FINAL REPORT

USAID/IMPACT MICRONUTRIENT FIELD SUPPORT TO THE GOVERNMENT OF HONDURAS, 1994-97: ACHIEVEMENTS, RESULTS AND LESSONS LEARNED
FINAL REPORT
USAID/IMPACT MICRONUTRIENT FIELD SUPPORT TO THE
GOVERNMENT OF HONDURAS, 1994-97:
ACHIEVEMENTS, RESULTS AND LESSONS LEARNED

Jose O. Mora
Vilma Estrada
Anne Swindale

December 1997

This report was funded by the United States Agency for International Development (USAID), Bureau for Global Programs, Field Support and Research, Office of Health and Nutrition under the Food Security and Nutrition Monitoring Project (IMPACT), Contract No. DAN-5110-C-00-0013-00 with financial support from USAID/Tegucigalpa under Contract No. DAN-5110-Q-12-0014-00.
# Table of Contents

List of Tables ........................................................................... i
List of Figures ........................................................................ i
List of Acronyms ..................................................................... ii
Executive Summary .................................................................. iii

I. Background ........................................................................... 1
   A. General information .................................................. 1
   B. Micronutrient deficiencies ......................................... 2
   C. Micronutrient actions initiated before 1993 ............... 3
   D. National Micronutrient Program, 1993/97 ................. 3

II. The USAID/IMPACT Field Support Plan (UIFSP), 1994/97 ... 4

III. UIFSP Achievements ....................................................... 6
   A. Policy and program development ............................ 6
   B. Training and technical assistance ............................ 6
   C. Program implementation .......................................... 7
      1. Supplementation .................................................. 7
      2. Fortification ....................................................... 7
      3. Dietary diversification ......................................... 8
      4. Information, education and communications (IEC) .... 8
      5. Micronutrient monitoring and surveillance system .... 8
   D. Policy/program environment and constraints .......... 9
      1. MOH political commitment and staff motivation .... 9
      2. MOH internal coordination .................................... 10
      3. MOH-IEF relationship .......................................... 10
      4. Management, financial and administrative issues .... 11

E. UIFSP Results ................................................................ 11
   1. Supplementation .................................................... 11
   2. Sugar fortification .................................................. 11
   3. Salt iodization ....................................................... 19

IV. National Impact ................................................................. 19
   A. Vitamin A deficiency (VAD) .................................... 22
   B. Iron deficiency anemia (IDA) ................................. 22
   C. Iodine deficiency disorders (IDD) ......................... 22

V. Lessons learned ................................................................. 23
   A. Generating political commitment ............................ 23
   B. Policy development ............................................... 23
   C. Developing public/private sector partnerships ......... 24
   D. Program integration .............................................. 25
   E. Project structure/management ............................... 26
   F. Interagency coordination ....................................... 27
   G. Sustainability ...................................................... 27
List of Tables

2. Average retinol content of fortification premix, Honduras 1991/92
   - 1996/97 ...................................................... 14
4. Retinol content of sugar at the retail level, Honduras 1994 - 1997 ............ 16

List of Figures

2. Retinol content of sugar at production plants. Honduras 1994/95 - 1996/97 ... 15
3. Retinol content of sugar at the household level. Honduras 1994/95
   - 1996/97 ...................................................... 17
4. Mean retinol content of sugar at the household level. Honduras
   1993/94 - 1995/96 ........................... 18
5. Iodine content of salt at the household level. Honduras 1987 - 1995/96 ...... 20
6. Mean iodine content of salt at the household level. Honduras 1987
   - 1995/96 ...................................................... 21
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>gross domestic product</td>
</tr>
<tr>
<td>INCAP</td>
<td>Institute of Nutrition of Central America and Panama, PanAmerican health Organization</td>
</tr>
<tr>
<td>ICAITI</td>
<td>Central American Institute for Research and Industrial Technology</td>
</tr>
<tr>
<td>ORT</td>
<td>oral rehydration therapy</td>
</tr>
<tr>
<td>VAD</td>
<td>vitamin A deficiency</td>
</tr>
<tr>
<td>IDA</td>
<td>iron deficiency anemia</td>
</tr>
<tr>
<td>IDD</td>
<td>iodine deficiency disorders</td>
</tr>
<tr>
<td>RDA</td>
<td>recommended daily allowance</td>
</tr>
<tr>
<td>NGO</td>
<td>non-governmental organizations</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children Fund</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>IEC</td>
<td>information, education and communication</td>
</tr>
<tr>
<td>EPI</td>
<td>Extended Program of Immunizations</td>
</tr>
<tr>
<td>QA/QC</td>
<td>quality assurance and control</td>
</tr>
<tr>
<td>MOH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>MOH/FCD</td>
<td>Ministry of Health Food Control Division</td>
</tr>
<tr>
<td>MOH/MCH</td>
<td>Ministry of Health Maternal Child Health Division</td>
</tr>
<tr>
<td>MOH/HED</td>
<td>Ministry of Health Health Education Division</td>
</tr>
<tr>
<td>MOH/DOE</td>
<td>Ministry of Health Division of Epidemiology</td>
</tr>
<tr>
<td>MOH/FND</td>
<td>Ministry of Health Food and Nutrition Directorate</td>
</tr>
<tr>
<td>IEF</td>
<td>International Eye Foundation</td>
</tr>
<tr>
<td>DIP</td>
<td>detailed implementation plan</td>
</tr>
<tr>
<td>UIFSP</td>
<td>USAID/IMPACT Field Support Plan</td>
</tr>
<tr>
<td>IU</td>
<td>International Units</td>
</tr>
<tr>
<td>IMPACT</td>
<td>Food Security and Nutrition Monitoring Project</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>VITAL</td>
<td>Vitamin A Field Support Project</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

Background. Sub-clinical vitamin A deficiency (VAD), iron deficiency anemia (IDA), and iodine deficiency disorders (IDD), including endemic goiter, have been serious public health problems in Honduras. Legislation was passed in 1968 for salt iodization and in 1977 for sugar fortification with vitamin A, but effective monitoring systems were not put in place. Sugar fortification was carried out sporadically until the late 1980s when it was more regularly resumed, although with low coverage and poor quality control. Salt iodization was implemented more regularly but program monitoring weakened over time. In 1987, the national prevalence of endemic goiter was 8.8% (down from 17% in 1966), but rates were above 10% (WHO cut-off for significant problem) in three endemic areas. Vitamin A and iron supplementation have been included in Ministry of Health Maternal and Child Health (MOH/MCH) norms, but not uniformly nor consistently applied. Limited vitamin A distribution, supported by UNICEF donations, usually linked to immunization campaigns, has been implemented by the Ministry of Health (MOH) and, at a smaller scale, by some non-governmental organizations (NGOs); iron supplementation for pregnant women and young children has not been systematically carried out and supplement supplies have been irregular.

In 1993, with USAID/VITAL assistance, the MOH developed and began to implement a national micronutrient program. Strategic elements included: strong government political commitment; a consensus building process with the food industry for improved fortification; training of MOH and industry personnel; information, education and communications (IEC) aimed at increased consumption of micronutrient rich foods; program monitoring and micronutrient surveillance systems. Program interventions included: fortification of sugar with vitamin A and salt with iodine, vitamin A and iron supplementation, and some dietary diversification activities. Implementation responsibilities were assigned to different MOH units. USAID/VITAL provided assistance to initiate program implementation through March, 1994 when the USAID's Food Security and Nutrition Monitoring (IMPACT) project was tasked with continuing support to the MOH. A USAID/IMPACT Field Support Plan (UIFSP) for 1994/97 was developed to provide technical and some financial support to the MOH, in coordination with other cooperating agencies, for sustainable program implementation.

UIFSP. The purpose of UIFSP was to strengthen the technical and operational capability of the public and the private sector (food industry, NGOs) to prevent and control micronutrient deficiencies. Assistance was to be provided with attention to sustainability, i.e. creating the conditions that would enable both the MOH and the private sector to continue effectively implementing the program, even in the absence of external assistance. Technical assistance to the MOH and the food industry, particularly to sugar and salt producers, was expected to make food fortification sustainable. Limited financial support was provided for start-up program implementation. Coordination was promoted within the MOH, with other sectors and with international organizations, particularly INCAP and UNICEF, as well as with other governmental and private organizations working in health, nutrition and community development projects.

iii
Achievements. The UIFSP was implemented in three priority health regions. The MOH was committed to later extend it to the entire country. Priority interventions were vitamin A and iron supplementation, sugar fortification, salt iodization, IEC, and micronutrient surveillance. The UIFSP was locally staffed by a full time technical coordinator and a communication specialist. IMPACT subscribed a sub-contract with the International Eye Foundation (IEF) for administrative and financial services, in order to facilitate UIFSP implementation.

Major accomplishments from 1994 to 1997 were:

• A policy dialogue process was established with the government at different levels.

• Training focused on MOH district and subdistrict personnel, primary school teachers, and community volunteers, as well as staff from sugar and salt production plants. A total of 1,447 individuals were trained.

• Technical assistance focused on general policy and program development, food fortification, Quality Assurance/Quality Control (QA/QC) and monitoring systems for fortified foods, micronutrient surveillance, supplementation protocols, and IEC.

• The MCH technical norms on vitamin A and iron supplementation were revised, vitamin A supplements were incorporated into the list of essential medicines, the MOH began making budgetary allocations for supplements in 1996, a distribution system was developed and partially put in place, vitamin A supplementation was linked to EPI and registered on immunization cards. Routine post-partum supplementation of women was established in some hospitals.

• Operational studies for the adaptation of fortification technology were conducted, technical manuals were developed for premix preparation and addition to sugar at production plants, legal procedures for fortificant imports were simplified, and training and technical assistance was provided in fortification technology, premix preparation and quality control.

• A functional QA/QC and monitoring system for sugar fortification and salt iodization was designed, field tested and formally established. It provides timely information on quality and coverage of fortified sugar and salt, and includes periodic check ups on the quality of premix and its addition to sugar and salt at production plants, random inspections at storage facilities and retail outlets, and periodic collection of sugar and salt specimens from a nationally representative sample of households.

• A consensus building process between the government and the private sector (food producers) was consolidated and a firm public/private sector partnership established.
An IEC plan focused on vitamin A and iodine was implemented in the priority regions. Formative research using qualitative ethnographic techniques was carried out, IEC messages developed and tested, and a significant amount of IEC materials prepared and used.

Attempts to incorporate supplementation monitoring information and a micronutrient surveillance component within the MOH information system and to implement a sentinel site based system only partially succeeded. Baseline anemia, goiter and urinary iodine studies in sentinel communities and schools in the priority regions, conducted independently rather than as integral part of a surveillance system, provided key surveillance information.

Policy/program environment and constraints. MOH political commitment remained very high. Commitment by the MOH units responsible for program implementation ranged from fair to excellent. Commitment by the food industry remained high as well. USAID/Honduras' role in strengthening political commitment and facilitating implementation was critical. Promoting internal coordination among the different MOH units responsible for implementation of micronutrient activities was not easy; the MOH didn't have a history of effective internal coordination and, given the predominant "verticalization" of MOH programs, internal coordination at the MOH central level was not very efficient. Competing health priorities and staff instability made it more difficult. Coordination at the district and sub-district levels was more effective. Coordination with other government institutions was promoted mostly in connection with food fortification, but linkages with the agricultural sector remained weak.

The MOH-IEF relationship was excellent. IEF attempted to play a dual role as service provider for the UIFSP and also directly assisting the MOH in program implementation. MOH perception of IEF as an implementing agency hampered program sustainability; perception by the MOH of the IEF-administered UIFSP as an IEF independent project external to MOH direct interests may have precluded building a stronger sense of MOH ownership. USAID/IMPACT headquarters secured excellent technical and administrative support, and IEF provided adequate administrative and financial services, as well as permanent back-up to the local coordinator and IEC specialist, who performed efficiently with remarkable dedication.

Results. In 1996, coverage of vitamin A supplementation (at least once) in children 6 months to 5 years of age reached 34% in infants and 48% in those 1-4 years, for an overall coverage of 45%; the quality of supplementation (proportion of children getting two capsules of 200,000 IU) is unknown. Coverage of vitamin A supplementation to post-partum women was only 15% in 1996. Coverage and quality of iron supplementation to pregnant women and children are not known.

There was a significant increase in the volume of sugar being fortified from 58,200 metric tons in 1993/94 to 110,000 in 1996/97, close to the estimated demand for table sugar. Coverage and quality of sugar fortification increased over time. The recovery rate (proportion of vitamin A added to sugar that shows up in sugar samples) at the plants improved from 87% in 1994/95 to
97% in 1996/97. The average retinol content of samples from the fortification premix increased from 10.6 g/kg in 1991/92 to 17.1 g/kg in 1996/97. The goal was to reach 100% coverage of table sugar for domestic consumption at a mean concentration of 15 µg/g of sugar at production plants. A substantial improvement occurred in both the proportion of sugar samples containing vitamin A and the average content at the consumer level. The difference between plant and consumer levels tended to narrow over time. The mean content of vitamin A in sugar available to the households increased significantly, and the average content of fortified sugar increased by 38%, which can be attributed primarily to improvement in fortification quality.

The monitoring system for iodized salt does not provide reliable estimates of the volume of the salt production for human consumption that is iodized, but does provide relevant information on coverage and quality of iodization at production plants, at retail stores, and at the consumer level. No quality control of the iodization premix has been established yet. In 1996, iodine content of about 70% of the samples collected at the plants was above 50 ppm. The proportion of samples from retail stores containing at least 50 ppm of iodine ranged from 76% to 88%, and those with at least 25 ppm from 81% to 95%, with an overall average content from 63 to 68 ppm (66 to 71 ppm for only iodized samples). MOH inspection at retail outlets has been facilitated by the establishment of proper labeling for most of the salt produced. About 95% of the salt marketed in 1996 was iodized. The proportion of salt samples at the consumer level with at least 25 ppm increased from 48% in 1987 to 77% in 1995/96. From 1987 to 1995/96, the average iodine content for all salt increased from 33 to 50 ppm, and for only iodized salt from 44 to 58 ppm. Useful salt iodization levels have been achieved for nearly 80% of the households.

Impact. The prevalence of VAD in preschool age children dramatically dropped from 39.5% in 1985 to 13.6% in 1996. This is mostly attributed to sugar fortification, given substantial improvement in coverage and quality over the last three years. In 1996, iron deficiency anemia continued to be a significant problem affecting one third of the preschool-aged children and one fourth of the women in childbearing age (at least one third of the pregnant women); there was no evidence of improvement over time, which, on the other hand, would not be expected in absence of specific interventions. In 1996, a decline in goiter prevalence to <5% in children from sentinel schools in endemic areas was observed, and the median urinary iodine excretion ranged from 13 to 50 µg/dL, above the 10 µg/dL cut-off proposed by WHO to suggest that IDD is under control. This is certainly the result of increased coverage and quality of salt iodization.

Lessons learned. A government's political commitment to micronutrients is often the result of concerted advocacy by international agencies. Information dissemination at all levels is of fundamental importance. Information should be provided to government decision-makers on the magnitude and social and economic implications of micronutrient malnutrition, but equally important, on the availability of cost-effective interventions that have been successfully implemented in similar countries. USAID missions may play a critical role in generating political commitment to micronutrients.
Policy dialogue is a slow and sometimes painful process, a challenge to the patience and endurance of those engaged in it, and often stressful to cooperating agencies eager to accelerate policy decisions and their implementation for prompt results. Policy advocates need to be aware of the lengthy and often frustrating policy development and implementation process. Once policy decisions are made, their implementation is also likely to be slower than desirable, due to local political, financial, management, administrative and logistic constraints.

A government's political commitment tends to be weak in the presence of budgetary restrictions. Temporary financial assistance may help to stimulate commitment but should be carefully managed to prevent undermining sustainability. Competing public health priorities often represent a real constraint for micronutrient policies and programs in an environment of serious financial and human resource limitations. Endemic and non endemic problems requiring urgent preferential attention, unforeseen budgetary allocations and scarce time of health authorities and service personnel, may take precedence over non emergency programs.

Supplementation policies should always be realistic and congruent with the resources available. Although supplement donations have been successfully used to achieve relatively high initial coverage rates, they tend to jeopardize sustainability in the long-term, hence they should be used with caution and limited to program start up.

Food fortification policies should be clearly established in conjunction with the food industry. Considerable savings to the sugar industry may result from not fortifying sugar to be used by soft drink industries where current vitamin A fortificants are highly unstable; however, it would make the monitoring process too complex for most government systems. The cost of fortification is usually transferred to the consumer as part of price increases associated with inflation; it represents less than 2% of the total retail cost of the unfortified product. Standard regional legislation on food fortification should be established so that certain staple foods exported are adequately fortified, and law enforcement secured for both exports and imports.

Micronutrient policies/programs are usually developed and carried out by the health sector, thus there is a tendency to assign relatively low priority to dietary diversification. An integrated approach needs to be developed through a concerted action with sectors other than health (e.g. agriculture, the private sector, NGOs), in order to foster efforts aimed at improved production, distribution and consumption of micronutrient rich foods.

Critical for generating private sector commitment is sensitization and establishment of regular and fluid communication mechanisms between government agencies and the private sector with a view to developing a mutually rewarding partnership throughout the entire process from policy development to formulation of legislation and technical specifications and their implementation. A consensus seeking approach based on mutual trust is most likely to succeed. International agencies are well suited to play a sensitization and catalytic role in promoting policy dialogue and public-private sector partnerships.
The food industry is generally concerned about political image and consumer's perception of the quality of their products. Positive reinforcement may be successfully used to complement law enforcement measures on fortification. Establishing mechanisms for rewarding good quality products (e.g. fortified foods) may prove cost-effective. Periodic information to the industry on changes in the micronutrient status of the population would help to maintain commitment. Proper labeling of fortified foods throughout the marketing system is not only feasible but critical to facilitate government monitoring.

National integrated micronutrient plans and programs are more likely to generate commitment from both planners and implementors than vertical, isolated interventions often aggressively promoted by international agencies. The long-term sustainability of donor-driven vertical programs is highly questionable. Although integrated programs are desirable, in practice implementation often has to proceed in steps, in part due to limited institutional capacity and financial resources.

No program is likely to succeed and show results in the absence of an efficient monitoring system. This should be established at the inception of program implementation, reviewed periodically and improved accordingly. The monitoring system for food fortification should focus on critical points of the process: timely acquisition of fortificants and provisions to initiate preparation of the premix, quality control of the premix and its distribution to production plants, quality control of the fortified foods at production plants, random inspection of storage facilities and retail outlets, and assessment of the fortified foods at the consumer level. Government inspection of fortified foods at retail stores should concentrate on verifying proper labeling; restricting the authority of government inspectors to impose sanctions is likely to discourage corruption.

Subcontracting a local NGO to provide administrative and financial services is a sound option. Some NGOs may offer an adequate infrastructure, as well as local experience and credibility, while being familiar with USAID financial regulations. However, the sub-contracted NGO, interested in securing a local niche, may portray itself as an implementing institution trying to substitute government efforts; in this case, field support activities may be perceived by the government as foreign to its own responsibilities hence undermining program ownership and long-term sustainability. Securing program ownership by the government is critical to sustainability. Setting-up a local project office, although requiring more time and resources, may be worth the effort. A carefully selected local resident advisor may act as a liaison between the central project officer, the local government and the USAID mission.

The long term sustainability of micronutrient policies and programs may be viewed through three inter-related dimensions. Political sustainability requires permanent sensitization and a social mobilization process that may be more effectively fostered by international agencies. Financial sustainability is to a great extent contingent upon political sustainability, at least to the extent that public resources need to be allocated for keeping the program running, particularly for covering recurrent costs and maintenance of the program monitoring system. Institutional sustainability, although to some extent contingent upon political sustainability and the availability of resources,
is greatly affected by the quality of human resources. Institution building through systematic training needs to be addressed from the planning stage and permanently reinforced. While intensive training may increase sustainability in the first place, unusual incentives may cause training activities to enjoy an unhealthy precedence over other program activities.

Government’s program ownership should be ensured by all means from the beginning and continuously reinforced. Start up limited financial support (e.g. operations research, program development) may be needed but should not take precedence over technical assistance, as this is often a critical need in micronutrient programs. In particular, government’s responsibility for covering critical program implementation costs, including recurrent costs, needs to be recognized as a key input affecting sustainability. Donor-driven programs run the risk of undermining long-term sustainability. Reversing a chronic dependency mentality is a real challenge for international donors.
I. BACKGROUND

A. General information

Honduras, with an estimated population of 5.8 million in 1997, of which about 56% live in rural areas, is one of the poorest countries of the Latin American region. After the severe economic crisis of the early 1980s, the Honduran economy has shown some recuperation: gross domestic product (GDP) per capita was about US $667 in 1997 (26% of it generated by the agricultural sector), with an annual growth of 3%, up from 1.8% in 1980-90. In 1996, the country's external debt represented about 89% of GDP. The inflation rate in 1996 was 25.4%, the highest in Central America. The population in absolute poverty was estimated to reach 68.7% in 1996, about 75.3% and 56% in the rural and urban areas, respectively.

The fertility rate has slowly declined (from 6.5 in 1981), but it is still one of the highest in the Latin American region (4.9 in 1993-95, with about 200,000 births), with a 50% contraceptive use rate (62% urban, 40% rural). The population annual growth rate remains at 3.1% and the group younger than 15 years represents 44% of the total. Life expectancy at birth was 69 years in 1995. Overall infant and child mortality rates have declined from 137 and 203, respectively, in 1960 to 42 and 56 in 1993, although large differences between urban and rural areas persist. Indirect estimates of infant mortality for 1991/95 reached 36/1000 (down from 45 in 1986/90), with a larger decline in rural areas (49 to 37) than in urban areas (38 to 33). Preschool-age mortality was 13/1000 in 1996. Maternal mortality reached 221 per 100,000 births in 1989. The illiteracy rate in 1996 was 26% (37% rural, 10% urban). Global malnutrition (low weight for age) remained practically unchanged between 1987 and 1996 (30% in 1987, 24.7% in 1991/92, 27.2% in 1996), whereas stunting declined significantly from 43.9% in 1987 to 37.8% in 1996.

Health expenditures represented about 9% of total government expenditures in 1997 (down from 13% in 1995) and the health sector (both public and private) covers an estimated 69% of the population (86% urban, 55% rural). Coverage of prenatal care (at least one prenatal check-up) increased from 67% in 1991/92 to 79% in 1996. In this same year, an estimated 69% of the population had potable water faucets on the premises and 74% had adequate sanitation. Immunization coverage has reached remarkable high rates (above 95% in 1996) including tetanus in pregnant women (97%). Oral rehydration therapy (ORT) usage for diarrhea amounted to 30% in 1996. Exclusive breast-feeding (2.0-3.9 months) increased from 23.2% in 1991/92 to 29.5% in 1996. In 1994, about 60% of the households consumed less than 80% of daily caloric requirements.
B. Micronutrient deficiencies

A national nutrition survey carried out by the Institute of Nutrition of Central America and Panama (INCAP) in 1966 revealed high rates of energy-protein malnutrition in infants and children, as well as significant sub-clinical vitamin A deficiency (VAD), iron deficiency anemia (IDA), iodine deficiency disorders (IDD) and clinically evident endemic goiter. Low serum retinol levels (less than 20 μg/dL) were found in about 40% of the children under 5 years of age, 34% of those under 15 years, and 22% of the general population, and the majority of the families surveyed reported grossly deficient consumption of vitamin A and iron. After the 1966 survey, a number of micronutrient interventions were initiated. Legislation was passed in 1968 for salt iodization and in 1977 for sugar fortification with vitamin A. Both were initiated soon after legislation was approved but effective monitoring systems were not put in place. Sugar fortification was carried out sporadically until the late 1980s when it was more regularly resumed, although with low coverage and no quality control. Salt iodization was implemented more regularly but program monitoring weakened over time.

Vitamin A deficiency remained a significant problem: 73% of the families (86% in the rural area) consumed less than 50% of the recommended daily allowances (RDAs) of the vitamin and, as an average, reported intake per capita met only about 30% of the RDAs. Vitamin A intake in children 18-59 months was especially low: 83% of them consumed less than 70% of the RDAs, 53% less than 50%, and 18% less than 10%. Overall, about one fifth of the children aged 18-59 months consumed less than 10% of the RDAs. Serum retinol of 1,500 children 12-59 months of age averaged 30.9 ± 11.5 μg/dL; about 18% of them had less than 20 μg/dL and 55% less than 30 μg/dL. Mean serum retinol of 579 adult women was 24.0 ± 8.7 μg/dL; 39.2% of them had less than 20 μg/dL and 81.7% less than 30 μg/dL. However, the quality of the biochemical data of this survey is questionable.

The 1987 survey also showed that about 70% of the families and 77% of the children consumed less than the RDAs for iron, whereas 19% and 33%, respectively, consumed less than 50% of them. The prevalence of anemia, measured by hemoglobin, reached 17.5% in children 18-59 months and 14.3% among adult women. The overall prevalence of endemic goiter amounted to 8.8% (down from 17% in 1966), but rates were above 10% (WHO cut-off for significant problem) in three departments, particularly in communities surrounding salt production areas, where small scale producers marketed non-iodized salt. About 70% of the salt samples collected in 1987 showed levels of iodine less than 25 ppm. A national micronutrient survey conducted in 1996 revealed a significant decline in VAD prevalence among children 1-5 years, and high IDA prevalence in both children and women of reproductive age.
C. Micronutrient actions initiated before 1993

Over the last two decades, vitamin A and iron supplementation have been included in Ministry of Health Maternal and Child Health Division (MOH/MCH) norms, but not uniformly nor consistently applied. Limited vitamin A distribution, supported by UNICEF donations, usually linked to immunization campaigns, has been implemented by the Ministry of Health (MOH) and, at a smaller scale, by some non-governmental organizations (NGOs); iron supplementation for pregnant women and young children has not been systematically carried out and iron supplement supplies have tended to be irregular. Other micronutrient activities, such as promotion by NGOs of improved production and consumption of natural sources of vitamin A and iron through home gardening, have had very limited coverage. Salt iodization has been more regularly implemented, with significant UNICEF technical and financial support.

D. National Micronutrient Program, 1993/97

In 1993, with USAID’S Vitamin A Field Support Project (VITAL), INCAP and UNICEF assistance, the MOH developed and began to implement a more integrated national micronutrient program. Strategic elements included: strong political commitment by the central government, particularly by the MOH at the central and district levels; a consensus building process with the food industry for improved fortification, as opposed to previous unsuccessful government attempts to enforce legislation; intensive training of health care personnel, as well as community volunteers, school teachers and industry personnel; an Information, education and communications (IEC) strategy for information dissemination at all levels, including the MOH and industry personnel, and for promoting increased consumption of micronutrient rich foods by the population, particularly by young children; a micronutrient monitoring and surveillance system for program monitoring and epidemiological surveillance of the micronutrient status of the population. The program encompassed a limited number of interventions: fortification of sugar and salt, vitamin A and iron supplementation, and some dietary diversification activities. A MOH work plan prepared in 1993 contemplated the following specific activities by program component:

Supplementation: updating the MOH/MCH technical norms; training health service personnel on preventive vitamin A and iron supplementation and disease targeted vitamin A supplementation; incorporation of high dose vitamin A capsules in the list of MOH essential medicines; establishment of a regular procurement system ensuring continuous supply of vitamin A and iron supplements; formulation and implementation of an operational plan for distribution and administration of high dose vitamin A supplements to children 6 months to 5 years of age, linked to the Extended Program of Immunizations (EPI), and to women immediately after delivery, as well as iron supplements for pregnant women and young children; establishment of a regular monitoring system for vitamin A and iron supplements.
Food fortification: improved communication between the MOH and the food industry (sugar and salt producers) by means of information dissemination and exchange, joint planning and coordination meetings; training and technical assistance to industry personnel on food fortification technology, quality control and monitoring; establishment of quality assurance and control (QA/QC) and government monitoring systems; technical assistance to strengthen the technical and operational capabilities of the MOH Food Control Division (MOH/FCD) for fortification monitoring at the central and regional levels.

Dietary diversification: promotion and technical assistance but not direct implementation of food production activities, except for IEC activities aimed at promoting increased consumption of micronutrient rich foods.

Implementation responsibilities were identified for the different MOH units: MOH/MCH for vitamin A and iron supplementation; MOH/FCD for promotion and monitoring of food fortification activities (sugar and salt); the Health Education Division (MOH/HED) for the communications/education component; and the Division of Epidemiology (MOH/DOE) for the establishment and operation of a micronutrient surveillance system based on sentinel sites. Overall coordination of the strategy and program implementation rested on the Food and Nutrition Directorate (MOH/FND). The MOH initially requested USAID assistance in micronutrients in 1992. A USAID/VITAL Field Support Plan was prepared to assist the MOH in implementation of the micronutrient program and a sub-contract was given to the International Eye Foundation (IEF) to provide administrative and financial services to the plan; a detailed implementation plan (DIP) was prepared and implemented from June, 1993 to March, 1994 when VITAL terminated and USAID’s Food Security and Nutrition Monitoring Project (IMPACT) was tasked with continuing technical and limited financial support to the MOH.

II. THE USAID/IMPACT FIELD SUPPORT PLAN (UIFSP), 1994/97

The UIFSP was conceived as a mechanism for providing technical and some financial support to the MOH, in coordination with other cooperating agencies, for the implementation of the micronutrient program. Securing MOH ownership was deemed extremely important for long term program sustainability.

The purpose of UIFSP was to strengthen the technical and operational capability of the public and the private sector (food industry, NGOs) to prevent and control micronutrient deficiencies. The intention was to provide assistance with attention to sustainability, that is, to creating the conditions that would enable both the MOH and the private sector to continue effectively implementing the micronutrient program, even in the absence of external assistance; in service training of MOH, industry and NGO personnel was seen as critical for sustainability. Technical assistance to the MOH and the food industry, particularly to sugar and salt producers, was expected to make food fortification sustainable. Limited financial assistance was to be provided for start-up program implementation (e.g. overall coordination, training and initial intense supervision of program activities, formative research and development and testing of
IEC messages and materials, and for field testing and establishment of the micronutrient surveillance system). Coordination was to be promoted within the MOH, with other sectors and with international organizations, particularly INCAP and UNICEF, as well as with other governmental and private organizations working in health, nutrition and community development projects.

Specific objectives of the UIFSP were to:

1. Strengthen the capacity of the MOH/MCH to establish sustained vitamin A and iron supplementation activities by means of training and supervisory assistance to health personnel and monitoring of supplementation coverage through the MOH information system.

2. Strengthen the capacity of the MOH/FCD to establish a monitoring system to systematically control the quality of fortified foods, and of the industry to secure QA/QC of fortified foods.

3. Strengthen the capacity of the MOH/HED to develop and implement an IEC plan aimed at information dissemination for sensitization and for promoting consumption of micronutrient rich foods, including fortified products.

4. Strengthen the capacity of the MOH/FND to develop and implement dietary diversification activities for improved production and consumption of micronutrient rich foods.

5. Strengthen the capacity of the MOH/DOE to establish a surveillance system for tracking the micronutrient status of the population and for program evaluation.

Implementation of the UIFSP was initiated in three priority health regions, with MOH commitment to later extend it to the entire country. Priority interventions were vitamin A and iron supplementation, sugar fortification, salt iodization, IEC, and micronutrient surveillance. The UIFSP was locally staffed by a full time technical coordinator and a communication specialist. As proposed by the MOH, Dr. Wilma Estrada (from the MOH/FCD) and Lic. Carlos Montoya (from the MOH/HED) were hired for these positions under a leave of absence for the duration of UIFSP, with a commitment for them to return to the MOH in 1996 to become responsible for securing continuity of the micronutrient program after UIFSP completion. In March 1994, IMPACT subscribed a sub-contract with IEF through September, 1996, which was later extended to August, 1997. IEF's role was to provide administrative and financial services, in order to facilitate timely and efficient implementation of the activities contemplated in the UIFSP.
III. UIFSP ACHIEVEMENTS

Major accomplishments of the UIFSP from March, 1994 to August, 1997 were:

A. Policy and program development

A new government took office in 1994. Policy dialogue continued with the new government authorities, who required additional sensitization, as well as further program development and implementation assistance. While UIFSP committed to continue providing technical and limited financial assistance for program implementation in the three priority regions, the MOH pledged to make proper budgetary allocations and other provisions to secure program continuity and expansion to the whole country. A consensus process was established between the government and the sugar and salt industry, with periodic meetings to evaluate progress made, discuss problems, look for solutions and set up goals and plans for the upcoming sugar harvest, which extends from November to May.

B. Training and technical assistance

UIFSP supported training focused on meeting remaining needs, including those resulting from personnel rotation, for MOH district and subdistrict personnel, primary school teachers, and community volunteers, as well as for staff from sugar and salt production plants. Travel expenses of trainers and trainees, as well as other training costs (e.g. training materials) were covered. Training activities were implemented in collaboration with INCAP, and those related to salt iodization were partially supported by UNICEF.

A total of 1,447 individuals were trained between 1994 and 1996, including health professionals, educators, auxiliary nurses, food inspectors, social workers, primary school teachers, local authorities, nutritionists, nutrition assistants, health promoters, community volunteers and food industry staff. Major training areas included general micronutrient information and sensitization; educational needs assessment; development, testing and use of educational materials; food fortification technology and premix preparation; quality assurance/control of iodized salt and fortified sugar; monitoring and surveillance systems; goiter assessment; supplementation protocols; information, education and communications in public health. Follow-up to the trainees was done through monthly supervisory meetings. Three sensitization and training workshops on micronutrients were held for NGO staff at the sub-district level.

Technical assistance provided by IMPACT staff and consultants focused on general policy and program development, food fortification, QA/QC and monitoring systems for fortified foods, micronutrient surveillance (including goiter assessment), supplementation protocols, and IEC.
C. Program implementation

1. Supplementation

The MCH technical norms on vitamin A and iron supplementation were revised and distributed throughout the health system, although there was no concomitant training of health personnel and a specific assessment of micronutrient supplements supply and demand was not carried out. Vitamin A supplements (200,000 IU capsules) were incorporated into the list of essential medicines and the MOH began making budgetary allocations, although not in sufficient amounts, to acquire vitamin A and iron supplements; a distribution system was developed and partially put in place. Vitamin A supplementation was linked to EPI and registered on immunization cards, although the information is not yet analyzed in a timely fashion and utilized for program monitoring. Routine post-partum supplementation of women has been established in some hospitals but not in the whole country. A mechanism for regular acquisition and distribution of vitamin A supplements was established through a MOH agreement with UNICEF, but the MOH still largely depends on donations.

2. Fortification

A series of activities were undertaken with active participation of different government agencies, including the Ministries of Health and Economy, and technical assistance agencies: operational studies for the adaptation of fortification technology; preparation of technical manuals for premix preparation and addition to sugar at production plants; simplification of legal procedures for fortificant imports; training and technical assistance in fortification technology, premix preparation and internal quality control procedures; and development of a functional fortification monitoring system.

Assistance to fortification activities was provided in close coordination with INCAP and UNICEF (for salt iodination), and included comprehensive assessments of the fortification process (sugar and salt) at the production plants, technological adaptation, and direct technical assistance to producers in fortification technologies, premix preparation and QA/QC. Assistance to the salt industry and program development in iodization was facilitated by an inventory of salt producers carried out in 1994; 189 salt producing plants, including 17 salt iodization facilities, were identified, all located in two departments. Three fourths of them are small scale plants sharing 30% of the market.

Through an OMNI Research Grant to INCAP/ICAITI, in collaboration with UIFSP, a functional QA/QC and monitoring system for sugar fortification and salt iodization was designed and formally established in 1995 after field testing and refinement. The system provides timely information on quality and coverage of fortified sugar and iodized salt. It includes periodic check ups on the quality of the premix and its addition to sugar at production plants, random inspections of sugar and salt at storage facilities and retail outlets, and periodic collection of sugar and salt specimens from a nationally representative sample of households; this is done at
a very low cost by piggy-backing on to household surveys periodically implemented by the government for other purposes. In addition, a salt labeling system was established that covers most of the salt marketed for human consumption, which has greatly facilitated government monitoring.

The consensus building process between the government and the private sector, (e.g. sugar and salt producers) was consolidated and a firm public/private sector partnership was established. Coordination meetings are held periodically. Sugar and salt producers unanimously acknowledge the quality of training and technical assistance provided to them. Key staff from the sugar industry were trained; they are now aware of the importance of fortification and capable of implementing it properly. Sugar producers are interested in ensuring the best possible quality of vitamin A fortification. Fortified sugar in large (100 lb) bags is properly labeled, but labeling of retail sugar packages is not done yet. Progress has also been made in motivating and providing assistance and sensitization training to small scale salt producers; however, lack of financial resources for modernization and acquisition of appropriate technology and equipment for small scale salt iodination is a persistent constraint.

3. Dietary diversification

Except for IEC activities aimed at promoting consumption of micronutrient rich foods, this was a relatively neglected area. Some pilot activities were carried out by the MOH/FND in a few rural communities, in addition to small scale projects implemented by NGOs.

4. Information, education and communications (IEC)

A micronutrient IEC strategy and plan, focused on vitamin A and iodine, was developed by the MOH, with UIFSP assistance. Formative research using qualitative ethnographic techniques was carried out, and IEC messages were developed and tested. A significant amount of IEC materials were prepared and used in the three priority regions, including five posters (supplementation protocols for health services, iron for pregnant women, sugar fortification, salt iodization and vitamin A rich foods); a logo and other promotional materials for fortified sugar; six video-cassettes on hidden hunger, vitamin A and salt iodization; ten radio spots on vitamin A and iodized salt; three leaflets on vitamin A and iodized salt and three fliers on iodized salt; as well as 108 slides, 26 photographs of the salt production process and a number of reprints and press releases on different vitamin A and iodine topics.

5. Micronutrient monitoring and surveillance system

Attempts to incorporate supplementation monitoring information and a micronutrient surveillance component within the MOH information system and to implement a sentinel site (communities, schools) based system only partially succeeded. As mentioned above, vitamin A supplementation
for children was recorded in the immunization records but the information is not analyzed and used in a timely manner. A monitoring system for sugar fortification and salt iodination was established as described elsewhere.

The MOH information system does not include surveillance information on micronutrients; however, baseline anemia, goiter and urinary iodine studies in sentinel communities and schools in the three priority regions, conducted independently rather than as integral part of a surveillance system, provided key surveillance information. The anemia study, carried out in 1994 in 589 children under 5 years of age and their 489 mothers in 30 sentinel communities, found a 65% anemia rate in children and 39% in women, with 81% in children 6-11 months and 67% in those 12-23 months (about 64% of the children less than 6 months had hemoglobin levels less than 11 g/dL). These rates are well above those reported from the 1987 survey, which raised concerns about the quality of the 1987 data; given the lack of effective interventions, reductions in anemia rates were not expected, but the 1994 rates were about three times higher than those from 1987. These findings moved the MOH to consider the need for a national micronutrient survey that was carried out with USAID/OMNI assistance in late 1996.

In summary, the status of implementation of the different program components (by August, 1997) was uneven. Significant progress had been made through policy dialogue, training and technical assistance in improving the sugar and salt fortification process and in establishing a functional QA/QC and monitoring system; remarkable progress had also been made in IEC on vitamin A and iodine, particularly in formative research and development, testing and use of communication materials; less had been accomplished in vitamin A supplementation; very little in iron supplementation and dietary diversification; and practically no progress was made in establishing a micronutrient surveillance system, except for baseline information collected from sentinel sites. During 1996/97, UIFSP was progressively phased out and assistance in micronutrients was shifted to USAID’s Opportunities for Micronutrient Interventions Project (OMNI).

D. POLICY/PROGRAM ENVIRONMENT AND CONSTRAINTS

1. MOH political commitment and staff motivation

MOH political commitment has remained very high, to a great extent due to the active role played by USAID officers Drs. Stanley Terrell, Mary Ann Anderson, David Losk and Richard Monteith, by Dr. Alejandro Melara, former MOH Chief of Health Promotion and Protection, and by Dr. Virginia Figueroa de Espinosa, Vice-minister for Population Risks. On all accounts, current government’s political commitment to micronutrients has been remarkably strong. Commitment by the MOH units responsible for program implementation have ranged from fair to excellent; staff motivation has been high at the MOH/FCD and MOH/HED, and at district and subdistrict levels. Commitment by the food industry has remained high, to a large extent due to continuation of the consensus building process and full satisfaction with timely
response to their requests for training, technical assistance and information. USAID/Honduras' role in strengthening political commitment and facilitating implementation has been critical.

2. MOH internal coordination

Promoting internal coordination among the different MOH units responsible for implementation of micronutrient activities has not been easy. The MOH does not have a history of effective internal coordination. Given the predominant "verticalization" of MOH programs (e.g. immunizations, diarrheal disease control, AIDS, acute respiratory infections), internal coordination at the MOH central level has not been very fluid. Competing health priorities (e.g. cholera and dengue epidemics, HIV) and staff instability have made it more difficult. Given this situation, the role of the informal micronutrient committee convened by the MOH/FND has been uneven; the Committee has never been formally established, it has limited decision making power, and does not meet regularly. On the other hand, central MOH coordination has been facilitated by USAID's excellent relationships with the MOH different units, which openly acknowledge the critical role played by USAID and the UIFSP in promoting an unprecedented level of commitment and internal coordination among them.

Coordination at the district and sub-district levels has been less problematic and more efficient. This has been facilitated by the decentralization process that has proceeded more effectively in the three priority districts, and by the pilot implementation of the "integrated child care approach" in the same districts for subsequent replication throughout the whole country. Coordination with NGOs has been less aggressively pursued. Coordination with other government institutions (e.g. Ministry of Economy) has been promoted mostly in connection food fortification, but linkages with the agricultural sector have remained weak.

3. MOH-IEF relationship

The MOH-IEF relationship has been excellent. The local IEF group is respected by the MOH for its accomplishments in blindness prevention, in the child survival and vitamin A project and as a USAID/IMPACT sub-contractor. More recently, IEF attempted to play a dual role as provider of administrative and financial services for the UIFSP and also directly assisting the MOH in program implementation. MOH perception of IEF as an implementing agency has hampered program sustainability, since the MOH central, district and subdistrict levels have not taken full ownership of program activities that are seen as pertaining to the so called "IEF project". This was apparently triggered by the UIFSP coordinator being portrayed as an IEF employee, spending little time at MOH offices and responding directly to IEF rather than to the MOH. Perception by the MOH of the IEF-administered UIFSP as an IEF independent project external to MOH direct interests may have precluded building a stronger sense of MOH ownership.
4. Management, financial and administrative issues

USAID/IMPACT headquarters in the US secured excellent technical and administrative support to UIFSP, mostly through Dr. Anne Swindale. IEF provided adequate administrative and financial services for the UIFSP. Some budgetary constraints were identified along with field implementation. For the most part, they resulted from underestimation of certain budget items and from the need to implement new activities that were not originally included in the DIP. This required a great deal of IEF flexibility to facilitate field implementation. IEF also provided permanent back-up to the UIFSP coordinator and IEC specialist, who performed efficiently with remarkable dedication.

E. UIFSP RESULTS

A major intermediate result expected from the UIFSP was an increased capacity of the MOH and the private sector (food industry, NGOs) to effectively implement and evaluate micronutrient interventions, e.g. food fortification, micronutrient supplementation and dietary diversification. The results of UIFSP assistance to the MOH are summarized using indicators selected for monitoring program implementation.

1. Supplementation

For the first time, in the 1997 budget specific allocations were made for supplements acquisition: 1.6 million capsules of vitamin A and 1.4 million bottles of iron sulphate drops (125 mg each), meeting about 40% of the estimated needs. In 1996, coverage of vitamin A supplementation to children under five years of age, defined as percent children from 6 months to 5 years of age supplemented at least once during the year, reached 34% in children less than 1 year and 48% in those 1-4 years, for an overall coverage of 45%; the quality of supplementation (proportion of children getting two capsules of 200,000 IU) is unknown. Coverage of vitamin A supplementation to post-partum women (proportion getting a 200,000 IU capsule of vitamin A) was only 15% in 1996. Coverage of iron supplementation to pregnant women and children (proportion getting iron supplements at least once) and quality (proportion getting iron supplements for at least three months) are not known.

2. Sugar fortification

Coverage. There has been a significant increase over time in the volume of sugar being fortified from 1,281,000 quintals (58,200 metric tons) in 1993/94 when fortification was reactivated up to 2,432,000 quintals (110,000 metric tons) in 1996/97, close to the estimated demand for table sugar (figure 1). Coverage and quality of sugar fortification increased over time, particularly after 1994 (figures 2 to 4). Given current government practice of exempting fortification of sugar for industrial use, coverage estimations should be made in reference to
Figure 1. Volume of fortified sugar. Honduras 1990/91 - 1996/97.

Source: Ministry of Health/Food Control Division monitoring system.
sugar for direct human consumption. Beginning with the 1995/96 harvest, full monitoring was established at sugar plants and data on the amounts of fortificant available and used (purchased plus left overs) from plant records allow more precise coverage estimations.

Table 1 presents the dilution rates for the 1994/95 through 1996/97 harvests (recommended 1 quintal of premix per 1000 quintals of sugar). The recovery rate (proportion of vitamin A added to sugar that shows up in sugar samples taken at the plants) improved from 87% in 1994/95 to 97% in 1996/97.

Table 1. Amount and dilution rate of premix, Honduras 1994/95 - 1996/97.

<table>
<thead>
<tr>
<th>Harvest year</th>
<th>Sugar production (quintals)</th>
<th>Premix used (quintals)</th>
<th>Premix left for next harvest (quintals)</th>
<th>Dilution rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994/95</td>
<td>1,552,632</td>
<td>1,659</td>
<td>115</td>
<td>936</td>
</tr>
<tr>
<td>1995/96</td>
<td>1,518,136</td>
<td>1,760</td>
<td>26</td>
<td>863</td>
</tr>
<tr>
<td>1996/97</td>
<td>2,431,806</td>
<td>2,514</td>
<td>86</td>
<td>967</td>
</tr>
</tbody>
</table>

The rate of "useful coverage", that is, the proportion of sugar that is fortified at levels at least the minimum estimated to meet the consumption gap of the population at risk of vitamin A deficiency, provides a more accurate view of program performance. The total volume of sugar fortified should be seen together with quality information (e.g. vitamin A content) of the fortification premix and of sugar at the plants, at retail stores and, particularly, at the consumer level. As the monitoring system has been progressively established, more relevant information has become available. The goal, as established by the government and stipulated in the legislation, is to reach 100% coverage of table sugar for domestic consumption at a mean concentration of 15 ug/g of sugar at production plants which, after expected losses throughout the marketing process, is expected to provide at least 10 ug/g or enough vitamin A to meet the consumption gap at the consumer level. Information is available from the monitoring system regarding quality of the premix and retinol concentration in sugar at production plants, retail stores and households.

Fortification premix. The average retinol content of samples from the fortification premix has increased from 10.6 g/kg in 1991/92 to 17.1 g/kg in 1996/97 (table 2). By 1996/97, 87% of the samples contained above 16.0 g/kg.
Table 2. Average retinol content of fortification premix, Honduras 1991/92 - 1996/97.

<table>
<thead>
<tr>
<th>Year</th>
<th>Average retinol content (g/kg)</th>
<th>Range (g/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>low</td>
<td>high</td>
</tr>
<tr>
<td>1991/92</td>
<td>10.6</td>
<td>6.6</td>
</tr>
<tr>
<td>1995/96</td>
<td>16.4</td>
<td>14.0</td>
</tr>
<tr>
<td>1996/97</td>
<td>17.1</td>
<td>14.4</td>
</tr>
</tbody>
</table>

Sugar Plants. Mean retinol concentration of sugar improved from 11.0 ug/g in 1994/95 to 15.5 - 16.0 in 1996/97 (table 3). The percent of sugar samples with less than 10 ug/g, the minimum level accepted at the plants, decreased from 38% in 1994/95 to 4% - 12% in 1996/97 (figure 2).

Table 3. Mean retinol content of sugar, Honduras 1994/95 - 1996/97.

<table>
<thead>
<tr>
<th>Harvest year</th>
<th>Mean retinol content (ug/g)</th>
<th>Number of samples</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994/95</td>
<td>11.0</td>
<td>352</td>
<td>MOH/FCD inspectors</td>
</tr>
<tr>
<td>1995/96</td>
<td>15.8</td>
<td>1,826</td>
<td>Plant personnel</td>
</tr>
<tr>
<td>1995/96</td>
<td>15.3</td>
<td>340</td>
<td>MOH/FCD inspectors</td>
</tr>
<tr>
<td>1996/97</td>
<td>16.0</td>
<td>2,361</td>
<td>Plant personnel</td>
</tr>
<tr>
<td>1996/97</td>
<td>15.5</td>
<td>622</td>
<td>MOH/FCD inspectors</td>
</tr>
</tbody>
</table>

Retail stores. While data from retail outlets should be interpreted with caution, as specimens were not collected from a representative sample of outlets, there seems to have been an improvement in the quality of fortified sugar available at the retail level. The percent of samples with more than 5 ug/g increased from 11% in 1994 to 55% in 1997 (table 4). In 1997, 42% of samples had more than 10 ug/g.
Figure 2. Retinol content of sugar at production plants. Honduras 1994/95 - 1996/97.

Source: Ministry of Health/Food Control Division monitoring system.
Table 4. Retinol content of sugar at the retail level, Honduras 1994 - 1997.

<table>
<thead>
<tr>
<th>Year</th>
<th>Retinol content (% of samples)</th>
<th>Number of samples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 µg/g</td>
<td>&gt; 5 µg/g</td>
</tr>
<tr>
<td>1994</td>
<td>87</td>
<td>11</td>
</tr>
<tr>
<td>1995</td>
<td>53</td>
<td>35</td>
</tr>
<tr>
<td>1996</td>
<td>60</td>
<td>38</td>
</tr>
<tr>
<td>1997</td>
<td>38</td>
<td>55</td>
</tr>
</tbody>
</table>

Households. In order to monitor the quality of fortified sugar consumed by Honduran families, sugar specimens have been collected from nationally representative samples of households and analyzed at the central MOH/FCD laboratories. The data document significant improvements in household access to adequately fortified sugar. The percent of samples with adequate amounts of vitamin A increased from 2% in 1993/94 to 50% in 1996 (figure 3).

The overall mean vitamin A content of sugar at the households increased from 0.4 µg/g in 1993/94 to 6.5 µg/g in 1996, and, for those samples containing vitamin A, from 5.8 µg/g in 1993/94 to 8.0 µg/g in 1996 (figure 4). Therefore, a substantial improvement occurred in both the proportion of samples containing vitamin A and the average content at the consumer level, as well as in vitamin A concentration in fortified sugar. The difference between plant and consumer level tended to narrow over time. In the three-year period, the overall mean content of vitamin A in sugar available to the households increased significantly, presumably as a result of the significant increase in both program coverage and quality. The average content of fortified sugar increased by 38%, which can be attributed primarily to improvement in fortification quality. With a mean sugar consumption of 20 to 32 grams per person per day for the lowest and highest income quartiles, in 1996 sugar provided between 130 and 208 µg of retinol per person/day, a significant proportion of the requirements, which range of 350 to 850 µg/day for children and adults.

The 1996 data also indicate that, despite significant improvements, full coverage of the sugar harvest has not been achieved; in addition, vitamin A stability throughout the marketing process in sugar appears to be relatively low, as in 1996 the average content dropped by 50% from about 16 µg/g at the plants to 8 µg/g at the households. It would also suggest that significant leakage exists of non fortified sugar to the market for direct human consumption. In fact, the difference in vitamin A levels between sugar containing it (8 µg/g) and the overall average for all samples (6.5 µg/g) may be mostly accounted for by the 25% unfortified sugar present at the consumer level either because not all sugar for direct human consumption was originally fortified (fortification began some time after the harvest had started) or because leakage of non fortified sugar for industrial use occurred.
Figure 3. Retinol content of sugar at the household level. Honduras 1994/95 - 1996/97.

Source: Ministry of Health/Food Control Division monitoring system.
Figure 4. Mean retinol content of sugar at the household level. Honduras 1993/94 - 1995/96.

Source: Ministry of Health/Food Control Division monitoring system.
3. Salt iodization

The government monitoring system for iodized salt does not provide reliable estimates of the volume of the salt production for human consumption that is iodized, but does provide relevant information on coverage and quality of iodization at production plants, at retail stores and at the consumer level. No quality control of the iodization premix has been established yet. In 1996, iodine content of about 70% of the samples collected at the plants by the MOH/FCD was above 50 ppm, with only 2% with less than 25 ppm and 10% with more than 100 ppm.

Information from retail stores indicates that the proportion of salt samples containing at least 50 ppm of iodine has ranged from 76% to 88%, and those with at least 25 ppm from 81% to 95%, with an overall average content from 63 to 68 ppm (66 to 71 ppm for only iodized samples). MOH inspection at retail outlets has been facilitated by the establishment of proper labeling for most of the salt produced. Coverage of iodization is relatively high: nearly 95% of the salt marketed in 1996; quality was somewhat less satisfactory, with about 10% of the fortified samples containing less than 25 ppm. However, samples collected from retail outlets are not statistically representative of the salt available in the market.

Data obtained from samples collected at the household level is more indicative of trends in iodine availability to the consumer (figures 5 and 6). With an estimated average salt consumption of about 10 g per person/day, salt iodization levels of at least 25 ppm would provide 250 ug. of iodine, which would be sufficient to meet the needs of the majority of the population. The proportion of salt samples at the consumer level with at least 25 ppm increased progressively from 48% in 1987 and 56% in 1993/94 to 78% in 1994/95 and 77% in 1995/96. From 1987 to 1995/96, the average iodine content for all salt increased from 33 to 50 ppm, and for only iodized salt from 44 to 58 ppm. Useful salt iodization levels have been achieved for nearly 80% of the households and the national average of iodine provided by salt is more than enough to meet the needs of the majority of the population.

IV. NATIONAL IMPACT

The ultimate goal of the UIFSP was to reduce vitamin A, iron and iodine deficiencies in the population. This was expected to be achieved by (1) securing distribution and proper use of vitamin A and iron supplements targeted to children and vitamin A to post-partum women, (2) making properly fortified foods (sugar, salt) available to meet the vitamin A and iodine consumption gaps of the population at risk, and (3) promoting increased consumption of food sources of vitamin A, iron and iodine, including fortified sugar and iodized salt. Program impact indicators include: for vitamin A, percent prevalence of serum retinol in children 1 to 5 years of age; for iron, percent prevalence of anemia in children 1-5 years and women of childbearing age; and for iodine, percent prevalence of goiter, and median and distribution of urinary iodine levels in school-aged children. These indicators show the following trends over time:
Figure 5. Iodine content of salt at the household level. Honduras 1987 - 1995/96.

Source: Ministry of Health/Food Control Division monitoring system.
Figure 6. Mean iodine content of salt at the household level. Honduras 1987 - 1995/96.

Source: Ministry of Health/Food Control Division monitoring system.
A. Vitamin A deficiency (VAD)

The prevalence of VAD reported in 1965 amounted to 39.5% among preschool-aged children. The 1987 data, of questionable quality, indicated a prevalence of about 18%. The national micronutrient survey in 1996 documented a significant reduction in VAD rate to 13.6%, which may be mostly attributed to sugar fortification, given the substantial improvement in its coverage and quality over the last three years, with some possible contribution from supplementation, after moderate coverage rates (48% in children 1-4 years of age) were reached in 1996.

B. Iron deficiency anemia (IDA)

The results of the 1996 national survey indicate that IDA continues to be a significant problem affecting one third of the preschool-aged children and one fourth of the women in childbearing age (at least one third of the pregnant women). There is no evidence of improvement over time which, on the other hand, would not be expected in absence of effective interventions. A secondary analysis of food consumption data collected in 1994/95 in the western rural region revealed that whereas total iron intake by women and children nearly meets theoretical requirements, its bioavailability is less than 5%, thus total absorbed iron is well below the requirements. It is, therefore, presumed that anemia in Honduras is basically attributed to iron deficiency, with other vitamin deficiencies and hookworm infestation also likely to contribute. To reduce anemia, a substantial improvement in bioavailable iron for the population at risk would be required, through supplementation and food-based interventions (e.g. fortification).

C. Iodine deficiency disorders (IDD)

The national survey in 1987 showed an overall goiter prevalence of 8.8% in the school population, down from 17% in 1966, with endemic areas for IDD clustered in three departments (in communities surrounding salt production sites) where prevalence rates amounted to 15.9%, 13.7% and 9.4%. An assessment made in 2,475 children in sentinel schools in 1995 revealed a significant decline in goiter prevalence to 4.9% in the three departments, and an urinary iodine assessment in 623 school children from sentinel schools in two endemic and one non endemic areas showed medians of 13.3, 15.4 and 50.0 ug/dL, respectively, above the 10 ug/dL cut-off proposed by WHO to suggest that IDD is under control. This is likely to be the result of increased coverage and quality of salt iodization. However, about 40% of the urine samples in endemic areas had iodine less than 10 ug/dL (20% less than 5 ug/dL), suggesting that there is room for additional improvement in IDD control.

---

V. LESSONS LEARNED

A. GENERATING POLITICAL COMMITMENT

A government’s political commitment to micronutrients is often the result of concerted advocacy by international agencies, including USAID, INCAP and UNICEF. Information dissemination at all levels is of fundamental importance. Information to be provided to politicians and government decision-makers should include not only the magnitude and social and economic implications of micronutrient malnutrition, but equally important, the availability of proven cost-effective interventions that have been successfully implemented in similar countries (e.g. neighboring countries). USAID missions may play a critical role in generating political commitment to micronutrients through establishing a fluid relationship with government authorities based on mutual thrust, providing relevant information, paying attention to their needs, looking for sources of technical assistance and channeling specific requests, as it has been the case in Honduras.

B. POLICY DEVELOPMENT

Policy dialogue is a slow and sometimes painful process in developing countries. It is a challenge to the patience and endurance of those engaged in it, particularly of outsiders, and is often stressful to cooperating agencies eager to accelerate policy decisions and their implementation for prompt results. Policy advocates need to be aware of the lengthy and often frustrating policy development and implementation process, particularly in unstable political environment that is common in developing countries. Once policy decisions are made and national micronutrient policies established, their implementation is also likely to be slower than desirable as a result of local political, financial, management, administrative and logistic constraints.

A government’s political commitment towards micronutrient supplementation, although not difficult to generate, tend to be weak in the presence of budgetary restrictions. Temporary financial assistance may help to trigger commitment but should be carefully managed to prevent undermining sustainability. Competing public health priorities often represent a real constraint for micronutrient policies and programs in an environment of serious financial and human resource limitations that is common in developing countries. These are frequently exposed to endemic and non endemic problems (e.g. cholera, dengue, measles and other epidemics, acute diarrhea, HIV) requiring urgent preferential attention, unforeseen budgetary allocations and scarce time of health authorities and service personnel, which take precedence over regular non emergency programs. This has recently been the case in Honduras.

Supplementation policies should always be realistic and congruent with the resources available. Although supplement donations have been successfully used to achieve relatively high initial
coverage rates, they tend to jeopardize sustainability in the long-term, hence they should be used with caution and limited to program start up.

Food fortification government policies should be clearly established in conjunction with the food industry. Legislation on sugar fortification with vitamin A should cover all sugar for domestic consumption, including both table sugar and that intended for food industry use, unless independent marketing systems exist and/or the government monitoring system is well developed, which is rarely the case in developing countries. Considerable savings to the sugar industry may result from not fortifying sugar to be used by soft drink industries in processes through which current vitamin A fortificants are highly unstable; however, it would make the monitoring process too complex for most government systems, while the potential savings are not very likely to be transferred to the consumer. Regulations in this regard should be established up front, with no waivers along the way that are hard to reverse. The cost of fortification (excluding the monitoring system) is usually transferred to the consumer as part of price increases associated with inflation. It represents less than 2% of the total retail cost of the unfortified product (e.g. about 1.5% for sugar in Honduras); therefore, it may be incorporated in the sugar cost structure.

Allowing imports of unfortified sugar in VAD countries is clearly inconsistent with government policies and the ultimate goal of eradicating vitamin A deficiency by the year 2000. Such imports must not be authorized. In the medium to long term, standard regional legislation on food fortification may be established so that certain staple foods exported to all countries of the region would be adequately fortified, and law enforcement secured for both exports and imports.

Micronutrient policies/programs are usually developed and carried out by the health sector, mainly by the MOH, which tends to assign relatively low priority to dietary diversification approaches to improve micronutrient intake. This is often the result of 1) the inability of the health sector to address development problems other than those purely health and disease-related; 2) the MOH role in securing adequate nutrient availability and intake restricted to only promotional and educational actions; and 3) the need to prioritize interventions with proven, well defined, short-term results to meet obvious political interests. An integrated approach needs to be developed through a concerted action with sectors other than health (e.g. agriculture, the private sector, NGOs), in order to foster efforts aimed at improved production, distribution and consumption of micronutrient rich foods. The public health sector may be specifically responsible for the promotional and educational aspects of dietary diversification.

C. DEVELOPING PUBLIC/PRIVATE SECTOR PARTNERSHIPS

Critical for generating private sector commitment to micronutrient programs is sensitization and establishment of regular and fluid communication mechanisms between government agencies and the private sector with a view to developing a mutually rewarding partnership throughout the entire process from policy development to formulation of legislation and technical specifications and their implementation. A consensus seeking approach based on mutual thrust is more likely
to succeed than simply passing and enforcing legislation or late dialogue after resistance has been generated and/or worsened by poor communication. Before engaging in policy dialogue with the food industry, government agencies should be well prepared to provide convincing relevant scientific and technical information, and to respond effectively to their needs with provision of technical assistance and timely information. International agencies are well suited to play a sensitization and catalytic role in promoting policy dialogue and public-private sector partnerships.

The private sector (e.g. food industry) is generally concerned about political image and consumer's perception on the quality of their products and services. Positive reinforcement may be successfully used to complement law enforcement measures. Establishing mechanisms for rewarding good quality products or services (e.g. fortified foods, quality supplements) may prove cost-effective. This has been tried successfully for sugar fortification in Honduras. Establishing specific merit awards, allowing the industry to publicize their successes, and periodically informing the consumer through mass media about brand names fulfilling quality standards, are likely to trigger competition for quality. Periodic information to the industry on changes in the micronutrient status of the population would help to maintain commitment. Proper labeling of fortified foods throughout the marketing system is not only feasible but critical to facilitate government monitoring, as it has been shown in Honduras with iodized salt.

D. PROGRAM INTEGRATION

National integrated micronutrient plans and programs are more likely to generate commitment from both planners and implementors than the vertical, isolated interventions often aggressively promoted by international agencies. Political commitment for these types of programs or projects is often the result of some form of pressure, either directly or indirectly through provision of financial support for project implementation. The long-term sustainability of donor-driven vertical programs is highly questionable. Although integrated programs are desirable, in practice implementation often has to proceed in steps, in part due to limited institutional capacity and financial resources. In Honduras, implementation of the micronutrient integrated program in 1994/97 largely focused on salt iodization and sugar fortification, with relatively less efforts made in supplementation and very little in dietary diversification; furthermore, while VAD and IDD were given priority attention, iron deficiency anemia was largely neglected.

No program is likely to succeed and show results in the absence of an efficient monitoring system. Some monitoring system should be put in place at the inception of program implementation, reviewed periodically and improved accordingly. Supplementation monitoring requires routine recording of supplement delivery within the regular health information system and timely analysis and use of the information; while progress is usually made in recording, specific technical assistance is often needed to establish a regular flow of information and timely analysis and use for programmatic purposes.
The monitoring system for food fortification should give priority attention to critical points of the process. Critical monitoring points would include acquisition of fortificants, timely provisions to initiate preparation of the premix in advance to the harvest, quality of the premix and its distribution to production plants, quality of the fortified food at production plants, random inspection of storage facilities and retail outlets, and quality of the fortified foods at the consumer level. Government inspection of fortified foods at retail stores should be concentrated on verifying proper labeling, and restricting the authority of government inspectors to impose sanctions is likely to discourage corruption.

A comprehensive monitoring system should not be limited to collection and analysis of product samples (e.g. premix, sugar, salt) for quantitative assessments of coverage and quality, but would also include appropriate follow-up and supervision of the fortification process. In order to do this, the capacity of the monitoring institution should be strengthened through training and empowerment through legislative and regulatory actions. The monitoring system should provide timely information needed for ongoing decision making, thus data processing, analysis, reporting and use need to be streamlined and accelerated. The MOH monitoring system should coordinate with other sectoral ministries (e.g. Economy, Agriculture) to the extent possible, by utilizing data collection systems already in place (e.g. periodic national surveys). The cost of maintaining an efficient monitoring system should not exceed the government's capacity and financial resources.

E. PROJECT STRUCTURE/MANAGEMENT

A frequent decision confronting USAID centrally-funded projects is how to secure some type of permanent presence in order to identify needs to be addressed and responded to, keep track of technical assistance and financial support, foster continuity of actions, maintain an efficient flow of communications with local counterparts, and provide administrative and financial services for field support. Reliance on USAID missions in this regard is not always feasible, as mission staff is usually overloaded and can't help to much on a daily basis beyond the initial contacts with government counterparts. Two major options may be considered: a) subcontracting a local institution or NGO; and b) setting-up a local office and hiring a local resident advisor or field support coordinator.

Subcontracting a local NGO to provide administrative and financial services is a sound option. Some NGOs may offer an adequate infrastructure, as well as local experience and credibility, while being familiar with USAID financial regulations. This is an expedient option saving the time and effort otherwise required to set up a local project office. The obvious risk is that the sub-contracted NGO, interested in securing a local niche, may portray itself as an implementing institution substituting government efforts; in this case, field support activities may be perceived by the government as foreign to its own responsibilities hence undermining program ownership and long-term sustainability. Securing government's program ownership is critical to sustainability. This is likely to be avoided by proper definition of NGO's responsibilities specifically excluding program implementation and emphasizing its role as provider of
administrative and financial services, as well as facilitating and channeling technical assistance. This may be difficult in practice, as NGOs are not often willing to play such restricted non-technical role.

Setting-up a local project office, although requiring more time and resources, may be worth the effort. A carefully selected local resident advisor would act as a liaison between the central project officer, the local government and the USAID mission, and is identified as a representative of a technical assistance/donor agency rather than of an implementing NGO. A resident advisor's major role would be coordination of technical and other assistance to the government in such a way that it promotes institution building and strengthens technical capacity for program implementation while preserving government's ownership.

In any case, selection of the local technical advisor/coordinator and other technical staff should be made carefully. In general, hiring government staff should be avoided to the extent possible, and this is often an USAID's mission explicit policy. The experience in Honduras would suggest that a government's interest in allowing members of its staff to become technical personnel hired by a field support project presumably with institution building purposes may not result in this staff being assigned specific micronutrient responsibilities upon returning to their institution.

F. INTERAGENCY COORDINATION

Interagency coordination is always desirable, often feasible and usually likely to depend on each agency's agenda and on personal relationships. Coordination is facilitated by well defined institutional objectives, priorities and policies, and by a constant exchange of information. UIFSP established effective donor coordination with INCAP, locally through the INCAP Basic Technical Group and regionally through regular communication between USAID/IMPACT and INCAP headquarters. Most training and fortification activities, as well as the design, testing, refinement and final implementation of the food fortification monitoring system, were implemented in close coordination with INCAP. Coordination with UNICEF was less effective, as there was some tendency for the UNICEF officer in charge of micronutrients to follow his own agenda, some times duplicating UIFSP activities (e.g. IEC). UNICEF made an explicit decision to concentrate on iodine deficiency and salt iodination, and the UIFSP assisted specifically with development of the monitoring system.

G. SUSTAINABILITY

The long term sustainability of micronutrient policies and programs may be viewed through three inter-related dimensions: political, financial and institutional. Political sustainability should be ensured at program inception and reinforced periodically thereafter; it requires sensitization and motivation of successive government leaders to maintain policies and program priorities and their implementation until micronutrient services are firmly established and demanded by the
population. Political sustainability requires permanent sensitization and a social mobilization process that is more effectively fostered by international agencies. Financial sustainability is to a great extent contingent upon political sustainability, at least to the extent that public resources need to be allocated for keeping the program running, particularly for covering recurrent costs and maintenance of the program monitoring system. Institutional sustainability, although to some extent contingent upon political sustainability and the availability of resources, is greatly affected by the quality of human resources. Institution building through systematic training needs to be addressed from the planning stage and permanently reinforced.

A frequent challenge is to provide an appropriate mix of technical and financial support for training and supervisory activities without covering program recurrent costs (e.g. per diem allowances) needed for securing continuity of program activities. Training is often given high priority because of sustainability considerations; however, spending a large amount of resources in multiple training events, often triggered by higher than usual interest in training activities associated with generous per diem rates that tend to be largely perceived as opportunities for staff extra salary compensation, may undermine sustainability. While intensive training may increase sustainability in the first place, unusual incentives may cause training activities to enjoy an unhealthy precedence over other program activities.

Government’s program ownership should be ensured by all means from the beginning and continuously reinforced. Start up limited financial support (e.g. operations research, program development) may be needed but should not take precedence over technical assistance, as this is often a critical need in micronutrient programs. In particular, government’s responsibility for covering critical program implementation costs, including recurrent costs, needs to be recognized as a key input affecting sustainability. Donor-driven programs are not likely to have long-term sustainability. By and large, this type of programs and the relatively large amounts of both financial and human resources allocated over long periods or through repeated cycles by international donors have greatly contributed to generate and/or reinforce a “dependency mentality” in developing countries, including Honduras.

Such dependency mentality, which is exemplified by public health authorities perceiving the project as being responsible for actual implementation of the program, as opposed to providing technical and financial support to the government in their role as implementor, precludes long-term sustainability of micronutrient programs. This is often reinforced by donor projects substituting government’s responsibility for implementation because of pressure to show short-term results at any rate. Reversing a chronic dependency mentality is a real challenge for international donors and requires a great deal of motivation, patience, creative thinking and innovation, and shorter term, limited and more focused financial support.