEALTH" PROJECT

NEPAL: June 30 - July 8, 1992

Dr. Zak I. Sabry

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**Report on Site Visit
Nepal Nutrition Intervention Project - Sarlahi
(Dr. Z. I. Sabry)**

I. INTRODUCTION

The site visit was carried out as part of the evaluation of the "Vitamin A for Health Project" of the USAID Office of Nutrition; overall evaluation was carried out by a committee composed of Drs. Harriet Kuhnlein, John McGigney and Zak Sabry. In May 1992, the committee met in Washington, D C. to review the global activities carried out under the project. Site visits were planned to evaluate some important elements of the project in three countries; Bolivia, Nepal and Uganda.

In Nepal, several activities have been carried out under the "Vitamin A for Health Project", notable amongst them is a project that demonstrated the effect of vitamin A supplementation on infant and child mortality, morbidity and growth. This study, known as the Nepal Nutrition Intervention Project - Sarlahi (NNIPS) was carried out between 1989 and 1992. A sequent study has been planned, also in Sarlahi, to determine the impact of vitamin A supplementation of women in the child-bearing age on obstetric performance, and maternal, fetal and infant mortality. This will be known as NNIPS II. In association with NNIPS I and II, there are also plans for a study of the relationship between household behaviors and the dietary intake of vitamin A (DIVA).

The terms of reference for the site visit in Nepal were:

- (1) to evaluate the implementation of the Nepal Nutrition Intervention Project - Sarlahi (NNIPS);
- (2) to assess the project's potential impact on the improvement of the vitamin A nutrition and health in Nepal; and
- (3) to determine the level of interest among the governmental and non-governmental agencies in Nepal for follow-up activities.

The schedule of the site visit was as follows:

Tue, June 30: arrived in Kathmandu and met with Dr. Keith West (NNIPS Principal Investigator);

Wed, July 01: met with Drs. Keith West and Subarna Khatri (NNIPS Director), and Ms Elizabeth Pradhan (NNIPS Data Manager) and other staff of the Project; met with Ms Ursula Nadolny, Chief of Health and Population Programs at the USAID Mission in Nepal; met with Dr. Mahendra Chhetri, Chief of the Nutrition Division in the Ministry of Health, and was accompanied by Dr. Keith West;

Thu, July 02 to Sun, July 05: travelled to Sarlahi, accompanied by Drs. Keith West, Subarna Khatri and Ms Elizabeth Pradhan; met with NNIPS field staff and participated in daily project activities, including household visits and interviews;

Mon, July 06: met with Drs. Quassay Al-Nahi and Rubina Imtiaz (Chief of Health and Nutrition Section, and E.P.I. Officer, respectively, at UNICEF/Nepal); met with Mr. Kelly Kammerer (Director of USAID Mission in Nepal) and Ms Ursula Nadolny, and was accompanied by Dr. Keith West; met with Drs. Keith West and Subarna Khatri, Ms Elizabeth Pradhan and other staff of the project in Kathmandu;

Tue, July 07: met with Dr. R.P. Pokhrel (Chairman of Nepal Netra Jyoti Sangh, NNJS, National Society for the Prevention of Blindness), and was accompanied by Dr. Subarna Khatri.

The site visit provided an excellent opportunity to evaluate the implementation of NNIPS I, and the preparation for NNIPS II and DIVA; and to assess their potential impact on vitamin A nutrition and health in Nepal. However, there was hardly an occasion to determine the level of interest among the governmental and non-governmental agencies for follow-up activities. The site visit seemed to coincide with changes and absences from office of some key governmental and non governmental personnel. It was possible therefore to address the first two terms of reference, but only to make inferences with regard to the third term of reference.

II. The Nepal Nutrition Intervention Project at Sarlahi District

This project was started in 1989 to assess the effect of vitamin A supplementation in infants and children on mortality, morbidity and growth. The National Nutrition Survey of Nepal, conducted in 1975, documented the high prevalence of vitamin A deficiency in the population. This deficiency has been known to be associated with the development of xerophthalmia and blindness. For decades prior to this survey, health professionals have viewed blindness prevention in terms of the alleviation of vitamin A deficiency.

In 1981, the Blindness Prevalence Survey focused attention on this very serious public health condition, and on the need to deal with the vitamin A deficiency problem. Then in 1983, the work of Sommer, Tarwatjo and others in Indonesia indicated that the consequences of vitamin A deficiency included an increased child mortality, independent of xerophthalmia and blindness. This finding gave a new impetus to interventions that would deal with the vitamin A deficiency problem, and consequently increase the chances of child survival in developing countries.

The Nepal Nutrition Intervention Project - Sarlahi (NNIPS I) was initiated in 1989 as a country-specific child survival effort, to determine the impact of vitamin A supplementation on infant and child mortality, morbidity and growth. It was a joint effort of the National Society for the Prevention of Blindness, a local Non Governmental Organization, known as the Nepal Netra Jyoti Sangh (NNJS), and the International Center for Epidemiologic and Preventive Ophthalmology (ICEPO) of the Johns Hopkins University. The project received the approval of the Social Service National Co-ordination Council (SSNCC) which coordinates the work of NGOs in Nepal. The project was also authorized by the Nepal Medical Research Council (now known as the Nepal Health Research Council, NHRC), the Government of Nepal agency required to authorize the conduct of health projects in the country.

The project area is in the Sarlahi district, which is located in the rural plains in the south of Nepal. It forms part of the Janakpur zone in the Central Region. The project area comprises 29 panchayats, now called Village Development Committees or VDCs, each of which divided into 9 Wards. The land area is estimated to be 400 square kilometers, with a population of approximately 144,000 inhabitants.

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Many aspects of the project design, implementation and findings have been published in the scientific literature (See for example The Lancet, vol. 338, pp 67-71, 1991, attached as Appendix A), and in many project reports submitted to USAID, NNJS and NHRC.

The NNIPS headquarters are in a suite of offices in the Nepal Eye Hospital Complex in Tripureswar, Kathmandu, and in a two-story building in Hariaun, in Sarlahi. The Kathmandu site houses central administration and accounting as well as the data processing center. This facilitates communication with various governmental and non-governmental agencies. It also ensures a more reliable power supply and a controlled environment for the computers' operation, thus providing the needed security for the data base. The Hariaun site in Sarlahi houses the field administration, the equipment and supplies and the data review and editing sections. It is centrally located in relation to the VDCs covered by the project, and is conveniently located on the main highway to the area. Communication between the two sites is mainly by telephone and through direct commuting of staff. The trip takes about 7 hours by car; longer by bus.

The setting of the offices at both sites is appropriate in that they provide basic facilities without pretension. Space is allocated to establish effective presence of the project administration and management at each site. The facilities for the field supervisors and the data editors are quite adequate. The organization chart for NNIPS is shown in Appendix B.

The protocol of the project called for the development of a sampling frame for the project population in Sarlahi. The study had a double-masked design, in which the sampling and the allocation to groups were carried out at random. For some of the project components, there was need for sampling from a stratified pool of eligible participants.

In the absence of reliable census data, the project staff developed maps, showing the boundaries for each ward, and the location of each household within the ward. As there is no street address system, households were given identification numbers which were painted on the outside and on the inside of each house. These maps were continuously up-dated to account for mobility within and outside the wards. Indeed, the census information base along with the health statistics obtained in the

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course of conducting this project form a valuable resource for the community in future assessment and intervention trials. The simplicity and rigor of the technology used in developing this demographic and health census data-base would be useful to apply to other similar projects.

The Logistics of the Field Work are complex. The project brings together locals and expatriates. It employs scientists, health professionals, interviewers, supervisors, and administrators. This has required considerable care and skill in the recruitment, training and management of the office and field staff.

The training of field staff emphasized a number of crucial issues. Those included the determination of eligibility of participating households, the dispensation of capsules and ensuring their ingestion by the intended persons and in the prescribed doses, the collection of data and minimizing errors of measurements, recording and transferring the data.

The magnitude of the project operation and the complexity of its logistics made it necessary to develop a detailed protocol of all project activities and procedures. A review of the protocol and the staff training material, produced in English and Nepalese, (See Appendix C), reflect the rigorous manner with which the project has been conceived and implemented.

During much of this site visit, a great deal of work and leisure time was spent with staff in the Head Office and in the field; individually and in groups. I had the opportunity to attend routinely-held staff meetings and daily briefings, as well as to interview staff in their offices, and to socialize with them in more informal settings. I also had the opportunity to observe field staff at work, and to attend interviews during household visits. This provided an excellent opportunity to learn about the various aspects of the project's operations.

The Data Management procedures were developed to account for the types of errors that are common to projects of this magnitude and complexity. The forms were designed to address the project's stated objectives, taking into consideration the time burden on participants, interviewers and examiners.

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The forms were readily distinguishable by their design. Once completed, they were reviewed in the field by two clerks, and were double checked by a third clerk, particularly verifying outlier values. The forms were then grouped by households in clearly identifiable folders and shipped to the data processing center in Kathmandu. There, the data were reviewed and entered, using a specially developed soft-ware package.

The system was developed to facilitate detection and correction of errors in data collection and entry. Considerable care and thought went into the development of the review and editing procedures, and of the quality control steps, both in the field and in the data processing center.

The Quality Assurance strategies were developed early on in the project. They were incorporated into the project's protocol and formed an integral part of the data collection training. The examination procedures and the questionnaires were tested for their reliability. In the course of data collection, outlier values were carefully monitored. In certain cases, as with ocular and ear examinations and anthropometric measurements, two examiners checked each other's work in accordance with a well delineated quality assurance protocol.

The plans for NNIPS II and DIVA hold a great deal of promise, not only for their relevance to nutrition and health issues, but also because they capitalize on the excellent resources available from the current project. The research design is rigorous. The field staff is well trained. The project population is cooperative and of sufficient size to give the study considerable statistical power. Also, the infrastructure and physical facilities are excellent. All these would ensure the success of such endeavor.

NNIPS II is a logical continuation of the work in progress. It aims at assessing the effect of vitamin A supplementation of women in the child bearing age on fetal and infant survival and development. The outcome should identify the best time for intervention to achieve the best results. The design of this phase of the project calls for low dosage weekly supplements instead of the high-dose-every-four-months protocol. For this intervention, all 30 VDCs are expected to participate, with a population of approximately 160,000 people, of whom about 36,000

women are under 40 years of age. The demographic census data are being updated and other preparatory steps are undertaken to facilitate the start of this phase as soon as it is approved by the NHRC.

DIVA is an important and necessary component of the NNIPS series. It is aimed at identifying the patterns of food consumption, household resource management strategies, and the cultural and attitudinal determinants that are associated with xerophthalmia. In carrying out this part of the project, it will be necessary to develop and validate anthropological and epidemiological methods. The approach represents the leading edge in health and nutrition assessment and intervention design. The findings will be of immense value to many other intervention trials.

This review of NNIPS clearly identified its fundamental value to health and nutrition program planning in Nepal. The physical and human resources developed by the project in Sarlahi are valuable assets worthy of maintenance and use for much needed operational research. This project could evolve into an international center for public health intervention trials. The findings from Sarlahi will find applications in much of the Indian sub-continent and many other asian countries. The experience gained and the approaches tested will be applicable to the alleviation of micro-nutrients other than vitamin A.

III. VITAMIN A NUTRITION AND HEALTH IMPROVEMENT IN NEPAL

Nepal ranks twentieth in the world in the under-five mortality rate. Nutrition and health surveys over the past several decades have documented the prevalence of blindness, xerophthalmia and vitamin A deficiency. The USAID Child Survival effort in Nepal has focused attention on the link between vitamin A deficiency and the under-five mortality. The evidence for their association is compelling.

NNIPS has documented a 30% reduction in mortality among children 6 to 72 months of age, in response to vitamin A supplementation. The effect appears to increase with age; being non-significant in infants under 6 months of age, and higher than 30% in the fifth and the sixth years. Plans are underway to test the effect of maternal supplementation with vitamin A on intrauterine growth, and fetal and early infant mortality.

Another project, in Jumla in western Nepal, showed a similar effect. Unpublished reports suggest that the villages where vitamin A supplements were distributed had about 26% less mortality in children under five years of age, than did villages where the supplement was not distributed.

A third project, also carried out as part of the USAID Child Survival activities in Nepal, is testing the relative cost and health benefits of three interventions: (1) high-dose vitamin A supplementation every 4 or 6 months, (2) basic primary health care strategies, and (3) maternal education to increase their literacy rate and their awareness of the dangers of vitamin A deficiency. The results of this project are currently being analyzed.

The scientific evidence weighs heavily in favor of vitamin A supplementation as a short-to-medium term measure to deal with the high child mortality rate in Nepal. Work carried out under the USAID "Vitamin A for Health" and "Child Survival" projects offer quantitative estimates of the health benefits, and provide an operational model for the distribution of vitamin A supplements through health posts, or directly to households with children under five years of age.

The policy implications of the findings of these projects were considered by governmental and non governmental agencies, in a national vitamin A workshop held in Kathmandu last February. The recommendations of the workshop emphasized the need, in the short to intermediate term, for periodic high vitamin A dose supplement for infants and children. The primary targets were: the 6 to 11 months old, with a single 100,000 i.u. dose, and the 12 to 60 months old, with a 200,000 i.u. dose every six months. The severely ill and the malnourished children should be particularly targeted for vitamin A supplementation. This calls for a continuous and dependable supply of vitamin A capsules in all the health posts in the country.

In a paper, delivered by Dr. Sabitri Pahari, Chief of the Public Health Division the Ministry of Health, it was indicated that 45 of Nepal's 75 districts are participating in a program that provides vitamin A capsules to children under 5 years of age, who are attending the health posts. The text of Dr. Pahari's paper is included as Appendix D.

In personal discussions with Dr. Mahendra Chhetri, Chief of the Nutrition Division of the Ministry of Health, he emphasized the value of training health workers operating within the recently re-organized health care system (See diagram on page 5 of Appendix D). He described a system for training master trainers who would then train others. One such training workshop was underway at the time of our meeting with Dr. Chhetri. He was quick to invite Dr. Khatri of NNIPS (who was quick to accept) to deliver a component of the workshop on the role of vitamin A in child survival and health.

The recommendations of the National Vitamin A Workshop were clear on the need to carry out the vitamin A supplementation twice a year: One campaign in March-April, during the Nepalese New Year, prior to the monsoon and coinciding with the highest risk season for xerophthalmia and measles; and another campaign in October-November, just prior to the harvest season. The distribution of the vitamin A capsules, within the new health care system, would be carried out by Community Health Volunteers (CHV), under the supervision of Volunteer Health Workers (VHW). NGOs may play an important role in the distribution of vitamin A capsules in their service areas, as long as the effort could be coordinated well with the Ministry of Health and the District Public Health Office.

In the short term, the workshop recommended that a Task Force be convened to identify high risk districts for the implementation of vitamin A capsules distribution. Also, that the Task Force be responsible for the development of a phase-wise implementation plan to be placed into the eighth Five-Year Plan of His Majesty's Government.

The workshop recommended three main strategies for dealing with vitamin A deficiency, in the long term. These were: increasing adult literacy, promoting nutrition education, and encouraging home gardening.

In addition, the workshop focused on three main activities to be instituted in the health care system for the prevention of vitamin A deficiency. These were: the expansion of de-worming services, the immunization against measles, and the promotion of health education on personal hygiene and sanitation.

These recommendations are in concordance with the strategies proposed by the Ministry of Health. In addition to vitamin A supplementation, three interventions were recommended by Dr. Pahari (Appendix D) for controlling micronutrient deficiencies. These were: dietary diversification, fortification, and public health measures. The essence of these strategies demonstrate the genuine concern of health officials over the broader aspects of health and nutrition issues. They also provide an opportunity to apply much of the technology that has been behind the success in alleviating the vitamin A deficiency to address problems with other micronutrients.

IV. CONCLUSIONS

Clearly, the health professionals in and out of the government are fully aware of the serious consequences of vitamin A deficiency on the health, survival and development of the Nepalese people. The work carried out under the USAID "Vitamin A for Health" and "Child Survival" projects has contributed substantially to this awareness. There is a valuable data-set, and more will be generated in the next few years, to provide country-specific base for designing cost efficient and effective interventions.

There is remarkable and demonstrable support and good will among the staff and the villagers in Sarlahi with regard to the work of the NNIPS. In the many such community and large scale projects which I have evaluated or conducted, I have not encountered a situation where national and expatriate scientists, professionals and administrators displayed more understanding and sensitivity to local field staff and participants. It is important that the collective talents, scientific power, and creative approaches mobilized in this project be preserved and exploited.

The team assembled in this project is poised to play a role in the implementation of interventions, not merely testing them. However, since public health interventions are the domain of the government and its officials, a partnership will need to be formed in Sarlahi between NNIPS researchers and the local health officials. This will streamline mechanisms for vitamin A supplementation, and facilitate the implementation of the short-to-intermediate term recommendations of the National Vitamin A Workshop. Indeed, such partnership could serve as a model in dealing with other nutrition and health problems.

The infrastructure and human resources of the NNIPS have all the elements of an experiment station for community interventions health trials. The setup is ideal for NNIPS to live up to the full scope of its name and address a broad range of nutrition interventions. It is well suited to launch an initiative on other micronutrient deficiencies, and possibly deal with iron deficiency anemia in young women and children in association with NNIPS II.

In broadening the scope and activities of NNIPS, strong support is needed from senior officials in HMG, particularly in the Ministry of Health and in NHRC. Key decision makers need to be identified and conditions set in place to forge a meaningful partnership between the Johns Hopkins faculty, local scientists and health professionals, and government officials. At present, there is a feeling that Nepal is going through a transition. In this phase of transforming the political system from an absolute monarchy to a democratic one, political power is passed on to new players. The political picture looks uncertain and needs to be clarified. So, the forging of a partnership will have to be cultivated over time, and with utmost sensitivity.

In many ways the time is ideal to achieve such partnership in the form of a collaborative effort aimed expressly at institution building and strengthening in support of the new National Health Policy. The statement of the new policy (Appendix E) emphasizes preventive, promotive, and basic primary health services. The approach supports the integration of nutrition improvement within the overall health objectives of the Nation. NNIPS is poised to play a vital role in the implementation of these objectives.

It would be desirable, therefore, to strengthen the ties between the top and middle levels of management at the Ministry of Health and the appropriate faculty at Johns Hopkins and other American Institutions. This will involve team work of faculty in health policy and administration, health education, epidemiology, and other disciplines. It will require setting up short courses and workshops for upper management, and providing fellowships for advanced training of middle management Nepalese personnel.

The expansion of the project will offer opportunities for an integrated approach to health services. This will allow NNIPS to capitalize on its experience in involving the community in the delivery of health services, and enhancing the cost efficiency of the health care system in Nepal. The experience of NNIPS is particularly robust in such a role because of its sensitivity to the cultural context. Expatriate staff have been ethnically compatible with Nepal and its congruous cultures. In effect, they are able to blend with the culture mosaic so as to bring about important social changes.

LIST OF APPENDICES

- A. "Efficacy of Vitamin A in Reducing Preschool Child Mortality in Nepal", The Lancet, Vol 338, July 1991.
- B. NNIPS Internal Organization Chart
- C. Protocol and Manuals of Operation and Quality Assurance (available from NNIPS)
- D. "Vitamine A Deficiency - Feasibility of Intervention Programme Conducted by Peripheral Health Workers", MOH/Nepal.
- E. "Political Commitment of Nepali Congress Government of Health Sector".

DOCUMENTS EXAMINED DURING THE DESK REVIEW OF AFRICAN PROJECTS

1. Tanzania Trip Report - VITAL - November 1992
2. Cote D'Ivoire Trip Report - VITAL - November 1992
3. Kenya Trip Report - VITAL - November 1992
4. Uganda Trip Report - VITAL - November 1992
5. Mali Trip Report - VITAL - May 1992
6. An Africa Region Strategy for the VITAL Project - September 1992
7. Cameroon Trip Report II - VITAL - August 1992
8. VITAL NEWS - Vol. 3, No. 2
9. "Impact of Vitamin A Supplementation on Childhood morbidity in Northern Ghana", The Lancet Feb. 1992.
10. Reseau D'Information Sur La Vitamine "A" Dans Le Sahel - INSAH
11. Memo and letter regarding Niger Gardening and Food Preservation Project
12. Memo regarding Sample Size Consideration; Biochemical indicators for Nigeria
13. Summary of Draft Project Document on Assessment of the Prevalence of Micronutrient Deficiency in Nigeria
14. "Vitamin A Supplementation and Child Survival", The Lancet - August 1992.
15. Subcontract between ISTI and the Tropical Diseases Research Centre, Zambia.
16. Letter from Food Policy and Nutrition Division/U.N. regarding proposals in Eastern and Western African countries.
17. Document concerning Projects in Burkina Faso, Mali, Mauritanie, Niger, Chad.
18. "Preservation of Vitamin A Rich Foods and Nutrition Education Project document.
19. Letter from University of London to VITAL concerning collaboration in Ghana.
20. Letter from IVACG concerning Vitamin A for Health Status Report.

21. Update of activities from Johns Hopkins University, Institute for International Programs.
22. Letter concerning FAO Regional Project on Food Preservation in the Sahel.
23. VITAMIN A FACTS - AFRICA REGION (Selected Countries)
24. Letter from Dana Center for Preventive Ophthalmology concerning activities.
25. "Clustering of Xerophthalmia within Households and Villages" paper.
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27. Weekly Epidemiological Record Releve Epidemiologique Hebdomadaire", World Health Organization, No. 19.
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