PD-ABS-701

International Eye Foundation

FINAL EVALUATION

Guatemala Vitamin A Intervention Project

"NutriAtol I"

Grant No: DAN-0045-G-SS-7104-00

January 1991

the International Eye Foundation

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Grant No: DAN-0045-G-SS-7104-00

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December 5, 1990

TO: U.S. A.I.D. Office of Nutrition
International Eye Foundation
International Science and Technology Institute
VITAL

FROM: M. G. Herrera M. D., Consultant

SUBJECT: Final Evaluation, Vitamin A Intervention Project, Guatemala (U.S. A.I.D. Grant No: DAN-0045-G-SS-7104-00)

In keeping with letter of agreement dated September 6, 1990, I visited Guatemala from October 7 to October 21 to lead the mid-term evaluation of the above named project. Prior to departure for Guatemala plans for the evaluation were discussed in detail with Mr. John Barrows, IEF, who provided me with background material and documentation concerning project implementation and progress to date. In Guatemala I worked closely with Dr. Gustavo Hernandez Polanco, Project Director, Dr. Noel Solomons, Scientific Director and Coordinator of CESSIAM, and with Dr. Ivan Mendoza, data analyst; IEF project staff was fully cooperative.

Meetings were held with the former data management consultant from Universidad Francisco Marroquin, Ms. Cynthia Rivera who in the past held the position of Assistant Project Coordinator, Dr. Maria Eugenia Sanchez and LCDA. Eugenia Saenz de Tejada, officers in charge of the Intra-household Food Distribution module and Mr. William Scott, project officer responsible for the Special Study financed under the Grant entitled "Consumption Practices in the Use of Domesticated and Indigenous Carotene Sources in the Guatemalan Diet." A field visit was carried out to Alta Verapaz where we visited one of the participating schools and interviewed the teacher in charge. A home visit was conducted to one of the participating households where I had the opportunity to interview the mother of an "agent" and two beneficiaries. Dr. Hernandez and I reviewed the experience gained during the three and a half years of project operation together with the promoter, Edyn Martinez, who was still employed by CPCSM-DM in Carcha. Meetings were held with the Inspector General of the provincial School System and the Director of the local Health Center.

An outline of the report was discussed with project staff prior to departure from Guatemala. The final report was developed with the collaboration of Drs. Hernandez-Polanco, Solomons and Mendoza.

The report is organized as follows: A brief description of the organization and activities of the executing agency is presented first, followed by a summary of the project's objectives, specific aims and design. A chronologic progress report follows underscoring accomplishments, problems and implications for future projects. Brief evaluations of the two ancillary applied research activities conducted under the Grant are also included. At the end there is a summary of the conclusions. The background section and findings concerning the first year of the project are based on the mid-term evaluation conducted in March, 1989.

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Background

I. Synopsis

The International Eye Foundation (IEF) in Bethesda in collaboration with the National Committees for the Blind and Deaf in Guatemala (CNPCS) have carried out an intervention project to ameliorate Vitamin A malnutrition in the province of Alta Verapaz, Guatemala. Conceived also as applied research, the project was designed to shed light on the roots of the Vitamin A deficiency problem in the area in order to identify sustainable and culturally congruent intervention options. Careful evaluation of the intervention process was carried out. The project entailed development of a Vitamin A-rich refeeding mixture for children convalescing from diarrhea and testing an innovative service delivery method whereby pre-school children were reached through their school-aged siblings. Teachers in rural schools multiplied the effectiveness of rural health promoters by identifying preschool siblings of their pupils, organizing gatherings of parents for nutritional and health education, and distributing supplements. This work was of special significance because it explored feasibility of using the rural school as focal point for developing primary health care. In addition, applied research was conducted on the consumption of Vitamin A-rich foods and their intra-household distribution. The results of these studies should yield guidelines for the design of sustainable nutrition interventions in the project area.

II. The Executing Agency: The Comite Nacional Prociegos y Sordomudos (CNPCS)

CNPCS is a non-governmental organization with a distinguished track record in the provision of subsidized services to the blind and the deaf in Guatemala. CNPCS serves persons who cannot afford private care; all prospective beneficiaries are screened by a well run social service department, and a sliding-scale fee system is applied. Services are financed by donations and by the proceeds of a private lottery sanctioned by the government. CNPCS has three divisions: Medical, Education and Rehabilitation.

The Medical Division (CNPCS-DM), directed by Dr. Gustavo Hernandez Polanco, runs several hospitals and clinics, and an education and rehabilitation center. In the capital and in several provinces, it employs 670 persons, and it is recognized as one of Latin America's leading institutions in this field of endeavor. CNPCS-DM provides ophthalmology and otology services free to persons without resources, others are charged modest fees in keeping with their ability to pay.

The Medical Division also offers an accredited residency training program leading to the postgraduate degree of Master in Ophthalmology conferred by the Universidad Francisco Marroquin.

This well-known academic program (Instituto de Ciencias de la Vision) is headed by Dr. Fernando Beltranena. one of Guatemala's leading ophthalmologists. CNPCS-DM also houses an active research program (CESSIAM) headed by Dr. Noel Solomons, formerly of the Massachusetts Institute of Technology's faculty. In addition, CNPCS-DM runs a blindness prevention program that provides training in ophthalmology to primary health care personnel including recent medical graduates beginning rural service and health promoters. Also under this program, surveys are conducted periodically to update epidemiological information concerning blindness and visual impairment in Guatemala. CNPCS-DM is a World Health Organization collaborating center for the prevention of blindness.

The Special Education Division operates schools for the blind and for the deaf and a unit that provides early stimulation to young children with various forms of sensory impairment. The Rehabilitation Division operates sheltered rural workshops, a training center to prepare blind persons for farm-based jobs and programs to foster self care and independent living for both young and elderly blind persons.

III. Objectives and Specific Aims:

The overall goals of the project were to reduce childhood morbidity and mortality and protect preschool children from Vitamin A deficiency in a rural area of the province of Alta Verapaz. Specifically, the project aimed to:

1. Develop and test a Vitamin A-rich convalescent refeeding mixture (Nutriatol) for use by children recovering from diarrhea or measles.

2. Distribute Nutriatol to 12,000 preschool children at risk of Vitamin A deficiency in the Province of Alta Verapaz.

3. Develop and implement a nutrition and health education program to instruct mothers on the management of diarrhea and the utilization of Nutriatol during convalescence.

4. Evaluate the acceptability of Nutriatol and its effectiveness to ameliorate Vitamin A deficiency.

5. Field test an innovative outreach method whereby health promoters utilize the rural school system to locate and deliver services to preschool children.

6. Obtain information on consumption of carotene-containing foods and their intra-household distribution. Study the effects of morbidity and the provision of Nutriatol on intra-household food distribution.

IV. Project Design

After a general meeting with local teachers, trained promoters visited each school to explain the project and to distribute the MIS forms used to record the names of students with siblings under six years of age. The latter were the target of supplementation, while the older siblings became the agents who distributed Nutriatol and enrolled their mothers and siblings in the program. When the promoters first visited the schools, a date was set for a meetings to which mothers were invited to participate.

At those meetings, promoters explained the purpose of the project to school children and their mothers underscoring the importance of oral rehydration therapy and convalescent feeding. They instructed mothers to administer one packet of Nutriatol a day for eight days to preschool children recovering from diarrhea or other infectious diseases. A supply of Nutriatol was left with the school teachers. Mothers were instructed to return empty packets via their school children in order to obtain further supplies.

Two or more times during the school year, promoters visited the schools to replenish supplies of Nutriatol. They also collected information concerning the number of packets distributed by teachers and the number of empty packets returned by each agent.

During school vacation, home visits were conducted to a subsample of beneficiaries to ascertain the utilization of Nutriatol as well as to investigate the impact of the education sessions on attitudes and practices concerning the management of diarrhea and feeding of preschool children.

V. Timetable

Initiated in June of 1987, the project was planned as follows:

<u>Phase One - Six Months</u>

1. Formulation and production of Nutriatol. Assay of Vitamin A content of the supplement by an independent laboratory and determination of shelf life.

2. Testing the effect of Nutriatol administration on serum levels of normal subjects and its acceptability to mothers and children.

3. Planning the field trial and making necessary contacts in Alta Verapaz communities with local leaders and representatives of the health and education sectors.

4. Purchasing a vehicle and other equipment.

5. Selection of two bilingual persons to be trained as health promoters/primary eye care technicians.

6. Design of the project data management system (MIS) utilizing appropriate consultants.

Phase Two - Twenty-Four Months

1. Appointment of project assistant coordinator (PAC) to assume day-to-day management of project logistics, field supervision, data processing and analysis.

2. Training of health promoters/primary eye care technicians at Rodolfo Robles Hospital in Guatemala City and in Alta Verapaz.

3. Development of educational materials to be used in the field.

4. First round of visits to 48 schools selected for participation during the first project year.

5. Follow-up visits including education sessions.

6. Home visits during school vacation.

7. During the second project year, a total of 70 schools were to be selected (during January of 1989) and the enrollment of teachers, school children and mothers conducted as explained above under #s 4, 5, and 6. Mid-course corrections and changes in methodology utilizing the experience acquired during the first year were to be put in place at that time.

8. Two ancillary research projects were planned for this year: (a) Consumption of domesticated and indigenous carotene sources in the Guatemalan diet (with a section specific to Alta Verapaz) and (b) Food consumption, intra-household distribution and the impact of distribution of a Vitamin A-rich convalescent food.

VI. Project Implementation (See Appendix 1)

1. Formulation and Production of Nutriatol

During the last quarter of 1987, the project director and CNPCS-DM staff made necessary contacts with local health, education and civil authorities to explain the project and enlist their collaboration. Local candidates for the positions of health promoters were identified and arrangements were made for their training early in 1988.

CNPCS-DM/CESSIAM in consultation with the commercial firm Alimentos S.A. opted to utilize a cereal mixture similar to INCAPARINA, a well known low cost weaning food as the vehicle to

deliver Vitamin-A to target children. Incaparina when cooked resembles a traditional thin porridge (Atol) commonly used in rural Guatemala. Incaparina, originally designed by scientists at the Institute of Nutrition of Central America and Panama, contains various cereals in the necessary proportions to provide protein of high biological value at reasonable cost. It is manufactured commercially by Alimentos S.A. and it was thus unnecessary to develop a new product which would have entailed additional time and higher costs. Studies conducted by CESSIAM have shown that Incaparina is fed frequently to children recovering from diarrhea and/or febrile illness enhancing the likelihood that the enriched product would be accepted. The Vitamin A content of NUTRIATOL was set at 3000 RE per 100 grams of uncooked powder approximately twice the Vitamin A content of Incaparina (Table 1). Twenty grams of the enriched mixture and fifteen grams of sugar are then packaged in suitably labeled envelopes. Feeding the content of one envelope per day provides 2.4 times the Vitamin-A WHO/RDA for children <3 years and 2.1 times the RDA for children 4-6 years of age.

Alimentos S.A. undertook the production and packaging of Nutriatol and samples were sent for analysis to the laboratories of Hoffman La Roche in Basel, Switzerland. Vitamin A content was found to be within the expected range. Shelf life of Vitamin A in Nutriatol was also found satisfactory. Problems were encountered in the storage of Nutriatol at project headquarters in Alta Verapaz and at the rural schools. Infestation with moths (Palomilla) was discovered in a small proportion of packets at the former location while rodents caused considerable damage to supplies at a few rural schools. Alimentos S.A. was consulted and the monthly use of phosphine gas at the warehouse was recommended. This was effective but safety precautions in the use of the pesticide were not adequate. The rodent problem (vide infra) has been addressed by using metal containers whenever possible. (The school I visited at the time of the Mid-term Evaluation had such containers but they lacked covers).

2. Nutriatol Acceptability and Biological Impact Studies

2.1 Acceptability of Nutriatol

The acceptability of Nutriatol and Incaparina was assessed among children recovering from diarrhea in both Guatemala City and in Alta Verapaz. Children aged 6 to 72 months were given Nutriatol or Incaparina and instructed in their use at the time of discharge

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[1] The proportion of recommended intake was calculated using WHO allowances which are lower than the U.S. RDA (Food and Nutrition Board, National Academy of Sciences, Recommended Dietary Allowances, 1980). If the latter are used, one Nutriatol packet provides 1.5 times the RDA for children <3 years of age and 1.3 times the RDA for children 4-6 years of age.

from ambulatory treatment facilities. Home visits conducted five days later revealed that consumption of both supplements was satisfactory (about 75% of prescribed amount). No significant differences were detected in the acceptability of Nutriatol and Incaparina in either geographic setting (Appendix II). Field staff reported that the sweet taste of Nutriatol appealed to beneficiaries since poor rural households frequently lack sugar to sweeten Incaparina.

2.2 Effect of Feeding Nutriatol on Retinol Serum Levels

Plasma retinol levels were determined in 38 healthy preschool children before and after receiving 1 packet of Nutriatol/day for 8 days. No significant differences were observed in retinol blood levels, a finding that is not surprising since the subjects presumably had adequate Vitamin A reserves (See Appendix II).

2.3 Serum Retinol Levels of Preschool Children Before and After Nutriatol Distribution

Children attending two government preschool education program (PAIN) nurseries in the Project area were selected for monitoring vitamin A status prior and during Nutriatol distribution. At these sites, there were no 'agents'; Nutriatol was given directly to mothers by teachers who instructed them to utilize the supplements and return empty packets to replenish their supplies. Blood samples were obtained in June 1988 and approximately one year later. A total of 190 children were tested initially, only 79 of these were available for re-testing. The blood was centrifuged on site, the plasma packed in dry ice for shipment first to Guatemala City and then to the U.S. Department of Agriculture Laboratories in Boston (Appendix III).

The results of the baseline plasma retinol level assays are summarized in Figure 1. The median retinol level was 19 with 55 percent of the cases falling below 20 micrograms/100 milliliters, i.e. in the 'at risk' category, five percent of the children were frankly deficient: below 10 micrograms/100 milliliters. These results suggested that Vitamin A deficiency was a significant public health problem in the study area.

Nutriatol was distributed by the promoters to the health centers on two occasions: immediately after obtaining baseline blood levels and again at the beginning of 1989, approximately six months later. Teachers were instructed on the nutrition messages to be delivered to the mothers and were given Nutriatol packets for distribution. Teachers, in turn, instructed mothers on the use of Nutriatol, delivered the education messages and requested that they return the empty packets. Since all children at these preschool facilities were under the age of seven, all were considered potential beneficiaries; households represented by children in attendance were considered target households. In 1988, there were

115 target households and 188 target children. Initial supplement distribution was effective since, as shown in Figures 2 and 3, 94 of eligible households and 95 percent of eligible children received Nutriatol. On the other hand, 99 percent of children received only one set of Nutriatol packets during the year, as opposed to one set for each episode of illness as planned (See figure 4). There were reasons for this problem: Promoters reported poor collaboration on the part of many teachers perhaps due to lack of adequate incentives to sustain interest in the project. The fact that promoters were unable to visit preschool facilities frequently enough to maintain liaison with teachers contributed to the problem. Two promoters were not enough to cover 48 schools in 1988, let alone 70 during 1989. As shown in Figures 5 and 6, Nutriatol distribution in the nurseries was less effective in 1989 when only 62 percent of eligible households and 69 percent of eligible children received supplements. A small but higher proportion of children received more than one treatment during that year (Figure 7).

Serum retinol levels among the 79 children who were tested, both at baseline and after supplementation, are reported in Table 2. Although the difference between means was small, it was statistically significant. It is noteworthy that after the Nutriatol intervention there were no children with retinol levels below 10 micrograms per 100 milliliters. However, since there was no control group, it cannot be concluded that Nutriatol distribution was the only factor that accounted for the observed difference. The average total dose of Vitamin A delivered via the Nutriatol supplement was only 9600 RE or approximately 11 day's requirement in each calendar year.[1]

3. Nutriatol Distribution Through the Schools

3.1 1988 - First Year of Operations

During the first quarter of 1988, CNPCS trained two health promoters with collaboration of CESSIAM staff, first in Guatemala City at CNPCS-DM headquarters and subsequently in Alta Verapaz. An Assistant Project Coordinator was appointed and steps were taken to produce educational materials. School District supervisors were contacted and a list of rural schools in the project areas was compiled; forty-eight were selected for participation on the basis of staff interest and geographic accessibility.

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[1] Each Nutriatol packet contains 600 RE. The recommended allowance for 1-3 year old children is 400 RE and for 4-6 year old children it is 500, (Recommended Dietary Allowances, Food and Nutrition Board, National Academy of Sciences, National Research Council, Revised 1989), 9600 RE represent about 22 days requirement, assuming an average allowance of 450 RE.

In the second quarter of 1988, visits to the schools were scheduled, but problems related to staffing, development of educational materials, information management, and transportation delayed the beginning of supplement distribution to the second half of the year. The Assistant Project Coordinator resigned in March. She was replaced by Ms. Cynthia Rivera, a trained psychologist with excellent management skills who is fluent in English and Spanish. She continued as project manager until December of 1989. Regrettably, she was based in Guatemala City and made only short fortnightly visits to supervise the promoters in the field. This shortcoming was pointed out at the time of the Mid-Term Evaluation but the frequency of her visits increased only marginally during 1989.

There were two abortive and time-consuming attempts to obtain appropriate visual materials for the educational sessions from commissioned artists. Ms. Rivera eventually secured collaboration from the arts department of a local university where posters were produced; the promoters were instructed in their use and given the corresponding guidelines (Appendix IV).

Transportation and storage of Nutriatol to project headquarters in Alta Verapaz was delayed until mid June, 1988. The product then had to be re-packaged in sets containing 8 Nutriatol packets each, enough for one treatment.

In mid-August the first round of visits to the schools was undertaken to enlist teachers' cooperation and to instruct them in the utilization of data forms. Mothers of school children with siblings under age six were invited to meet with the teacher and the health promoter. All in all, approximately 1/2 of eligible mothers attended, a significant proportion, considering the rains and difficult terrain, but still insufficient given the importance of this contact in accomplishing project goals.

The APC and one of the CPCS-DM headquarters social workers headquarters who is fluent in kekchi supervised several of the education sessions and concluded that the posters and presentations were effective. At the time of the promoters second visit, rodent damage to Nutriatol supplies was detected in the schools. Metal containers were made available and teachers were asked to accelerate distribution of Nutriatol (an 8 packet kit for each preschool sibling was given to each child with siblings in that age range.)

The third round of school visits initiated in September was not completed since half of the schools closed for vacation earlier than expected, i.e. in November. Promoters attempted to collect data forms concerning nutriatol distribution at teacher's homes but this proved impossible in many instances. In some cases, teachers distributed the supplement to target children as planned and

replenished the family's supply when empty packets were returned. In most cases, when faced with substantial remnants of supplement at the end of the school year, teachers decided on their own to distribute Nutriatol to families with preschoolers in the community.

The start-up problems described above resulted in large amounts of supplements remaining in the schools when they closed prematurely. This explained in part the deficit between 51,000 Nutriatol packets delivered to the schools and 17,600 reported distributed to beneficiaries by teachers. The latter figure is based on distribution receipts returned by teachers to the promoters. According to the latter, many teachers failed to complete these receipts even though they distributed the supplement. Frequently, teachers attempted to complete the 'paper work' at the time of a subsequent visit by the promoter, thus casting considerable doubts on the accuracy of their records. Although the backlog of supplement disposed of by teachers at the end of the year contributed to the deficit, the problem persisted in 1989. Large remnants of Nutriatol at the end of the school year was not an issue then, suggesting that inadequate teachers' collaboration, related to the paucity of visits by promoters played an important role.

3.2 1989 - Second Year of Operation

In 1989, sixty-seven rural schools, the same two preschool centers and a health center were selected for participation in the project. All teachers and the director of the health center were invited to an information meeting in early February at the provincial capital of Coban. Out of 190 persons invited, 76 attended, i.e. about 40 percent. Difficulties in communication and particularly transportation problems involving teachers in faraway schools were cited as explanations for the low attendance rate. It is likely that making a special trip on their day off to the provincial capital for a meeting to learn about a project that would likely add to their chores was not appealing. In the ensuing months, promoters visited all schools to again inform teachers about the project and instructed them on how to complete the forms used to enroll school children and their younger siblings. In addition, the education sessions for the mothers were scheduled at that time. Two thousand four hundred and thirteen mothers were invited and 88% (2,463) attended, a significant improvement over the 1988 attendance record. The health promoter who is fluent in kekchi ran the 70 educational sessions between March 3rd and May 31, 1989. He felt the sessions had been effective and this was confirmed by the teacher I interviewed. She pointed out that not only mothers but also the school children (agents) had been interested and responsive to the presentations.

A total of 159,680 packets of Nutriatol were delivered to the schools in four rounds of visits during 1989. Deficient teacher

compliance in completing MIS forms was again noted; only 77,553 of the Nutriatol packets were accounted for by delivery receipts. According to the promoters, a large proportion of teachers failed to submit such receipts, even though they delivered Nutriatol to the agents. In retrospect, however, the key problem was understaffing. In 1989, two promoters covered 67 schools, two pre-schools and one health care center i.e. 22 more institutions than in 1988. This excessive work load undermined their effectiveness in more than one way. Promoters were expected to carry out the following tasks: a) repackage Nutriatol into 8-packet units at the warehouse; b) periodically fumigate the supplement; c) plan and conduct the orientation session; d) visit each of the 70 institutions to deliver Nutriatol, instruct teachers on the MIS forms system, and plan meetings with the mothers of students with preschool-aged siblings; e) schedule and conduct 70 educations sessions, one at each school; f) replenish Nutriatol supplies at least three times during the school year; g) conduct home visits to administer the evaluation questionnaires; h) report in writing concerning vehicle use, changes in the lists of "agents" and beneficiaries, movement of Nutriatol into and out of the warehouse; and i) collect and deliver receipts to project headquarters. This amounted to 350 visits to individual schools (more than one/day) in addition to other tasks. Considering that only one of the two promoters responsible for the above tasks was fluent in kekchi it was difficult to establish adequate rapport with teachers and beneficiaries. The non-kekchi speaker was seriously limited in his ability to conduct education sessions and home interviews, thus increasing the load on the other promoter. Fifteen to twenty schools per bilingual promoter would have been a more a realistic workload considering the time necessary to reach some of the sites.

VII. Project Effectiveness

1. Nutriatol Distribution

Development of the management information system to monitor project effectiveness was delayed initially, but following the mid-term evaluation, a D-Base III archive was organized and Dr. Ivan Mendoza an able CESSIAM investigator, took charge of data management and analysis.

A summary of findings follows:

Table 3 summarizes the number of packets of Nutriatol purchased by the project, delivered to project headquarters in Carcha, distributed to the schools, and reported by teachers as delivered to beneficiaries. Discrepancies between the number of packets delivered to schools and given to beneficiaries have been discussed above.

Utilizing information concerning "agents" (ie, school children with preschool siblings) and their younger siblings, the

number of targeted households (hogares candidatos) and potential beneficiaries was determined.[1]

Figures 8 and 9 summarize the number of targeted households and potential beneficiaries 'receiving'[2] supplements in 1988. A modest proportion of targeted households (70%) and potential beneficiaries (71%) were reached by the program.

In 1989, the program was in operation considerably longer and the proportion of targeted beneficiaries 'reached' increased (households 82%, potential beneficiaries 81%) (Figures 10 and 11). It is possible that a larger number benefited since teachers were frequently remiss in filling out receipts forms.

Theoretically, each child was expected to receive one Nutriatol treatment (8 packets) following each episode of diarrhea. According to baseline studies it was expected that children would have 6 or 8 episodes of diarrhea annually, resulting in 6 or 8 treatments. In fact, during 1988, only 4% of beneficiaries received more than one treatment (Figure 12). In 1989 that proportion was substantially higher but still below expectations: 33% received one treatment; 30 % received two treatments; 15% received 3 treatments; 11 % received 4 treatments, etc. (Figure 13). The fact that Nutriatol distribution during 1989 spanned 8 months in contrast with 3 in 1988 partially explains the observed difference.

In summary, the apparent low number of treatments distributed could be attributed to delays in initiating the program in 1988, failure by teachers to complete receipts and neglect by mothers to request additional supplies by returning empty envelopes. A lower incidence then expected of diarrheal disease could also have been a factor.

2. Household Survey Results

Two hundred ninety-eight home visits were conducted in 1988 to assess Nutriatol utilization and the effectiveness of the education program. The sample consisted of households who had received the supplement (Table 4). After one education session

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[1] 'Targeted household' was one with one or more school children who reported preschool siblings at home. 'Potential beneficiaries' were all preschool siblings identified. Households and beneficiaries were classified as having been reached if according to receipts submitted by teachers they had received at least one set of Nutriatol packets.

[2] The number of households 'receiving' or 'reached' was based on the number of packets delivered to agent documented in writing (receipts).

74% of the mothers understood the purpose of feeding Nutriatol and 68% reported doing it as instructed following an episode of diarrhea. There was little evidence of leakage or problems in the delivery of the product via the school children. On the other hand, only 43% of the mothers saved the empty packets to secure further supplies of Nutriatol.

During an interlude in the visits to the schools caused by a teachers' strike, the promoters conducted a second household survey during July and August of 1989. The protocol and tabulation of results are included in Appendix V. Staffing and budgetary constraints did not permit utilizing independent observers in this survey intended to re-evaluate the effect of the education program and assess the effectiveness of supplement delivery via the school children. Instead, the promoters and particularly the promoter fluent in kekchi conducted the surveys themselves. According to one of the promoters, this biased respondent's answers in an effort to please the person conducting the survey who had been also in charge of the education sessions. In spite of this limitation results suggest that it was feasible to entrust Nutriatol delivery to school children. All 354 households sampled reported receiving the supplement given to the school children by the teachers. Ninety-one percent of mothers understood the objectives of the program, while 97 percent expressed approval. Seventy-eight percent understood completely how to use Nutriatol, 17 percent understood partially, and 5 percent required a new explanation. Beneficiary children who received Nutriatol after diarrhea consumed the entire set of eight packages almost universally and mothers reported that they liked it. Storage facilities were found to be adequate although some damage by rodents and insects was reported in 30 percent of the cases.

Nutriatol was used primarily by the intended beneficiaries although in 14 percent of the time some of it was shared with siblings. Sharing with adult members of the family and neighbors was virtually non-existent. Neither was there any trade of the supplement for food or other products.

The survey showed that 88 percent of mothers were able to name foods high in Vitamin-A content, an indication of the success of the education program. Ninety-four percent of mothers reported saving the empty packages in order to return them to request further allotments of the supplement. This figure contrasts with the relatively low percentage of households and children that actually secured one or more additional Nutriatol allotments. This discrepancy may reflect the subjects' tendency to answer the question to please the interviewer as mentioned above.

VIII. Third Year of Operations - 1990 (See Appendix VI)

Although the project formally concluded at the end of 1989, International Eye Foundation and CNPCS opted to continue operations during 1990 on a reduced scale. The intent was to maintain rapport between the project, the schools and the communities while planning the next phase of the project (Nutriatol II). Dr. Hernandez Polanco continued to direct the project from Guatemala City, while the field staff was reduced to one promoter, Mr. Edyn Martinez, who had been with the project from its inception. Thirty-five rural schools were selected in the Municipalities of Coban, Carcha, and Chamelco on the basis of geographic accessibility and previous cooperation with the project. Distant schools and those where teachers or communities had not been responsive were dropped. During January, using the Department of Education school census, plans were made for the year. Five school visits were planned and appropriate MIS forms prepared. During February, Nutriatol was transported to Carcha where it was repackaged as before. The first round of visits to the schools was initiated and continued in March at the rate of two to five visits per day. Even though teachers had been carefully selected, some failed to report Nutriatol distribution as instructed. Mothers were invited to the education sessions. The latter began in April, this time with the use of a projector powered by a portable generator. The use of slides stimulated the interest of school children and their mothers. Two education sessions a day were conducted.

In the first semester of 1990, 35 schools were enrolled in the program, 9,935 treatment sets were distributed, i.e. 79,500 Nutriatol packets. One thousand three hundred and twelve mothers attended the education sessions, an average of 37 at each school and both the promoter and Dr. Hernandez Polanco felt that the sessions had been very well received. Attendance was as good as during 1989. Mr. Martinez reported the following problems: Teachers were absent attending meetings about which he had no foreknowledge. Attendance to the education sessions dropped during May, a time of peak agricultural activities when women were expected to accompany men in the fields. The electric generator purchased to operate the slide projector was too small and had to be replaced. During 1990, as before, supervision was sporadic and now in the absence of an associate projector coordinator, the promoter had to work largely on his own.

On the other hand, more community leaders took on interest in the project during this year. There are several letters on file at project headquarters requesting that the project be continued in the future (Appendix VII). During the second semester, the promoter conducted home visits but the information has not been tabulated.

During 1990, it was decided to instruct mothers to utilize Nutriatol even when preschool children had not been ill. Although quantitative data is not available, both the promoter and the school teacher I interviewed reported a significant increase in the demand for Nutriatol; many more empty packets were returned as mothers began utilizing it as a component of the preschool child's diet.

IX. Accomplishments, Problems and Implications for Future Projects

1. The Project - A New CNPCS Initiative

The project was an important new endeavor of the CNPCS-DM: operations research in methods to reach poor rural communities. Most of CNPCS-DM activities have been hospital based, yet its administration recognizes the importance of preventive measures among the rural poor, a subset of the population that comprises more than fifty percent of the Guatemalan population. The project served to focus this concern. Project implementation problems have received careful attention and options to solve them discussed.

Reaching home bound vulnerable groups such as pregnant and lactating women and their preschool children is difficult, expensive and often inefficient particularly in mountainous terrain with limited access roads. The innovative concept of using rural schools which concentrate members of rural families as a means to reach preschool children and their mothers with preventive/curative measures deserves continued evaluation. It could be a first step towards linking rural education and primary health care. However, it may be unrealistic to expect already overburdened teachers to accept new responsibilities without additional incentives. Closer collaboration with regional school authorities and more interaction between promoters and school teachers would have been helpful.

As in any attempt to field a new service delivery scheme, problems and delays have occurred. The experience gained should serve to refine the method being test and to design other cost-effective Vitamin A and health/nutrition interventions. Problems encountered were analyzed in order to identify opportunities to solve them.

2. Nutriatol, a Vehicle for Vitamin A Delivery?

The project succeeded in designing and commissioning the production of a Vitamin-A enriched food supplement (Nutriatol) for children convalescing from diarrhea and other infectious diseases. Nutriatol was well accepted by mothers and children at least as well as Incaparina, the well-known weaning food which it closely resembles. An innovative service delivery method has

been tried whereby preschool children are reached through their school-aged siblings.

Nutriatol if used according to the instructions -one packet a day for eight days following an episode of diarrhea (average duration 8 days) or febrile illness, will be sufficient to replenish the Vitamin A deficit incurred during the illness for which it was prescribed. On the other hand, it would not be sufficient to replenish previously depleted hepatic stores. Moreover, since few beneficiaries received more than two Nutriatol treatments per year the supplement was presumably insufficient to even replenish disease-related deficits. Several options merit consideration in follow-up projects:

a) Design a sustainable long-range strategy based on education and agricultural extension to increase consumption of carotene containing vegetables.[1]

b) Continue to use Nutriatol as a 'convalescent food' but raise the Vitamin A content three or four fold. The risk of toxicity would still be low unless large numbers of packets were distributed indiscriminately. WHO recommends semi-annual distribution of capsules containing 200,000 units or 60,000 RE to protect preschool children at risk of Vitamin A deficiency. This is the equivalent of 100 thirty five gram Nutriatol packets or 12 eight day treatments. These would be delivered in one year to a child treated six times during the year with Nutriatol containing four times the current concentrations of Vitamin A.

c) Continue to distribute Nutriatol as currently formulated as a mechanism to capture the interest and attention of mothers in combination with an enhanced education program. Depending on resources, 'treatment' with Nutriatol could be extended to 16 days post-diarrhea.

d) In lieu of Nutriatol, distribution of 200,000 IU Vitamin A capsules to school children and their siblings could be organized in collaboration with area health services.

3. Supervision

The promoters did not report to anyone locally. Their supervisors, i.e. the project director, the APC and the CPCS-DM staff social workers were all based in Guatemala City. Their field visits were sporadic and communication by telephone difficult. In retrospect, this was the most important flaw of

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[1] The results of another CESSIAM study that aims at testing the effect on Vitamin A nutritional status providing vegetables to poor households will be relevant to this issue.

the project. Future programs must take this into consideration. A field supervisor needs to reside in the area. Information needs to be managed locally to be useful for self-monitoring.

4. The Role of CESSIAM

The project was designed and planned by Dr. Hernandez, Director of CNPCS-DM in close collaboration with Dr. Noel Solomons, CESSIAM Scientific Director. Project management and implementation has been coordinated by the project director, while CESSIAM staff involvement was limited at first to the execution of the pilot studies of Nutriatol acceptability and impact on retinol blood levels. Subsequently, the contribution of CESSIAM to the operations research aspect of the project increased significantly with the designation of Dr. Ivan Mendoza as data manager and analyst. CESSIAM staff could and, in my opinion, should be more involved in data management and data quality assurance. The considerable CESSIAM expertise in scientific methodology represents an in-house asset that can be utilized further. The project such as the one under review should be part of CESSIAM's portfolio, subject to periodic review in the weekly scientific sessions. Such integration would increase the likelihood of successful applied research and would complement the training of CESSIAM students and postdoctoral fellows. To illustrate this point, abstracts concerning various aspects of the Nutriatol I project submitted by CESSIAM staff members for presentation at scientific meetings are included as Appendix VIII.

CNPCS-DM is planning other applied research projects which will require day-to-day management and efficient data archiving and analysis. These functions could be organized with CESSIAM collaboration. This would have the advantage of economy of scale in terms of data management and scientific review.

X. Special Studies

The Nutriatol Project was designed as an intervention to ameliorate Vitamin A malnutrition but it was also conceived from the beginning as applied research aimed at elucidating the roots of the Vitamin A deficiency problem. The goal was to make recommendations for sustainable and culturally congruent approaches to resolve it. During implementation of Nutriatol I, it became clear that more information was needed on two subjects: the consumption of domesticated and indigenous carotene sources by the target population and the intra-household distribution of foods containing Vitamin A including Nutriatol. A small additional grant was made by A.I.D., Office of Nutrition to conduct these two studies; the first one was completed in February of 1990, the second one is still in progress. A brief evaluation follows:

1. Consumption Practices of Domesticated and Indigenous Carotene Sources in the Guatemalan Diet (Appendix IX)

This study was conducted in Alta Verapaz, Santa Rosa, and Zacapa provinces by William Scott (IEF Guatemala) and Marjorie Haskell (CESSIAM) with guidance from Jack Blanks (IEF) and Noel Solomons (CESSIAM). A survey was designed to obtain information on: (1) consumption practices of carotene-containing vegetables (fruits were not included), (2) sources of these foods, (3) attitudes towards home/community garden projects and (4) desirable characteristics of future interventions of this type. Questionnaires were administered to community leaders, teachers, and heads of local households. A total of 290 households were surveyed, a 100 of which were in the Department of Alta Verapaz, the site of both Nutriatol I and the planned follow-up project (Nutriatol II). The other 190 households were distributed between two sites, one in the Department of Santa Rosa, and one in the Department of Zacapa. At each geographic site interviews were conducted in townships, small hamlets and dispersed settlements. The project successfully identified the most commonly consumed Vitamin A-rich vegetables. Particularly important was the identification of several indigenous greens such as "quilete" and "apasote" which are widely consumed. Such practices ought to be encouraged instead of attempting to introduce new species. In retrospect, inclusion of fruits in the survey would have been desirable, since mangoes and papaya are good sources of Vitamin A in some areas. The study report includes a brief summary of some interviews with teachers and community leaders. In their opinion, garden interventions could be successful if errors committed in the past are avoided. In summary, this applied research project has yielded results useful in designing culturally congruent home garden interventions. The latter are a key component of the proposed follow-up phase of the Nutriatol I Project (Nutriatol II).

2. Intra-household Distribution Project

Initially planned as a small study to assess utilization of Nutriatol and its impact on dietary intake of beneficiaries, the project evolved into a rather ambitious undertaking.

The specific aims finally adopted were to: (1) describe the dietary intake patterns of preschoolers and their mothers prior to Nutriatol introduction, (2) assess intra-household food distribution among preschool children and their mothers over a one year period. (Nutriatol was introduced as a medicinal food, i.e. post-diarrheal or post-measles, during the observation period. Repeated measures of intra-household distribution are used to detect changes as a result of supplement distribution.) (3) describe seasonal changes in food intake, (4) describe changes in dietary intake during convalescence from diarrhea and measles among preschool children, (5) assess acceptability of

Nutriatol as a medicinal food, and (6) assess Nutriatol use and misuse including sharing with other family members.

The study is multidisciplinary. It entails collaboration between LCDA. Saenz de Tejada, an experienced anthropologist with particular interest in dietary practices, Ms. Galindo, a nutritionist with survey experience and Dr. Sanchez, a physician responsible for day-to-day management and coordination of the project. Dr. Ivan Mendoza, an able investigator from CESSIAM, acts as a consultant in data management and analysis. The project director is Dr. Gustavo Hernandez Polanco. Residing in the study area there are two interviewers and a social worker.

In addition to providing information concerning the objectives listed above, the anthropologist was to investigate knowledge, attitudes and practices related to child feeding in sickness and health. Particular attention was to be paid to beliefs and practices concerning the use of porridges (atoles).

The sample was recruited in three different settings: poor urban dwellers, small landholders and farm laborers. The site chosen for the work is San Pedro Yepocapa in the province of Chimaltenango where Nutriatol distribution was about to begin through the health system under a grant from 'Sight and Life.' This made it possible to study the effect of introducing Nutriatol. Data collection is scheduled to end in March 1991. In retrospect, it may have been preferable to conduct the study in Alta Verapaz where Nutriatol I was carried out and where the proposed new project will take place. Dietary practices are likely to differ between provinces. However, the Intra-household Distribution Project was conceived when Nutriatol I was winding down.

Methodology

A census was conducted in each of the three sub-areas (urban, rural, estates) to identify families with children under the age of 6 years. Because of logistic reasons (lack of a project vehicle and need to work with a population with access to Nutriatol through the health system), most of the sample was recruited in the urban area. The 261 households (566 children <6) would probably suffice to address the research questions in one setting; attempting the investigation in three reduces the likelihood of detecting significant differences.

The study design called for 1) Development of a new dietary assessment tool; 2) Repeated measures of dietary patterns among preschool children and their mothers; 3) Study of dietary patterns among children with diarrhea; 4) In-depth observation of dietary intake and food related behavior by the anthropologist.

Problems Related to Design and Methodology

1. One of the key objectives of the study was to determine whether Nutriatol was used appropriately, i.e. whether the supplement was given to children recovering from diarrhea and not to anyone else. With this in mind, a 7-day recall questionnaire was developed. Given time and financial constraints, devising a new dietary assessment instrument may not have been a realistic goal. The 7-day recall questionnaire developed could not be field tested or validated prior to application. It is questionable whether it will be sensitive to changes expected in outcome variables other than food consumption patterns. The method does not include estimation of either frequency or portion size, parameters essential to measuring intra-family distribution of items consumed by both adults and children. The researchers plan to extrapolate average portion sizes and frequency data from a very small number of 24-hour recalls conducted among preschoolers in the sample (n=13) and an even smaller number of food frequency assessments carried out in adults (n=8).[1]

2. The anthropologist is collecting information on portion sizes during day-long household observations of preschool children and their mothers. No provisions were made, however, to validate her estimates through standardization. Integration of the work of the anthropologist with that of other project professionals has been lacking. The anthropologist was commissioned to carry out 60 home interviews but no provisions were made initially for her participation in data analysis or report writing.

Problems Concerning Implementation

The project is scheduled to end in March of 1991, i.e. data collection ought to be 80% complete. The dietary assessment interviews and administration of various questionnaires are almost up to date but the anthropologist has only completed 11 of 60 planned household studies. Various logistic problems have now been solved and plans have been made for her to complete the household visits during December and January.

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[1] The recall method adopted uses photographs of commonly consumed food items. This could pose a problem since respondents may assume they are being asked whether they have consumed the amount of food prepared as shown in the photographs. When children have diarrhea the mother is asked whether the child has consumed the pictured foods during the 'first days' of illness. The survey therefore does not cover the critical period of convalescence.

The success of the project is also threatened by imminent staffing changes:

1. The field director, Dr. Maria Eugenia Sanchez, has resigned effective January 1991 to undertake residency training in ophthalmology. Dr. Sanchez is the only full-time professional on the project. Her resignation poses a serious threat to completion of data collection and successful analyses of the information. The problem is compounded by the absence of the project nutritionist who is currently working in Atlanta, GA, USA. Further financial resources will be needed for participation of the anthropologist in data analysis. The large amount of data collected by her needs to be reduced to a manageable data base and analyzed in concert with the rest of the information being collected. Dr. Mendoza should play a key role. Given the importance of the subject matter and the sound interdisciplinary orientation of the study, every effort should be made to complete it.

Recommendations

Dr. Hernandez Polanco and Dr. Solomons are actively seeking a person to replace Dr. Sanchez. The new field director should begin work as soon as possible in order to have ample opportunity to be briefed by Dr. Sanchez. In addition, IEF and CPCSM-CM have agreed to modify and extend the contract with Dr. Saenz de Tejada to make time available for her participation in planning and conducting joint analysis of the data collected. It is worth considering the administration of a conventional 24-hour recall dietary intake survey to the entire sample at the time of the last round of visits. Although this would increase costs and pose logistic problems, it would permit validation of the new method currently in use. Twenty-four hour recall data, in spite of its limitations, may also add to information on intra-household food distribution. It may be worth considering assessing the validity and accuracy of the anthropologist's portion-size estimations. Assuming successful completion of the study, further resources will be needed to carry out in-depth analysis of the data set.

XI. Conclusions

Analysis of project accomplishments and problems conducted jointly with the professional staff led to the following conclusions:

1. It is appropriate and feasible for CNPCS/DM to engage in community-based outreach public health programs. This represents an important departure for an organization that heretofore has concentrated primarily on clinic-based curative care.

2. It proved feasible to conduct a nutrition intervention program aimed at reducing vitamin A deficiency and simultaneously conduct operations research to test and refine innovative methods to reach children at risk.

3. The rural school setting can be used to advantage to deliver health and nutrition education and targeted interventions aimed not only at school children but also at their families including preschool siblings.

4. Well-trained bilingual health promoters with at least a secondary education can be effective in enlisting the collaboration of teachers and in delivering health and nutrition messages to students and their families. Their effectiveness, however, is predicated on a reasonable ratio between promoters and schools in the project areas. Such a ratio should not be less than 1 to 10 and promoters should be bilingual in kekchi and Spanish.

5. Enlisting teachers's collaboration takes time and effort and will not be universally successful. Frequent visits by promoters, use of audiovisual materials and other incentives to motivate teachers, school children and parents contribute to the success of the program.

6. An outreach program based on trained health promoters with limited educational background requires field supervisors resident in the area who oversee the work of the promoters, support them, and guide them. Ideally, the project leader should also be located in the project area. Understaffing and insufficient field supervision were the key problems.

7. Distribution of a nutritive food supplement enriched with Vitamin A was effective in capturing the attention of teachers, school children and the parents of the preschoolers and focusing it on nutritional needs, particularly during convalescence. Nutriatol as formulated and distributed during the two years of the project made some contribution to Vitamin A nutrition but was in all likelihood insufficient to redress chronic Vitamin A deficiency present in a significant proportion of preschool children in the area.

8. Although preschool children are more vulnerable to illness-induced malnutrition, school children should be included among beneficiaries in future projects. A tangible reward for their participation would serve as an incentive and could well have positive health effects.

9. The management information system of subsequent project should be designed in advance and field tested prior to

initiation of the project. Data entry, data management, and analysis of the findings should be an integral part of the project operation and contribute in a meaningful fashion to supervision, in-service training and refinement of methodology.

10. Vitamin A deficiency correlates with malnutrition and many other problems that afflict poor rural households. Attempts to redress it should be intersectorial and entail collaboration between health, education and agricultural sectors. The promoters could catalyze such collaboration at the community level. If successful, project benefits may be broader than amelioration of Vitamin A deficiency and more likely to be sustainable.

TABLE 1.

Appendix A: Breakdown of NUTRIATOL vs. INCAPARINA

The specifications for the basic product (an INCAPARINA-like atol) and for the vitamin A-rich analogue (NUTRIATOL) are shown below. INCAPARINA is a commercially-successful product made of locally-available basic ingredients (corn flour, cotton seed flour). A brief survey of urban mothers, followed up after release of their respective children from the rehyudration unit of a general hospital after treatment for acute diarhea, showed that virtually all fed some INCAPARINA as part of the convalescent refeeding regimen (Lopez, M. L.; Molina, S.: unpublished results, CeSSIAM).

Nutrient Content: per 100 g of powder

	INCAPARINA	NUTRIATOL
vitamin A	4500 IU (1364 RE)	9990 IU (3000 RE)
Niacin	13.62 mg	13.62 mg
Thiamin (B1)	1.70 mg	1.70 mg
Riboflavin	1.01 mg	1.01 mg
iron	11.20 mg	11.20 mg
calcium	305.00 mg	305.00 mg
phosphorus	68.00 mg	68.00 mg
Lysine	250.00 mg	250.00 mg

The amount of powder to be used for a serving is 20 grams. Thus each serving of INCAPARINA supplies 273 RE of dietary vitamin A activity and each serving of NUTRIATOL will supply 600 RE which represents 2.4 times the requirement of vitamin A for a 0-3 year old child and twice the requirement for a 4-6 year old according to the recommendations of FAO/WHO.

TABLE 3.

Year	Purchased	Delivered to Schools	Reported Delivered to Agents
1988	308,000	50,927	17,584
1989	343,200	159,680	77,553
1990	-0-	111,450	N.A.

TABLE 4.

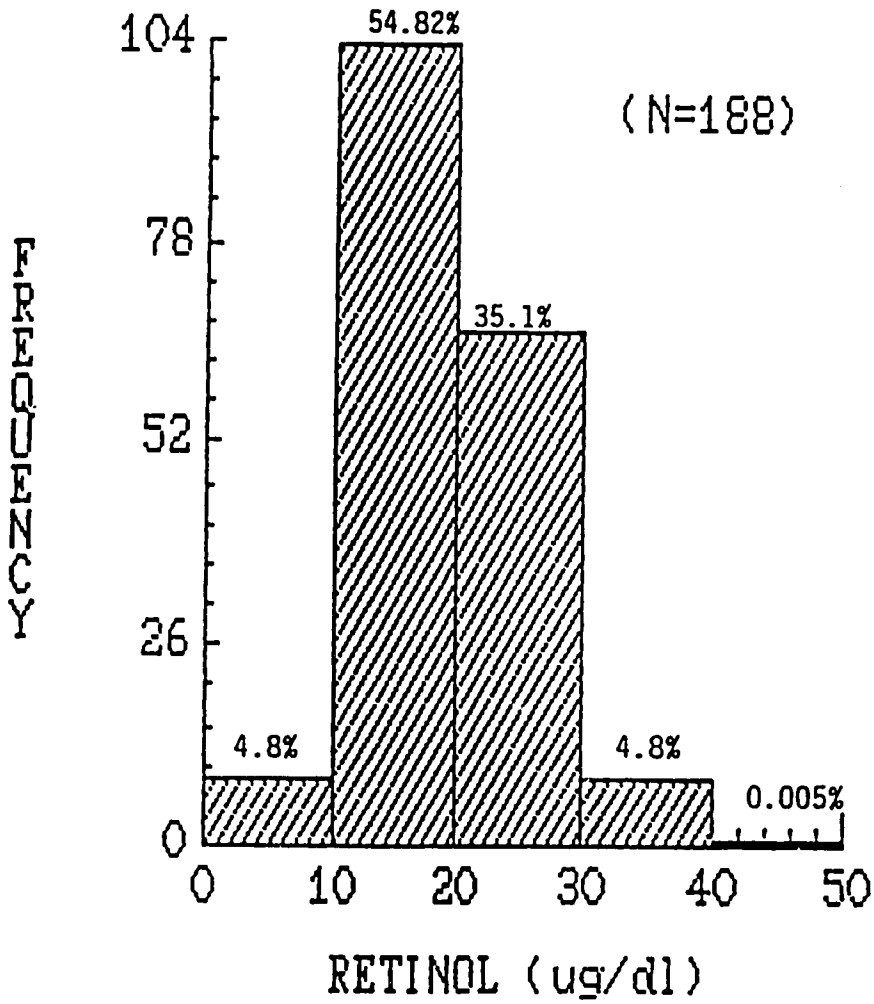
CONSULTA DE VISITAS A HOGARES

Condiciones de almacenamiento:
Roedores: 67 - Insectos: 68 - Humedad: 0 - Seco: 269

Comprensión del propósito del producto	SI (235) -	NO (63)
Comprensión de la forma de uso	SI (209) -	NO (89)
Conservación de paquetes vacios	SI (170) -	NO (128)
Comparten el producto	SI (8) -	NO (290)
Intercambian producto	SI (2) -	NO (296)
Conocimiento sobre vitamina A Si: 246	- Poco: 45 - Nada: 0	
Conservan hoja gráfica de instrucciones	SI (243) -	NO (55)
Obtención fácil del producto	SI (281) -	NO (1)
Pagó por el producto	SI (6) -	NO (292)
Agente entrega el producto bien	SI (279) -	NO (19)
Reciben el producto	SI (279) -	NO (19)

Enter) Continuar

FIGURE 1



This figure shows the Histogram Distribution of Plasma Retinol levels (As analyzed by Dr. Carmen Castañeda in the Nutritional Evaluation Laboratory of the U.S.D.A. Human Nutrition Research Center on Aging, a collaborative Center) for 188 preschool children from Kekchi households for two centers of the program of integrated attention to the preschool, child (P.A.I.N) collected by a team of investigators from Cessiam four point eight per cent of the children had retinol levels below 10 ug/dl, considered "deficient/at -risk"; 54.8% had levels from 10 to 19 ug/dl, considered "low" the combined prevalence o subnormal, plasma retinol was 60%

FIGURE 2.

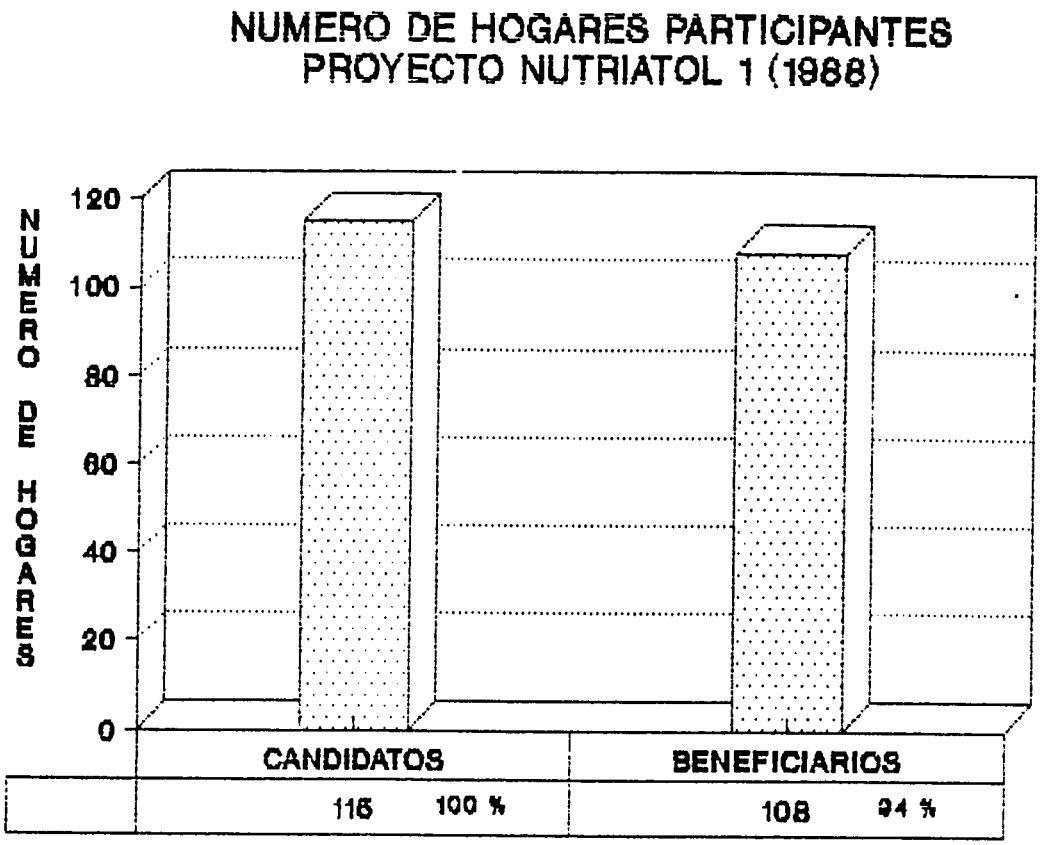

NUMERO DE HOGARES PARTICIPANTES
PROYECTO NUTRIATOL 1 (1988)
NUMERO DE HOGARES
120
100
80
60
40
20
0
CANDIDATOS
BENEFICIARIOS
116
100 %
108
94 %

FIGURE 3.

NUMERO DE NIÑOS PARTICIPANTES
PROYECTO NUTRIATOL 1 (1988)

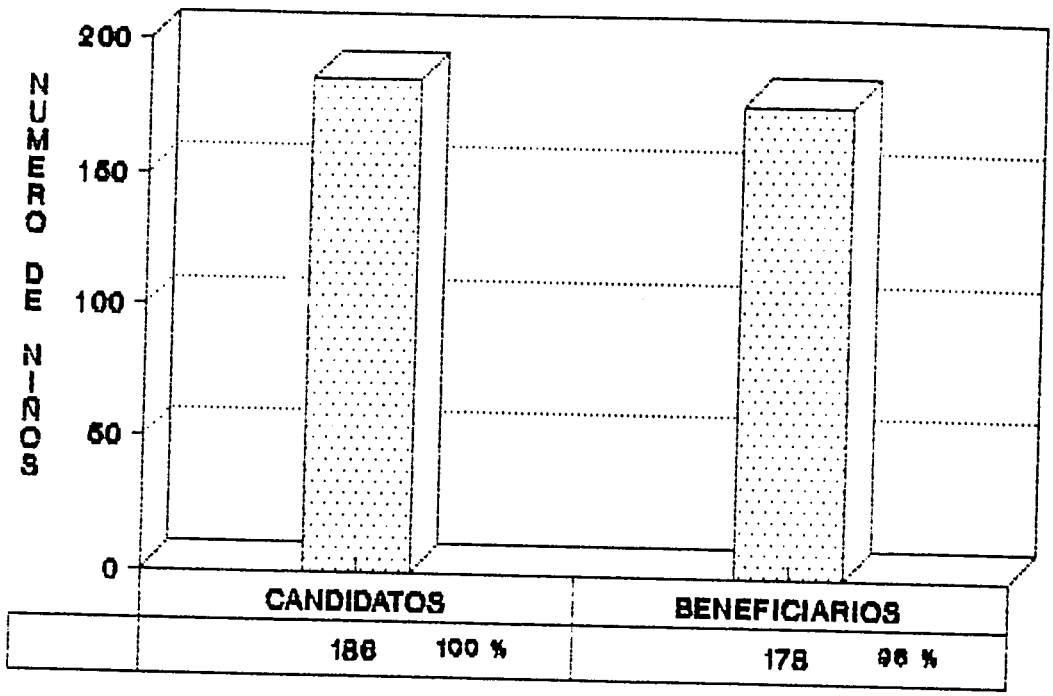
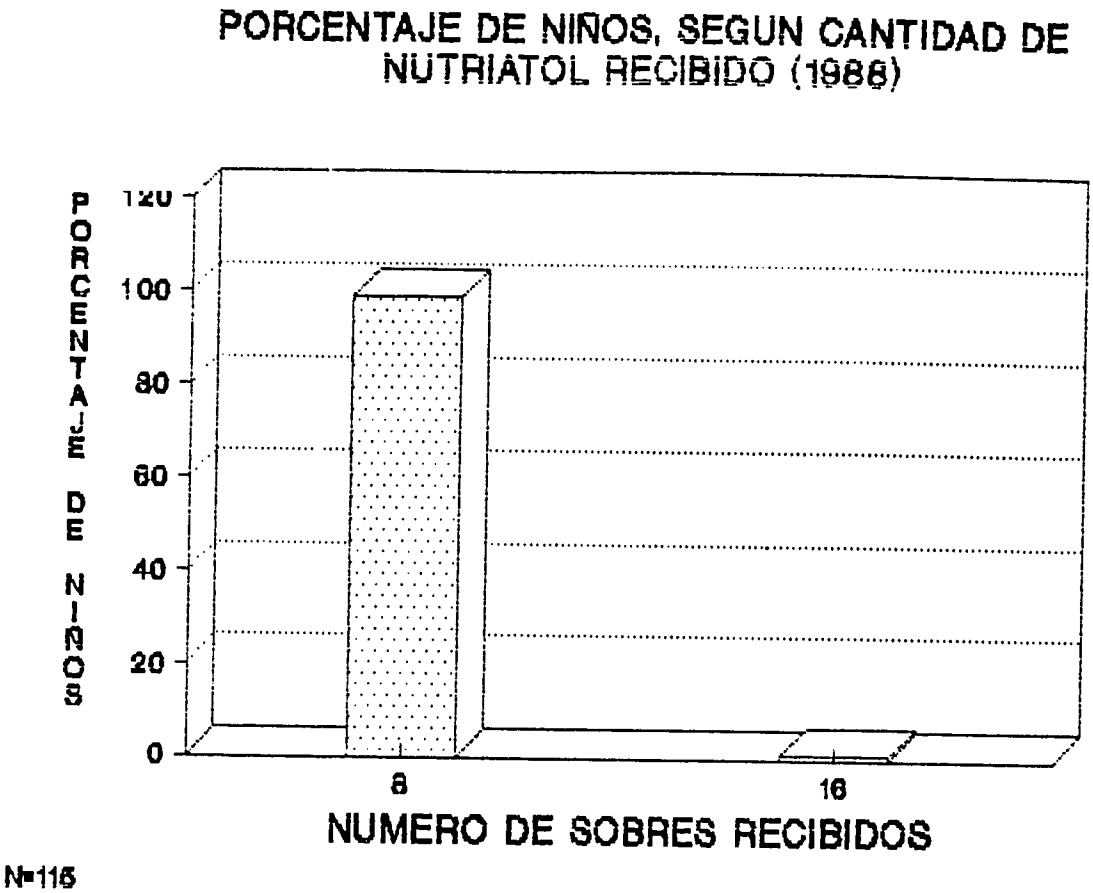


FIGURE 4.



N=116

FIGURE 5.

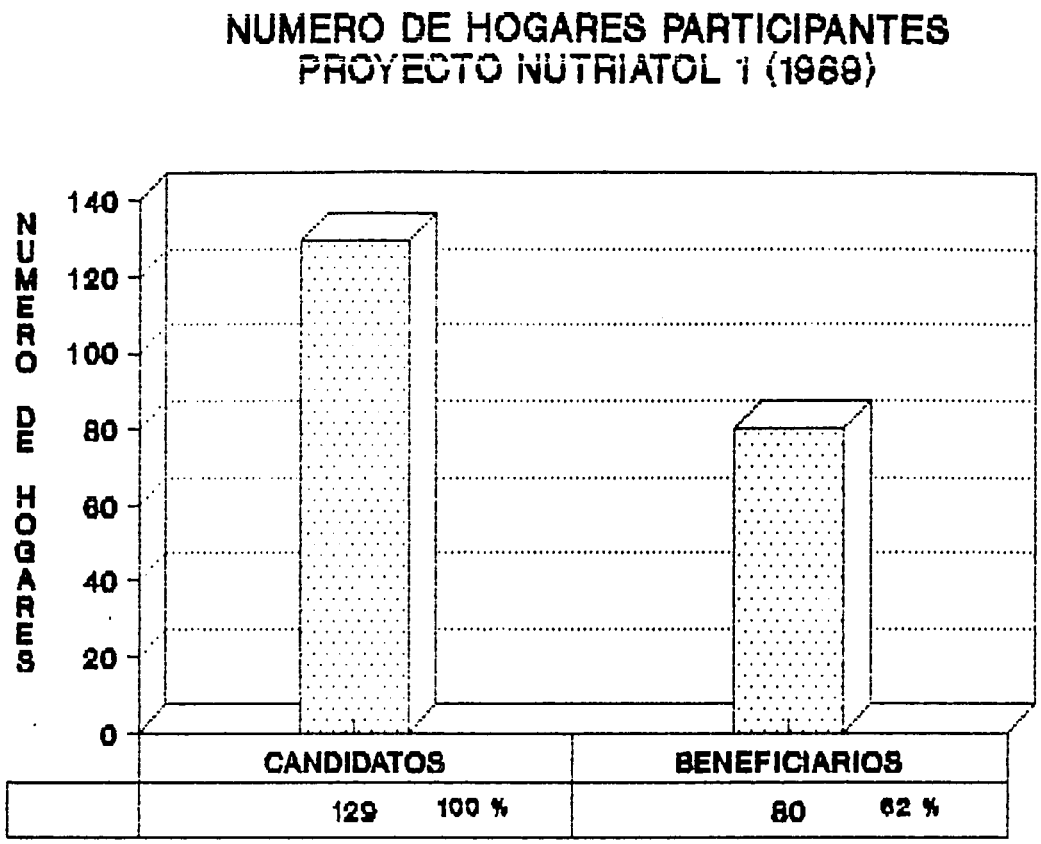

NUMERO DE HOGARES PARTICIPANTES
PROYECTO NUTRIATOL I (1969)
NUMERO DE HOGARES
140
120
100
80
60
40
20
0
CANDIDATOS
BENEFICIARIOS
129
100 %
80
62 %

FIGURE 6.

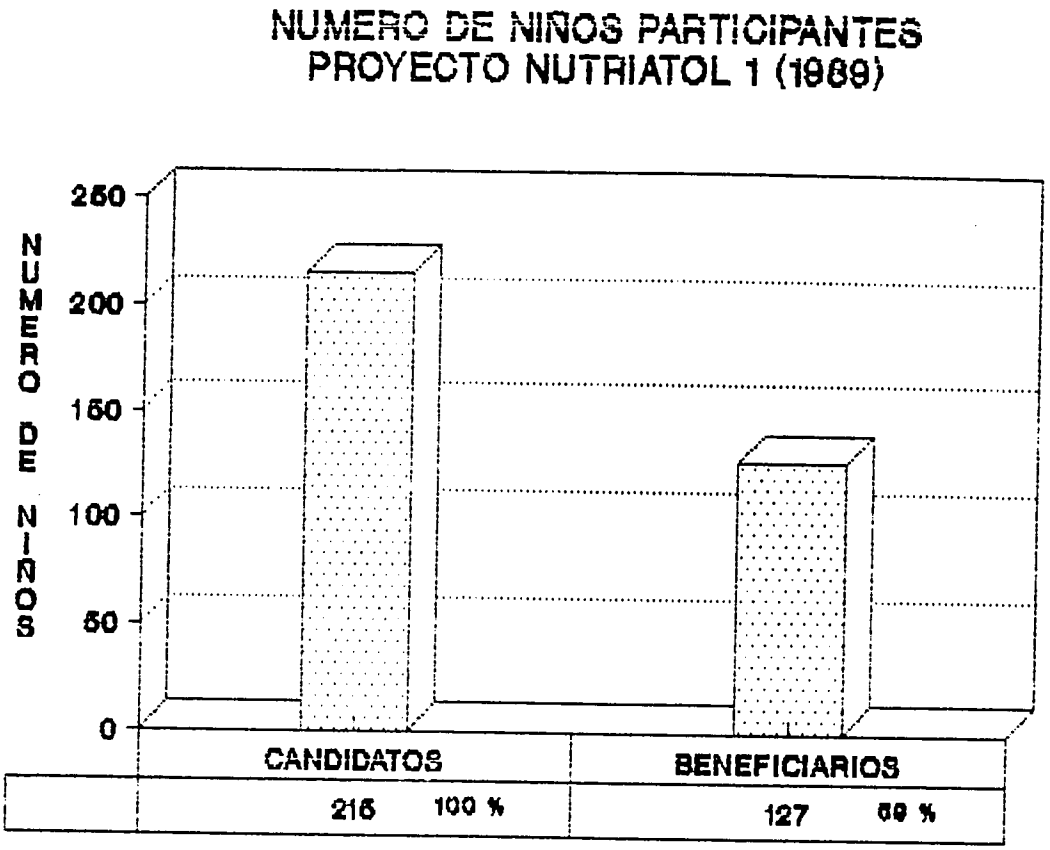

NUMERO DE NIÑOS PARTICIPANTES
PROYECTO NUTRIATOL 1 (1989)
NUMERO DE NIÑOS
250
200
150
100
50
0
CANDIDATOS
BENEFICIARIOS
215 100 %
127 59 %

FIGURE 7.

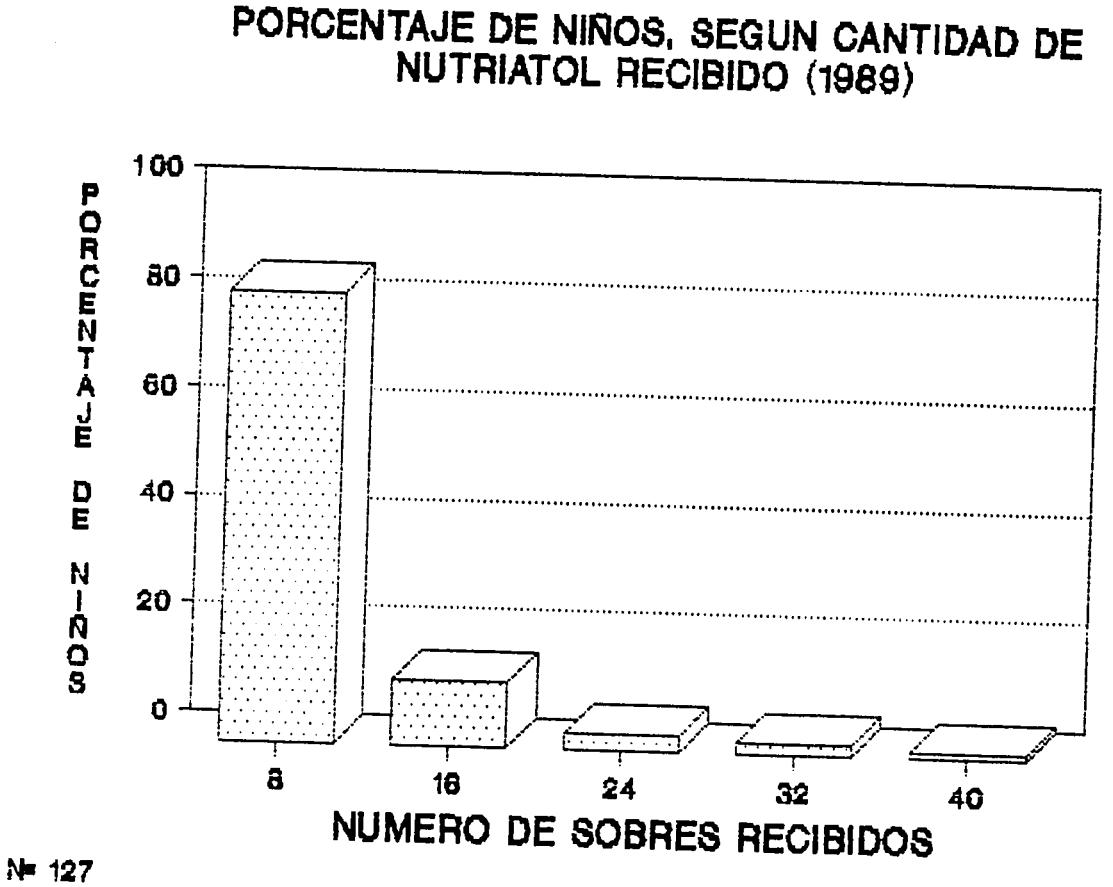

PORCENTAJE DE NIÑOS, SEGUN CANTIDAD DE NUTRIATOL RECIBIDO (1989)
PORCENTAJE DE NIÑOS
100
80
60
40
20
0
8
16
24
32
40
NUMERO DE SOBRES RECIBIDOS
N= 127

FIGURE 8.

NUMERO DE HOGARES PARTICIPANTES
PROYECTO NUTRIATOL 1 (1988)

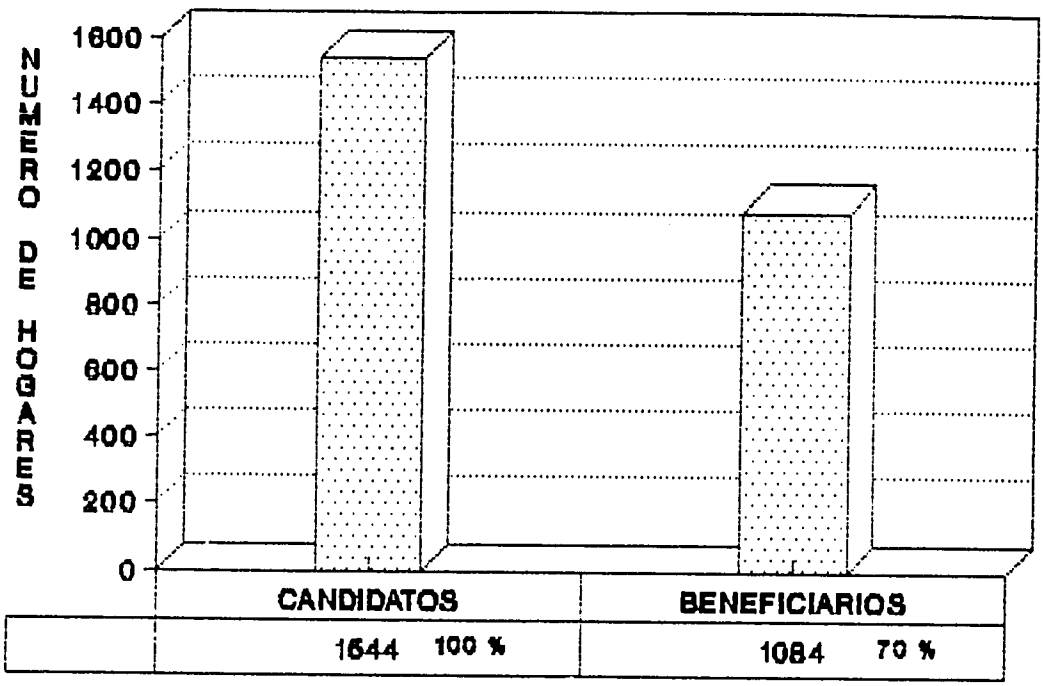


FIGURE 9.

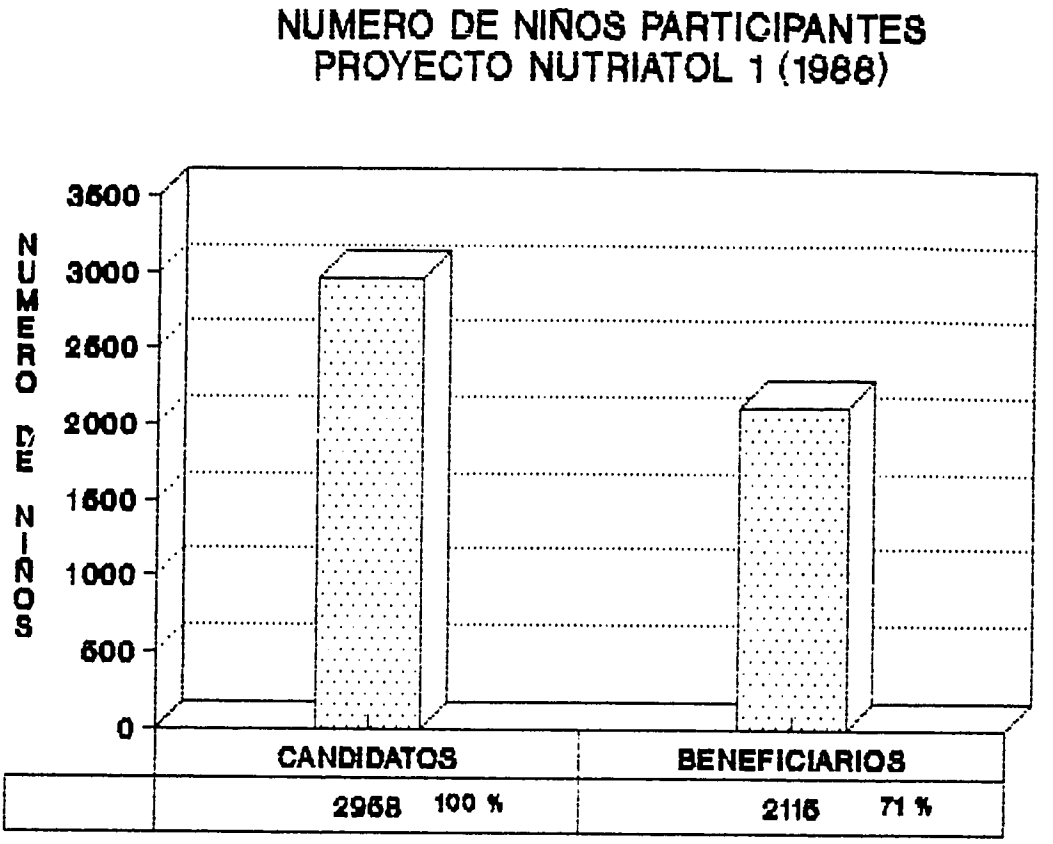

NUMERO DE NIÑOS PARTICIPANTES
PROYECTO NUTRIATOL 1 (1988)
NUMERO DE NIÑOS
3500
3000
2500
2000
1500
1000
500
0
CANDIDATOS
BENEFICIARIOS
2958 100 %
2116 71 %

FIGURE 10.

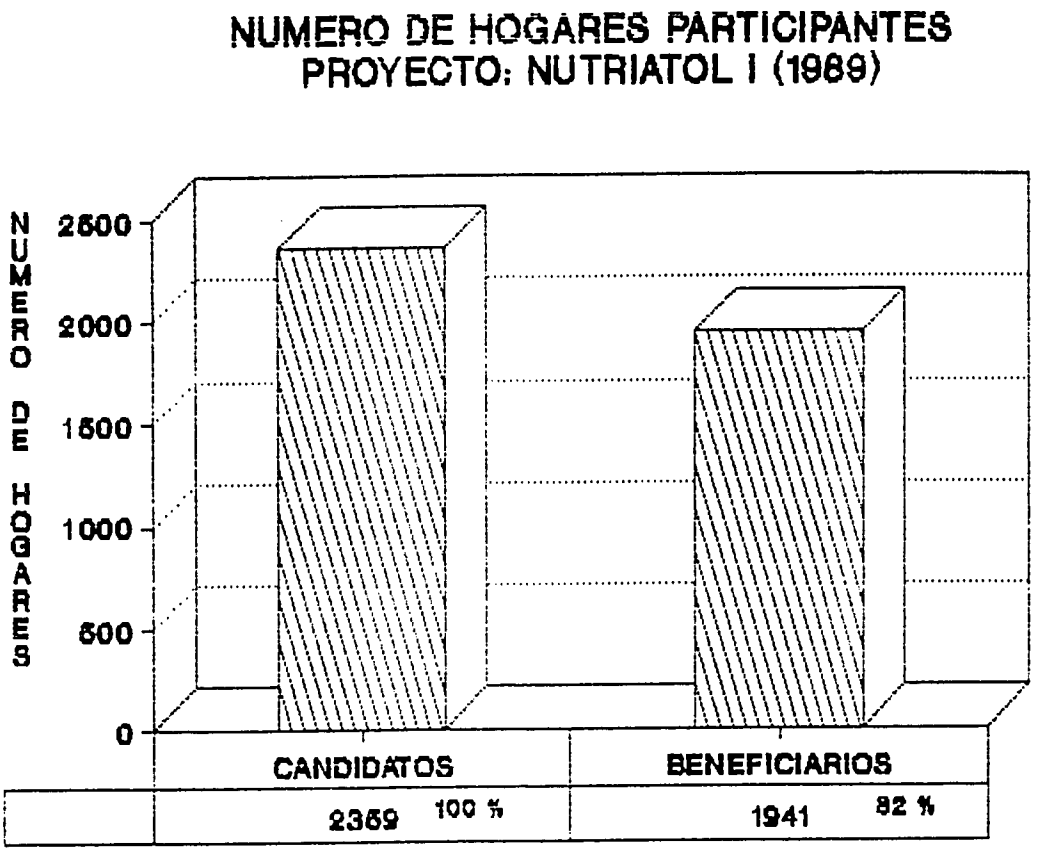

NUMERO DE HOGARES PARTICIPANTES
PROYECTO: NUTRIATOL I (1989)
NUMERO DE HOGARES
2500
2000
1500
1000
500
0
CANDIDATOS
BENEFICIARIOS
2369
100 %
1941
82 %

FIGURE 11.

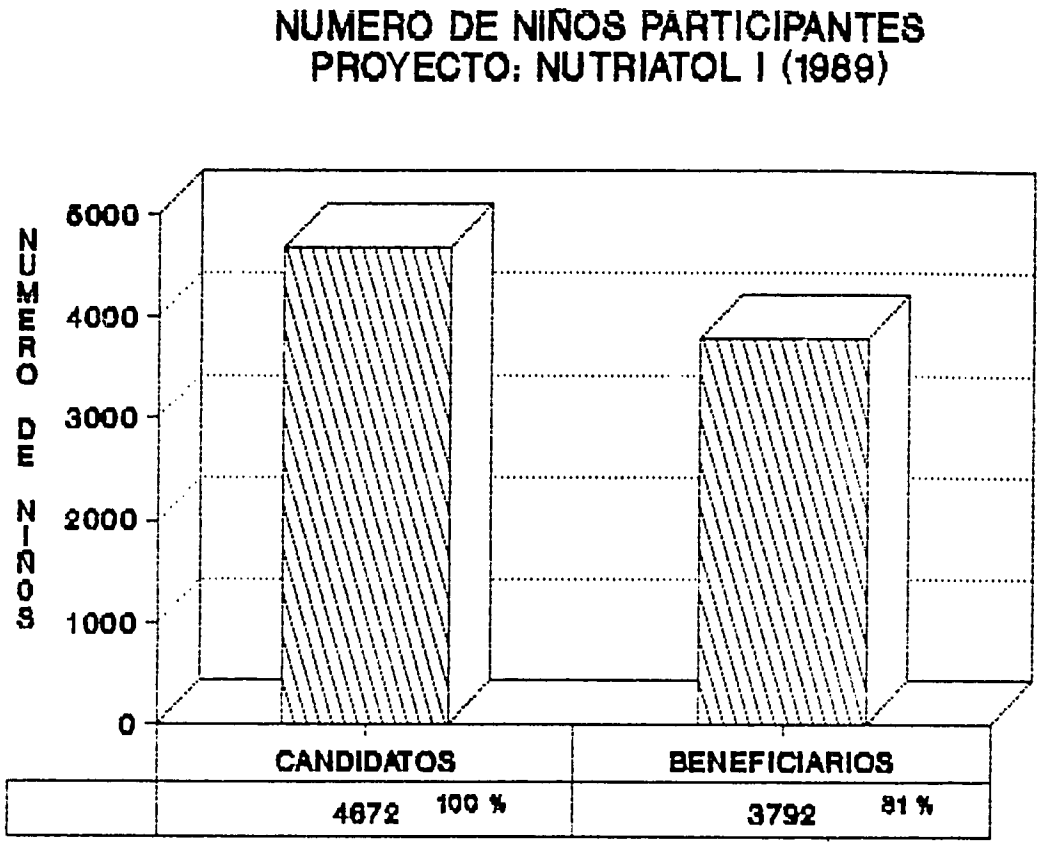

NUMERO DE NIÑOS PARTICIPANTES
PROYECTO: NUTRIATOL I (1989)
NUMERO DE NIÑOS
5000
4000
3000
2000
1000
0
CANDIDATOS
BENEFICIARIOS
4672
100 %
3792
81 %

FIGURE 12.

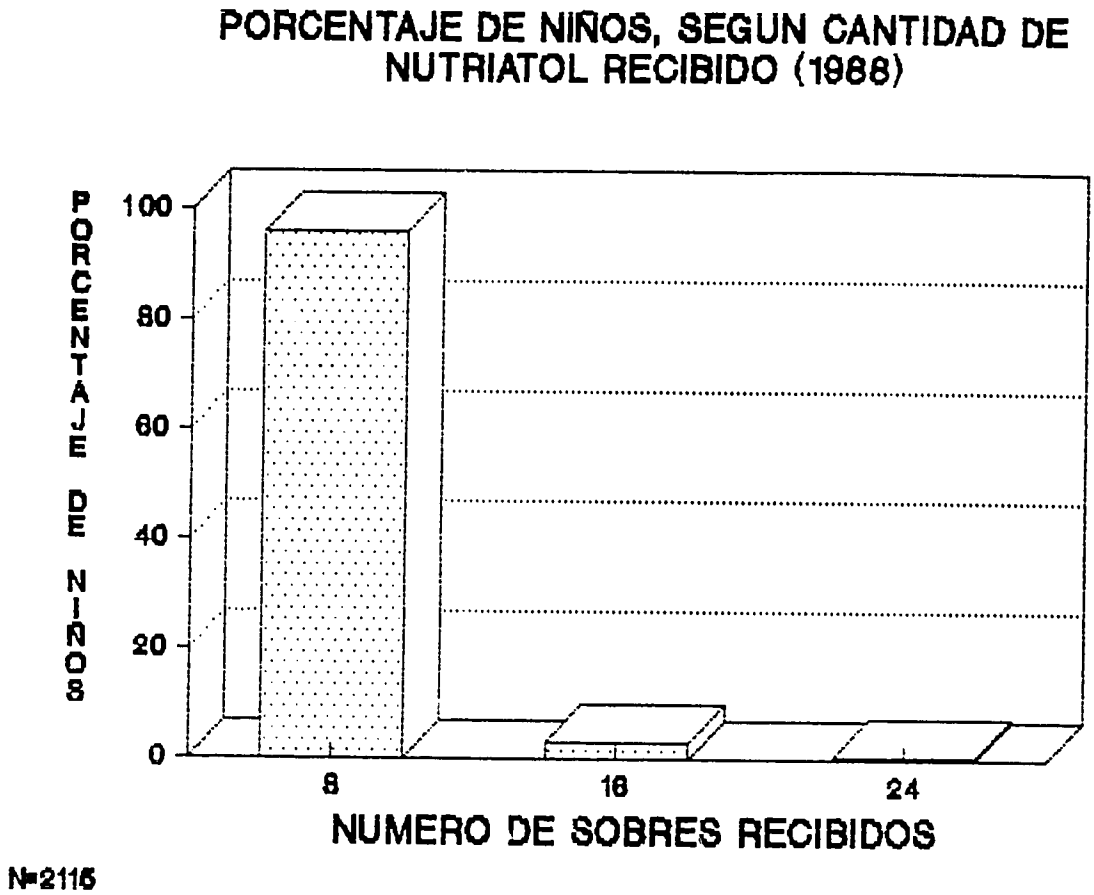
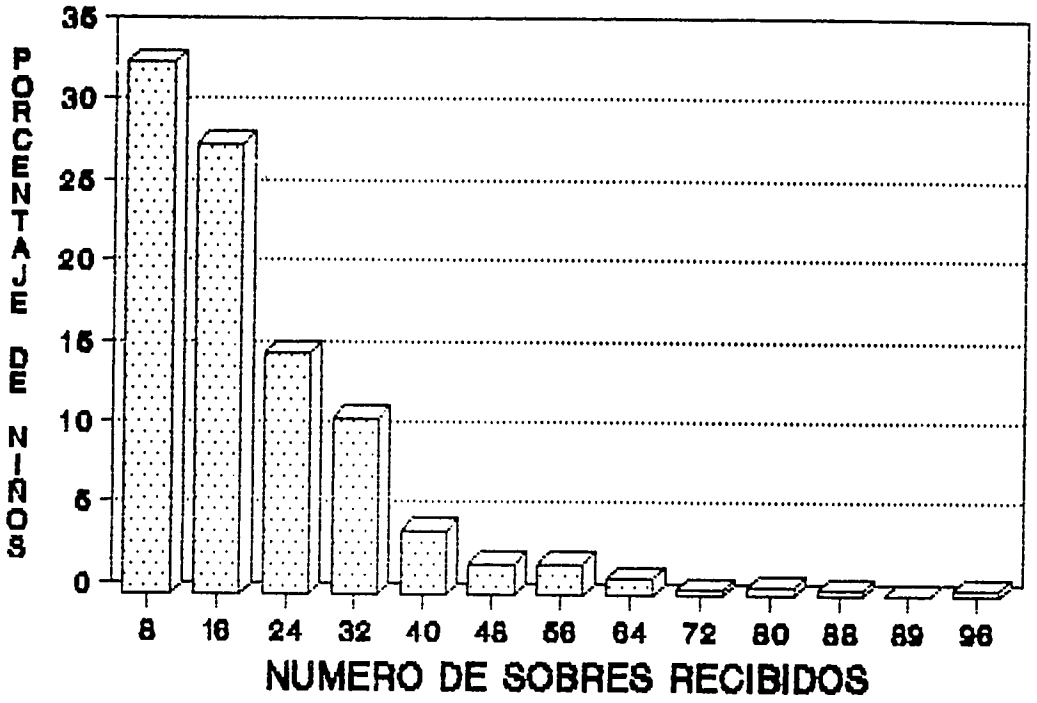

PORCENTAJE DE NIÑOS, SEGUN CANTIDAD DE NUTRIATOL RECIBIDO (1988)
PORCENTAJE DE NIÑOS
100
80
60
40
20
0
8
16
24
NUMERO DE SOBRES RECIBIDOS
N=2115

FIGURE 13.

PORCENTAJE DE NIÑOS, SEGUN CANTIDAD DE NUTRIATOL RECIBIDO (1989)



N= 3792

APPENDIX I

RESUMEN DE ACTIVIDADES DEL PROYECTO DE INTERVENCION DE VITAMINA "A" - PERIODO 1988

RO 1988
studio Impacto Biologico y Aceptabilidad
nstalacion de la computadora
eleccion de areas para distribucion
e compro el vehiculo
onvenio escrito Promotores/Hospital
e contrato P. A. C. - inicia en febrero

EERO 1988: Entrenamiento de Promotores de S.O.P.

:IO 1988
Visita APROFAM y ASECSA (Asoc. de Servicios
Asunto: Guia para Comunitarios de Salud
elaborar de Chimaltenango)
guias visuales.
Contratacion artista para elaborar guias visuales
T.S. Sra. de Vasques contacta supervisores de Educ.
para hacer presentacion del Programa en Coban
Se obtienen placas y seguro del vehiculo
P. A. C. dejo de trabajar para el Programa

RIL 1988
Se contrato nuevo P.A.C.
Compra e instalacion parrilla del vehiculo
Se pintan logos en las puertas de vehiculo
Construccion area de pacientes externos Hospital de Carcha
29 de abril: Sesion de Maestros - asistencia del 25%
Nuevo contacto con escuela de arte
Se escogieron 47 Escuelas y 1 Centro de Salud
Varias visitas a Data Pro (mayoria de formas oec. ajuste
para facilidad y exactitud
Dra. L. Vasquez viaja a Coban y Carcha - asunto estudio
aceptabilidad del Nutriatol en Alta Verapaz

YO 1988
Edyn M. firma documento responsabilidad del vehiculo
el 28-5-88
Compra de 513 sacos
Se solicita censo ninos pre-escolares del area
Se contrata otro artista para desarrollar ayudas visuales
Nuevos intentos contactar Data Pro
Arreglo lento de transporte Nutriatol, de Guatemala a Coban
(tocando del 6 al 26 de mayo)

UNIO 1988
Ampliaciones fotograficas y 2 juegos sliides
de ayudas visuales
7 y 8 de junio Hematologia PAIN
36,000 bolsas plasticas pequenas (paquetes de 8 unidades)
Envio de Nutriatol a Carcha, 14 y 15-6-88 (100 y 200 sacos)
- Se inicia labor de empaque el 28-6-88
- Inauguracion Hospital de Carcha
- Compra de 125 bolsas plasticas tamano oficio (sets Formas)
- Promotores son instruidos en manejo ayudas visuales y entrega de guia del material educativo
- Elaboracion del 1er. calendario de Informacion/Distribucion
- Impresion de 11,500 formas MIS
- Elaboracion de recibo de formas MIS a firmar por maestros

JULIO 1988
- Sustitucion de 3 escuelas por asunto de ubicacion
- Recorrido de Informacion individual a maestros sobre el manejo de las formas MIS, y al mismo tiempo acordar citas para sesion educativa (durante todo el mes)
- Visita de supervision sobre la comunicacion positiva del mensaje educativa, comprension de manejo de formas por maestros y revision del sistema de trabajo de promotores
- Resultado negativo de comunicacion con Data Pro

AGOSTO 1988
- Las sesiones educativas se llevaron a cabo durante todo el mes de agosto
- T.S. Sra. de Galvan y P.A.C. hacen supervision de sesiones educativas en Ketchi (comprobar transmision clara del mensaje)
- Los promotores empacan 3 o 4 horas diarias el Nutriatol a ser distribuido al dia siguiente
- Se detecto contaminacion de gusanos de palomilla en el Producto durante la 1ra. semana de agosto.
- 25 paquetes analizados en el Lab. de Alimentos S. A.
- 0.27% del producto desechado por contaminacion
  0.58% del producto desechado por defecto empaque/fabrica
- Se contrato personal temporal para labor seleccion del Nut.
- Alimentos S. A. reconoce una limpiacion mensual
- P.A.C. visito bodegas de Alimentos S. A. (asunto verificar condiciones desinfeccion del area de almacenamiento)
- La Universidad F. M. toma responsabilidad del desarrollo del Programa MIS (1ra. comunicacion con Nestor Garcia el 16-8-88)
- 25 sliides de vistas panoramicas (INCAP)

SEPTIEMBRE 1988
- Se llevan a cabo las visitas escolares
- 1, 8 y 9 de septiembre (visita Sr. Yancey)
- Se aplica encuesta a Promotores (asunto: retroalimentacion sobre labor desempenada)

OCTUBRE 1988
- Traduccion del Manuel de Instrucciones de Generador Elec.
- Problemas para recolectar las formas (15% de escuelas ya cerradas)
- P.A.C. realiza supervision de Visitas a Hogares
  a. Entrevista en Ketchi fluido (comprobacion)
  b. Se encontro cooperacion guia comunitario
  c. Se observo la falta de transporte a las aldeas
  d. No hay acceso al Centro de Salud y el Hospital
  e. No existe separacion de vivienda y comida de personas y animales domesticos
  f. La vivienda consiste en un solo cuarto para guardar y preparar alimentos, siendo el mismo tambien para dormir
- Promotores manifiestan descontento con labor de empaque
- Aumento de salarios (33.33% y 20%)
- Se desarrolla la nueva forma de Visita a Hogares

NOVIEMBRE 1988
- Se comienza a usar parte del programa MIS (alimentacion de datos se inicia el 9 de noviembre)
  a. Claves de seguridad b. Registro de datos de agentes y consumidores
- Redistribucion de Nutriatol directa a Hogares durante visitas se hicieron durante el mes de noviembre, terminando el dia 26
- Vehiculo Suzuki traido a Guatemala por Edyn Martinez (para permanecer en Guatemala durante el mes de diciembre, hasta el reinicio de labores del Programa en enero 1989
- Se seleccionaron 21 escuelas adicionales a las que asisten un promedio de 1000 alumnos
- Del 28 de noviembre al 9 de diciembre se empacaron 8000 paquetes de Nutriatol de 8 unidades c/u (10 dias a 800 paquetes diarios)
- 211 sacos de Nutriatol fueron transportados a Carcha el dia 29 de noviembre
- Problemas de personal en el Centro de Salud de Lanquin impidieron distribucion. Solamente 11 unidades fueron distribuidas a 1 consumidores. Se solicitaron 100 tarjetas para facilitar control de distribucion de 1989.

Comité Nac. Prociegos y S. M.
I. E. F.
Fundación Internacional del ojo

REPORTE DE ACTIVIDADES
1989
R E S U M E N

Las actividades del Proyecto de Intervención de Vitamina "A" para el año de 1989, se iniciaron con una sesión informativa para los maestros de las 69 escuelas participantes y el Director Medico del Centro de Salud de Lanquín A. V. Esta sesión se hizo el día 10 de Febrero en el Auditorium del Colegio la Inmaculada de Coban, A. V.

Tomando en cuenta los 70 establecimientos que participarían en el proyecto, se esperaba la asistencia de 190 personas, mas solo asistieron 75 maestros y el Medico de Lanquin que en total hicieron 76 Personas, quiere decir esto que asistio un 40% y estuvo ausente un 60%.

En los meses siguientes se elaboraron itinerarios para visitas escolares con el fin de Informar sobre las formas, entrega de Nutriatol y Cita de Madres de Familia para las Sesiones Educativas.

Se elaboro un itinerario de acuerdo a la distancia y ahorro de combustible para educar a las Madres de Familia, las platicas fueron impartidas en los 70 establecimientos, esta fase se inició el día 13-03-89 y segun lo establecido terminaría el día 11-05-89 pero como siempre hay incomvenientes, como por ejemplo: Reuniones Magisteriales, siembra y limpia de Maíz o por Olvido de los Profesores, entonces se elaboro otro itinerario con nuevas fechas para las escuelas que aun todavía no habian recibido la información Educativa, este se inicio el día 12-05-89 y finalizo el día 31-05-89.

Se tuvo el dato de la cantidad de madres de familia de todos los establecimientos en cuenta el Centro de Salud de Lanquin, este era de 2,813 Madres de Familia, al haber finalizado esta fase se tuvo el dato de 2,463 Madres asistentes a la Sesiones Educativas lo cual nos dió un 87.6% de Asistencia, y un 12.4% de Ausencia.

El Proyecto del año de 1989, tuvo 4 distribuciones de Nutriatolen total siendo que se distribuyeron 19,960 paquetes de 8U., o sea 159,680 Unidades. La distribucion fue Real pero el retorno de la Constancia de Entrega no lo domostro así, ya que no se tuvo la suficiente colaboracion de parte de el personal docente de los establecimientos asi como el personal del Centro de Salud de Lanquin.

En cuanto a los establecimientos de PAIN que son 2, estan incluidos dentro de los 69 establecimientos, ya que no se les discrimino en cuanto a la beneficencia del proyecto y al igual que los demas ellos tambien no respondieron como se esperaba.

En cuanto a la evaluacion en las visitas domiciliarias para conocer y saber cuanto entendieron en las sesiones educativas, dire que fue regular ya que un 78% de las madres encuestadas si entendieron la Higiene, la elaboracion del suero Oral y Nutria-Atol, el resto o sea 22% confundio el suero Oral con el Nutria-Tol, poca higiene en casa y de sus niños asi como el consumo del producto para toda la familia y no solo para el o los niños menores de 6 años.

Hay que hacer enfasis en el hecho de que al hacer visitas domiciliarias, la persona tiene que ser suficientemente bilingue ya que nuestra poblacion es en el 95% de habla Q'eqchi' Si esto no es así los datos que se recaben o la informacion que se les de no llegara en un 100%, al menos en lo peronal estoy satisfecho al haber dado las 70 Platicas Educativas y posteriormente evaluar mi mensaje en las Visitas.

Promotor Salud Ocular
I. E. F.
Comité Nac. Proiectos A.S.M.
Dr. Martin A.V.

Promotor del Proyecto.

APPENDIX II

R E P O R T

STUDIES ON THE COMPARATIVE ACCEPTABILITY OF NUTRITAIOL AND INCAPARINA FOR THE POST-EPISODE CONVALESCENT FEEDING OF CHILDREN TREATED FOR DIARRHEAL DISEASE IN HOSPITAL OUT-PATIENT DEPARTMENTS IN GUATEMALA CITY AND ALTA VERAPAZ

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INTRODUCTION

The problem of hypovitaminosis A continues to be evident in various populations of Guatemala. It has been recognized that an episode of infectious disease has the effect of producing a deterioration in the hepatic reserves and nutritional status of the individual with respect to this vitamin. This motivated the search for an intervention that would allow attention to the specific repletion of children suffering an episode of gastroenteritis or measles. A brief survey conducted among mothers of children receiving treatment for diarrhea at the "San Juan de Dios" General Hospital in Guatemala City revealed that all of the mothers had introduced the commercial "atol" product, Incaparina, into the diet of their children during the convalescent phase of the illness (Lopez M, Molina S: unpublished observations). Thus the product NutriAtol was conceived of to deliver 2.4 times the daily recommended allowance of dietary vitamin A.

NutriAtol was conceived of as a medicinal food. It differs from the product that is in the marketplace (Incaparina) in that; 1) it comes in an individual serving-size packet to make one 8 fluid ounce serving for one individual (as opposed to Incaparina which has its smallest packet provide one-liter [or four servings] of the beverage); 2) it has a distinct (and unfamiliar) package; 3) it has the sugar premixed into the dry preparation; and 4) it has 600 RE of vitamin A activity per

serving as compared to 273 RE for Incaparina. One of the components of applied research in the initial phase of the NutriAtol Intervention Project of the National Committee for the Blind and Deaf of Guatemala and the International Eye Foundation (IEF) of Bethesda, Maryland was to determine the acceptability of the formulation and delivery of the vitamin A-enriched product, and compare it to the standard commercial product, Incaparina.

SUBJECTS AND METHODS

The subjects eligible for this study were patients aged 6 mo to 72 mo who attended one of the outpatient treatment centers during the days of enrollment. The treatment-center in the urban study was the outpatient department and Rehydration Unit of the Pediatric Hospital of the Guatemalan Institute of Social Security (IGSS). The treatment centers in the Alta Verapaz study were: 1) the outpatient department of the Regional Hospital of Coban; 2) the government Health Center at San Pedro Carcha.

The mode of enrollment was to have our staff persons on duty in the treatment centers. They asked hospital personnel to refer to them children in the appropriate age- group when they were due for discharge after evaluation and treatment for their diarrheal episode. The mothers were asked for their collaboration. If agreeing to participation, the child was

assigned in alternating order to NutriAtol, Incaparina, NutriAtol, Incaparina, etc. Depending on the treatment modality a specific, and appropriate, set of verbal instructions were given for the preparation of the respective products. The common denominator of the instructions to the mothers was: to give the child a single, 8 oz serving on each of next four days. Data on the the age, sex, presence of vomiting, fever and dehydration as part of the clinical picture of the episode and the address and localization of the home were obtained, and the powdered product (NutriAtol or Incaparina) was donated to the mother-child dyad.

On the fifth day following the patient's visit to the treatment center, and the day after which the final of the four doses was due to be given, a promotor visited the home (or tried to visit the home) of the patient's family. On that occasion he asked whether the diarrhea had continued, or if not, when had it finshed. Also, the specific -- day-by-day -- intake of the assigned preparation was inquired in terms of the amount prepared for the child, the amount consumed, and the amount discarded, and whether any other member of the family had consumed the product. The data was tabulated, and means and standard deviations were calculated.

Urban Phase

The urban phase of the acceptability study was to determine

whether there would be any differences in the acceptance and consumption of the offered atol products (i.e. between NutriAtol and Incaparina) by postdiarrheal children from the dominant, city-dwelling group. This was also a "warm-up" and training phase for the later phase with rural Kekchi mothers.

The elements of comparability of treatment groups were: age of patients; duration of diarrhea; distribution of gender of subjects; presence of vomiting; presence of fever; and presence of dehydration. Firstly, in none of these aspects were important differences observed between the total group assigned to NutriAtol (n = 18), and the subgroup encountered at follow-up (n = 16) or between the total group assigned to Incaparina (n = 18) and the subgroup found at the home visit (n = 12)(see MASTER TABLE). The NutriAtol/Urb subgroup had a mean age of 13.0 $\pm$ 5.3 mo (median: 12 mo; range: 6 to 28 mo), as compared with the Incaparina/Urb subgroup's 12.9 $\pm$ 3.9 mo (median: 13.5 mo; range: 6 to 19 mo). There is no significant differnce in mean ages, nor in their distribution. The mean durations of prior diarrhea were 3.9 $\pm$ 2.8 days (median: 4 days; range: 1 to 12 days) (NutriAtol) subgroup and 5.8 $\pm$ 3.3 days (median: 5.5 days; range: 1 to 13 days) (Incaparina) subgroup. In the NutriAtol/Urb subgroup, 9 patients (56.2%) were males and 7 were females (43.8%); the partition in the Incaparina/Urb was 6 males (50%) and 6 females (50%). With respect to vomiting associated with the diarrheal episode, 10 patients in the

NutriAtol/Urb subgroup (62.5%), and 9 patients (75%) in the Incaparina/Urb subgroup. This rate of vomiting is not different between subgroups. The incidence of a febrile diarrheal episode was slightly, but not significantly, greater in the NutriAtol/Urb subgroup, 13 of 16 (81.2%) than in the Incaparina/Urb subgroup 7 of 12 (58.3%). Three children (18.8%) in the NutriAtol/Urb subgroup and 4 children (33.%) of the Incaparina/Urb subgroup had dehydration when seen at the hospital.

At the 5th-day household visit, 18% of the children in the NutriAtol/Urb subgroup and 25% of the Incaparina/Urb still had diarrhea. In terms of consumption of the atol, the mean daily consumption of prepared product by the NutriAtol/A.V. group was 6.4 ± 2.3 fluid ounces (median: 7.2 oz; range 1 to 8 oz) The mean cumulative, 4-day consumption was 24.8 ± 10 oz (median: 28 oz; range: 1 to 32 oz). A total of 24 oz of prepared product was rejected, and had to be discarded. Six packages of the NutriAtol (240 g) were returned at the home visit. With the level of retinyl palmitate fortification in the product, the mean cumulative vitamin A intake from the NutriAtol was 1863 ± 748 RE (median 2100 RE; range: 75 to 2400 RE). The mean daily consumption of prepared product by the Incaparina/Urb group was 7.0 ± 1.2 fluid ounces (median: 7.6 oz; range 4.5 to 8 oz) The mean cumulative, 4-day consumption was 25.1 ± 6.2 oz (median: 26 oz; range: 16 to 32 oz). A total of 72.5 oz of

prepared product was rejected, and had to be discarded. A total of 280 g of Incaparina powder had not been used, and was returned at the home visit. With the level of retinyl palmitate fortification in the product, the mean daily vitamin A intake from the NutriAtol was 858 ± 212 RE (median 888 RE; range: 546 to 1092 RE). The difference in total daily vitamin A consumption from the distributed atol product was significantly different between treatment groups ($p<0.01$).

Rural Phase

The rural phase of the acceptability study was to determine whether there would be any differences in the acceptance and consumption of the offered atol products (i.e. between NutriAtol and Incaparina) by postdiarrheal children from the cultural/linguistic group that is the target for the definitive distribution of NutriAtol (Kekchi), and to see if any differences between the rural Kekchi mothers and children and the urban mothers and children from the capital city (see above) would be apparent.

The elements of comparability of treatment groups were again: age of patients; duration of diarrhea; distribution of gender of subjects; presence of vomiting; presence of fever; and presence of dehydration. Firstly, in all aspects of these elements, no important differences were observed between the total group assigned to NutriAtol (n = 19), and the subgroup

encountered at follow-up (n = 16) (see MASTER TABLE). The NutriAtol/AV subgroup had a mean age of 15.4 ± 14.4 mo (median: 11 mo; range: 5 to 64 mo), as compared with the Incaparina/AV subgroup's 20.8 ± 11.5 mo (median: 20 mo; range: 6 to 49 mo). Although there is no significant differnce in ages, the former group is distributed toward younger patients and the latter toward older. The mean durations of prior diarrhea were 4.3 ± 1.9 days (median: 4 days; range: 2 to 10 days) (NutriAtol) subgroup and 4.4 ± 2.0 days (median: 5 days; range: 1 to 10 days) (Incaparina/AV subgroup). In the NutriAtol/AV subgroup, 8 patients (50%) were males and 8 were females (50%); the partition in the Incaparina/AV was 10 males (62.5%) and 6 females (37.5%). With respect to vomiting associated with the diarrheal episode, 11 patients in the NutriAtol/AV subgroup (68.8%), but only 2 patients (12.5%) in the Incaparina/AV subgroup. This rate of vomiting is different between subgroups ($p<0.05$), and would militate against successful consumption of NutriAtol. The incidence of a febrile diarrheal episode was equivalent, with 56.2% and 50% in the NutriAtol/AV and Incaparina/AV subgroup. No child in either group was dehydrated.

At the 5th-day household visit, 12.5% of the children in the NutriAtol/A.V. subgroup and 31.2% of the Incaparina/A.V. still had diarrhea. In terms of consumption of the atol, the mean daily consumption of prepared product by the

NutriAtol/A.V. group was 7.3 ± 1.8 fluid ounces (median: 8 oz; range 1.3 to 8 oz) The mean cumulative, 4-day consumption was 28.5 ± 7.2 oz (median: 32 oz; range: 5 to 32 oz). A total of 48 oz of prepared product was rejected, and had to be discarded. One package of the NutriAtol (40 g) was returned at the home visit. With the level of retinyl palmitate fortification in the product, the mean daily vitamin A intake from the NutriAtol was 2137 ± 537 RE (median 2400 RE; range: 375 to 2400 RE). the mean cumulative consumption of prepared product by the Incaparina/A.V. group was 6.6 ± 2.0 fluid ounces (Median: 7.8 oz; range 2.1 to 8 oz) The mean cumulative, 4-day consumption was 26.0 ± 8.5 oz (median: 31 oz; range: 8.5 to 32 oz). A total of 96 oz of prepared product was rejected, and had to be discarded. No Incaparina was returned at the home visit. With the level of retinyl palmitate fortification in the product, the mean daily vitamin A intake from the NutriAtol was 888 ± 290 RE (median 1057 RE; range: 290 to 1092 RE). The difference in total daily vitamin A consumption from the distributed atol product was significantly different between treatment groups ($p<0.01$)

DISCUSSION

The exercises had respective goals of enrolling 40 children in each of the two regions -- urban/capital city and rural/Alta Verapaz -- with 20 randomly assigned to each of the alternative atol products (NutriAtol or Incaparina). The exercises fell

X not daily should read total

XX Incaparina

short of the established quota in both locales: in the urban study, 36 children were enrolled, but only 28 were available for5th-day follow-up; in the rural study, 35 children were enrolled, but only 32 were followed up with a home visit. Despite this attrition, the results are felt to be meaningful and interpretable.

The primary comparison is across treatments, and with the exception of the reverse skewing of the age distributions in the rural children and the significantly greater vomiting in the diarrheal episodes of the children assigned to NutriAtol in Alta Verapaz, the groups at the time of enrollment in the study -- and the subgroups followed up with the home visit, were basically comparable. This is consistent with the conditions for the null hypothesis of no difference in acceptability and tolerance being tested at both the urban and the rural localities. ALthough the across-treatment comparability is the most important, a within-treatment, across-region null hypothesis is also of interest, namely that the geographical-cultural backgrounds of the mothers and patients would not be a factor in the acceptability. In this regard, the subgroups for NutriAtol -- urban versus A.V. -- were comparable in age, duration of diarrhea, presence of vomiting, and presence of fever. The outstanding difference was the presence of fluid-electrolytic imbalance in some of the urban children, but in none of the rural children. The subgroups assigned Incaparina

were comparable across region with regard to gender distribution, duration of diarrhea, and the presence of fever. The median ages were 20 and 13.5 mo, respectively, and the rate of vomiting was lower in the urban group while there was an incidence of dehydration in that group.

With respect to the comparisons of the alternative products we can observe in both the urban cohorts and the rural cohorts that virtually no differences exist in the rates of consumption. The fact that NutrAtol was a new and unfamiliar product did not lead to its rejection, nor did its pre-determined level of sweetening reduce the chidren's consumption. Similarly, the inconvenience of having to divide into four portions the powder in a 75-80 g baglet of Incaparina, and to provide sugar independly did not produce a relative decrease in its intake. Although the total amounts of the atol that was prepared and then not consumed by the child, it is of note that three times as much Incaparina in the urban population and twice as much Incaparinae in the rural area was rejected, as compared to NutrAtol. It is also of speculative interest that rural children consumed, on average, almost a fluid ounce more of the NutriAtol than did their counterparts in the city. Overall, we can conclude that NutriAtol is at least as acceptable as Incaparina as a postdiarrhea food for both urban mothers and their convalescing children, and that it supplies 2.5 times as much vitamin A.

Appendix A: Breakdown of NUTRIATOL vs. INCAPARINA

The specifications for the basic product (an INCAPARINA-like atol) and for the vitamin A-rich analogue (NUTRIATOL) are shown below. INCAPARINA is a commercially-successful product made of locally-available basic ingredients (corn flour, cotton seed flour). A brief survey of urban mothers, followed up after release of their respective children from the rehyudration unit of a general hospital after treatment for acute diarhea, showed that virtually all fed some INCAPARINA as part of the convalescent refeeding regimen (Lopez, M. L.; Molina, S.: unpublished results, CeSSIAM).

Nutrient Content: per 100 g of powder

	INCAPARINA	NUTRIATOL
vitamin A	4500 IU (1364 RE)	9990 IU (3000 RE)
Niacin	13.62 mg	13.62 mg
Thiamin (B1)	1.70 mg	1.70 mg
Riboflavin	1.01 mg	1.01 mg
iron	11.20 mg	11.20 mg
calcium	305.00 mg	305.00 mg
phosphorus	68.00 mg	68.00 mg
Lysine	250.00 mg	250.00 mg

The amount of powder to be used for a serving is 20 grams. Thus each serving of INCAPARINA supplies 273 RE of dietary vitamin A activity and each serving of NUTRIATOL will supply 600 RE which represents 2.4 times the requirement of vitamin A for a 0-3 year old child and twice the requirement for a 4-6 year old according to the recommendations of FAO/WHO.

CONSUMO DE NUTRIATOL

CONSUMPTION OF NUTRIATOL BY THE SUBGROUP: URBAN STUDY

No.	Día 1	Día 2	Día 3	Día 4	Total	RE
1	6	8	0	8	22	1,650
2	4	8	8	8	28	2,100
3	8	8	8	8	32	2,400
4	8	8	8	8	32	2,400
5	8	8	8	8	32	2,400
6	4	8	8	8	28	2,100
7	8	8	8	8	32	2,400
8	4	8	8	8	28	2,100
9	8	6	8	8	30	2,250
10	1	1.5	2	6	10.5	787.5
11	8	8	8	8	32	2,400
12	8	8	8	8	32	2,400
13	1	3	0	0	4	300
14	1	0	0	0	1	75
15	8	8	4	8	28	2,100
16	3	8	8	7	26	1,950

CONSUMO DE INCAPARINA

CONSUMPTION OF INCAPARINA BY THE SUBGROUP: URBAN STUDY

No.	Día 1	Día 2	Día 3	Día 4	Total	RE
1	7	8	8	6	29	989.6
2	8	8	8	8	32	1,092
3	8	8	8	8	32	1,092
4	2	4	6	6	18	614.3
5	5	7	8	4	24	819
6	0	0	8	8	16	546
7	8	8	8	8	32	1,092
8	6	6	7	8	27	921
9	8	8	8	8	32	1,092
10	3	4	5	7	19	648.4
11	5	5	7	8	25	853.1
12	8	8	0	0	16	546

CONSUMO DE NUTRIATOL

CONSUMPTION OF NUTRIATOL BY THE SUBGROUP: ALTA VERAPAZ

No.	Día 1	Día 2	Día 3	Día 4	Total	RE
1	8	8	8	8	32	2,400
2	8	8	8	8	32	2,400
3	8	8	8	8	32	2,400
4	6	6	6	6	24	1,800
5	8	8	8	8	32	2,400
6	8	8	8	0	24	1,800
7	8	8	8	8	32	2,400
8	8	8	8	8	32	2,400
9	8	8	8	8	32	2,400
10	8	8	8	8	32	2,400
11	8	8	8	8	32	2,400
12	7	7	7	8	29	2,175
13	8	8	8	8	32	2,400
14	4	5	6	7	22	1,650
15	8	8	8	8	32	2,400
16	1	1	1	2	5	375

CONSUMO DE INCAPARINA

CONSUMPTION OF INCAPARINA BY THE SUBGROUP: ALTA VERAPAZ

No.	Día 1	Día 2	Día 3	Día 4	Total	RE
1	8	6	6	8	28	955.50
2	8	8	8	6	30	1,023.75
3	8	8	8	8	32	1,092.00
4	8	8	6	8	30	1,023.75
5	0	3	5	5	13	443.62
6	8	8	8	8	32	1,092.00
7	8	8	8	8	32	1,092.00
8	8	8	8	8	32	1,092.00
9	8	8	8	8	32	1,092.00
10	8	8	8	8	32	1,092.00
11	8	8	8	8	32	1,092.00
12	2	1	3	2.5	8.5	290.06
13	6	6	4	6	22	750.75
14	8	8	8	8	32	1,092.00
15	2	1	4	6	13	443.6
16	3	3	4	6	16	5

Master Table

	URBAN				RURAL			
	NUTRIATOL		INCAPARINA		NUTRIATOL		INCAPARINA	
	GROUP	SUBGROUP	GROUP	SUBGROUP	GROUP	SUBGROUP	GROUP	SUBGROUP
	N=18	n=16	n=18	n=12	n=19	n=16	n=16	n=0
AGE (months)								
X	12.9±5.1	13±5.3	12±4.2	12.8±3.9	18.5±18.6	15.4±14.4	20.8±11.5	
Md	12	12	10.5	13.5	12	11	20	
Range	6-28	6-28	6-19	6-19	5-72	5-64	6-49	
SEX								
Number M/F	9/9	9/7	9/9	6/6	10/9	8/8	10/6	
% M/F	50/50	56.3/43.8	50/50	50/50	52.6/47.4	50/50	62.5/37.5	
Duration of Diarrhea (days)								
X	4.4±3.2	3.9±2.8	5.4±3.9	5.8±3.3	4.3±1.9	4.4±2.1	5.1±2.4	
Md	3	3	4	5.5	4	4	5	
Range	1-12	1-12	1-14	1-13	2-10	2-10	1-10	
With Vomiting								
Number +/-	11/7	10/6	13/5	9/3	14/5	11/5	2/14	
% +/-	61.1/38.8	62.5/37.5	72.2/27.7	75/25	73.7/26.3	68.8/31.3	12.5/87.5	
With Fever								
Number +/-	14/4	13/3	10/8	7/5	12/7	9/7	8/8	
% +/-	77.7/22.2	81.3/18.7	55.5/44.4	58.3/41.6	63.2/36.8	56.3/43.8	50/50	

	NUTRIATOL		INCAPARINA		NUTRIATOL		INCAPARINA	
	GROUP	SUBGROUP	GROUP	SUBGROUP	GROUP	SUBGROUP	GROUP	SUBGROUP
	n=18	n=16	n=18	n=12	n=19	n=16	n=16	n=0
With Dehydration								
Number +/-	3/15	3/13	5/13	4/8	0/0	0/0	0/0	
% +/-	16.6/83.3	18.8/81.3	27.7/72.2	33.3/66.7	0/0	0/0	0/0	
Continued Diarrhea								
Number +/-		3/13		3/9		2/14	5/11	
% +/-		18.7/81.3		25/75		12.5/87.5	31.3/68.7	
Consuption of Atol (ounces)								
$\bar{X}$		6.4±1.3		6.9±1.3		7.3±1.8	6.6±2.1	
Md		7.2		7.7		8	7.8	
Range		1-8		4.5-8		1.3-8	2.1-8	
Cumulative Consuption of Atol (ounces)								
$\bar{X}$		24.8±9.9		25.2±6.2		28.5±7.2	26.1±8.5	
Md		28		26		32	31	
Range		1-32		16-32		5-32	8.5-32	
Cumulative Consuption of Atol (RE)								
$\bar{X}$		1,863.3±748.1		858.3±212.1		2,137.5±537.4	888.3±290.1	
Md		2,100		887.3		2,400	1,057	
Range		75-2,400		546-1,092		375-2,400	290.1-1,092	

APPENDIX III

INTRODUCTION

Se sabe que la deficiencia leve de vitamina A puede ocurrir en ninos sanos y bien nutridos y se manifiesta solamente por ceguera nocturna (la cual no puede documentarse en ninos pequenos). Estos ninos tienen una mortalidad cuatro veces mayor de morir (1) y un mayor riesgo de desarrollar infecciones respiratorias (2), diarrea e infecciones urinarias (3). Por otra parte, los ninos que han presentado un episodio de diarrea o de infeccion respiratoria, tienen mayor posibilidad de presentar xeroftalmia.

En base a lo anterior, surgio la idea de un programa de prevencion dirigido a ninos menores de 6 anos que presentan diarrea o que tengan sarampion. Ambas enfermedades pueden producir un deterioro en el estado nutricional de vitamina A debido que disminuyen su absorcion y a que la ingesta esta reducida durante la enfermedad. De esta manera, el administrar vitamina A durante el periodo de la enfermedad, podria ayudar a prevenir dicho problema. El vehiculo empleado para dicha suplementacion es un atol fortificado con vitamina A (Nutriatol) cuya administracion diaria (de una cantidad de 8 tomas provee 3 veces el requerimiento de vitamina A recomendado por FAO-OMS. (4) .

En esta etapa del proyecto, se evalua el impacto biologico que Nutriatol pueda tener sobre el estado nutricional de vitamina A, medido a traves de niveles plasmaticos de retinol, en ninos sanos de edad preescolar, durante un tiempo de suplementacion de 8 dias.

Los objetivos del estudio fueron:

a) determinar el impacto biologico del uso de Nutriatol en ninos sanos, preescolares, durante un periodo de suplementacion de 8 dias.
b) Determinar el estado nutricional de los ninos en terminos de antropometria: peso y talla.
c) Determinar los niveles de vitamina A y hemoglobina en sangre de los ninos.
d) Determinar la presencia de parasitos en heces a traves de la tecnica de Kato-katz.

MATERIAL Y METODOS.

1. POBLACION.

Los ninos estudiados fueron usuarios de la Casa del Nino No1, ubicada en la zona 1 de la ciudad de Guatemala. Sus edades oscilaron entre 33 y 54 meses y pertenecieron a ambos sexos.

El protocolo fue aprobado por las autoridades de la Sociedad Protectora del Nino siendo el director Medico el Dr. Ricardo Asturias, asi como por el Comite de Derechos Humanos de CeSSTAM. Se realizo una reunion con los padres de familia a quienes se les presento el estudio, sus propositos, riesgos y beneficios. Los padres que asi lo quisieron, firmaron la hoja de Consentimiento informado (anexo No1).

Los criterios de exclusion fueron los siguientes: 1) ninos con un deficit mayor de 10% del peso esperado para su talla. 2)ninos con alguna enfermedad infecciosa aguda en el momento de la inscripcion o durante el desarrollo del estudio. 3)ninos que por alguna causa faltaron mas de 1 dia a la guarderia durante el periodo del estudio y el atol no pudo ser administrado.

PROCEDIMIENTOS

Se determino el peso y la talla de todos los ninos cuyos padres autorizaron el estudio. El peso se tomo en una escala calibrada y la talla en un infantometro. La talla y la edad se usaron para calcular la adecuacion de talla para edad (5). El peso y la edad se usaron para calcular la adecuacion peso para edad (6). Con las medidas obtenidas, se calculo el indice de peso para talla (7), el cual fue usado para seleccionar los ninos con un adecuado estado nutricional. Se utilizo la mediana de las tablas de NCHS (National Center for Health Statistics. U.S.A.) Los ninos fueron clasificados de acuerdo al siguiente esquema: Obesidad: >120%. Riesgo de obesidad: 111 a 120%. Normal: 90 a 119%. Desnutricion aguda leve: 80 a 89%. Desnutricion aguda moderada: 70 a 79%. Desnutricion severa moderada: <70%.

Para la determinacion del estado hematologico y del retinol plasmatico, se extrajeron 3 cc de sangre venosa (los ninos no estuvieron en ayuno). De esta muestra, 40 ul fueron depositados en un tubo de microhematocrito. El resto fue colocado en tubos plasticos con oxalato de potasio al 20% , luego se centrifugo y se refrigeron a -20oC. Los analisis para vitamina A y E se realizaron en el laboratorio. Los valores de Vitamina A fueron clasificados de acuerdo al criterio de OMS en la siguiente escala: Normal: >20 ug/dl. Bajo: 10 - 19 ug/dl. Deficiente: <10 ug/dl. Vitamina E: normal: >500ug/dl.

Los tubos capilares se centrifugaron por 5 minutos y se determino el porcentaje ocupado por las celulas rojas. El criterio que determino los casos de riesgo de anemia fue un hematocrito menor de 35% (de acuerdo ala edad del nino y a la altitud de la ciudad de Guatemala).

A los ninos inscritos en el estudio, se les dio una porcion de Nutriatol diariamente. Se inicio el dia martes y se continuo durante toda la semana. Los paquetes de nutriatol se prepararon simultaneamente en la cocina de la Casa del Nino No1. Si un nino se ausento por un dia, se le dieron dos sobres de Nutritatol para que los tomara en el fin de semana. Al resto de los ninos, se les dio un sobre de atol para tomarlo durante el fin de semana. Durante la segunda semana de trabajo, se dio el atol diariamente hasta el dia miercoles. Se supervizo que cada nino bebiera el atol en su totalidad. Si alguno de los ninos presento una infeccion durante este intervalo de tiempo, fue excluido del estudio. El dia jueves, se obtuvo una segunda muestra de sangre, en las mismas condiciones previamente descritas (con excepcion del microhematocrito). Ademas, se recolectaron muestras de heces para analisis de huevos y protozoos mediante la tecnica de frote de heces en frasco (concentradas) y el metodo de sedimentacion de kato-katz.

RESULTADOS.

Se inscribieron inicialmente un total de 70 ninos, de los cuales fueron excluidos treintidos sujetos. Solamente un nino fue excluido por presentar desnutricion moderada aguda. El resto se excluyeron por ausencia o enfermedad. Se presentan y analizan los resultados obtenidos en los 38 ninos que completaron el estudio

El grupo de 38 ninos fue formado por 24 varones y 18 ninas, cuyas edades oscilaron entre 33 a 54 meses con un promedio de 40 + 6 meses y una mediana de 39 meses.

<u>Antropometria:</u>

La distribucion de los ninos de acuerdo a la clasificacion de peso para talla puede observarse en la grafica No1, en donde se encuentra solamente un caso con desnutricion aguda leve.
El ochenta y nueve porciento de los sujetos fueron normales (n=34) y tres ninos tienen riesgo de obesidad (8%).

En la grafica No2, se encuentra la distribucion de los ninos segun sus porcentajes de adecuacion del indicador talla/edad. Se encuentra que tres ninos (8%) tienen retardo moderado de talla y 18 ninos (47%) tienen un retardo leve de crecimiento. Dieciseis ninos fueron normales segun este indicador (45%).

El indicador Peso/edad mostro que 21 ninos (55%) tienen deficit leve y el resto de ninos es normal (grafica No3).

Estado hematologico.

La determinacion de hematocrito se realizo en los 38 ninos. Ninguno de ellos tuvo valores subnormales.

Estado parasitologico:

Se obtuvo muestras en 34 de los ninos a las cuales se les aplico la tecnica de frota de heces en fresco (para protozoarios) y de Kato-katz (para helmintos. Se encontro que un 59% (n=20) de las muestras fueron negativas y cuarenta y uno porciento de los casos (n=14), tuvieron uno o mas parasitos. Ellos fueron: Giardia lamblias en 8 muestras; Ascaris lumbricoides 3 casos , E. Nana en 3 muestras. Entamoeba histolitica en 2 casos, Trichuris trichiuras en 1 caso. Un nino presento 3 parasitos simultaneamente, 1 ninos presento 2 parasitos y 12 ninos tuvieron un parasito solamente.

Concentracion de Retinol:

La concentracion plasmatica de vitamina A tuvo un promedio inicial de 24 ug/dl + 6. Se encontraron 7 casos con niveles considerados "bajos" y no hubo ningun caso de deficiencia. Al finalizar el periodo de suplementacion se encontro que el promedio de vitamina A fue de 27 ug/dl + 6. Se encontraron 5 ninos con niveles considerados bajos y el resto fue normal. No hubo diferencia significativa ($p<0.05$) entre ambas concentraciones, evaluadas mediante la prueba T de Student.

En la grafica No4 se muestra la distribucion de frecuencias de los valores iniciales (4a) y finales (4b) de la concentracion de retinol.

La variacion de cada caso individual puede observarse en la grafica No5, en donde se nota que 28 casos mejoraron los niveles de retinol (74%) mientras que 10 casos los disminuyeron.

En la grafica No6, se muestra la distribucion de los valores de las diferencias (delta) entre la concentracion inicial y la concentracion. final; se observa que la mayor frecuencia de casos son cambios positivos (aumento).

Concentracion de Vitamina E plasmatica:

La concentracion plasmatica de vitamina E se analizo en 38 ninos, pero solamente 30 tuvieron 2 determinaciones (por cantidad de plasma insuficiente para el analisis). Se encontro un promedio inicial de 501 +144 ug/dl y un promedio final de 562 + 253. La distribucion de estos valores se observa en la grafica 7a (concentracion inicial) y 7b (concentracion final). Considerando 500ug /dl como un punto de corte, se observa que 15 casos o sea un 50% de las muestras analizadas, tuvieron valores subnormales. El cambio de cada caso individual puede notarse en la grafica No8. Ocho sujetos disminuyeron sus valores (27%) y al resto mostro un cambio positivo (73%), Sin embargo, no hubo diferencia significativa entre los valores iniciales y los

valoras finalas (<0.05).

DISCUSION.

El estado nutricional de un grupo puede evaluarse mediante diferentes indices antropometricos.

El indice talla edad, representa la historia nutricional pasada. Un valor subnormal indica desnutricion cronica que produce achicamiento (8). El porcentaje de ninos encontrados con achicamiento (que incluya deficit de talla para edad leve y moderado) fue de 8%, lo cual es bastante aceptable si se compara con el dato reportado en la Encuesta Nacional de 1977 (9), en donde se encuentra un 46% de ninos con achicamiento, en las edades comprendidas entre 6 y 60 meses.

El indice peso/talla, es un reflejo del estado nutricional actual, el cual se encuentra satisfactorio en este grupo de ninos, encontrando ademas ocho porciento de ninos con tendencia a obesidad, los cuales deben tener seguimiento para prevenir un incremento indeseado de peso.

El indice peso/edad, es una combinacion de los indicadores previos, y esta por debajo de lo normal en un 55 % de ninos, lo cual es aceptable si se compara con la proporcion reportada en la Evaluacion Nutricional de 1965 (10), en donde se encontro un 73% de ninos con peso inferior a lo normal. En resumen, puede decirse que los ninos presentaron desnutricion previamente pero que actualmente su estado nutricional, medido por antropometria es aceptable.

La etiologia de la hipovitaminosis A es multiple: dieta pobre en fuentes de retinol o sus precursores, dietas pobres en grasas y en vitamina E; parasitismo (giardia y ascaris) (11) y enfermedades infecciosas.

El estado nutricional de vitamina A puede ser evaluado con diferentes formas metodos: clinico (examen ocular, prueba de adaptacion a la obscuridad), por encuesta dietetica evaluando la ingesta de vitamina A y por medio de metodos bioquimicos. (retinol y respuesta relativa a la dosis:RDR) (12) Se puede clasificar un caso (segun su estado de vitamina A) en tres estados diferentes: normal (>20ug/dl),marginal o bajo (10-19ug/dl) y deficiente:<10ug./dl.

Es importante notar que la poblacion seleccionada es normal (desde el punto de vista antropometrico y clinico) y que los ninos estaban recibiendo multivitaminicos regularmente (con dosis terapeutica de vitamina A). A pesar de ello, se encontro un 18% de ninos con niveles bajos.

Los niveles bajos reflejan un estado marginal de vitamina A y una reserva hepatica pobre. La implicacion clinica de estos niveles bajos puede traducirse en mayor susceptibilidad a infecciones mientras que al examen ocular se encuentra normal.

El diagnostico definitivo del estado marginal de vitamina A se realiza mediante la prueba de RDR que consiste en la respuesta de los niveles de retinol a una carga de vitamina A. Una elevacion por arriba de 20% despues de 5 horas indica reservas hepaticas insuficientes (12).

En la poblacion estudiada, el metodo diagnostico mas fidedigno seria la respuesta de RDR, pero por ser una prueba complicada no fue aplicada. La tendencia al aumento de los niveles observada en 74% de los sujetos, puede indicarnos que los ninos estaban inicialmente en un estado marginal de vitamina A y por esa razon respondieron elevando sus niveles.

Por otra parte, la magnitud del cambio no fue suficiente para tener significancia estadistica. Este hecho puede deberse a que los ninos mejoraron sus reservas de vitamina A sin alterar considerablemente los niveles plasmaticos de retinol. Como ya se menciono previamente, la valoracion plasmatica de los niveles de retinol tiene sus limitaciones. Siendo la mas importante, que es fidedigna en los estados extremos de la escala (deficiencia o hipervitaminosis).

Respecto al estado de vitamina E, es llamativo el hallazgo de que la mitad de los ninos tenian niveles subnormales. La vitamina E se encuentra en membranas celulares y su principal funcion es la oxidacion de acidos grasos poliinsaturados. La principal fuente de esta vitamina son los aceites vegetales, mientras que los productos de origen animal son muy pobres (13).

La deficiencia de vitamina E puede producir (en animales experimentales), cambios en sistema reproductivo, muscular, nervioso, y hematopoietico. Tambien se encuentra una disminucion de la absorcion de vitamina A. En animales se demostro que la carencia de vitamina E disminuye la retencion de vitamina A (por su efecto antioxidante. En el hombre, suelen coexistir las dos deficiencias por lo que se recomienda suplementar ambas vitaminas. En seres humanos existen pocos datos sobre los signos clinicos de la deficiencia de esta vitamina. Se ha estudiado este topico principalmente en ninos prematuros. Sin embargo, seria conveniente, revisar la grasa utilizada en la preparacion de las comidas de los ninos para poder brindar un mejor aporte dietetico de esta vitamina.

La alta prevalencia de parasitismo en ninos que asisten a una institucion ha sido documentada. En un estudio efectuado en preescolares del Comite Nacional de Estimulacion Temprana (14). se encontraron parasitos en un 29% de los ninos. En el grupo estudiado, la prevalencia fue de 41%, lo cual es bastante alto. Ademas, se encontro Giardia como el parasito mas frecuente. Se sabe que la giardiasis puede afectar el estado nutricional y la absorcion de vitamina A (11). Por otra parte, la tecnica de Kato-katz, es empleada para conocer la intensidad de la infeccion parasitaria y no solamente la prevalencia. De esta forma, brinda datos utiles sobre la severidad del parasitismo.

Sin embargo, como se utiliza para evaluar helmintos, y en el caso que nos ocupa, solamente hubo 4 casos de helmintiasis, no es necesario hacer algun comentario. Este hallazgo va de acuerdo con la literatura, pues se sabe que la infestacion con helmintos en mas comun en la edad escolar.

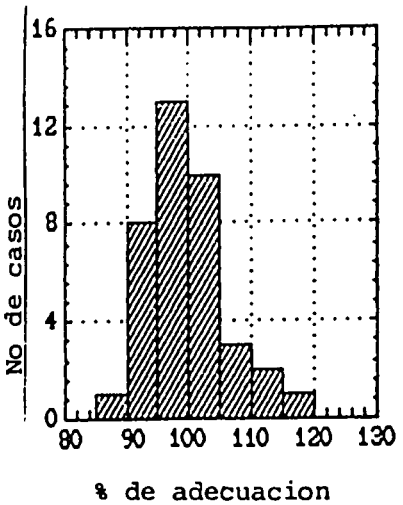
Conviene recordar que la forma mas comun de transmision de protozoarios es el agua no potable. Por lo que se puede recomendar revisar este aspecto.

En resumen, al evaluar este grupo de 38 preescolares "sanos", se encontraron, desde el punto de vista antropometrico, con desnutricion cronica pasada, manifestada con retardo en talla, pero actualmente con un estado nutricional normal. Los valores iniciales de retinol demostraron una alta prevalencia de ninos con niveles bajos de retinol (18%). Despues de la suplementacion, se encontro 74% de los ninos mejoraron sus niveles. El incremento no fue significativo. Esto puede explicarse por que los ninos tuvieron un estado "marginal" con reservas hepaticas insuficientes. Se encontro ademas deficiencia de vitamina E en la mitad de los ninos y una alta prevalencia de parasitismo, principalmente protozoarios. Por lo anterior se recomienda revisar el aporte de agua potable a los ninos, incrementar su consumo de grasas de origen vegetal y de alimentos ricos en vitamina A.

DISTRIBUCION DE LOS VALORES DE PORCENTAJES DE ADECUACION DE LOS INDICES ANTROPOMETRICOS de 38 ninos preescolares sanos (Casa del Niño No1)

GRAFICA N°1

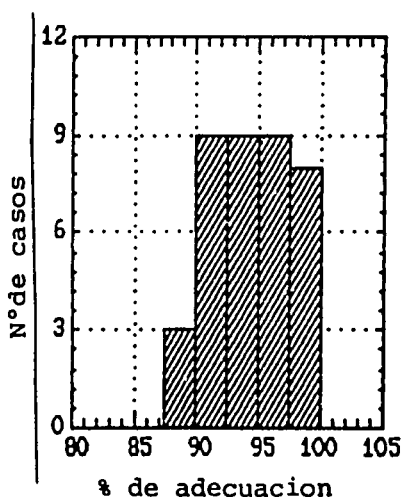
Distribucion de casos segun el indicador Peso para talla



* en color rojo los valores subnormales.

GRAFICA N°2

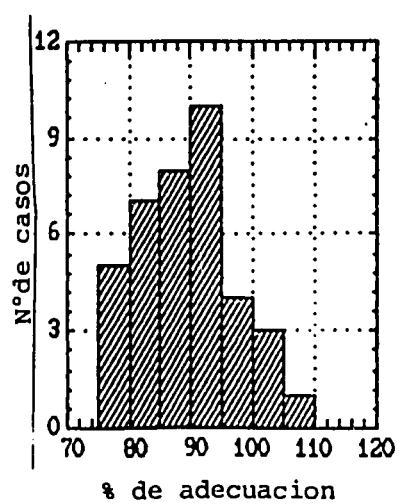
Distribucion de casos según el indicador Talla para edad



* en color rojo los valores subnormales.

GRAFICA N°3

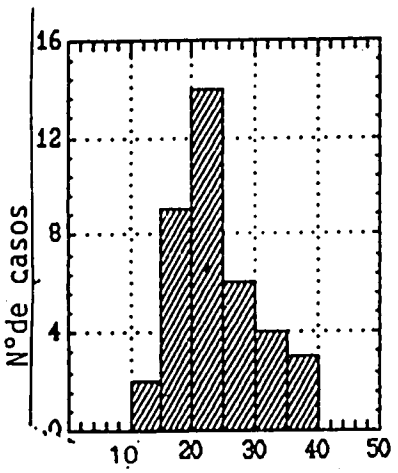
Distribucion de casos segun el indicador Peso para edad



* en color rojo los valores subnormales.

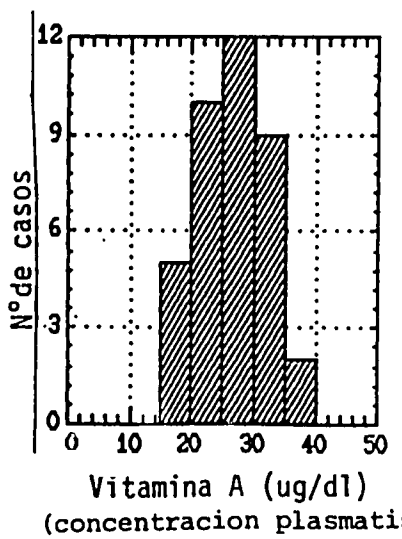
GRAFICA N°4 A

FRECUENCIA DE DISTRIBUCION DE VALORES DE VITAMINA A PLASMATICA AL INICIO DE SUPLEMENTACION CON NUTRIATOL



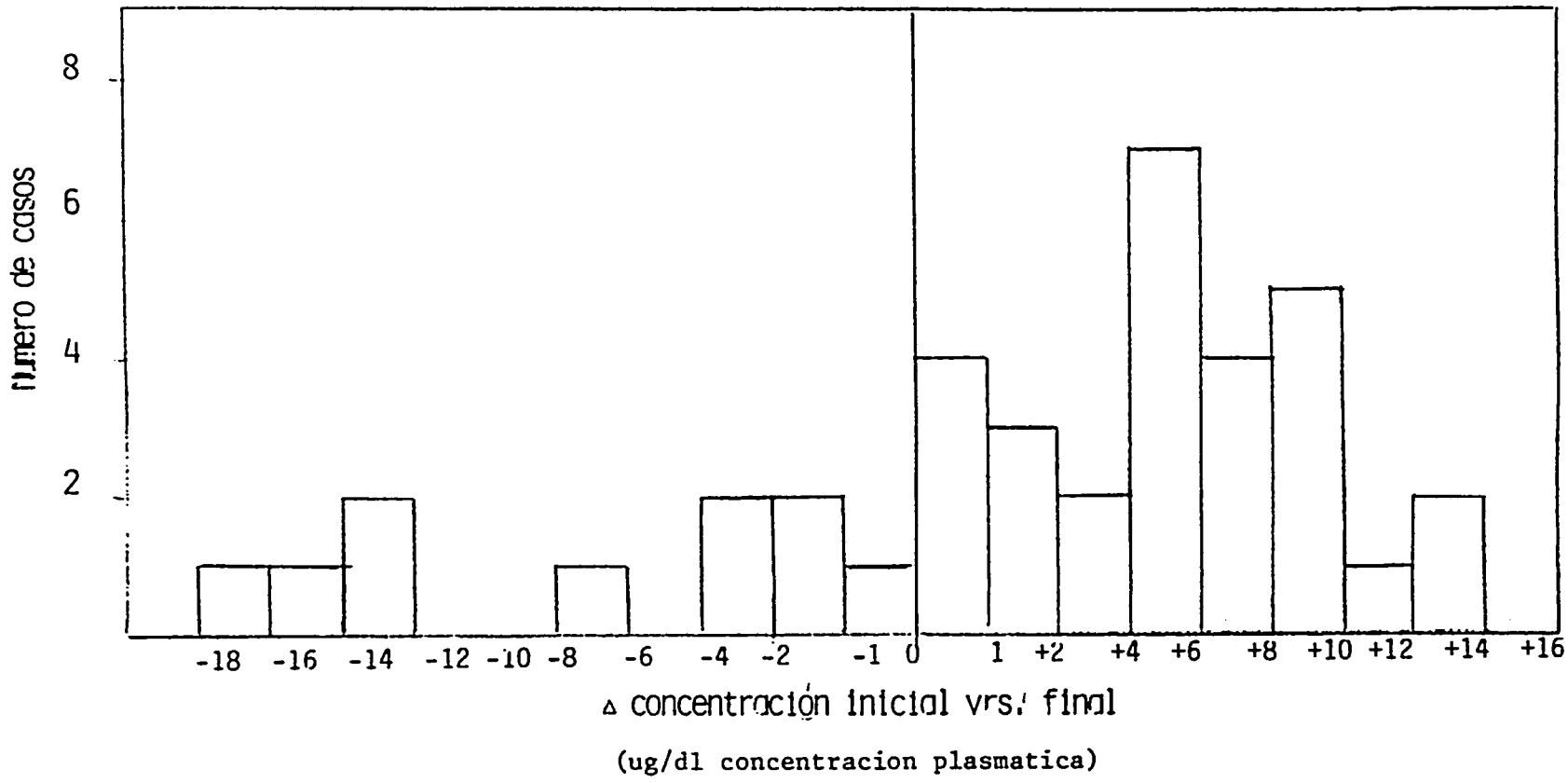
GRAFICA N°4 B

FRECUENCIA DE DISTRIBUCION DE VALORES DE VITAMINA A PLASMATICA AL FINAL DE LA SUPLEMENTACION CON NUTRIATOL



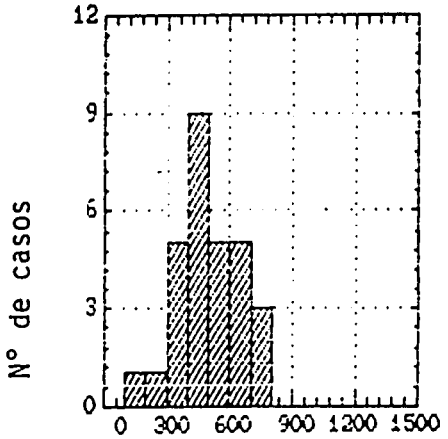
GRAFICA N° 6

DISTRIBUCION DE FRECUENCIA DE LAS DIFERENCIAS ENTRE LA CONCENTRACION INICIAL Y FINAL DE VITAMINA "A" PLASMATICA EN 38 NIÑOS PREESCOLARES SANOS SUPLEMENTADOS CON NUTRIATOL, DURANTE 8 DIAS.



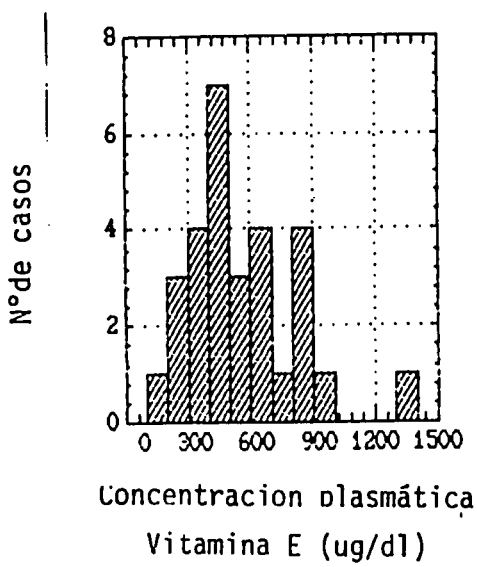
GRAFICA N° 7 A

FRECUENCIA DE DISTRIBUCION DE VALORES DE VITAMINA E PLASMATICA AL INICIO DE LA SUPLEMENTACION CON NUTRIATOL



* en rojo los valores subnormales

GRAFICA N° 7 B FRECUENCIA DE DISTRIBUCION DE VALORES DE VITAMINA E PLASMATICA AL FINAL DE LA SUPLEMENTACION CON NUTRIATOL



* en rojo los valores subnormales

APPENDIX IV

INSTRUCCIONES PARA EL USO DE LAS AYUDAS VISUALES DEL PROGRAMA EDUCATIVO

CARTEL No. 1

LA DIARREA

La diarrea puede afectar a personas de cualquier edad, pero es más común y peligrosa en los niños.

Una persona con diarrea tiene más de 3 defecaciones en un día, con una consistencia blanda o líquida.

CONSECUENCIAS DE LA DIARREA EN LOS NIÑOS

1. La diarrea es en muchas ocasiones la causa más común de la muerte de los niños de 6 meses a 2 años de edad.
   Un niño muere cada 7 segundos alrededor del mundo a causa de la diarrea y sus complicaciones.
   En Guatemala 5 de cada 10 niños mueren por deshidratación a causa de la diarrea. Los niños menores de 5 años enferman de diarrea alrededor de 3 veces por año.
2. La diarrea es más frecuente y peligrosa en los niños que están mal alimentados y en los niños que no están mamando.
3. Es importante que lleve al niño al Centro de Salud pronto si el tiene diarrea durante 2 días seguidos.
4. La diarrea también se conoce con el nombre de:
   Asientos, mal de mayo, deposiciones, puro pato, cursiento, currutaca, mal de camioneta, cagadera, chorrío.

CAUSAS DE LA DIARREA

1. Las moscas:
   Cuando las moscas se paran en la suciedad o en el popó, después llegan à pararse sobre la comida llevando la enfermedad en las patas.
2. La falta de higiene en casa:
   Una casa sucia, con trastos de cocina sin lavar y basura regada por todos lados.
3. La falta de higiene personal:

El no bañarse todos los días, el no limpiarse las uñas, el no lavarse las manos después de defecar, el no lavarse las manos antes de preparar la comida, el no lavarse las manos antes de comer y después de cambiar los pañales al niño.

4. Beber agua sin hervir:
   Cuando se bebe el agua directamente después de obtenerla del chorro, del pozo, del río, etc.
5. Defecar y orinar en cualquier lugar:
   Cuando no se usa la letrina, ésto atrae moscas y suciedad, trayendo enfermedad.
6. Falta de higiene en la letrina:
   Cuando la letrina no está limpia y tapada atrae mosmas, y éstas transmiten la diarrea.

PREVENCION DE LA DIARREA

1. Hervir el agua para beber durante 15 minutos. Se deja enfriar y luego se puede tomar.
2. Mantener la casa limpia, los trastos de cocina lavados con jabon y agua, la basura en un solo lugar y tapada.
3. Tener buenos hábitos de limpieza personal o higiene personal:
   - Bañarse diariamente
   - Limpiarse las uñas
   - Lavarse las manos después de defecar
   - Lavarse las manos antes de preparar los alimentos
   - Lavarse las manos antes de comer
   - Lavarse las manos después de cambiar pañal al niño
4. Defecar y orinar unicamente en la letrina para evitar atraer moscas.
5. Mantener la letrina limpia y tapada.

CARTEL No. 2

¿ QUE ES DISHIDRATACION ?

Significa perder grandes cantidades de agua y sales del cuerpo que son necesarias para vivir.

El cuerpo pierde agua normalmente cuando orinamos y cuando sudamos, pero cuando hay diarrea o vómitos perdemos mucha agua. Esto es más peligroso en los niños, porque al perder mucha agua pueden morir si no se les atiende luego.

SEÑALES DE DESHIDRATACION EN EL CUERPO

Cuando el niño tiene 2 o más de éstas señales quiere decir que está deshidratado y debe dársele suero de inmediato. Las señales son las siguientes:

1. Llora sin lágrimas
2. Tiene la boca y la lengua secas
3. Orina muy poco. La orina es de color oscuro
4. Tiene mucha sed
5. Los ojos están hundidos
6. La respiración es más rápida o acelerada
7. La mollera se hunde
8. Pocos vómitos

La mollera o fontanela es una parte suave que está arriba en la cabeza del niño o niña menor de un año. Cuando la mollera se hunde quiere decir que el niño está en peligro porque ha perdido mucha agua.

Mucha gente cree que cuando se cae la mollera significa que el bebé se va a morir, pero en realidad significa que al niño le hace falta agua que se le debe reponer pronto para que no se muera.

Existen varias costumbres guatemaltecas para tratar de curar la mollera hundida o caída, algunas de ellas son:

- Restregar la mollera con aceite
- Chupar la mollera para levantarla
- Algunas comadronas ponen al bebé con los pies hacia arriba y le pegan suave con la mano

Estas cosas no harán daño al niño si se le está dando al mismo tiempo el suero como tratamiento. Sin embargo, la costumbre que tienen algunas madres de meter sus dedos en la boca del niño y empujar hacia arriba es peligrosa, puede causar al bebé una grave infección.

CARTEL No. 3

REHIDRATACION

La rehidratación es dar al niño el líquido que su cuerpo ha perdido. Cuando se le da a tomar el suero, a veces aumenta la cantidad de diarrea, pues el niño estaba deshidratado o con muy poca agua en el cuerpo, y al recibir más agua, su cuerpo puede sacar más también.

La madre no debe sentir temor de que el niño empeore, ya que después de los primeros vasos, se le calmará la diarrea y el suero ayudará a mejorar la salud del niño.

FORMA DE DAR EL SUERO AL NIÑO

El suero se le puede dar a tomar en taza o en vaso, por poquitos, o con cucharita cada 5 minutos.

CUANDO EL NIÑO VOMITA EL SUERO

Si el niño vomita el suero, espere 10 o 15 minutos antes de volver a ofrecerle suero en taza o con cucharita.

Si el niño vomita el suero más de 3 veces, debe llevarlo de inmediato al Centro de Salud.

Cuando el niño vomita debe dejar de darle de mamar por 24 horas (un día). Si el niño toma leche de vaca o de bote debe dejar de darle la leche por 48 horas (dos días).

Después de un día puede darle nuevamente de mamar, y puede darle pacha con leche preparada de la siguiente manera después de dos días:

Debe cuartear la leche con la mitad de agua de arroz.

Se le debe dar poquita leche al principio. Poco a poco se va aumentando hasta que el niño pueda tomar las 8 onzas. Esta leche rala se le da al niño por un día. Después se le da la leche cuarteada con menos agua de arroz, y después de ésto el niño podrá tomar la leche en la forma de siempre.

CUANDO EL NIÑO NO TIENE VOMITOS

Debe darle a tomar el suero por pocos en taza o vaso, o con cucharita cada 5 minutos durante el día y durante la noche, hasta que el niño orine bastante.

Si el niño no orina por un periodo de 6 horas, debe llevarlo de inmediato al Centro de Salud.

ALIMENTACION DURANTE EL PERIODO DE DIARREA

Algunas personas acostumbran a quitar toda la comida la niño cuando éste tiene diarrea. Pero no debe quitarle todo el alimento, sino debe dar al niño comidas suaves como:

Sopa desgrasada, agua de arroz, agua de coco, agua de cebada, pecho, mosh sin leche. NO DEBE DARLE FRUTAS CRUDAS NI COMIDAS CON GRASA.

11

CLASES DE SUERO Y FORMA DE PREPARARLO

1. Existe un suero que se compra en sobre, ya viene preparado y listo para mezclar con agua.
2. El otro tipo de suero se puede hacer en casa.

Suero de Sobre:

- Hierva un litro de agua y déjela enfriar. Tape el recipiente para que este no sea tocado por las moscas, ni le entre polvo.
- Mezcle el sobre completo de suero oral en el litro de agua hervida y revuelva bien.
- Pruebe el suero, si éste está bien mezclado tendrá un sabor parecido a las lágrimas.
- El suero se puede usar solo durante 24 horas (un día). Después de un día de haberlo preparado no debe usarlo y debe tirarlo.

Suero hecho en Casa:

- Hierva un litro de agua y déjela enfriar tapada.
- Mezcle en el agua lo siguiente: 2 cucharadas de azucar
  1 cucharadita de sal
  El jugo de 2 o más naranjas

  Debe mezclarse bien todo el contenido. No debe usarse el suero después de las 24 horas de haber sido preparado.

CARTEL No. 4

VITAMINA A

La vitamina A es un alimento que el cuerpo necesita comer todos los días para poder mantener buena salud, tener buenos ojos, huesos fuertes y piel saludable; también ayuda para no enfermarse y para tener buenos dientes.

¿DE DONDE SE PUEDE OBTENER LA VITAMINA A?

El cuerpo obtiene la vitamina A de las comidas, como por ejemplo:

La espinaca, el aguacate, el plátano, las yerbas verdes (yerba mora, acelga, berro, bledo, etc.) la zanahoria, el camote, la papaya, el melón, el mango, la leche, los huevos, el hígado de pescado, de cerdo y de animales de monte, y las vísceras de res. Todos estos alimentos tienen mucha vitamina A.

CUANDO EL NIÑO ENFERMA DE DIARREA O DE SARAMPION

Cuando el niño está enfermo con diarrea o sarampión, no tiene hambre y deja de comer. Generalmente el niño dura enfermo por unos ocho días, en los que pierde vitamina A porque no come bien. La diarrea produce pérdida de vitamina A en cada asiento.

Generalmente después de ocho días el niño puede comer bien otra vez y necesita recuperar la vitamina A que ha perdido para tener buena salud otra vez. Para ayudarlo a estar bien de salud se le dará un tratamiento de Nutriatol - que es un atol medicinal muy sabroso que tiene mucha vitamina A - durante ocho días seguidos, tomando un sobre cada día, comenzando después de que el niño ya ha tomado la medicina para la diarrea o el sarampión, y después que ya ha terminado de tomar el suero. Se comienza a dar el Nutriatol una semana después de que el niño empezó a estar enfermo.

QUE PASA CUANDO AL CUERPO LE FALTA LA VITAMINA A

Cuando el niño tiene falta de vitamina A, puede sufrir problemas de los ojos y hasta puede quedarse ciego, también es más fácil que agarre una enfermedad y que tenga malos dientes.

CARTEL No. 5

COMO PREPARAR EL NUTRIATOL

¿Qué es Nutriatol?

Es un atol medicinal muy sabroso, que tiene mucha vitamina A.

Nutri A: rico en vitamina A
Atol: en forma de atol

FORMA DE PREPARARLO

1. Lave sus manos con jabón y agua
2. Lave los trastos que usará con jabón y agua
3. Mezcle un sobre de Nutriatol con 8 onzas de agua
4. Hierva la mezcla durante 20 minutos
5. Deje enfriar hasta que el niño pueda tomarlo en pacha, en taza o con cuchara
6. De al niño un sobre de Nutriatol cada día, durante 8 días seguidos.

COMO PUEDE CONSEGUIR EL NUTRIATOL

El niño mayor de cada familia, que va a la escuela, llevará 8 sobrecitos de Nutriatol para cada hermano menor de 6 años que está en la casa enfermo con diarrea o con sarampión.

EN DONDE DEBE GUARDAR EL NUTRIATOL

Debe guardar el Nutriatol en un lugar seco, lejos de donde los niños puedan agarrarlo, y de donde los animales puedan tocarlo.

Puede guardarse dentro de una lata con tapadera, o dentro de una caja plástica tapada, o bien dentro de un frasco con tapadera, o dentro de una bolsa plástica gruesa bien amarrada o cerrada.

CUANDO DEBE USAR EL NUTRIATOL

Debe usar el Nutriatol cuando el niño acaba de pasar una diarrea o sarampión. El nutriatol no es una medicina para la diarrea y tampoco es una medicina para el sarampión, sino es un atol medicinal que le ayudará al niño a ponerse bien y le dará el alimento y la vitamina A que perdió al estar enfermo; por eso, el Nutriatol se le da después de que ha tomado la medicina para la diarrea o para el sarampión.

Recuerde:

a. Debe darle bastantes líquidos al niño
b. No debe quitarle todo el alimento al niño, debe darle comidas suaves
c. Debe darle el suero hasta que el niño lo termine
d. Al terminar de darle la medicina para la diarrea o el sarampión debe darle Nutriatol por 8 días seguidos
e. Guarde cada sobrecito de Nutriatol vacío

¿PORQUE ES IMPORTANTE QUE GUARDE LOS SOBRECITOS VACIOS DE NUTRIATOL?

Porque el niño debe devolver los sobrecitos vacíos para poder obtener más Nutriatol.

CARTEL No. 6

UNA DIETA BALANCEADA

Cada vez que nuestro cuerpo se mueve gastamos energía, cada vez que pensamos también gastamos energía; esta energía o fuerza se debe reponer con la comida.

Nutrirse quiere decir comer los alimentos para reponer la fuerza o energía que gastamos todos los días. La nutrición comienza cuando comemos los alimentos. La comida se convierte en energía o fuerza que el cuerpo necesita para mantenerse con vida, buena salud y fuerza.

QUE ES UNA BUENA ALIMENTACION

Para alimentarse bien o nutrirse necesita comer diferentes alimentos. No necesita comer mucho de cada cosa, pero si necesita comer todo muy limpio, en un lugar tranquilo y en paz.

Cuando comemos cualquier comida, solo para llenar el estómago y para quitar el hambre no comemos todo lo que nuestro cuerpo necesita. Debemos comer lo que ayude a nuestro cuerpo a tener buena salud y fuerza y para eso necesitamos saber para qué nos sirve cada cosa que comemos.

HAY TRES CLASES DE ALIMENTOS DIFERENTES

1. La leche, los huevos, la carne, el pescado, las manías, el queso, nos ayudan a crecer y tener músculos fuertes. También nos ayudan a tener la fuerza para movernos todos los días.

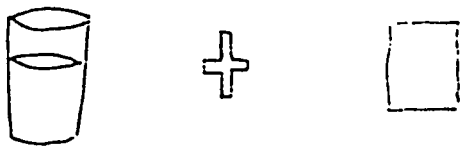
2. Las frutas y las verduras nos ayudan a convertir los alimentos en energía o fuerza, también nos forman los huesos y los dientes y nos dan una sangre saludable.

3. Los cereales (trigo, avena, cebada, arroz, etc.), los granos (el frijol, el maiz, el garbanzo, etc.) y las grasas (mantequilla, crema, el aceite para cocinar, etc.), el pan, las galletas, la miel de abeja, el chocolate, son todos alimentos que nos dan lo siguiente:

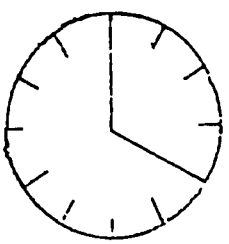
- Nos dan energía y fuerza
- Mantienen el calor en el cuerpo
- Dan sabor a nuestras comidas
- Ayudan a tener buena digestión

Cuando no comemos de las tres clases de alimentos tooos los días, nuestro cuerpo no funciona bien, nos enfermamos y nos ponemos débiles.

COMO PREPARAR EL NUTRIATOL

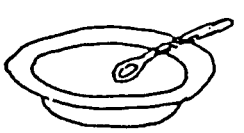


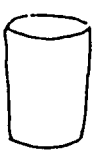
Se mezcla un sobre de Nutriatol en 8 onzas de agua



Se hierve esta mezcla durante 20 minutos

Se puede dar el Nutriatol al niño:
- En pacha
- En vaso o en taza
- Con cucharita en platito





¿QUE ES NUTRIATOL?

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6. Se le da al niño un sobre de Nutriatol cada día, durante 8 días seguidos.

COMO PUEDE CONSEGUIR EL NUTRIATOL

El niño mayor de cada familia, que va a la escuela, llevará 8 sobrecitos de Nutriatol para cada hermano o hermana menor de 6 años, que se encuentre en la casa enfermo con diarrea o con sarampión.

CUANDO SE DEBE DAR EL NUTRIATOL

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RECUERDE:

a. Debe darle bastantes líquidos al niño
b. No debe quitarle todo el alimento, sino debe darle comidas suaves
c. Debe darle el suero hasta que el niño lo termine
d. Al terminar de darle la medicina para la diarrea o el sarampión, debe darle Nutriatol por 8 días seguidos
e. Guarde cada sobrecito de Nutriatol vacío.

¿PORQUE ES IMPORTANTE QUE GUARDE LOS SOBRECITOS VACIOS DE NUTRIATOL?

Porque el niño debe devolver los sobrecitos vacíos para poder obtener más Nutriatol.

EN DONDE SE DEBE GUARDAR EL NUTRIATOL

Debe guardar el Nutriatol en un lugar seco, lejos de donde los niños puedan agarrarlo, y de donde los animales puedan tocarlo.

Puede guardarse dentro de una lata con tapadera, o dentro de una caja plástica tapada, o bien dentro de un frasco con tapadera, o dentro de una bolsa plástica gruesa bien amarrada o cerrada.

APPENDIX V

Fundación Internacional del Ojo

Comité Nacional Prociegos y Sordomudos

REPORTE - VISITA A HOGARES DE NIÑOS CONSUMIDORES DE NUTRIATOL

Nombre del niño agente:_____NI:___

Nombre de la Escuela:_____NI:___

Número de niños menores de 6 años en el hogar: _____

Almacenaje del Nutriatol:

1. Adecuado: S___ N___ 2. Ambiente Seco: S___ N___

3. Roedores: S___ N___ 4. Insectos: S___ N___

Comprensión de la finalidad del Producto:

1. Completa:___ 2. Necesitó nueva explicación:___

3. Manifiesta Interés:___ 4. Manifiesta desinterés:___

Comprensión de como usar el Producto:

1. Completa:___ 2. Parcial:___ 3. Necesitó nueva explicacion:___

Producto ya consumido:

1. 8 sobres consumidos:___ 2. Menos de 8 sobres:___

3. El nino termina las 8 onzas:___ 4. El nino no termina las 8 onzas:___

5. Al nino le gusta el sabor: S___ N___

Guardan los paquetes vacios para su devolucion: S___ N___

1. Completos:___ 2. Incompletos:___ (No. de Ø a 7)

Han compartido el Nutriatol con otras personas:

1. Familiares:___ 2. Otros hermanitos:___ 3. Vecinos o amigos:___

Han intercambiado el Nutriatol por:

1. Otros alimentos:___ 2. Otros productos:___

La madre del consumidor puede recordar o mencionar algunos alimentos que contienen vitamina "A":

Si ____ Poco ____ Nada ____

La senora conserva la Hoja Grafica de Instrucciones de Preparacion:

Si ____ No ____

Obtener el Nutriatol fue: Facil ____ Dificil ____

Tuvo que pagar alguna cantidad de dinero para recibir el Nutriatol:

Si ____ No ____

El nino (agente) puede llevar el Nutriatol a la casa:

Si ___ No ___ Se le pierde ___ Otro: _____

_____

Han recibido el Producto: Si ____ No ____

Si no lo han recibido, especifique la razon: _____

_____

Nombre del Promotor: _____

Fecha: _____

s	341	96.3%	100.0%
Total	354	100.0%	

RAZON	Freq	Percent	Cum.
n	341	96.3%	96.3%
s	13	3.7%	100.0%
Total	354	100.0%	

FECHA	Freq	Percent	Cum.
2107.0	1	0.3%	0.3%
20889.0	11	3.1%	3.4%
30889.0	11	3.1%	6.5%
40889.0	10	2.8%	9.3%
60889.0	1	0.3%	9.6%
70889.0	9	2.5%	12.1%
80889.0	25	7.1%	19.2%
90889.0	16	4.5%	23.7%
90989.0	4	1.1%	24.9%
100889.0	20	5.6%	30.5%
110889.0	10	2.8%	33.3%
140889.0	25	7.1%	40.4%
150889.0	15	4.2%	44.6%
160889.0	20	5.6%	50.3%
170889.0	20	5.6%	55.9%
180789.0	6	1.7%	57.6%
180889.0	5	1.4%	59.0%
190789.0	8	2.3%	61.3%
200789.0	14	4.0%	65.3%
210789.0	9	2.5%	67.8%
210889.0	10	2.8%	70.6%
220889.0	15	4.2%	74.9%
230889.0	11	3.1%	78.0%
240789.0	11	3.1%	81.1%
250789.0	13	3.7%	84.7%
260789.0	12	3.4%	88.1%
270789.0	11	3.1%	91.2%
270889.0	1	0.3%	91.5%
280789.0	10	2.8%	94.4%
290889.0	10	2.8%	97.2%
310789.0	10	2.8%	100.0%
Total	354	100.0%	

Sum = 58365924.00
Mean = 164875.49
Standard deviation = 78639.73

10	4	1.1%	11.9%
11	5	1.4%	13.3%
12	5	1.4%	14.7%
14	4	1.1%	15.8%
15	5	1.4%	17.2%
16	5	1.4%	18.6%
18	5	1.4%	20.1%
19	5	1.4%	21.5%
20	5	1.4%	22.9%
21	5	1.4%	24.3%
22	5	1.4%	25.7%
23	5	1.4%	27.1%
24	14	4.0%	31.1%
25	5	1.4%	32.5%
26	5	1.4%	33.9%
27	5	1.4%	35.3%
28	4	1.1%	36.4%
29	5	1.4%	37.9%
30	5	1.4%	39.3%
31	4	1.1%	40.4%
32	5	1.4%	41.8%
33	5	1.4%	43.2%
34	5	1.4%	44.6%
35	5	1.4%	46.0%
36	6	1.7%	47.7%
37	5	1.4%	49.2%
38	5	1.4%	50.6%
39	5	1.4%	52.0%
40	5	1.4%	53.4%
41	5	1.4%	54.8%
42	4	1.1%	55.9%
43	5	1.4%	57.3%
44	5	1.4%	58.8%
45	5	1.4%	60.2%
46	10	2.8%	63.0%
47	5	1.4%	64.4%
48	6	1.7%	66.1%
49	6	1.7%	67.8%
50	5	1.4%	69.2%
51	5	1.4%	70.6%
52	5	1.4%	72.0%
53	5	1.4%	73.4%
54	5	1.4%	74.9%
55	5	1.4%	76.3%
56	5	1.4%	77.7%
57	5	1.4%	79.1%
58	6	1.7%	80.8%
59	6	1.7%	82.5%
60	5	1.4%	83.9%
61	5	1.4%	85.3%
62	5	1.4%	86.7%
63	5	1.4%	88.1%
64	5	1.4%	89.5%
65	6	1.7%	91.2%
66	6	1.7%	92.9%
67	6	1.7%	94.6%
68	6	1.7%	96.3%
69	6	1.7%	98.0%
70	5	1.4%	99.4%

NIAGENTE	Freq	Percent	Cum.
1	39	11.0%	11.0%
2	26	7.3%	18.3%
3	24	6.7%	25.0%
4	30	8.4%	33.4%
5	27	7.6%	41.0%
6	21	5.9%	46.9%
7	23	6.5%	53.4%
8	21	5.9%	59.3%
9	20	5.6%	64.9%
10	25	7.0%	71.9%
11	13	3.7%	75.6%
12	12	3.4%	78.9%
13	11	3.1%	82.0%
14	7	2.0%	84.0%
15	6	1.7%	85.7%
16	5	1.4%	87.1%
17	4	1.1%	88.2%
18	6	1.7%	89.9%
19	8	2.2%	92.1%
20	4	1.1%	93.3%
21	3	0.8%	94.1%
22	2	0.6%	94.7%
23	2	0.6%	95.2%
24	1	0.3%	95.5%
26	3	0.8%	96.3%
27	2	0.6%	96.9%
29	1	0.3%	97.2%
31	1	0.3%	97.5%
33	1	0.3%	97.8%
37	1	0.3%	98.0%
38	1	0.3%	98.3%
39	1	0.3%	98.6%
40	1	0.3%	98.9%
47	1	0.3%	99.2%
86	1	0.3%	99.4%
88	1	0.3%	99.7%
95	1	0.3%	100.0%
Total	356	100.0%	

Sum	=	3281.00
Mean	=	9.22
Standard deviation	=	10.34

NIEC	Freq	Percent	Cum.
1	5	1.4%	1.4%
2	6	1.7%	3.1%
3	5	1.4%	4.5%
4	1	0.3%	4.8%
5	5	1.4%	6.2%
6	5	1.4%	7.6%
7	6	1.7%	9.3%
8	5	1.4%	10.7%

101	1	0.3%	99.7%
481	1	0.3%	100.0%
Total	354	100.0%	

Sum = 13711.00
Mean = 38.73
Standard deviation = 30.99

NINOS	Freq	Percent	Cum.
1	106	30.0%	30.0%
2	144	40.8%	70.8%
3	82	23.2%	94.1%
4	14	4.0%	98.0%
5	6	1.7%	99.7%
15	1	0.3%	100.0%
Total	353	100.0%	

Sum = 741.00
Mean = 2.10
Standard deviation = 1.15

ADEC	Freq	Percent	Cum.
n	3	0.8%	0.8%
s	351	99.2%	100.0%
Total	354	100.0%	

SECO	Freq	Percent	Cum.
n	24	6.8%	6.8%
s	330	93.2%	100.0%
Total	354	100.0%	

ROED	Freq	Percent	Cum.
n	250	70.6%	70.6%
s	104	29.4%	100.0%
Total	354	100.0%	

INSEC	Freq	Percent	Cum.
n	253	71.5%	71.5%
s	101	28.5%	100.0%
Total	354	100.0%	

COMP	Freq	Percent	Cum.

n	32	9.0%	9.0%
s	322	91.0%	100.0%
Total	354	100.0%	

NUEVA	Freq	Percent	Cum.
n	323	91.2%	91.2%
s	31	8.8%	100.0%
Total	354	100.0%	

INT	Freq	Percent	Cum.
n	11	3.1%	3.1%
s	343	96.9%	100.0%
Total	354	100.0%	

DESINT	Freq	Percent	Cum.
n	353	99.7%	99.7%
s	1	0.3%	100.0%
Total	354	100.0%	

USOCOMP	Freq	Percent	Cum.
n	79	22.3%	22.3%
s	275	77.7%	100.0%
Total	354	100.0%	

USOPAR	Freq	Percent	Cum.
n	292	82.5%	82.5%
s	62	17.5%	100.0%
Total	354	100.0%	

USONUEVO	Freq	Percent	Cum.
n	337	95.2%	95.2%
s	17	4.8%	100.0%
Total	354	100.0%	

CONS8	Freq	Percent	Cum.
n	3	0.8%	0.8%
s	351	99.2%	100.0%

Total	354	100.0%

CONS_8	Freq	Percent	Cum.
n	353	99.7%	99.7%
s	1	0.3%	100.0%
Total	354	100.0%	

TERM8	Freq	Percent	Cum.
n	2	0.6%	0.6%
s	352	99.4%	100.0%
Total	354	100.0%	

TERM_8	Freq	Percent	Cum.
n	354	100.0%	100.0%
Total	354	100.0%	

LEGUSTA	Freq	Percent	Cum.
n	1	0.3%	0.3%
s	353	99.7%	100.0%
Total	354	100.0%	

GUARDA	Freq	Percent	Cum.
n	22	6.2%	6.2%
s	332	93.8%	100.0%
Total	354	100.0%	

COMPLET	Freq	Percent	Cum.
n	33	9.3%	9.3%
s	321	90.7%	100.0%
Total	354	100.0%	

INCOMP	Freq	Percent	Cum.
n	322	91.0%	91.0%
s	32	9.0%	100.0%
Total	354	100.0%	

FAM	Freq	Percent	Cum.
n	352	99.4%	99.4%
s	2	0.6%	100.0%
Total	354	100.0%	

HERMA	Freq	Percent	Cum.
n	303	85.6%	85.6%
s	51	14.4%	100.0%
Total	354	100.0%	

VECINOS	Freq	Percent	Cum.
n	354	100.0%	100.0%
Total	354	100.0%	

ALIM	Freq	Percent	Cum.
n	348	98.3%	98.3%
s	6	1.7%	100.0%
Total	354	100.0%	

OTROS	Freq	Percent	Cum.
n	353	99.7%	99.7%
s	1	0.3%	100.0%
Total	354	100.0%	

VITASI	Freq	Percent	Cum.
n	41	11.6%	11.6%
s	313	88.4%	100.0%
Total	354	100.0%	

VITAPOCO	Freq	Percent	Cum.
n	316	89.3%	89.3%
s	38	10.7%	100.0%
Total	354	100.0%	

VITANADA	Freq	Percent	Cum.
n	351	99.2%	99.2%
s	3	0.8%	100.0%

Total	354	100.0%

HOJA	Freq	Percent	Cum.
n	22	6.2%	6.2%
s	332	93.8%	100.0%
Total	354	100.0%	

FACIL	Freq	Percent	Cum.
n	2	0.6%	0.6%
s	352	99.4%	100.0%
Total	354	100.0%	

DIFICIL	Freq	Percent	Cum.
n	353	99.7%	99.7%
s	1	0.3%	100.0%
Total	354	100.0%	

PAGO	Freq	Percent	Cum.
n	354	100.0%	100.0%
Total	354	100.0%	

LLEVAR	Freq	Percent	Cum.
s	354	100.0%	100.0%
Total	354	100.0%	

PIERDE	Freq	Percent	Cum.
n	354	100.0%	100.0%
Total	354	100.0%	

OTRO	Freq	Percent	Cum.
n	354	100.0%	100.0%
Total	354	100.0%	

RECIBEN	Freq	Percent	Cum.
n	13	3.7%	3.7%

APPENDIX VI

INDICE GENERAL

INFORME SEMESTRAL DE ACTIVIDADES

PROYECTO DE INTERVENCION DE VITAMINA "A"

AÑO 1,990.

I. Introduccion y Justificacion:

La Fundacion Internacional del Ojo (I.E.F.) por medio del comite Nacional Prociegos y sordomudos de Guatemala, está llevando a cabo el proyecto de-Intervencion de Vitamina "A" estando a cargo de este el Dr. Gustavo Hernandez Polanco. Por lo tanto,se presenta un informe semestral de actividades realizadas en el Departamento de Alta Verapaz, en los Municipios de Coban San Pedro Carcha y San Juan Chamelco, especificamente en Treinta y cinco-Comunidades (35)
Este informe se hace con el fin de dejar constancia de las actividades realizadas durante el primer semestre del presente año.

II. Objetivos:

II 1. Que el informe sirva de constancia a la labor de Campo y sus efectos positivos, así como la proyeccion del maestro a su comunidad.

II 2. Que el informe sirva para corregir errores y mejorar el trabajo-- en el futuro.

II 3. Que se tomen en cuenta las Recomendaciones en el presente informe para mejorar la labor del proyecto, si este continuara.

II. ACTIVIDADES FUNDAMENTALES DESARROLLADAS.

(ENERO-JUNIO)

ENERO;

- Se reacondiciona el vehiculo que se necesitara para los fines del proyecto.

- Tabulacion de datos por Escuela, Cantidad de Alumnos Asistentes y cantidad de Hermanos de los consumidores, por Aula.

- Sumar la cantidad de Alumnos y consumidores y multiplicarla por 5 veces, que será la distribucion durante todo el año, esta cantidad ya -- multiplicada servira para pedir la cantidad necesaria de NUTRIATOL.

- Tabular la cantidad de Maestros en las 35 escuelas para imprimir las formas a necesitar, para llevar control de Alumnos, consumidores,

Gb

Cantidad de nutriatol distribuido en las escuelas, bodega y otros.

FEBRERO;

- Se finaliza la tabulacion de datos y la cantidad de formas y se envia este al jefe del programa para su consideracion.

- Se recibe la cantidad de nutriatol y las formas para la distribucion en el area.

- Se elaboran los itinerarios de trabajo asi como el empaque de Nutriatol en bolsas de 8 U.

- Se inicia la Fase I a,b,c. Se informa a Maestros fines especificos del proyecto, explicacion de las formas asi como la primera entrega de Nutriatol. A esta Fase se le da inicio el día 19 de Febrero.

MARZO;

- Se continua con la distribucion e informacion, terminando esta aotividad- el día 6 de marzo de los corrientes de acuerdo al Itinerario.

- Como siempre hay atrasos por ausencias, esta actividad finalizo el día 12 de Marzo.

- Del 13 de Marzo al 19, nuevamente se empaca Nutriatol en bolsas de 8 U. así como la elaboracion del segundo Itinerario de Salidas.

- 20 de Marzo se le da inicio a la Fase II a,b,c. Esta ronda de visitas se hacen entre 2 y 5 diarias según la localizacion y distancia.

- En este lapso de visitas se acordó la fecha y hora para impartir las platicas Educativas, elaborando un Tercer Itinerario para el efecto.

- No todos los maestros para este tiempo han entregado las formas a llenar, ya sea por falta de tiempo o por negligencia.

ABRIL;

- Se continua con la distribucion de Nutriatol y convenio de Platicas Educativas, finalizando el día 16-04-90.

- Se inicia el día 23-04-90 la Fase III a,b,c. consistiendo estas en las Platicas Educativas.

- Para el Efecto se conto con una Planta Electrica y un Proyector con 10 diapositivas Educativas y 25 Recreativas, esta disposicion fue lograda

gracias a que esta surte mayor efecto en la poblacion rural, tomando encuenta que ahí no llega la Energía electrica y mucho menos el Cine o la Televisión.

- Se visitaron 2 Escuelas diarias en horarios de 8am. a 12;30 pm.

MAYO:

- Continuacion de Platicas Educativas, que segun el itinerario concluirian el día 17-05-90, pero debido a que es tiempo de limpia y rosa de terrenos así como la siembra de maiz, en algunas escuelas no hubo asistencia de madres de familia, por lo tanto se pospuso la fecha afin de que todas recibieran esta informacion. Estas concluyeron en difinitiva el día 31-05-90.

JUNIO:

- Iniciacion de la Fase IV a,b,. la Cual empesara el día 18-06-90, los primeros días de este mes se utilisaran para empaque de Nutriatol en bolsas de 8 U. A sí como tambien el Chequeo correspondiente al Vehiculo y el cambio de llantas ya que las anteriores no soportaron los malos caminos.

IV RESUMEN GENERAL DE ACTIVIDADES.

IV 1	Escuelas que estan incluidas en el programa ;	35
IV 2	Nutriatol distribuido a la fecha en Bolsas :	9,935
IV 3	Nutriatol distribuido a la fecha en Unidades:	79,480
IV 4	Promedio de Kilometraje por Mes:	2,250
IV 5	Numero de Madres Instruidas: (Un promedio de 37 asistentes por Escuela)	1,312

De acuerdo al Resumen General, en las 35 escuelas se han distribuido la cantidad de 79,480 unidades de Nutriatol que equivale a 9,935 paquetes de 8 U., todo este producto ya consumido segun las constancias de Entrega.

Para recorrer mensualmente cada comunidad en la distribucion, recoleccion de formas y chequeos del vehiculo a la Capital, se han necesitado un promedio de 2,250 Kms. Para recorrer estos kilometros se ha necesitado un promedio de 64 Galones de combustible (Gasolina Super) para el funcionamiento del Vehiculo.

V PROBLEMAS ENCONTRADOS EN EL AREA DE TRABAJO

V 1 Ausencia de el personal docente de las escuelas por los motivos siguientes:

a. Reuniones Magisteriales a nivel de Distrito.
b. Recoleccion de la Refaccion Escolar.

c. Recoleccion de Utiles Escolares.
d. Juegos Inter-Escuelas Rurales.

V 2- Se encontro un problema con la asistencia de las madres de familia, ya que cuando es tiempo de limpia y siembra de maiz, ellas tienen que preparar el alimento a los limpiadores y sembradores, lo que hace imposible la presencia de ellas al establecimiento.

V 3- Para poder dar las platicas Educativas con diapositivas, necesitamos Energía Electrica, y nos hemos encontrado con el problema de la planta electrica, ya que la anterior no era de suficiente voltage se tuvo que descartar, por el momento se tuvo que alquilar una.

V 4- Se dificulta la visita escolar, cuando empiezan las Ferias Municipales, ya que tambien las Escuelas obtienen el feriado correspondiente.

V 5- La comunicacion a la Capital no es del todo excelente ya que el Hospital de ojos de San Pedro Carcha, no cuenta por el momento un Teléfono propio.

VI. RECOMENDACIONES:

VI 1- Se tratara de Coordinar las Platicas Educativas en el futuro, cuando no sea tiempo de limpia y siembra de Maiz, para que la asistencia de Madres de Familia sea masiva.

VI 2- Se Coordinará el trabajo con los profesores, para no llegar a las comunidades y ellos esten ausentes, ya que esto implica gasto de combustible y perdida de tiempo.

VI 3- Se recomienda a la Fundacion, lograr obtener otra planta electrica de mas voltage, para las Platicas Educativas futuras.

VI 4- Para la mejor comunicacion y un contacto permanente, se necesita con urgencia el Teléfono.

VI 5- El proyecto de intervencion de Vitamina "A", tambien necesita una - MAQUINA DE ESCRIBIR, para esta área, para un mejor funcionamiento del mismo.

VII. **EVALUACION:**

VI 1- Las Platicas Educativas consisten en 6 Temas los cuales son: Diarrea, Higiene, Deshidratación, Rehidratacion, Nutrición y Preparacion del Nutriatol. Por lo tanto se considera que el Proyecto de Intervencion de Vitamina A , ha surtido sus efectos positivos ya que todavía las Madres recuerdan la elaboracion del Suero Oral Casero, que hace un año se les explico.

VI 2- Durante este año fue menor la cantidad de Madres instruidas, logicamente por la misma cantidad de Escuelas, pero el porcentaje es el mismo.

VI 3- Hay mucho interes de que el proyecto continue, prueba de ello hay varias cartas, donde los representantes de las comunidades y personal docente de las Escuelas, piden la permanencia difinitiva, ya que consideran de mucho beneficio no solo el producto Nutriatol, sino que tambien la Instruccion que se les proporciona.

VI 4- Durante los proximos meses, se continuara con la distribucion del Producto, así como la VISITA DOMICILIARIA, se proporcionara la debida informacion al igual que el presente Informe.

EDYN MARTINEZ
PROMOTOR EN SALUD OCULAR BASICA

Promotor Salud Ocular
I. E. F.
Comité Nac. Prociegos y S. M.
Carchá, A. V.

SAN PEDRO CARCHA, A.V. JUNIO/90.-

APPENDIX VII

Aldea Bancab, San Pedro Carcha, A.V. 11 de Julio de 1,990.

Doctor:
Gustavo Hernández Polanco.
Fundacion Nacional del Ojo.
Presente.

Apreciable Doctor:

Reciba por este medio un atento y fraternal saludo en nombre de todos los niños de esta comunidad, deseandole toda clase de éxitos al frente de sus actividades diarias.

El objeto de la presente es unicamente para expresarle nuestro más sincero AGRADECIMIENTO por el aporte tan valioso que hemos recibido de parte de dicha institución, con el programa de NUTRI-ATOL; rogandole al mismo tiempo que dicho programa siga vigente para -- esta comunidad, en beneficio de toda la niñez.

Sin más por momento me suscribo de Usted, como su atenta y deferente servidora;

Profa. Hilda Violeta Ruiz de Morales.
Directora Escuela Of. Rural Mixta Bancab-Sepo

c.c. Archivo

PATTERNS OF AVAILABILITY, ACCEPTANCE, AND USE OF CAROTENE-CONTAINING, DOMESTICATED VEGETABLES AND WILD PLANTS IN THREE RURAL REGIONS OF GUATEMALA (ALTA VERAPAZ; SANTA ROSA; ZACAPA).
W. Scott, M. Haskell. International Eye Foundation, Bethesda, MD, USA, and Guatemala City; and the Center for Studies of Sensory Impairment, Aging and Metabolism, Guatemala City, Guatemala.

The theme of this meeting of IVACG suggests a consensus around the notion that long-term, sustainable improvement in vitamin A status in regions of the world endemic for hypovitaminosis A will come from improved consumption of dietary sources of the vitamin. In Guatemala, 70% of vitamin A intake is from plant sources in the form of provitamin A carotenoids. Horticultural promotion, in the form of home gardens, is seen as the most culturally and economically consistent strategy. Given the variety of seasons, soils, climates, altitudes, and cultural beliefs and practices among the regions of Guatemala, we realized that a necessary step between the conception and the execution of a gardens-promotion project was a survey of past experience with and attitudes toward garden promotion, and the current consumption of green, yellow and orange plants, with an emphasis both on domesticated and indigenous (wild) species. Local community leaders and teachers had limited experience with garden programs, but were generally in favor of the hypothetical idea of initiating projects. The major forms of procurement of wild plants in the three regions were foraging and the marketplace, whereas vegetables came from the commercial purchase or home production. Regional differences were observed in reported consumption of both domesticated vegetables and wild greens, although there were also large areas of inter-regional homology. The arid province of Zacapa differed from the other two regions in selection of vegetables; the indigenous population of Alta Verapaz used a greater variety of wild plants than did the "ladino" groups in the other two localities. Within regions, acceptance patterns for carotene-containing foods differed along the urban-to-rural continuum. With previous community-level inquiry of this nature, both the planning for, and the anticipated acceptance of, horticultural promotions are likely to be benefitted.

APPENDIX VIII (2)

PATTERN OF OCURRENCE OF VITAMIN A-CONTAINING FOODS IN THE DIET OF DIARRHEIC AND NON-DIARRHEIC CHILDREN IN RURAL GUATEMALA.

Sanchez, M.E.; Galindo, C.; Solomons N.W., Hernandez, G.; Mendoza, I. International Eye Foundation, Bethesda Maryland; National Committee for the Blind and Deaf, Guatemala; Center for Studies of Sensory Impairment Aging and Metabolism (CeSSIAM).

The present study was conducted as part of the baseline data collection for the development of an intervention seeking to introduce a vitamin A-rich drink into the diet of children convalescing from diarrhea. The objectives of this study were: 1) to describe the food pattern of pre-school age children in one urban and three rural communities of Guatemala; and 2) to compare the ocurrence of vitamin A-containing foods in the diets of diarrheic and non-diarrheic children. Dietary information and a seven-day history of diarrhea were collected upon intervieving the care-taker of the child. Dietary information was obtained by shoving each care-taker a collection of 50 photograph and asking whether or not the child had consumed these food in the last seven days. Children were classified as diarrheic if diarrhea was reported for at least one day during the seven days prior to the interview. A total of 566 preschool age children were studied; (204 in the urban area and 362 in the rural area); 14.8 % (84/566) were classified as diarrheic. Significant differences were not found in the occurrence of vitamin A-containing foods in the diet of diarrheic and non-diarrheic children in either the rural or the urban communities. However, significant qualitative differences were found in the food patterns of the rural and urban communities. In the urban area the foods more frequently consumed were, in decreasing order: eggs and cereals (84%); meat (74%); legumes and vegetables (70%). Of these food groups, the items most consumed were corn, rice, wheat and meat. In the vegetables group, the most frequently consumed items were potato (85.9 %) and "quilete" (Solanum americanum) (84%). In the rural area, the food pattern was different in the meat and vegetables consumption, whereas in the urban group these foods were found among the first five items; in the rural areas, they were in the 7th and 9th place. Despite these differences, corn, black beans, and "quilete" were consumed in similar percentages as in the urban area. However, other food items with low nutritional value such as coffee and "junk food" were include in the children's diets. Dairy products and fruit and vegetable based beverages were consumed by 30 to 50% of the population studied. The vitamin A-rich foods most frequently reported in the children's diet were carrot, tomato, quilete, plantain and Incaparina (a vitamin A-rich beverage of mixed vegetables). These data must be related with quantitative dietary information in order to know the actual contribution of vitamin A to the child's diet.

APPENDIX VIII (3)

INTRAHOUSEHOLD FOOD DISTRIBUTION - AN ANTHROPOLOGICAL APPROACH. E. Saenz de Tejada. International Eye Foundation, Bethesda, Maryland and Guatemala City, Guatemala.

Hypovitaminosis A has been recognized in Guatemala for the past decades and a variety of tactics have been implemented to reduce this deficiency. Many interventions have not had sufficient impact as cultural aspects of the target population have not been taken into consideration in their plans. This study attempted to obtain descriptive information by means of direct and structured observations on household food distribution patterns in a sample of 60 households in a town, a village, a private farm and an agrarian community in the area of Yepocapa, Chimaltenango, before and during a vitamin A intervention (introduction of NutriAtol, a vitamin A fortified cereal gruel). Information was gathered on the foods available in the different environment and ways of obtaining them. Corn, tomatoes, onions, sugar, salt and coffee are available throughout the area and are purchased at local stores. Bananas are gathered and are more available in the rural areas. Generally speaking, there is more food availability in the urban area. In addition, there are seasonal changes in this food availability, especially in fruits and green leaf vegetables thar are gathered locally. Most foods are prepared by boiling, though some are roasted or fried. The main type of food or dish is the corn "tortilla" (paddie) and a greater quantity of it is eaten during every meal. All other foods are secondary and eaten as a complement of the "tortilla". In most cases, adult women of the household prepare meals, the wife being the primary food-preparer. These women spend at least ten hours a day doing food related tasks. Meals are usually prepared on "poyos" (mud stoves) using firewood as fuel. There are three major meal periods in Yepocapa: morning, noon and evening meal, but children snack with great regularity inbetween main meals. Attendance at these meals differs depending on work/school schedules. Adult women are servers and sometimes, the first to come are the first served. When present, adult men are served first and more food than any other member of the household. Women serve themselves last and some times, the least. Both boys and girls are served less than adults, but are given priority in serving order when adult men are not around. Some ethnic groups in the country share specific beliefs about the appropriateness of specific foods for different age members of the family and for different conditions of health (illness, pregnancy, lactation) based on the hot/cold dichotomy and other food classifications. "Chipilin", a green leaf vegetable, is classified as hot and is proscribed by some when there is a temperature. "Quilete", another leaf vegetable, is classified as cold and some proscribe it when breast feeding. With such knowledge of household resource allocation patterns, food beliefs and practices, the effectiveness of interventions can be improved.

APPENDIX IX

International Eye Foundation

CONSUMPTION PRACTICES IN THE USE OF DOMESTICATED AND INDIGENOUS CAROTENE SOURCES IN THE GUATEMALAN DIET

Alta Verapaz, Santa Rosa and Zacapa Provinces
Guatemala

Vitamin A Intervention Project: Guatemala

USAID Office of Nutrition
Grant # DAN-0045-G-SS-7104-00
Vitamin A Deficiency Program Support (# 931-0045)

Prepared By: William Scott, IEF Guatemala
Marjorie Haskell, CeSSIAM Guatemala

Contacts: Jack Blanks, IEF Bethesda
Noel Solomons, CeSSIAM Guatemala

February 16, 1990

Preliminary Synopsis of the Final Report of "Consumption Practices in the Use of Domesticated and Indigenous Carotene Sources in the Guatemalan Diet"

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Tables (including list) appear after page 22

EXECUTIVE SUMMARY:

The National Committee for the Blind and Deaf of Guatemala and the International Eye Foundation of Bethesda, Maryland are currently participating jointly in a Vitamin A intervention project in the Republic of Guatemala. The project sites are San Pedro Carcha and San Juan Chamelco in the Department of Alta Verapaz, and San Pedro Yepocapa in the Department of Chimaltenango. In these sites the Vitamin A enriched, post-convalescent refeeding food, NutriAtol, is being distributed. To expand this progran and include a sustainable Vitamin A component, the present study was conducted to determine the feasibility of promoting home, school and/or community gardens.

The purpose of this study was to gather information on consumption practices regarding carotene-containing fruits and vegetables and their sources, and on previous experience with, and attitudes toward the promotion of garden projects in three regions of Guatemala to determine whether a garden project could be included as part of a more comprehensive Vitamin A intervention strategy for these regions. Specific interview questionnaires were developed for the distinct levels of informants: community leaders, teachers, and local households. A total of 290 households were interviewed: 100 in the Department of Alta Verapaz, 92 in the Department of Santa Rosa, and 98 in the Department of Alta Verapaz. A total of nine community leaders and 4 teachers were interviewed. Within each Department, interviews were conducted in three geographic entities 1) townships, 2) hamlet, and 3) either plantation or dispersed settlements.

Consumption of carotene-containing vegetables and foraged greens is presented in bar charts for each area and its three geographic entities; the sources of these food items are presented in pie charts. This data indicates the universal consumption of sweet potatoes, carrots, yellow squash and tomatoes. Also, the widespread consumption of certain indigenous greens (quilete, apazote, and bledo) is demonstrated. Differences in the consumption patterns among the three regions are also shown. Data on widely consumed (>80% of households reporting consumption) vegetables and indigenous greens that are cultivated and foraged, respectively, is also presented.

The teacher-leader interviews indicate that under certain conditions garden interventions would be well received, and specific suggestions are provided that would be helpful in designing projects that are relevant to their respective areas. These suggestions, in conjunction with the food consumption data, provide background information that will permit the modeling of regionally-specific and appropriate garden intervention programs for the three departmental populations.

INTRODUCTION:

A cross-sectional survey was conducted to assess; 1) the consumption of carotene-containing vegetables, fruits and indigenous greens; 2) the sources (own cultivation, neighbors, market, or gathered wild) of these carotene-containing foods, and 3) community attitudes about exisiting, or previous home/school or community gardens projects. This information was gathered in three distinct regions of Guatemala: Alta Verapaz in the Sierra Madre mountains of northeastern Guatemala; Zacapa in the desert plain of eastern Guatemala; and Santa Rosa in the eastern mid-lands of the Republic. Moreover, within each region, a roughly equal proportion of households among the three geographic entities of 1) township; 2) hamlet; and 3) plantation were selected. The purpose of the survey was to gather information in order to determine whether a home/school or community gardens intervention would be appropriate in the three regions, as a means of increasing dietary carotene intake.

In the first section of this report, the results for each region are presented, followed by a discussion of the similiarities and differences among the three geographic entities within each region. This is followed by a discussion of the similarities and differences across the three regions. Finally, recommendations for each of three areas, based on the results from the above data and community attitudes towards garden projects are discussed.

METHODS:

Interview Procedures: Two questionnaires were developed to obtain information on 1) the consumption and sources of carotene rich vegetables and fruits; and 2) community attitudes towards previous or exisiting garden projects. Interviews were conducted with heads of households, most frequently women, to assess the consumption and sources of carotene rich vegetables, wild greens, and fruits. They were also asked about their experiences with existing or previous gardens projects, problems with gardens, and suggestions for future projects. Similar questionnaires were administered to community leaders, including health care promoters, garden promoters, mayors, and school teachers to assess community attitudes towards existing or previous garden projects. Interviews were conducted by Bill Scott in the Departments of Alta Verapaz and Zacapa, and by Jeremiah Goldstein in the Department of Santa Rosa. Interviews lasted approximately 15 minutes each. In Alta Verapaz, where Kekchi is the predominant language, a translator was utilized.

SUMMARY OF DATA OBTAINED:

The distribution of interviews conducted in the three regions is shown in Table 1. In total, 290 questionnaires were administered, with approximately 100 from each of the three regions. In addition, nine interviews were conducted with community leaders, and 4 interviews were conducted with school teachers in the three regions.

TABLE 1
Distribution of Interviews

Alta Verapaz N=100	
Townships: Saraxoch and Esperanza	N=32
Hamlets: Sehubub and Chabal	N=38
Plantations: Semesche and Sonte	N=30
Community Leaders	N=3
School Teacher	N=1
Santa Rosa N=92	
Townships: San Rafael and Santa Cruz Naranjo	N=35
Hamlets: Potrerillos and Hamlets of San Rafael	N=41
Plantation: Trapicito	N=16
Community Leaders	N=4
School Teacher	N=1
Zacapa N=98	
Townships: La Fragua and Triunfo	N=37
Hamlets: Santa Lucia and Terrero	N=34
Caserios*: Coban and San Nicolas	N=27
Community Leaders	N=2
School Teacher	N=2

* In Zacapa, the plantation system as such does not exist. Dispersed populations "caserios" were substituted as an alternative geographic entity.

DATA ANALYSIS:

The data on the consumption patterns and sources of vegetables and indigenous (wild) greens is presented in this report, the fruit consumption data will be analyzed at a later date. Within each region, like geographic entities were combined (township-township, hamlet-hamlet, etc.); thus the data is displayed by geographic entities and not by individual communities.

The consumption pattern of carotene containing vegetables and wild greens is expressed as the percentage of households reporting consumption. This data is displayed in bar graphs, in ranked order, to demonstrate the pattern of consumption in each region as a whole, and in each of the three geographic entities of townships, hamlets, and plantations.

The relative contribution of each of the four possible sources (own cultivation, neighbors, market, and foraged) of the indexed carotene-containing food items is expressed as a percentage of total sources reported. This data is displayed in pie charts for each region as a whole, as well as for the three geographic entities within each region.

A series of bar graphs displays the food items that are widely consumed, and currently cultivated or foraged in each of the geographic entities, within each region. For these graphs, the food items were selected based on the percentage of households reporting consumption; a cut-off criterion of >80.0% was used to define "widely consumed" vegetables and wild greens.

DEPARMENT OF ALTA VERAPAZ:

PHYSICAL DESCRIPTION

Climatic and Environment Data:

Soils: Alta verapaz is generally a "karst" region, characterized by limestone substructure with steep slopes, cliffs, sinkholes and caves as predominant physical features. The soils are broadly referred to as the "sebol" series (reddish-brown lateritic soils) derived from alluvial limestone sediments and covered by a varying thickness of volcanic ash, adding to fertility. However, these soils are generally subject to both heavy leaching and erosion, particularly in areas where population density is more intense and heavy deforestation has occurred.

Climate: Except for the eastern and northern lowlands, Alta Verapaz has a tropical highland island climate, and is characterized by a misty, humid environment. The average altitude is 1500 meters, rainfall is spread over more of the year than other areas of Guatemala, averaging over 400 mm per month. The dry months are January through April with generally less than 100 mm of rain per month. These months also tend to be warmer, though overall there is little temperature variation throughout the year. Maximum temperatures are in the upper 20 C range, and minimums range from 8-10 C.

Growning season: The planting season lasts from mid-April to June; harvest is September through mid-November. Some vegetables are planted in August-September for January harvest.

Description of the Population: In the department of Alta Verapaz, over 90% of the population is of indigenous origin belonging to three linguistic groups: Kekchi, Pokoman, and Pokomchi, with Kekchi being the numerical dominant group. The majority of interviews were conducted with Kekchi Indians in May of 1989, at the beginning of the rainy season, and again in November of 1989 at the end of the rainy season. Selection of the sites was roughly based on access to area markets (Coban, San Pedro Carcha), with the township being within urban bus or short walking distance from the market, hamlets approximately one hour away by bus service, often erratic depending on road conditions, and the plantations being 2.5 hours away (Semesche was an additional hours' walk by foot).

RESULTS OF DIETARY QUESTIONNAIRES

Reported Carotene-Containing Vegetable Consumption:

The consumption pattern of carotene-containing vegetables for the Department of Alta Verapaz and the three geographic entities of townships, hamlets and plantations is shown in Figures 1-4. The consumption pattern is similar across the geographic entities, however the percentage of households reporting consumption decreases as the distance from the marketplace increases. Generally, the consumption of vegetables is highest in the townships, and lowest in the plantations.

It should be noted that three additional items (cilantro, miltomate and radish leaves) are included in the data for the hamlets but not for the other geographic entities. These items were added to the instrument upon learning that they were consumed in this area.

Sources of Carotene-containing Vegetables:

The sources of carotene-containing vegetables for the Department of Alta Verapaz and the three geographic entities are shown in Figures 5-8. The major source for the Department as a whole, and in each of the sub-regions is the marketplace. However, the percentage of vegetables obtained from the marketplace is quite different between the townships (80%) and the more distant hamlets (54%) and plantations (59%). Conversely, the percentage of households cultivating their own vegetables is higher in the hamlets (41%) and plantations (29%), than in the townships (13%). In other words, families with access to the marketplace, appear to obtain the indexed vegetables from that source rather than growing vegetables themselves, and that persons more remote from the market tend to be more reliant on local sources (own cultivation, neighbors). It is interesting that the cultivation of vegetables is lower in the plantations than in the hamlets. The most likely reasons for this are decreased access to material resources (tools, fertilizer, seed source, etc.), less input from organizations

promoting gardens, and adverse environmental conditions (crops freeze in Semesche, while Semesche is too hot to grow vegetables).

Leading Cultivated Carotene-Containing Vegetables:

The most widely consumed vegetables (>80% of households reporting consumption) that are cultivated to some extent in Alta Verapaz are shown in Figures 9-11. The pattern of cultivation is similar across the three sub-regions, however, a greater percentage of vegetables are cultivated in the hamlets and plantations than in the townships. It is encouraging that sweet potatoes and carrots are cultivated to some extent in all three of the regions, and that yellow squash is cultivated in both the townships and plantations. All three of these vegetables are particularly good sources of beta-carotene (1900-6000 mcg/100g of edible portion).

Reported Wild Greens Consumption:

The consumption pattern of wild greens in the three geographic entities are shown in Figures 12-15. As with the vegetables, consumption patterns are similar across geographic entities. Generally, the percentage of households reporting consumption of wild greens increases with distance from the market, indicating an increased reliance on wild greens in the more remote areas.

It should be noted that the wild greens in the lower tiers of the bar graphs (chomtee, tziton, chipilin) grow only in their respective climatic zones, which may account for the difference in reported consumption across geographic entities. Some wild greens are heartier and grow in a wider geographic range (quilete, samat, osh), while others are more regionally specific. Also, spearmint data was obtained only in the hamlets, as it became evident that it was widely consumed. Since it is used primarily as a condiment in soups, it probably does not contribute significantly to overall carotene intake.

Sources of Wild Greens:

The sources of wild greens for the region are shown in Figures 16-19. Overall, 38% of the wild greens are foraged, which is the major source of wild greens in the Department of Alta Verapaz as a whole, however there are differences among the geographic sub-regions. The leading source of wild greens in the townships is the marketplace (46%), while in the more remote hamlets and plantations, most of the greens are gathered wild, 51 and 43% respectively. Again, it appears that persons living in the more remote areas rely more on gathering wild greens to supplement their diets. However, it is interesting that persons living in the townships still consume wild greens even though they have access to a wide variety of vegetables in the marketplace.

It should also be noted that in responding to the source question, many people answered "own cultivation" or "neighbors", which may indicate that the greens were gathered from their own, or their neighbors milpas (plots where the staples, corn and beans are planted). In the milpa, small quantities of many other vegetables are intercropped, and wild greens grow spontaneously in and around these areas, so some overlap in response to this question may have occurred. It is also true that wild greens grow spontaneously around the houses, and it may be that they report the source of these greens as "own cultivation", when in reality the greens are not actually cultivated. However, in some cases, the greens are cultivated around the household in small quantities.

Leading Wild Greens Gathered:

The most widely consumed wild greens (>80% of households reporting consumption) that are foraged in the three geographic entities are shown in Figures 20-22. The pattern of foraged greens is similar in the hamlets and plantations, with a larger percentage, and wider variety of greens gathered. Fewer varieties of greens are gathered in the townships, with the marketplace being the primary source. There is also a similarity in the pattern of cultivation of greens between the hamlets and plantations. Again, as previously noted, there be some overlap in the source responses of "own cultivation" and "foraged". Generally, it appears that persons living in the hamlets and plantations are more likely to forage greens, while persons in townships rely more on market sources.

DEPARTMENT OF SANTA ROSA:

PHYSICAL DESCRIPTION

Climatic and Environmental Data for Santa Rosa:

Physical description: Located on the southwestern coastal plain of Guatemala, the department of Santa Rosa is divided almost evenly into three regions, the Pacific Coastal Plain, the Pacific Slope region, and the Central Highlands.

Soils: The Pacific Coastal Plain is situated approximately 165 meters above sea level and the soils are generally poorly drained and more adaptable to cattle production, unless adequate drainage systems are installed.

The soils of the Pacific Slope region are deep soils over volcanic materials, except on the steeper slopes. These soils are fertile, though subject to leaching and erosion, and are used to grow coffee.

The Central Highlands are generally rolling lands characterized by shallow rocky soils. Small fincas predominate

in this region of Santa Rosa. This is the area under consideration for future home garden interventions. The elevation of this region varies between 1,300 meters in the eastern region to 2,500 meters in the west. Soil classifications of the highland region are Barberena, Bucul, Mongo, Jalapa and undifferentiated valley soils. Most of these soils are suceptible to leaching and erosion.

Climate: Santa Rosa is more tropical than Alta Verapaz, rising up from the Pacific Coast to low mountains. Annual rainfall is 2000 mm per year, and the rainy season lasts from May to September. Rain is relatively scarce during other seasons. Temperature variations are minimal, with an annual average temperature of 20 C in the north and 25 C in the south.

Growing season: The planting season ranges from late April to June, with some areas cultivated during the months of November through February, where irrigation is available. Harvest ranges from September to mid-November.

Description of the Population:

In the department of Santa Rosa, the population is largely "ladino", speaking Spanish, with increasing migration of indigenous persons from the Mayan highlands. A total of 92 households were interviewed in the Department of Santa Rosa. In the municipalities of San Rafael Las Flores and Santa Cruz Naranjo, 35 households were interviewed. In the surrounding hamlets, 41 households were interviewed, and 16 households were interviewed in the finca of Trapicito.

RESULTS OF THE DIETARY SURVEY

Reported Carotene-Containing Vegetable Consumption:

The consumption patter of carotene-containing vegetables for the Department of Santa Rosa and the three geographic entities of townships, hamlets and plantations are shown in Figures 23-26. As in Alta Verapaz, the consumption pattern is similar across the geographic entities, and varies little between the townships and hamlets. However, reported vegetable consumption decreases noticeably in the plantation of Trapicito. It appears that there is a better variety of vegetables available in the townships and hamlets, when compared to the plantation. For example, in the plantation nobody reported consuming spinach, mustard or turnip greens whereas these items were consumed to some extent in the other sub-regions. Generally, persons living in a plantation setting are less likely to have resources (land, money, seed, etc.) and time available to grow their own or purchase vegetables. This may account for the reduction in reported consumption.

Sources of Carotene-Containing Vegetables:

The sources of carotene-containing vegetables for the Department of Santa Rosa and the three geographic entities are shown in Figures 27-30. Overall, the major source for the Department as a whole, and in each of the sub-regions is the marketplace. In this case, the percentage of vegetables obtained from the marketplace is similar between townships and hamlets, 50% and 45% respectively, while the plantation reports 61% from the marketplace. It is also interesting to note that twice as many households report cultivating their own vegetables in the hamlets compared to the townships and the plantation. In the townships, more than twice as many households reported obtaining vegetables from neighbors, suggesting that their neighbors have land in nearby hamlets, and able to grow vegetables. On the other hand, it appears that the plantation has both limited access to locally produced carotene-containing vegetables and limited access to market sources.

Leading Cultivated Carotene-Containing Vegetables:

The leading cultivated carotene-containing vegetables are shown in Figures 31-33 by geographic entity. The patterns of leading cultivated vegetables are similar between townships and hamlets, though twice as many households reported cultivating their own vegetables in the hamlets compared to the townships. The variety of vegetables cultivated declines markedly in the plantations, with only three "widely consumed" items reported cultivated. Of the vegetables cultivated, yellow squash and sweet and hot peppers are relatively good sources of beta-carotene, containing approximately 1900, 800 and 5800 mcg/100g edible portion, respectively.

Reported Consumption of Wild Greens:

The consumption pattern of wild greens for the Department of Santa Rosa and the three geographic subregions are shown in Figures 34-37. Consumption patterns of wild greens are similar across the geographic entities. Wild greens are widely consumed among the three sub-regions, and there is a progressive increase in the consumption of verdolaga as distance from the marketplace increases. Generally, it was noted during the interview process across the three Departments, that verdolaga was not a popular green, and was consumed only when necessary.

Reported Sources of Wild Greens:

The reported sources of wild greens in the Department of Santa Rosa and the three sub-regions are shown in Figures 38-41. The major overall source of wild greens for the Department as a whole is foraged (61%). The hamlets and plantations both show a markedly higher level of reported foraged greens, 71 and 65% respectively, than the townships (50%). A larger percentage of households in the townships reported obtaining wild greens from

neighbors (21%), compared to the hamlets (7%) and plantation (11%). Again, it may be that some families in the townships have land in nearby hamlets where they may forage or grow indigenous greens. Also, as mentioned previously, there may be some overlap in the source categories of "own cultivation", "neighbors" and "foraged", since the indigenous greens are known to grow spontaneously in and around the "milpas" and households. Another interesting note is that the market source for the plantation is 0%, and that market sources for the Department as a whole are only reported as 6%.

Leading Indigenous Greens Gathered Wild:

The patterns of foraged greens for the three geographic entities are shown in Figures 42-44. The pattern of foraging for greens is similar in the hamlets and townships; the same greens are foraged, and the percentage of households that report foraging each green is similar. However, in the plantation, over 90% of the households reported foraging for verdolaga, whereas verdolaga was not widely consumed in the hamlets and townships. This suggests that persons living in the plantation are more reliant on basic indigenous greens for subsistence, since as previously mentioned, verdolaga is usually consumed only when other food items are not available.

DEPARTMENT OF ZACAPA:

PHYSICAL DESCRIPTION

Climatic and Environmental Data:

Physical Description: Zacapa is located in the desert valley of eastern Guatemala. The region is unique in Guatemala, being both extemely dry and hot. Running through the center of the region, the Motagua river divides Zacapa into roughly north-south halves. Mountains bound the southern and northern borders. The northern mountains are largely uninhabited, the southern mountains contain a relatively large populus (municipality of San Diego). Along the river, there is extensive irrigation with an elaborate canal system, providing water to large commercial farms, where mainly export crops are grown. Excess produce (non-exportable) from these farms (okra and melons) are sometimes sold in the local market, or given away free.

Soils: The soils along the river are principally a rich valley sediment (suelos del valle). Land holdings are large in this relatively rich soil region. On either side of this narrow band of fertility are desertous regions consisting of shallow, infertile soils (Chol and Zacapa classifications). No soil data is available for the mountainous areas, however small gardens seem to be adaptable to soil conditions in this area.

Climate: In Zacapa there is a scarcity of rain through the year. Along the Motagua River, it only rains from June to October with an average annual rainfall of 50mm. In the mountains bordering the northern and southern regions, the total annual rainfall is higher, but in all regions the dry season, from October to April is severe. The average temperature for the year is 25 C.

Growing season: The growing season is from May to October, except in irrigated zones where crops can be produced year-round. Generally, gardens are only feasible in the irrigated areas, however a harvest can be obtained once a year in the mountainous zones.

RESULTS OF DIETARY SURVEY

Reported Consumption of Carotene-Containing Vegetables:

The patterns of vegetable consumption for the Department of Zacapa and the sub-regions are shown in Figures 45-48. Overall, a wide variety of vegetables were reported consumed in the Department of Zacapa. The pattern of consumption is similar across the three sub-regions, however the percentage of households reporting consumption drops off in the "caserios". In the hamlets, data for radish leaves and cilantro was obtained only in the hamlet of Terrero; in the caserios, data for radish leaves was obtained only in Coban, and no data was collected for cilantro or turnip greens. These items were added to the instrument upon learning that they were consumed to some extent in the given areas.

Reported Sources of Carotene-Containing Vegetables:

The sources of vegetables for the Department of Zacapa and the three sub-regions are shown in Figures 49-52. The major source for the Department as a whole, and for the three sub-regions is the marketplace, with a gradual decline from township to "caserios", 59, 55, and 48% respectively. In the hamlets and "caserios", the percentage of vegetables cultivated and obtained from the neighbors was higher compared to the townships. Again, it appears that persons living in the urban areas obtain most of their vegetables from the marketplace, while persons living in rural areas are more reliant on local sources.

Leading Cultivated Carotene-Containing Vegetables:

The leading cultivated carotene-containing vegetables for the sub-regions are shown in Figures 53-55. The vegetables cultivated are similar across the three regions, with more variety in the "caserios". Of the vegetables cultivated, sweet potato and sweet and hot peppers are the best sources of beta-carotene. It should be noted that most of the hot peppers (chiltepe) in Zacapa are gathered wild, and not cultivated.

Reported Consumption of Wild Greens:

The patterns of consumption of wild greens in the Department of Zacapa and the geographic entities are shown in Figures 56-59. Indigenous greens are widely consumed in Zacapa. The leading wild greens are chipilin, quilete, and bledo, and the pattern of consumption is similar across the three sub-regions. Data on the consumption of verdolaga was obtained for the three sub-regions, however in the hamlets, no data was obtained from the hamlet of Santa Lucia. Data on consumption of apazote is presented for the townships, however apazote was dropped from the questionnaire upon learning that it is only used medicinally in Zacapa. It is interesting that a greater percentage of households reported consuming verdolaga in the townships than in the rural areas, which is the opposite of what was observed in Santa Rosa.

Reported Sources of Wild Greens:

The reported sources of wild greens for the Department of Zacapa and the sub-regions are shown in Figures 60-63. The major source of wild greens in the region as a whole, and in the sub-regions is foraged. It is interesting that the percentage of greens foraged was highest in the townships, and decreased markedly as distance from the marketplace increased. The percentage of greens foraged in the townships was 75%, compared to 66% and 56% in the hamlets and "caserios", respectively. One possible explanation is that there is overlap in the responses in the case of the "caserios". The percentage of greens reported obtained from neighbors in the "caserios" was more than three times that of the townships and hamlets. It may be that persons from certain households in the "caserios" go out and forage greens and then sell them to their neighbors, in which case, the primary source is actually foraged. Also, the percentage of greens reported obtained from the market was more than twice as much as in the townships and hamlets. Again, some overlap in responses may have occurred. Although the greens were purchased, they may have been purchased from neighbors who gathered the greens in the wild.

Leading Wild Greens Gathered:

The leading wild greens gathered in the three sub-regions are shown in Figures 64-66. The pattern of greens gathered is similar across the three regions, however, the percentage of households that reported gathering greens in the townships is equal to, or greater than that of the hamlets and caserios. Also, bledo was reported gathered in the townships, but not in the hamlets or "caserios". Actually, bledo is gathered in the other areas, but it is was not reported consumed by >80% of the households in these areas, and for this reason was not included in the chart.

CROSS REGIONAL COMPARISON OF REPORTED CONSUMPTION OF CAROTENE-CONTAINING FOOD ITEMS:

Leading Vegetables (>80% Households Reporting Consumption)
Consumed by Department in Ranked Order

Alta Verapaz	Santa Rosa	Zacapa
squash buds	tomato	tomato
bean sprouts	green beans	green beans
tomato	carrot	carrot
green beans	watercress	hot pepper
sweet potato	miltomate	sweet pepper
carrot	squash buds	sweet potato
sweet pepper	sweet pepper	bean sprouts
yellow squash	bean sprouts	
bean leaves		
scallions		

Regional differences:

bean leaves - not eaten in Zacapa (animal feed)
watercress - more acceptable in Santa Rosa and Zacapa

Similarities among regions:

Good beta-carotene sources: carrot, yellow squash (>80% in Alta Verapaz, 78% in Zacapa, 78% in Santa Rosa), sweet potato (58% in Santa Rosa)

Leading Greens (<80% of Households reporting Consumption)
by Department in Ranked Order

Alta Verapaz	Santa Rosa	Zacapa
quilete	quilete	chipilin
samat	chipilin	quilete
osh	bledo	
apazote	apazote	
tzoloj		

Regional differences:

samat, osh, tzoloj are found only in Alta Verapaz

Similarities among regions:

quilete, chipilin (62% Alta Verapaz), apazote (medicinal in Zacapa), bledo (79% in Zacapa, 57% in Alta Verapaz)

Vegetables Sources
(Percentages)

Department

	Alta Verapaz	Santa Rosa	Zacapa
Market	63	50	54
Own Cult.	29	30	25
Neighbors	6	17	16
Foraged	1	3	5

Townships

	Alta Verapaz	Santa Rosa	Zacapa
Market	80	50	59
Own Cult.	13	20	20
Neighbors	7	27	16
Foraged	1	3	6

Hamlets

	Alta Verapaz	Santa Rosa	Zacapa
Market	54	45	55
Own Cult.	41	41	30
Neighbors	4	11	11
Foraged	1	3	4

Plantations

	Alta Verapaz	Santa Rosa	Zacapa
Market	59	61	48
Own Cult.	29	21	25
Neighbors	9	12	21
Foraged	3	6	6

Sources of Greens
(Percentages)

Department

	Alta Verapaz	Santa Rosa	Zacapa
Foraged	38	61	67
Own Cult.	22	19	14
Market	30	6	6
Neighbors	10	13	12

Townships

	Alta Verapaz	Santa Rosa	Zacapa
Foraged	19	50	75
Own Cult.	19	19	12
Market	46	10	5
Neighbors	17	21	8

Hamlets

	Alta Verapaz	Santa Rosa	Zacapa
Foraged	51	71	66
Own Cult.	26	18	22
Market	19	4	4
Neighbors	4	7	8

Plantations

	Alta Verapaz	Santa Rosa	Zacapa
Foraged	43	65	56
Own Cult.	22	24	6
Market	27	0	12
Neighbors	8	11	26

Leading Vegetables (>80% Households Reporting Consumption) that are Cultivated, in Ranked Order (most widely cultivated to least widely cultivated)

Townships

Alta Verapaz	Santa Rosa	Zacapa
squash buds	squash buds	cilantro
scallions	bean sprouts	green beans
bean sprouts	green beans	sweet pepper
carrot	hot peppers	hot peppers
green beans	sweet peppers	hot peppers
sweet potato	miltomate	tomato
yellow squash	tomato	

Hamlets

Alta Verapaz	Santa Rosa	Zacapa
bean sprouts	bean sprouts	bean sprouts
green beans	squash buds	green beans
hot peppers	green beans	hot peppers
tomato	yellow squash	tomato
sweet potato	miltomate	sweet potato
	tomato	

Plantations

Alta Verapaz	Santa Rosa	Zacapa
bean sprouts	squash buds	bean sprouts
squash buds	tomato	peas
green beans		tomato
yellow squash		sweet potato
tomato		sweet peppers
sweet potato		hot peppers
carrots		

Regional differences:

carrots were reported cultivated in Alta Verapaz, but not in Santa Rosa or Zacapa, however carrots are cultivated to some extent in all three regions.

Similarities among regions:

sweet potato (78% in Santa Rosa), squash and squash buds (yellow squash 78% in Zacapa), peppers (hot and sweet), green beans

(Leading Greens (>80% Households Reporting Consumption) that are Foraged in Ranked Order (most widely foraged to least widely foraged)

Townships

Alta Verapaz	Santa Rosa	Zacapa
quilete	quilete	bledo
apazote	bledo	quilete
samat	chipilin	chipilin
osh	apazote	

Hamlets

Alta Verapaz	Santa Rosa	Zacapa
tziton	bledo	quilete
tzoloj	apazote	chipilin
quilete	quilete	
roctish	chipilin	
apazote		
samat		
osh		

Plantations

Alta Verapaz	Santa Rosa	Zacapa
quilete	verdolaga	quilete
tzoloj	bledo	chipilin
samat	quilete	
roctish	chipilin	
apazote	apazote	
osh		

Regional differences:

those regionally specific to Alta Verapaz verdolaga is more acceptable in Santa Rosa

Similarities among the regions:

quilete, apazote (used only medicinally in Zacapa), chipilin (in Santa Rosa and Zacapa), and bledo (in Santa Rosa and Zacapa)

MILPA AGRICULTURE AND COMMUNITY ATTITUDES TOWARDS GARDEN PROJECTS:

"Milpa Agriculture"

In prescribing an appropriate course for a gardens intervention in Guatemala, it is necessary to understand the "milpa" structure found not only in the indigenous area (Alta Verapaz), but also in the more "ladino" areas (Zacapa and Santa Rosa). The "milpa" is the plot of land utilized by the local farmer to produce maize primarily, but also beans and smaller quantities of secondary vegetables. These plots are either owned or more frequently, depending on the region, "rented" from the larger land holders in the region. The plots are generally small - 1/2 cuerda (800 sq. meters) or less - and it is on these parcels that the families' survival depends.

In conducting the vegetables consumption and source interviews in these three regions, it became clear to me that the term "huerta" or garden was vague for many of those interviewed. When asked if they had a garden, many would answer "no" after just having affirmed in the survey that they did cultivate some vegetables, whether in their "milpas" and/or in small plantings around their homes.

A good description of the role of the "milpa" in Guatemalan rural areas is contained in Sheldon Annis's book, God and Production in a Guatemalan Town. In the chapter on Milpa Agriculture, Annis writes that "Farmers often casually described plants by saying "solo es monte" (just weeds) even though such "weeds" can be sold as herbs, medicinal plants, dyestuffs, or can be fed to the turkey. In field inventories I frequently did not see or failed to ask about crops of rapid maturation, usually ornamental flowers and occasionally radishes. I misunderstood that plants which seemed inedible can sometimes be prepared in edible forms"...."Milpa is an agronomic system that operates by producing a very large number of very small quantities. In many instances, the intercrops can be more important than the primary corn crop. Because of the biotic diversity and seasonal variation, the precise output defies quantification. Since most "milpa" inputs require no direct outlay of cash, a farmer is unlikely to have a corresponding notion of what is produced. Upon being asked what is being grown in a particular field, a farmer is likely to simply respond "milpa" or "maize" (in some senses the words are interchangeable). The ambiguity arises because the farmer conceives a corn field as a place with corn, beans, some carrots, a few guicoy, a half-a dozen or so ayotes, a row or two of radishes, several kinds of chiles for cooking, a couple of dozen pacayas for Easter, three coffee bushes, two gravilea trees for shade and firewood in the Northwest corner, fodder for his brother-in-law's cow, dried corn stalks to be used for a new kitchen wall, and so forth. The alternative to asking a farmer what and how much he produces from a given unit of

land--on site case studies of individual plots based on field observation during the full agricultural cycle--is inordinately time consuming and does not lend itself to aggregation of statistical data for more than a few cases".

Despite the difficulties in quantifying what is produced on a "milpa", the survey data obtained in Alta Verapaz, Zacapa, and Santa Rosa helps to focus/define what is consumed locally and suggests culturally appropriate vegetables for intercropping with corn and beans, or for increasing production in small household plots. Also, by identifying those wild greens which are widely accepted in a given region, strategies can be developed so that these traditional plants can be promoted, their use reinforced, and where they have been "domesticated", their cultivation expanded.

"Community Attitudes"

Zacapa

While local leaders and teachers are receptive to the possibility of gardens interventions, the area isn't conducive to such activities due primarily to the lack of access to water. Intercropping would work for those persons with access to irrigated lands, however for more remote populations without water, crops such as carrot or sweet potato would require an inordinate amount of time to tend, and would be likely to fail. The same applies to those small plots planted near the home, as available water is likely to be used for higher priorities.

Reinforcement of existing vegetable and wild green consumption should be emphasized and consumption of other less popular greens such as radish leaves (radishes are widely consumed, though leaf consumption in not common) and apazote (used primarily as a medicine in Zacapa) should be promoted.

Alta Verapaz

To summarize leader/teacher interviews: these persons are receptive to gardens interventions, particularly to promotor, seed and fertilizer inputs, though previous projects have met with little success. The Peace Corps has worked in some of the areas interviewed in conjunction with DIGESA, and DIGESA has also conducted "capacitation" courses with some local farmers. The Mennonites also promote vegetable consumption in those areas where they have missions.

In the areas where such projects have been attempted, most have been unsuccessful due to the following factors:

- lack of cultural sensitivity - i.e. attempting to cultivate vegetables that are not environmentally or culturally appropriate.

- failure to motivate the community - more success is evident in working with individual motivated families and in some schools garden projects where the teachers are strong collaborators.

- lack of sustained intervention - organizations frequently give the gardens projects a try for one or two growing seasons and then they fade away.

Santa Rosa

The responses to the interviews conducted in Santa Rosa are positive regarding the development of gardens interventions. In the region of Santa Cruz, DIGESA has no projects, nor does the Peace Corps. A new market has been constructed in the town, and thus far no produce is sold there, however the potential is there. In this municipality the primary obstacle to the development of a gardens intervention is the lack of water and the lack of technical know-how. However, local leaders see a project in this area as reducing costs and dependence on external markets.

In San Rafael, the other area of Santa Rosa targeted for gardens interventions, water scarcity is less of a factor. Interviews show more experience with vegetable production, and more existing community infrastructure exists (health promoters).

RECOMMENDATIONS:

1. Direct garden projects towards hamlets and other rural entities, as the closer the population is to the market source the less likely they are to grow their own vegetables.

2. Utilize existing organizations, where available, that are involved in community development, especially those with experience in health care delivery, garden projects and nutrition. These organizations can serve as vehicles for promotion of improved nutrition, and can help establish demonstration plots, locate markets and develop economic incentives for locally produced vegetables and greens (DIGESA, health promoters, school teachers, Peace Corps, church organizations, etc.)

3. Locate and hire local promoters to be trained in nutrition and garden promotion to provide technical assistance and some resources (seeds, tools) in promoting home/school gardens.

   - train promoters in participatory techniques so that they can become optimally involved in their target communities.

   - provide training in nutrition, specifically in vitamin A interventions, explaining the need for improved diet including vegetables and greens.

   - provide horticultural training for promoters involved in gardens projects. They should be able to provide assistance in 1) building fences (for gardens around schools and the home), 2) basic composting, 3) dealing with local pests and plagues, 4) how to optimize environmental and water resources, 5) provide seeds, where available, and when appropriate, distribute sweet potato and beta-III carrot seeds to those farmers that are identified as "innovators" within a given community - (have them try new intercroping methods).

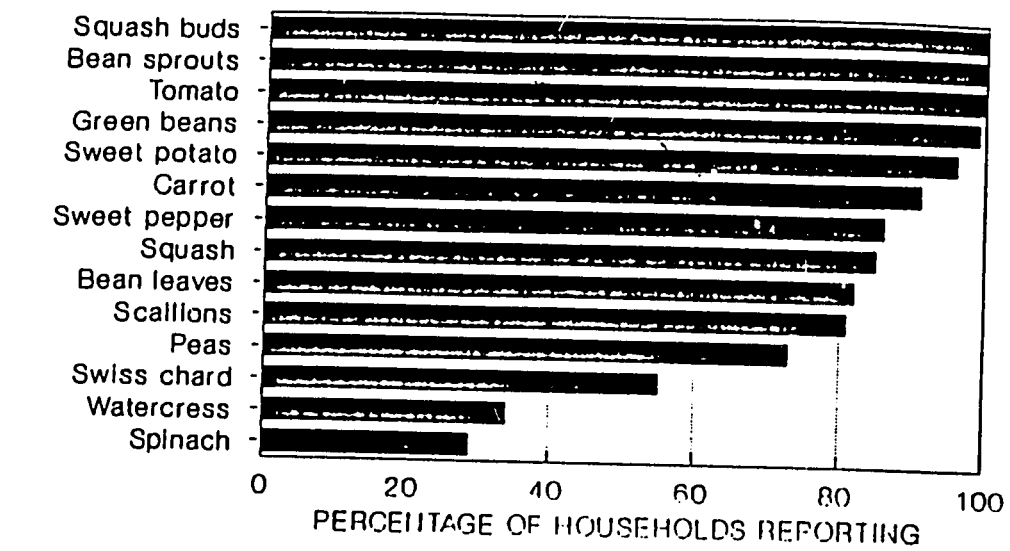
4. Promote school gardens, provide seeds, tools, on-going technical assistance.

5. Work on improving existing planting and consumption routines within a region.

6. Promote consumption of wild greens, offer advice on preparation, and cultivation where feasible.

LIST OF FIGURES

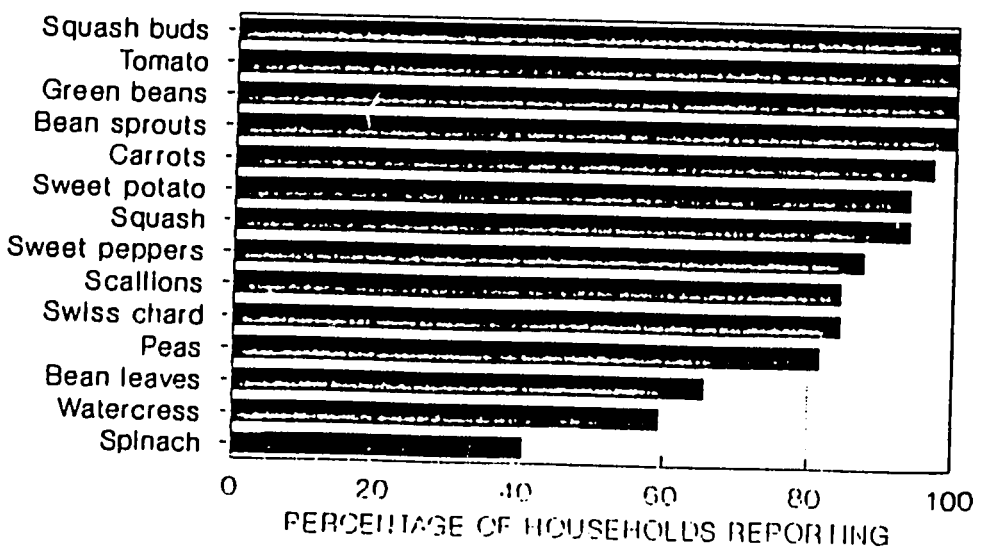
REPORTED VEGETABLE CONSUMPTION DEPARTMENT OF ALTA VERAPAZ



N=100

FIGURE 1

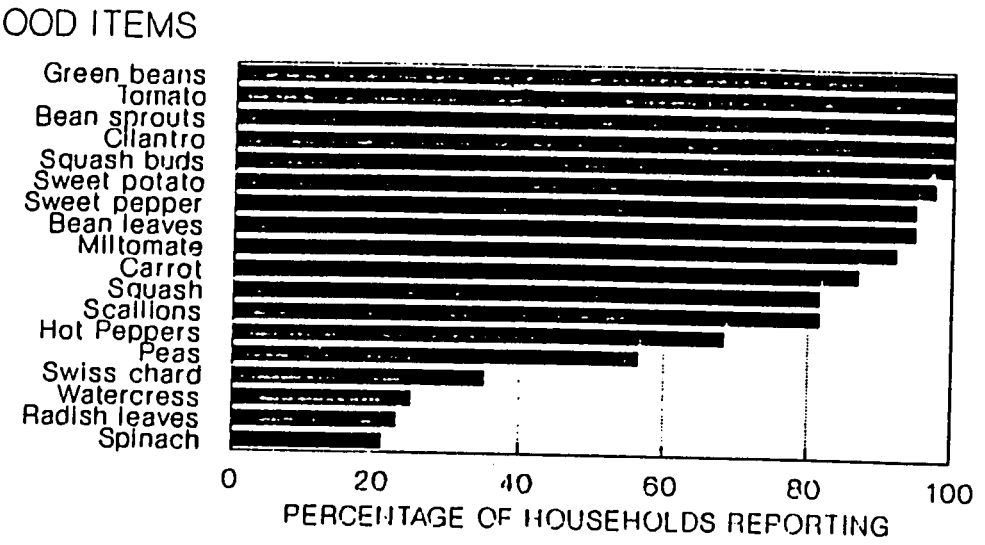
VEGETABLE CONSUMPTION IN THE TOWNSHIPS OF SARAXOCH AND ESPERANZA, ALTA VERAPAZ



N=32

FIGURE 2

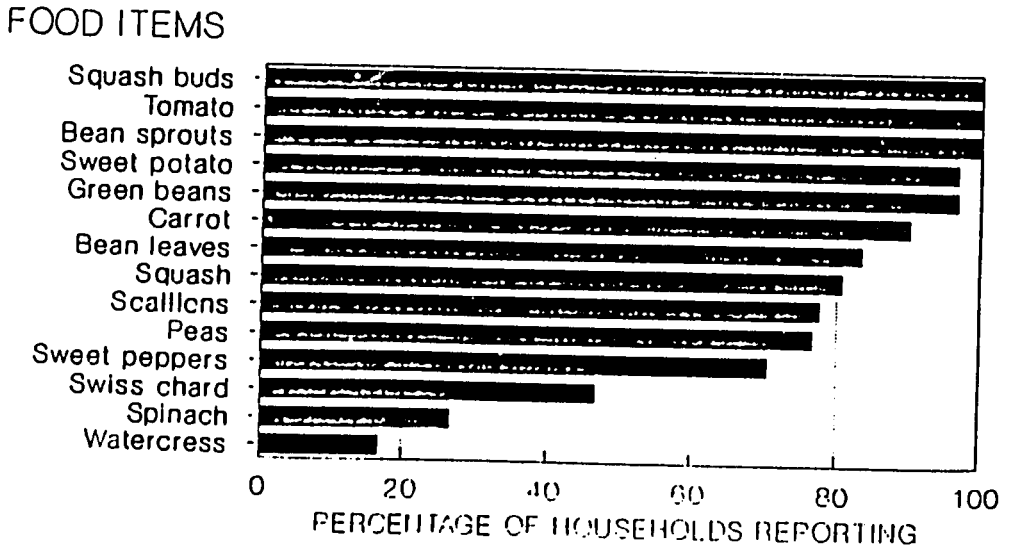
VEGETABLE CONSUMPTION IN THE HAMLETS OF SEHUBUB AND CHABAL, ALTA VERAPAZ



N=38

FIGURE 3

VEGETABLE CONSUMPTION IN PLANTATIONS OF SEMESCHE AND SONTE, ALTA VERAPAZ



N=30

FIGURE 4

SOURCES OF VEGETABLES FOR ALTA VERAPAZ

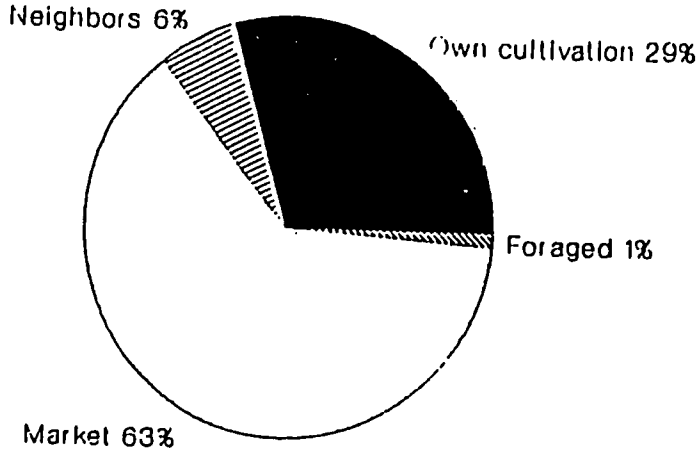


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FIGURE 5

SOURCES OF VEGETABLES IN TOWNSHIPS OF SARAXOCH AND ESPERANZA, ALTA VERAPAZ

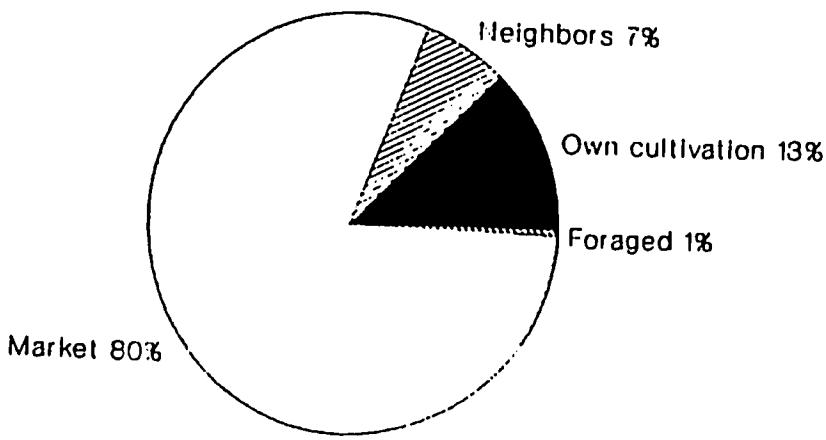

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FIGURE 6

SOURCES OF VEGETABLES IN THE HAMLETS OF SEHUBUB AND CHABAL, ALTA VERAPAZ

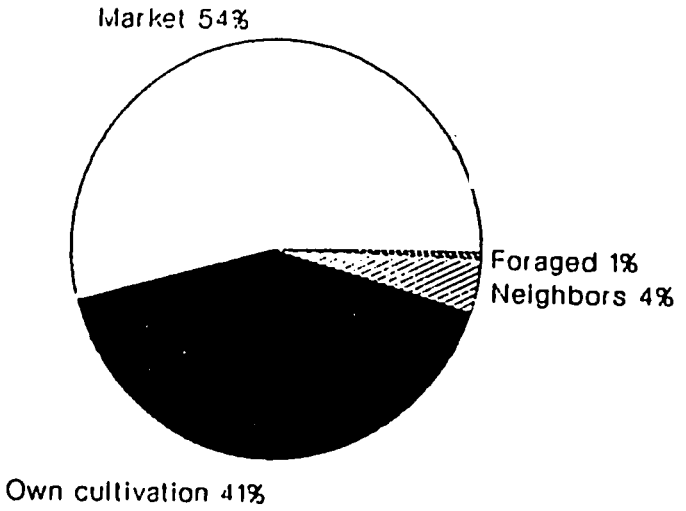

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FIGURE 7

SOURCES OF VEGETABLES AT THE PLANTATIONS OF SEMESCHE AND SONTE, ALTA VERAPAZ

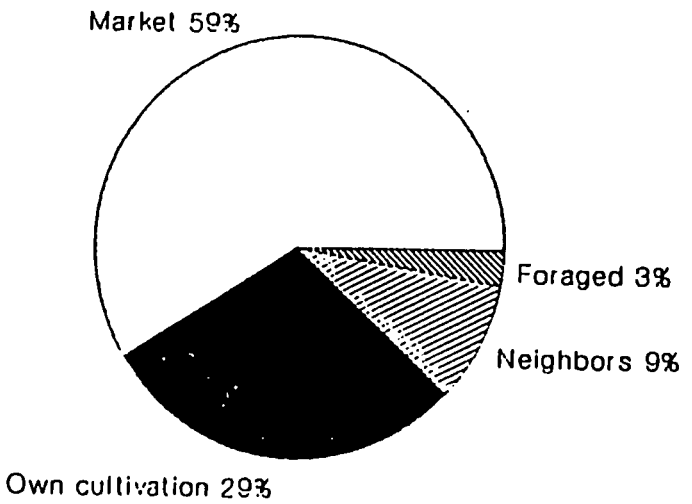

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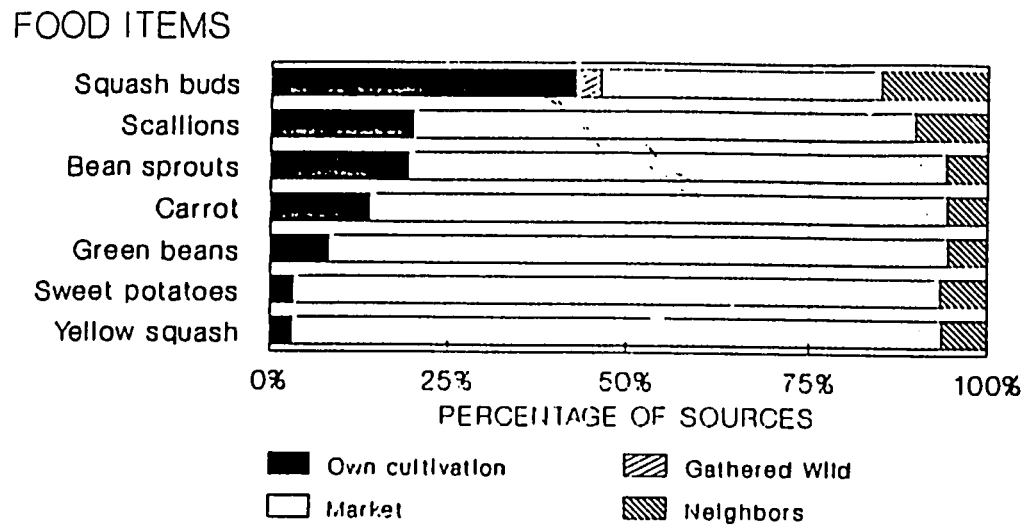
FIGURE 8

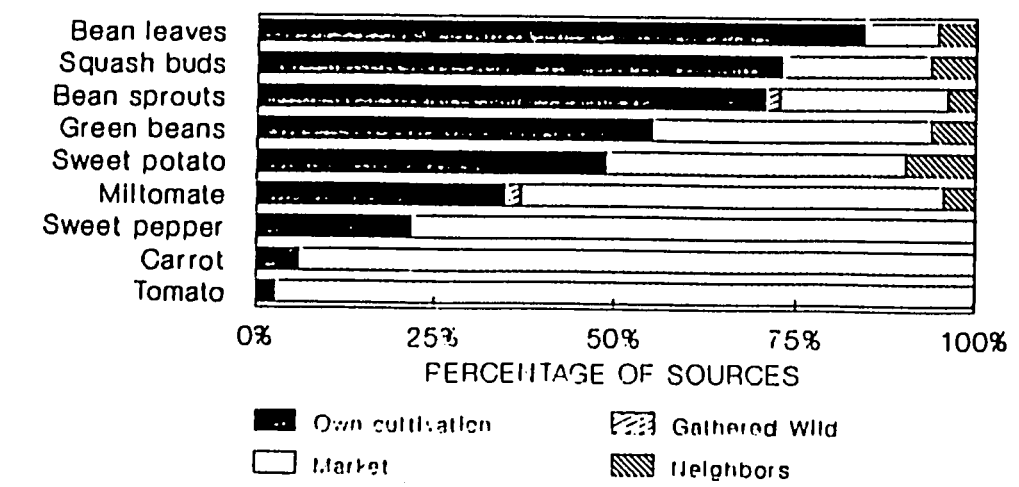
LEADING CAROTENE-CONTAINING VEGETABLES* CULTIVATED IN THE TOWNSHIPS OF SARAXOCH AND ESPERANZA, ALTA VERAPAZ



N=32
*>80% of Households reported consuming food items

FIGURE 9

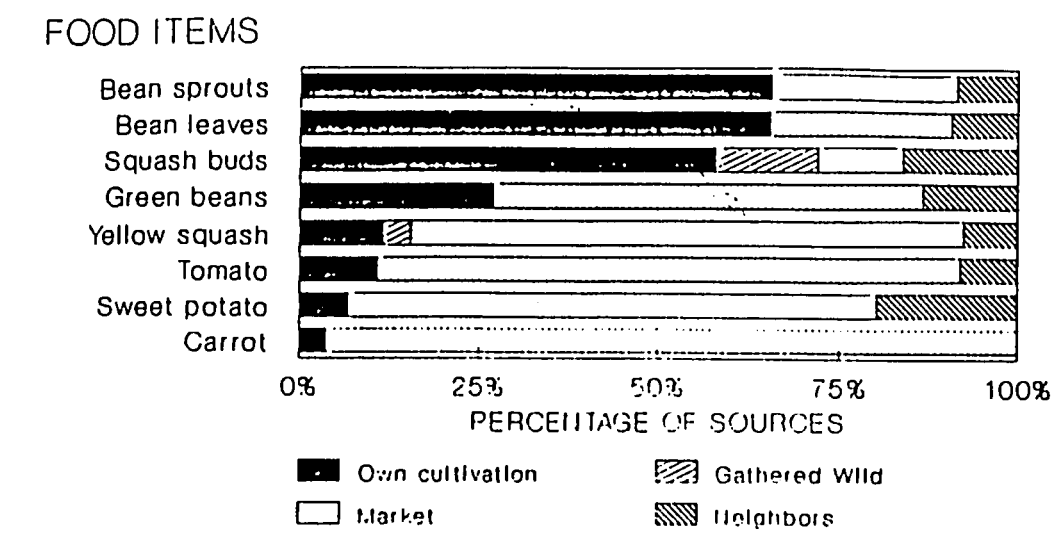
LEADING CAROTENE-CONTAINING VEGETABLES* CULTIVATED IN THE HAMLETS OF SEHUBUB AND CHABAL, ALTA VERAPAZ



N=38
*>80% of households reported consuming food items

FIGURE 10

LEADING CAROTENE-CONTAINING VEGETABLES* CULTIVATED IN THE PLANTATIONS OF SEMESCHE AND SONTE, A.V.



N=30
*>80% of Households reported consuming food items

FIGURE 11

WILD GREEN CONSUMPTION DEPARTMENT OF ALTA VERAPAZ

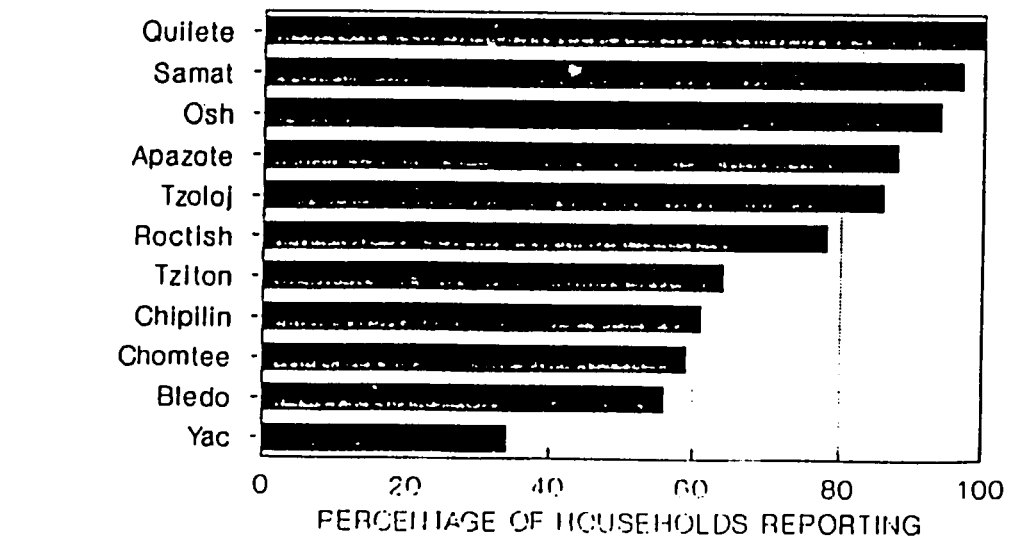


FIGURE 12

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WILD GREEN CONSUMPTION IN THE TOWNSHIPS OF SARAXOCH AND ESPERANZA, ALTA VERAPAZ

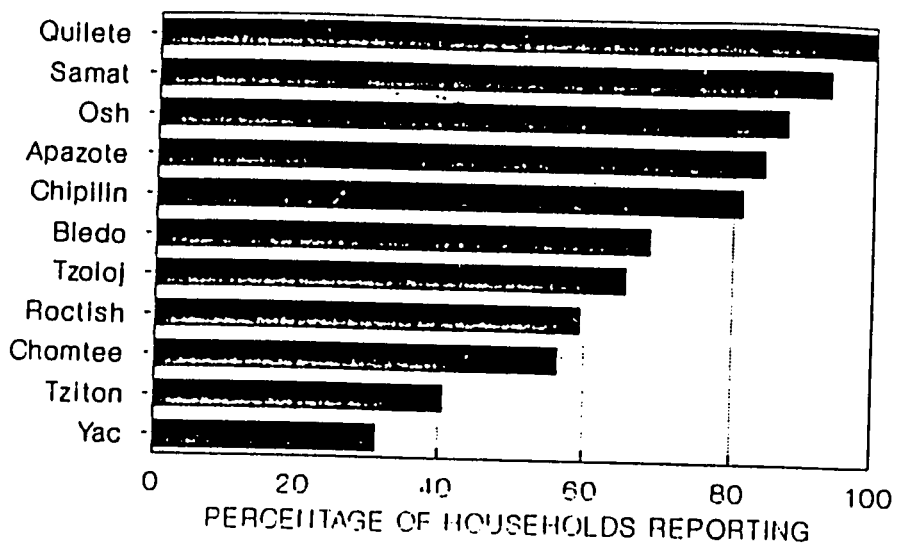

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FIGURE 13

WILD GREEN CONSUMPTION IN THE HAMLETS OF SEHUBUB AND CHABAL, ALTA VERAPAZ

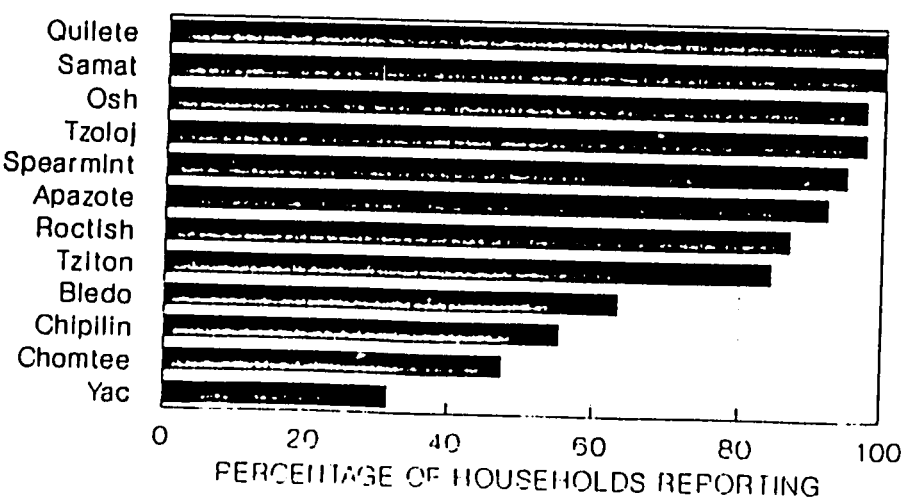

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FIGURE 14

WILD GREEN CONSUMPTION IN THE PLANTATIONS SEMESCHE AND SONTE ALTA VERAPAZ

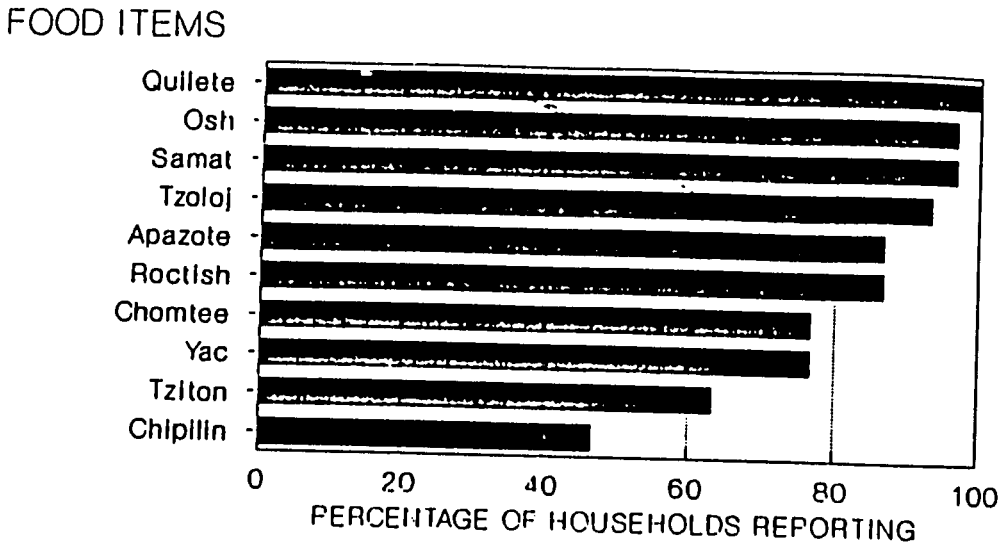

FIGURE 15

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SOURCES OF "WILD" GREENS FOR ALTA VERAPAZ

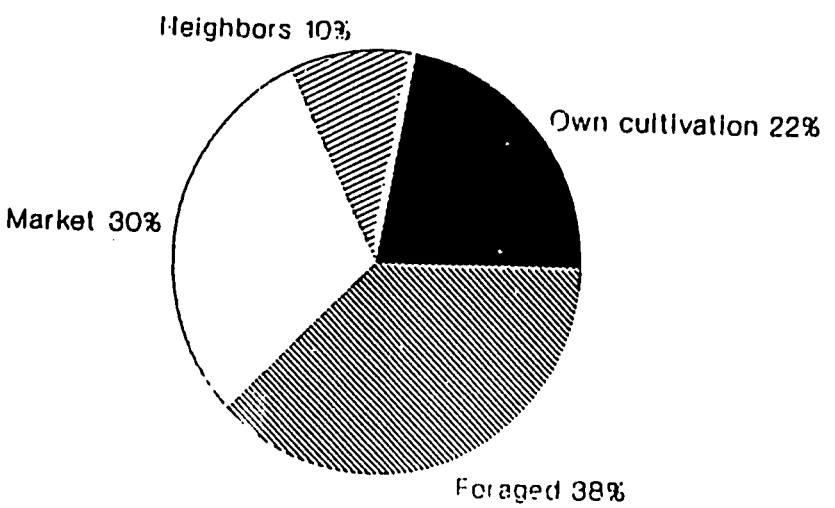

FIGURE 16

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SOURCES OF WILD GREENS IN THE TOWNSHIPS OF SARAXOCH AND ESPERANZA, ALTA VERAPAZ

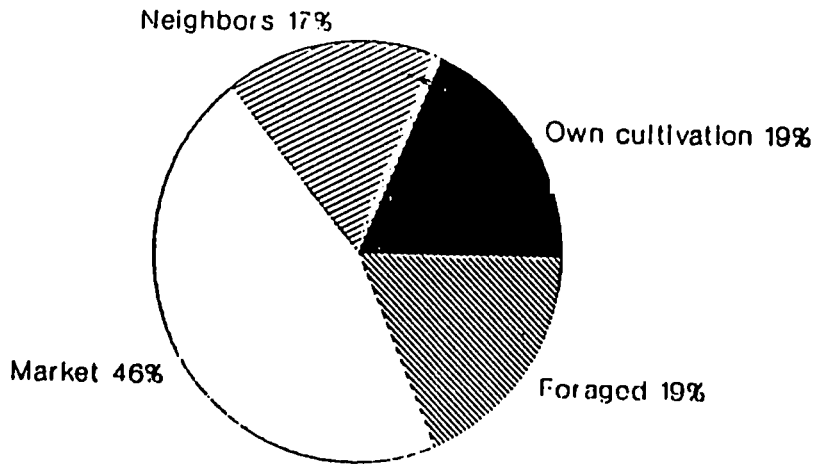

FIGURE 17

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SOURCES OF "WILD" GREENS IN HAMLETS OF SEHUBUB AND CHABAL, ALTA VERAPAZ

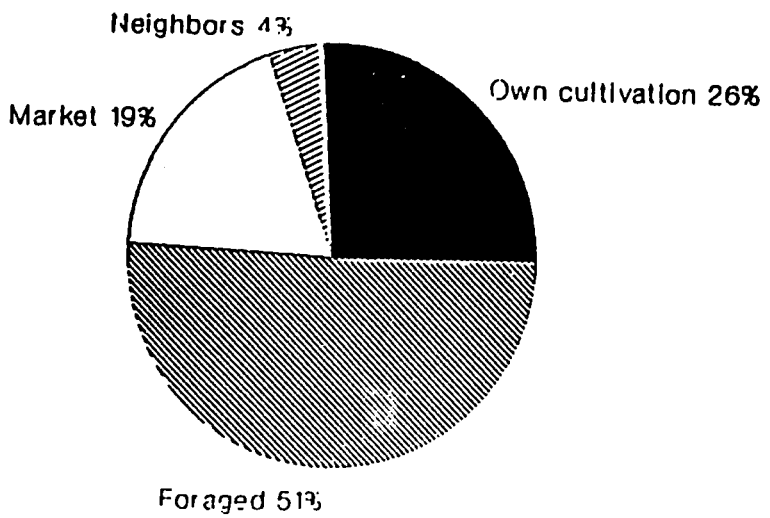

FIGURE 19

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SOURCES OF "WILD" GREENS AT THE PLANTATIONS SEMESCHE AND SONTE, ALTA VERAPAZ

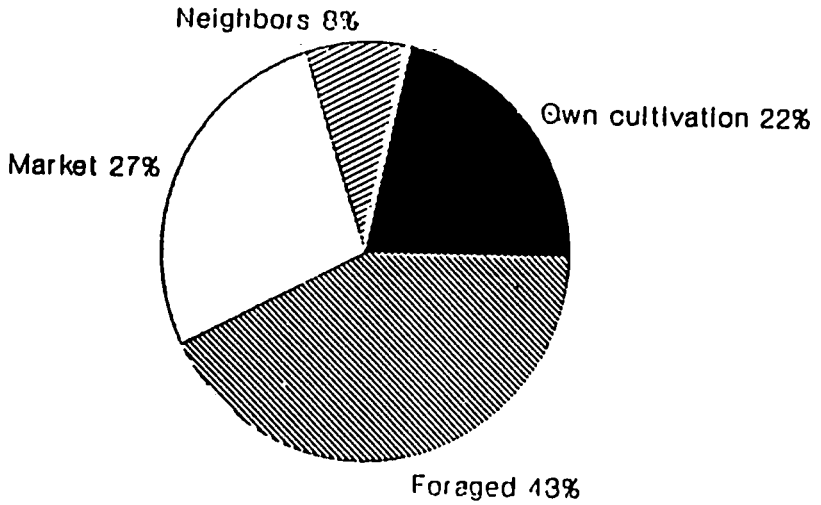
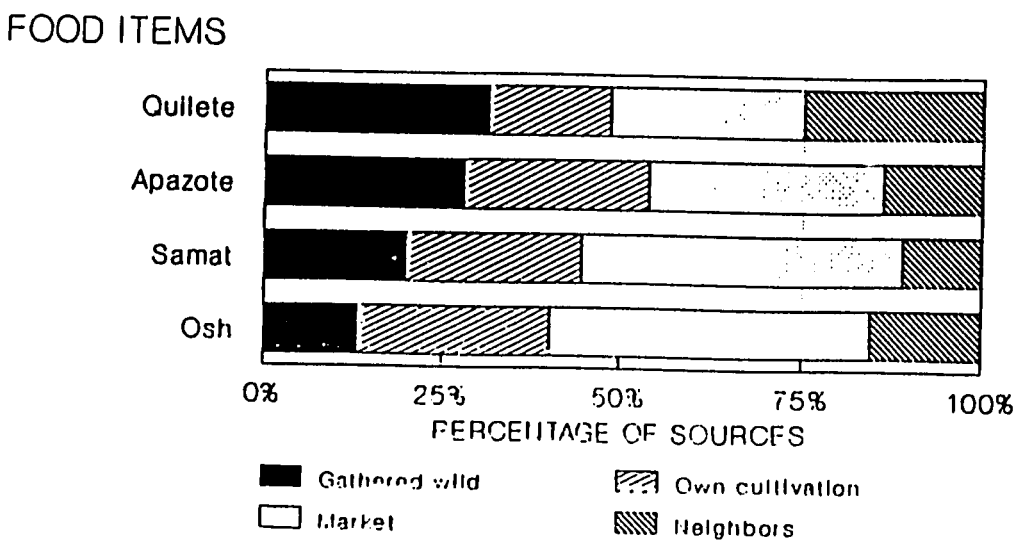


FIGURE 19

n=30

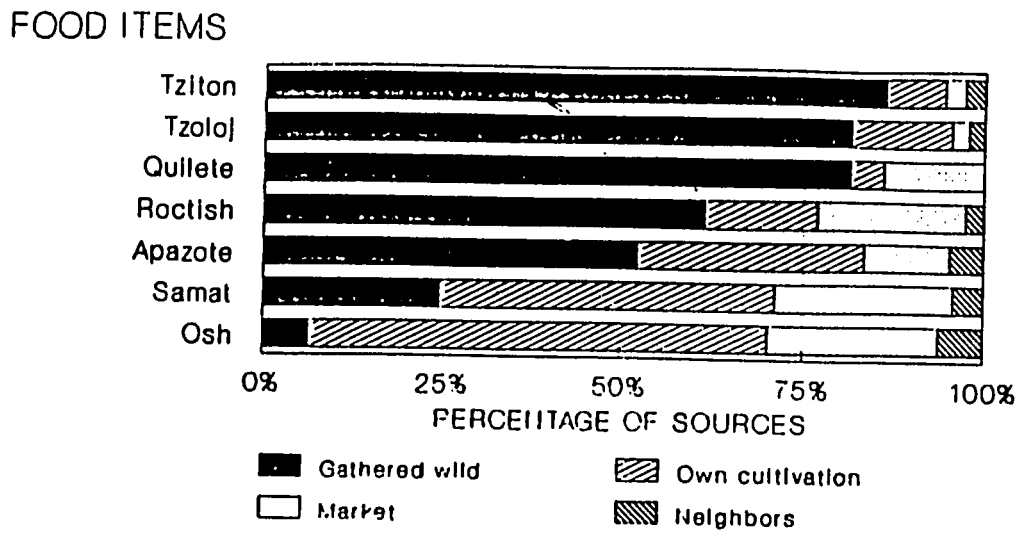
LEADING WILD GREENS* GATHERED IN THE TOWNSHIPS OF SARAXOCH AND ESPERANZA ALTA VERAPAZ



N=32
*>80% of Households reported consuming food items

FIGURE 20

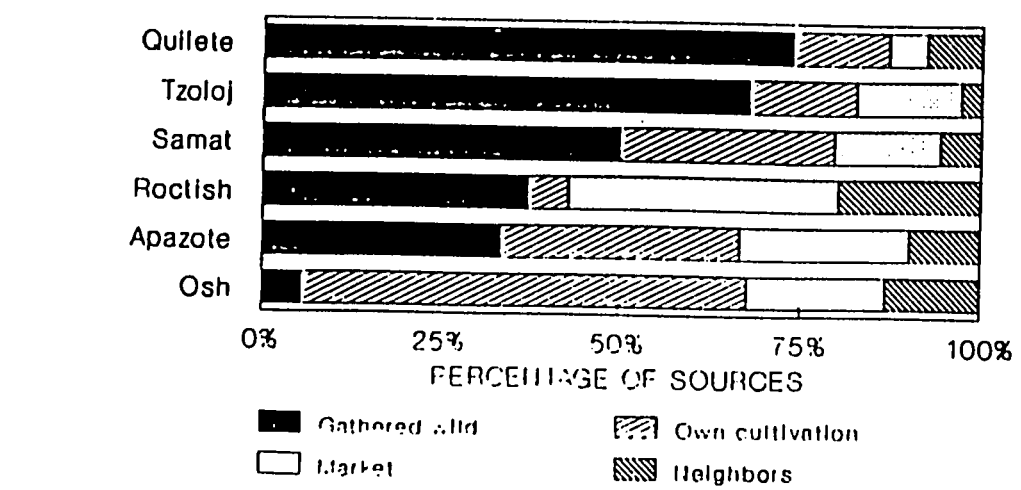
LEADING WILD GREENS* GATHERED IN THE HAMLETS OF SEHUBUB AND CHABAL, ALTA VERAPAZ



N=38
*>80% of Households reported consuming food items

FIGURE 21

LEADING WILD GREENS* GATHERED IN THE PLANTATIONS OF SEMESCHE AND SONTE, ALTA VERAPAZ



N=30
*>80% of Households reported consuming food items

FIGURE 22

REPORTED VEGETABLE CONSUMPTION DEPARTMENT OF SANTA ROSA

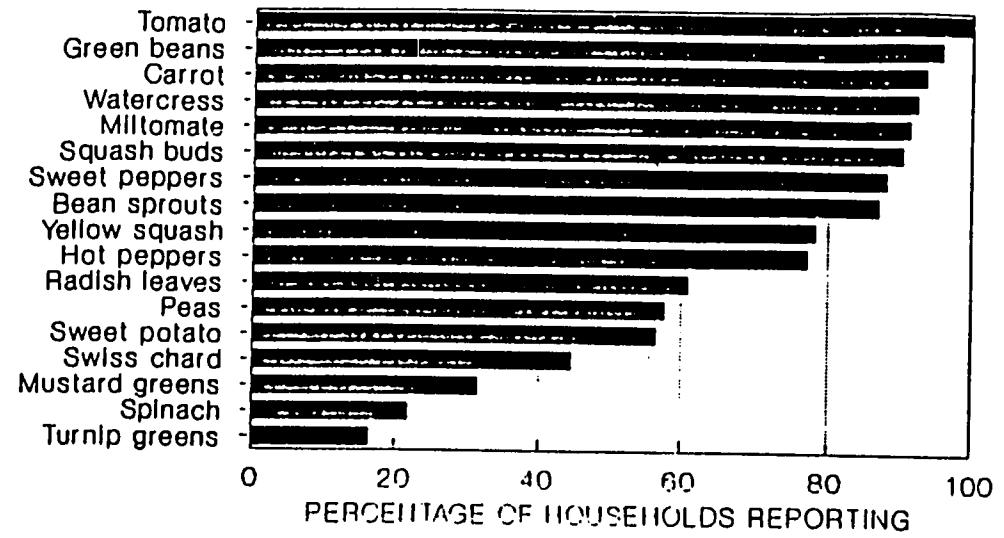


FIGURE 23

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REPORTED VEGETABLE CONSUMPTION IN TOWNSHIPS OF SANTA CRUZ NARANJO AND SAN RAFAEL, SANTA ROSA

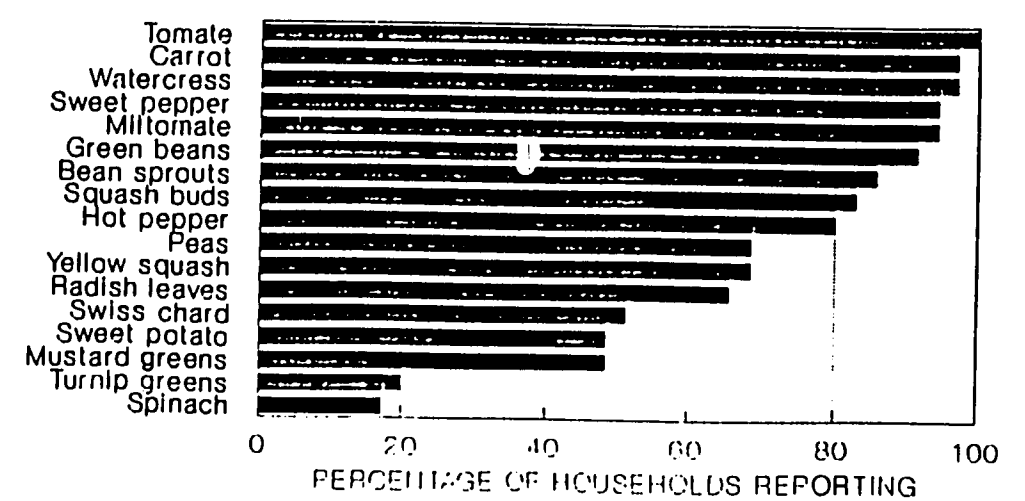

FIGURE 24

N=35

REPORTED VEGETABLE CONSUMPTION IN HAMLETS OF SANTA ROSA (POTRERILLOS, AND HAMLETS OUTSIDE OF SAN RAFAEL)

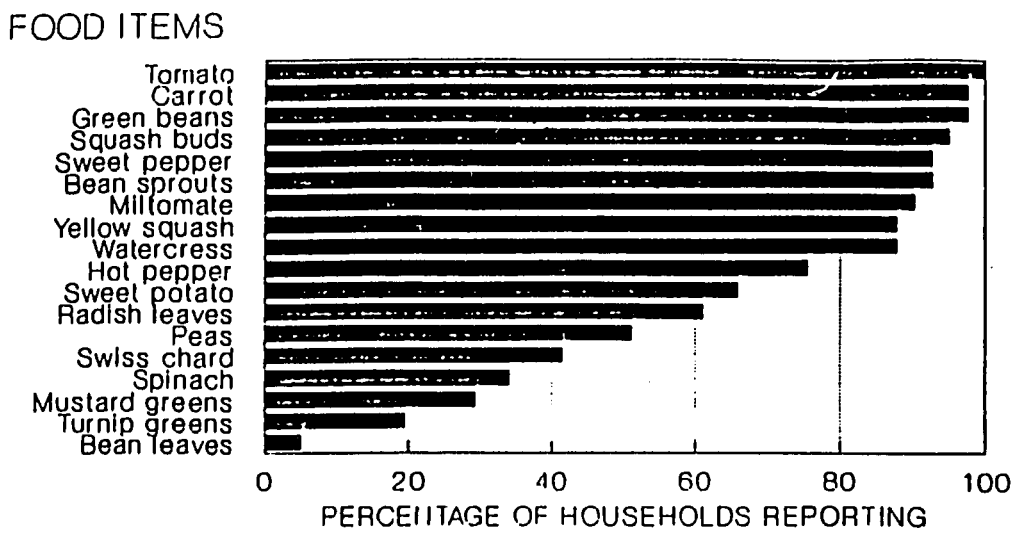

FIGURE 25

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REPORTED VEGETABLE CONSUMPTION IN THE PLANTATION TRAPICITO, SANTA ROSA

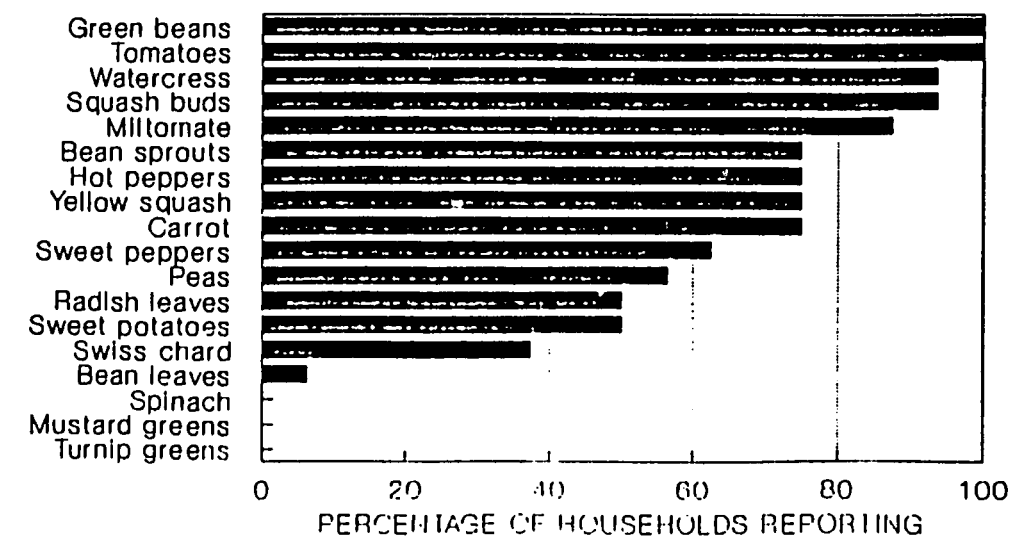

FIGURE 26

N=16

SOURCES OF VEGETABLES IN THE DEPARTMENT OF SANTA ROSA

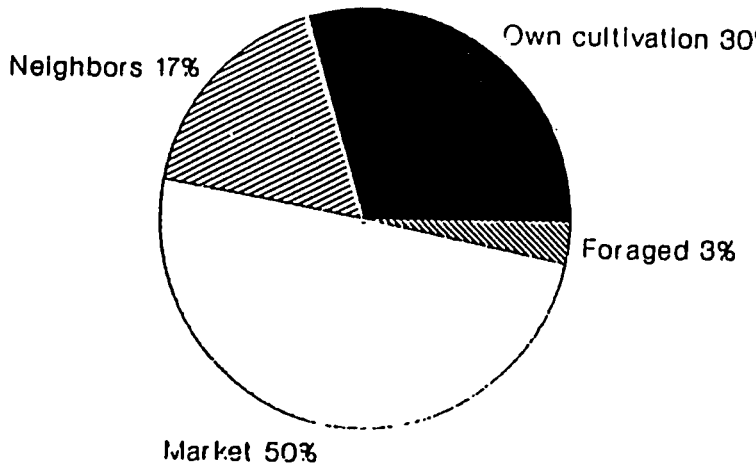

FIGURE 27

N=92

SOURCES OF VEGETABLES IN TOWNSHIPS OF SANTA CRUZ NARANJO AND SAN RAFAEL, SANTA ROSA

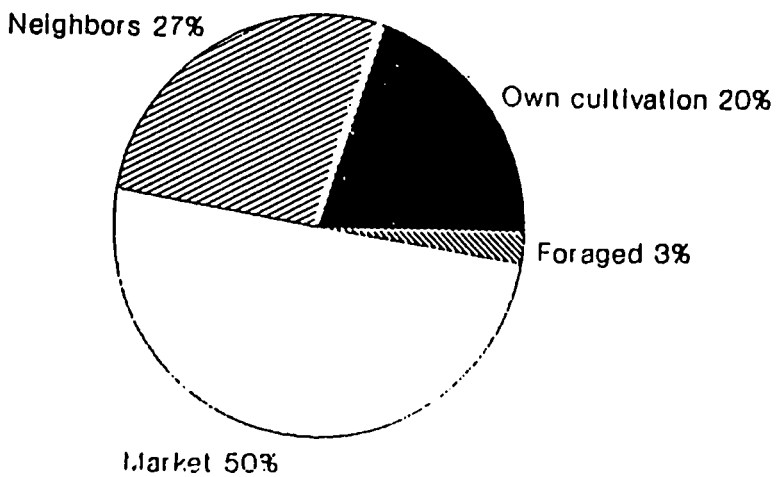

FIGURE 28

N=35

SOURCES OF VEGETABLES IN HAMLETS OF SANTA ROSA (POTRERILLOS AND HAMLETS OUTSIDE OF SAN RAFAEL)

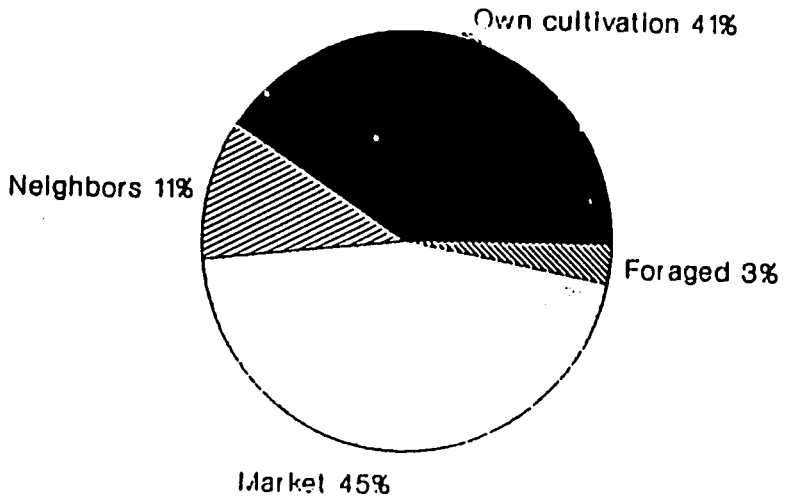

FIGURE 29

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SOURCES OF VEGETABLES IN THE PLANTATION TRAPICITO, SANTA ROSA

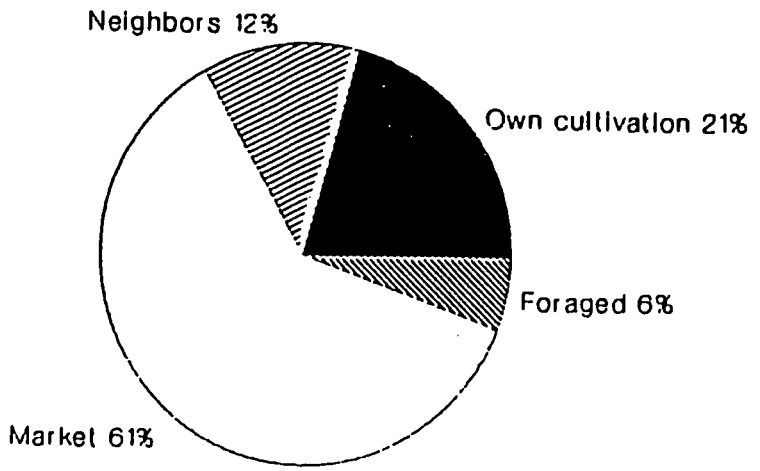
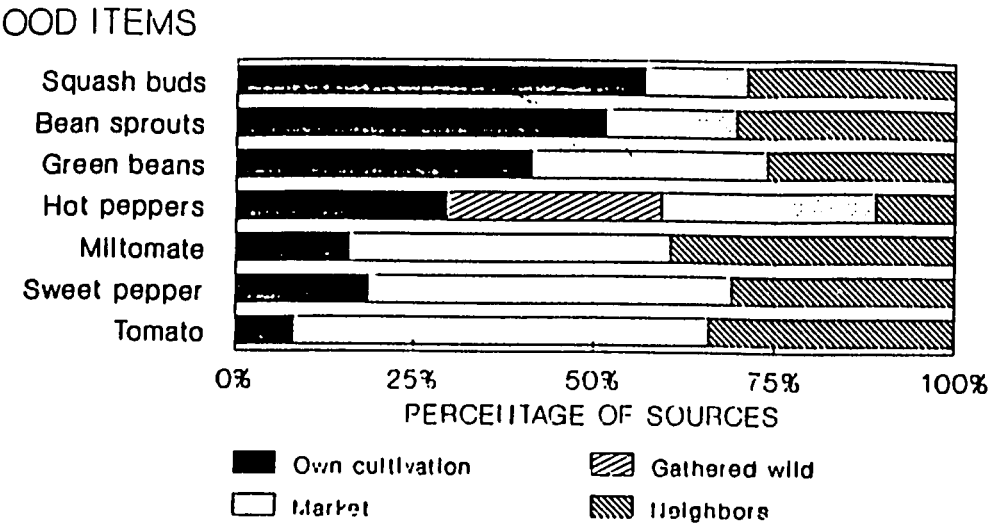


FIGURE 30

N=16

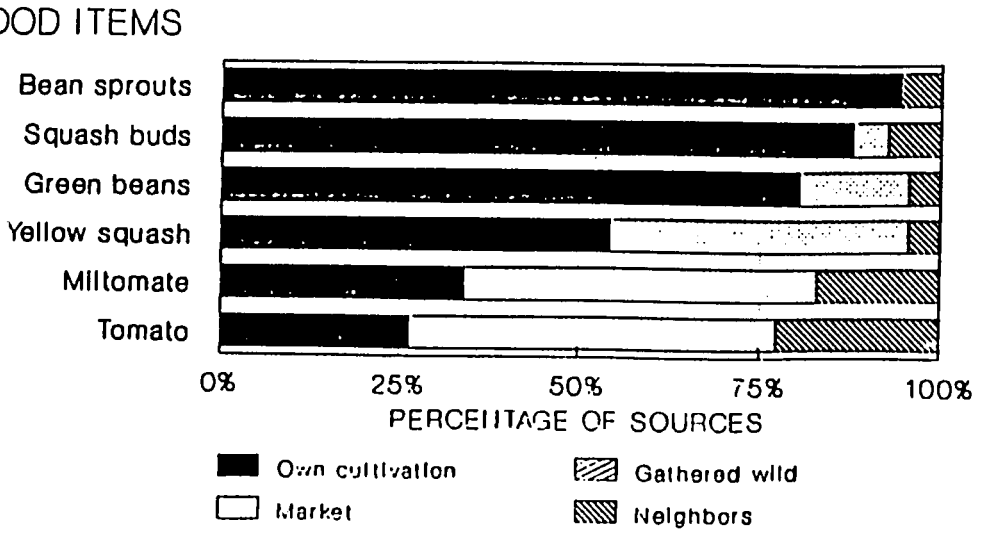
LEADING CAROTENE-CONTAINING* VEGETABLES CULTIVATED IN THE TOWNSHIPS OF SANTA CRUZ NARANJO AND SAN RAFAEL, SANTA ROSA



N=35
*>80% of Households reported consuming food items

FIGURE 31

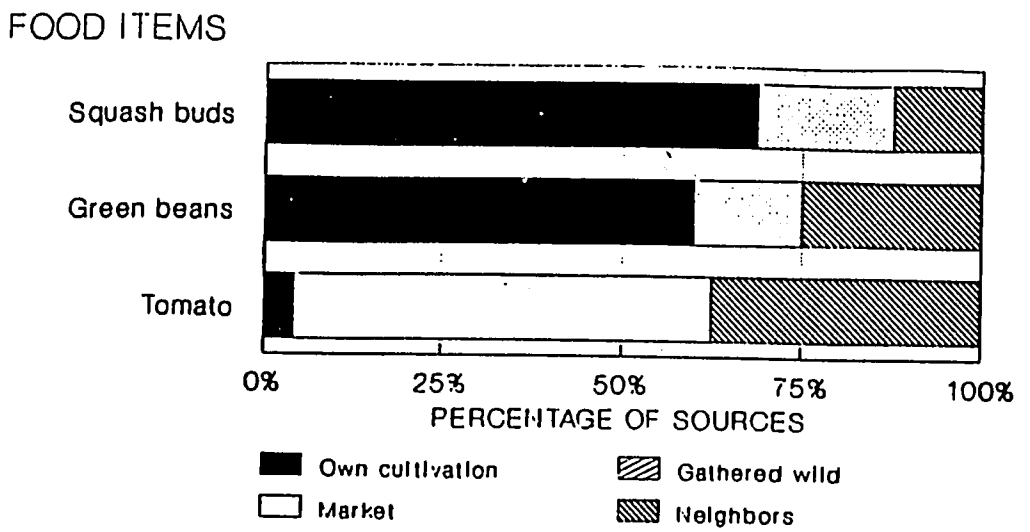
LEADING CAROTENE-CONTAINING VEGETABLES* IN THE HAMLETS OF POTRERILLOS AND HAMLETS OF SAN RAFAEL, SANTA ROSA



N=41
*>80% of Households reported consuming food items

FIGURE 32

LEADING CAROTENE-CONTAINING VEGETABLES* IN THE PLANTATION OF TRAPICITO, SANTA ROSA



N=16
*>80 of Households reported consuming food items

FIGURE 33

REPORTED WILD GREEN CONSUMPTION DEPARTMENT OF SANTA ROSA

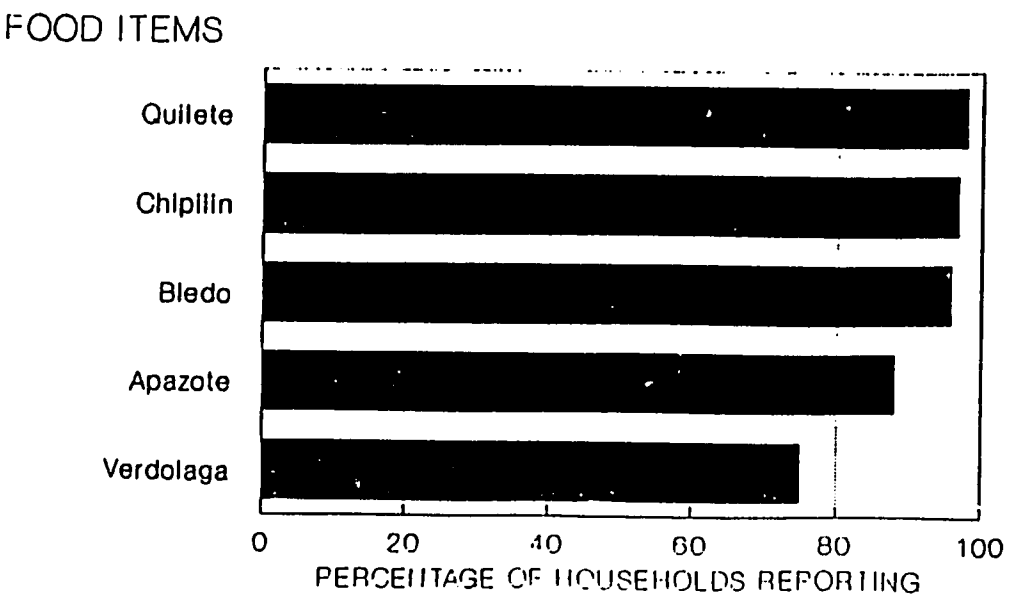


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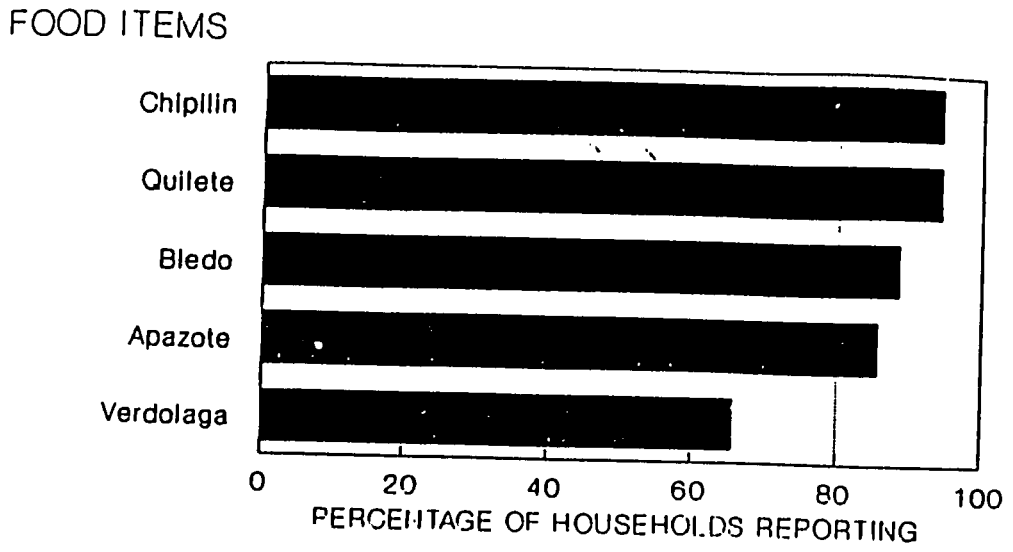
FIGURE 34

REPORTED WILD GREEN CONSUMPTION IN TOWNSHIPS OF SANTA CRUZ NARANJO AND SAN RAFAEL, SANTA ROSA



N=35

FIGURE 35

REPORTED WILD GREEN CONSUMPTION IN HAMLETS OF POTRERILLOS AND HAMLETS SURROUNDING SAN RAFAEL, SANTA ROSA

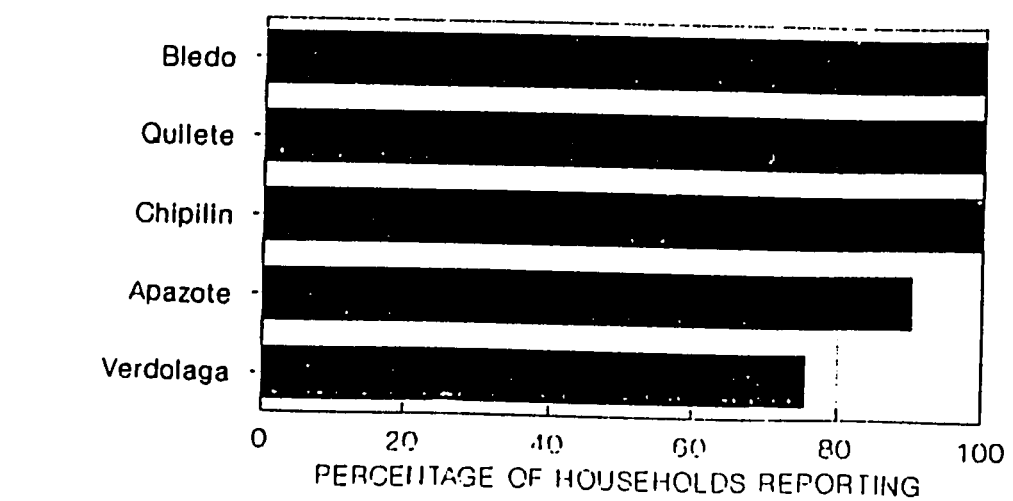


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FIGURE 36

REPORTED CONSUMPTION OF WILD GREENS IN THE PLANTATION TRAPICITO, SANTA ROSA

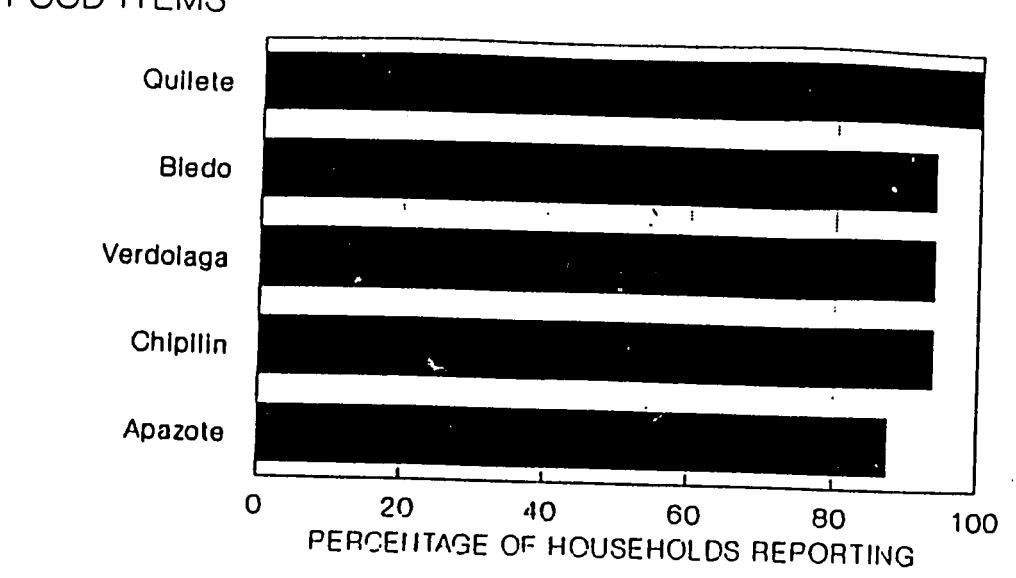

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FIGURE 37

SOURCES OF WILD GREENS IN THE DEPARTMENT OF SANTA ROSA

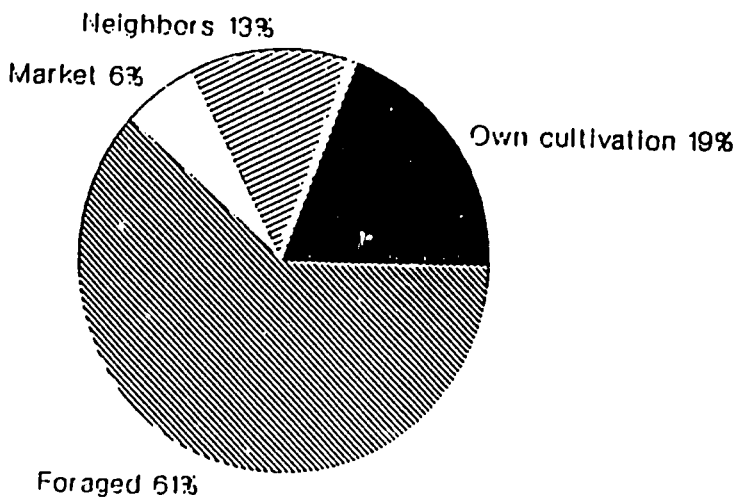

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FIGURE 38

SOURCES OF WILD GREENS IN TOWNSHIPS OF SANTA CRUZ NARANJO AND SAN RAFAEL, SANTA ROSA

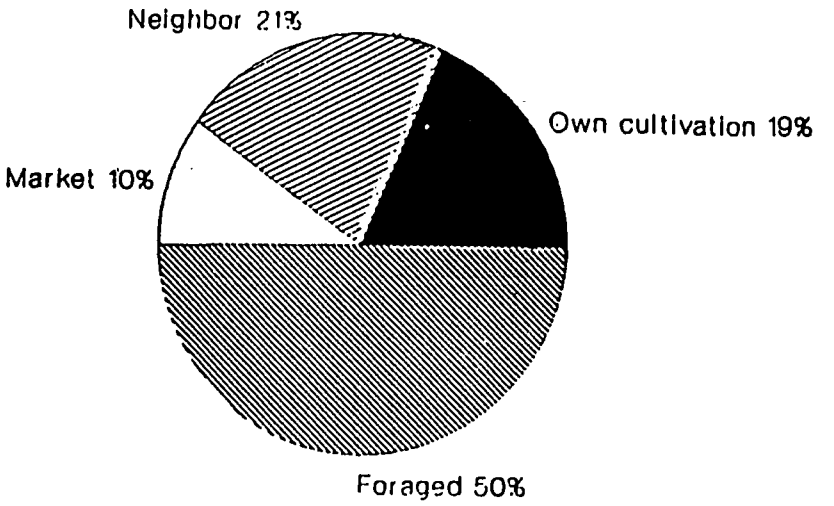

FIGURE 39

N=35

SOURCES OF WILD GREENS IN HAMLETS OF SANTA ROSA (POTRERILLOS AND HAMLETS OUTSIDE OF SAN RAFAEL)

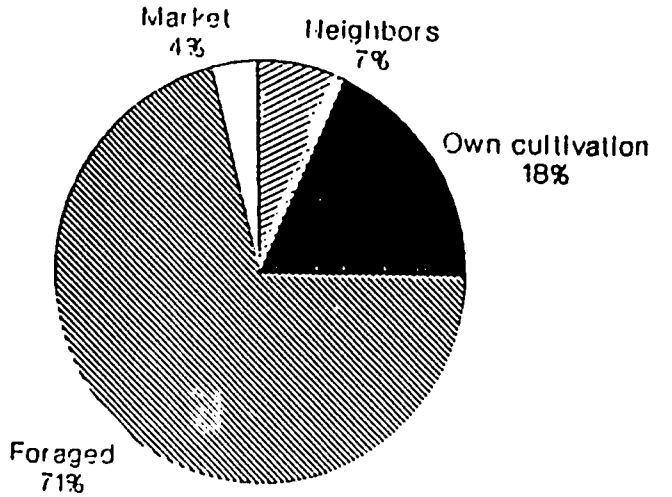

FIGURE 40

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SOURCES OF WILD GREENS IN THE PLANTATION TRAPICITO, SANTA ROSA

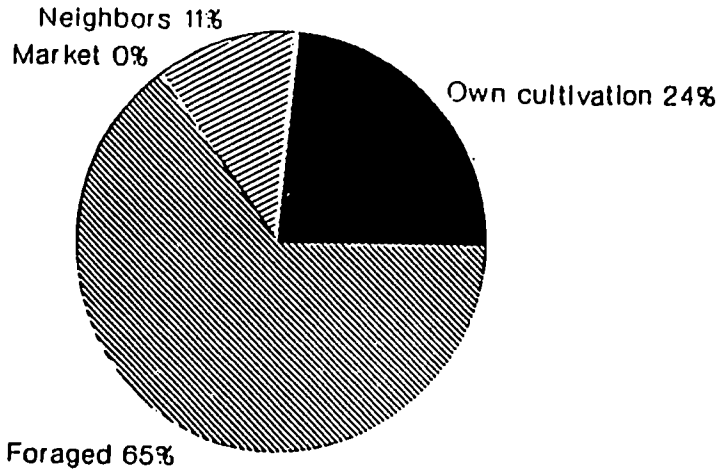
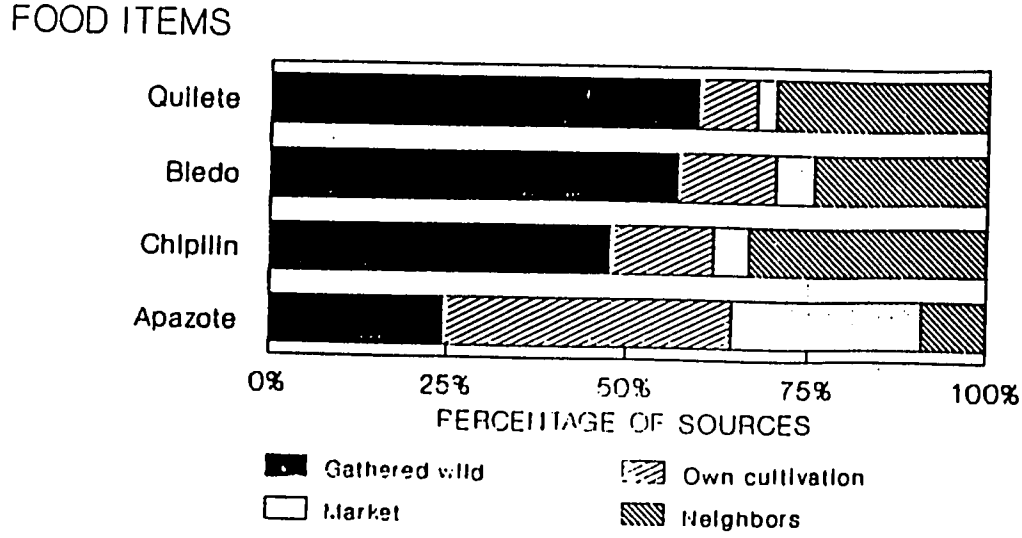


FIGURE 41

N=16

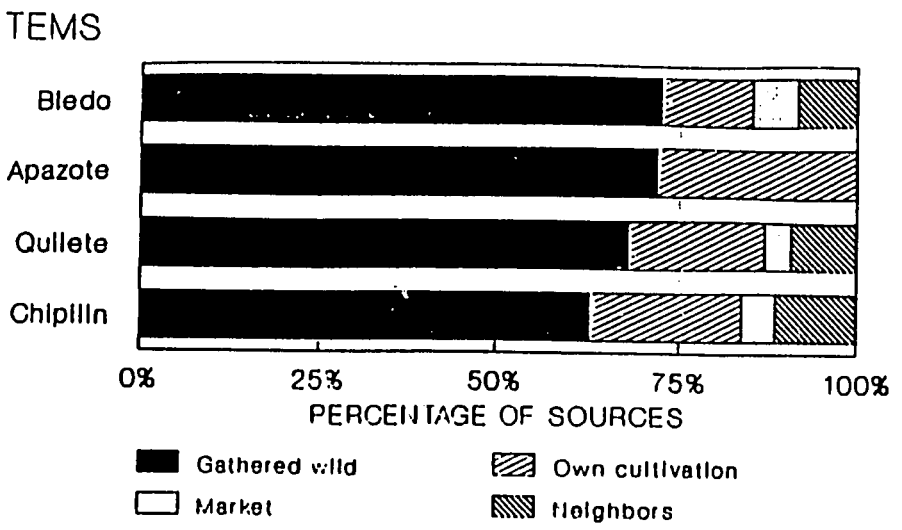
LEADING WILD GREENS* GATHERED IN THE TOWNSHIPS OF SANTA CRUZ NARANJO AND SAN RAFAEL, SANTA ROSA



N=35
*>80% of Households reported consuming food items

FIGURE 42

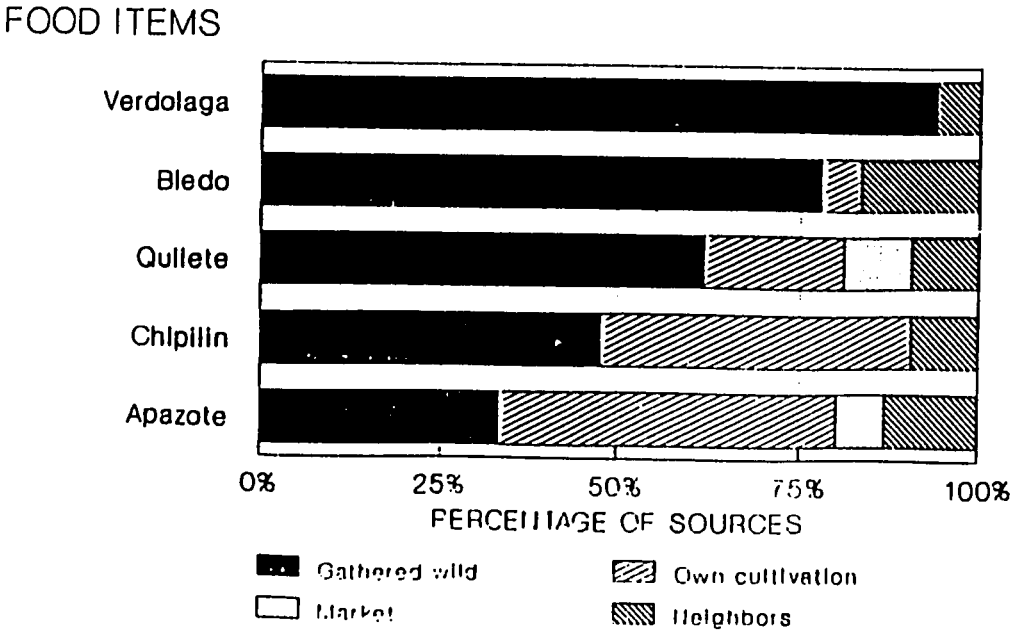
LEADING WILD GREENS* GATHERED IN THE HAMLETS OF POTRERILLOS AND HAMLETS OF SAN RAFAEL, SANTA ROSA



N=41
*)80 Households reported consuming food items

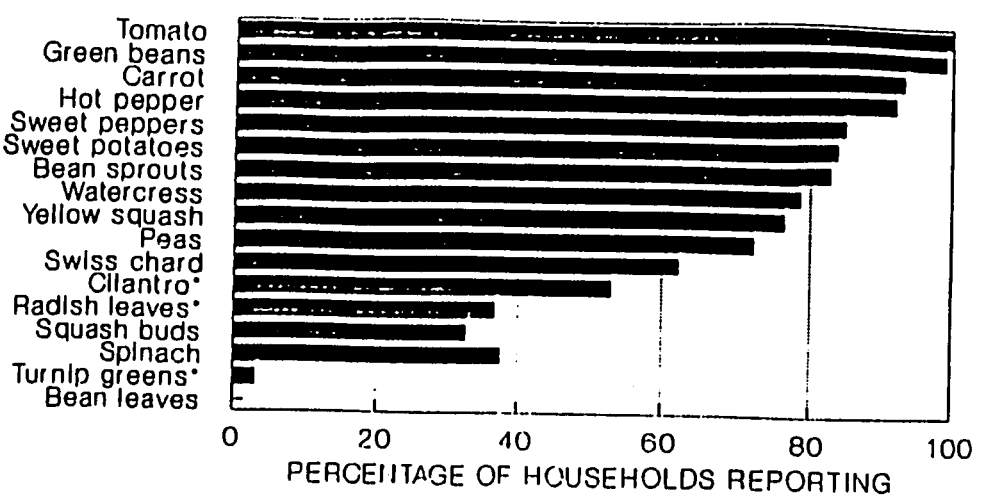
FIGURE 43

LEADING WILD GREENS* GATHERED IN THE PLANTATION TRAPICITO, SANTA ROSA



N=16

REPORTED VEGETABLE CONSUMPTION IN THE DEPARTMENT OF ZACAPA



N=98
*Data obtained in townships, and partial reporting from the hamlets and caserios

FIGURE 45

REPORTED CONSUMPTION OF VEGETABLES IN THE TOWNSHIPS OF LA FRAGUA AND TRIUNFO, ZACAPA

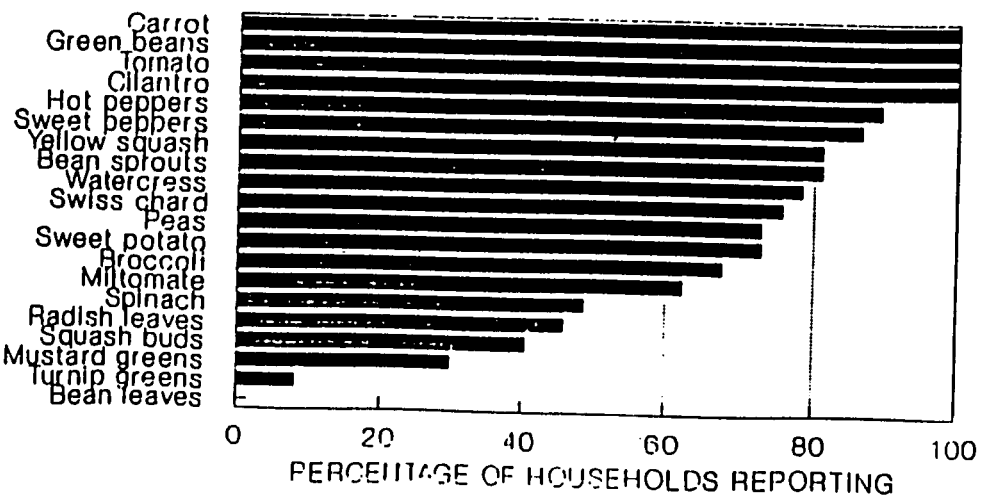


FIGURE 46

N=37

REPORTED VEGETABLE CONSUMPTION IN THE HAMLETS OF TERRERO AND SANTA LUCIA, ZACAPA

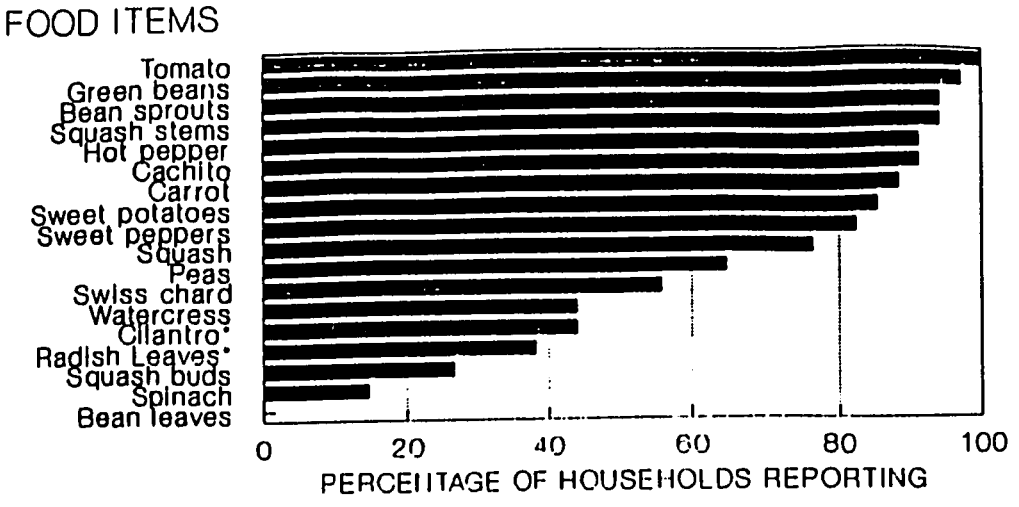


FIGURE 47

N=34
*Data obtained for Terrero only

REPORTED VEGETABLE CONSUMPTION IN THE CASERIOS OF COBAN AND SAN NICOLAS IN ZACAPA

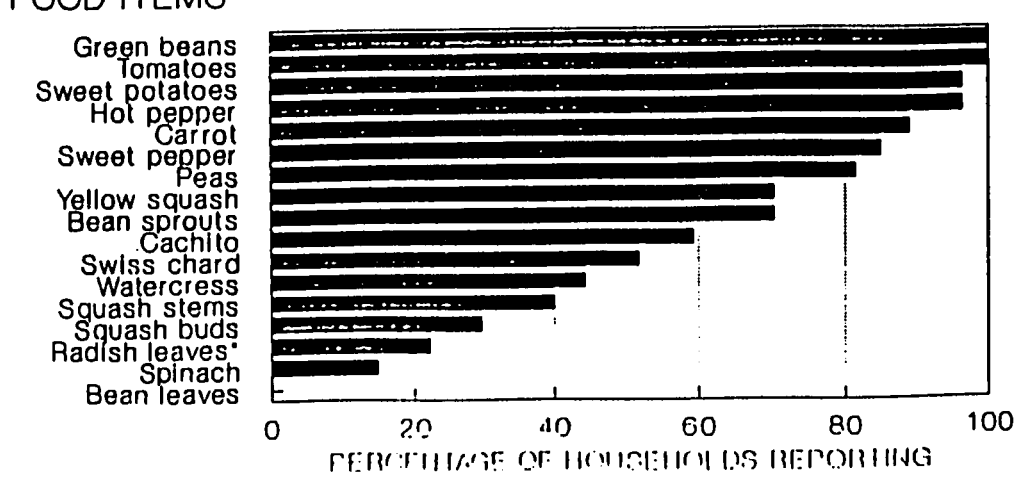


FIGURE 48

N=27
*Data obtained only for Coban

SOURCES OF VEGETABLES IN THE DEPARTMENT OF ZACAPA

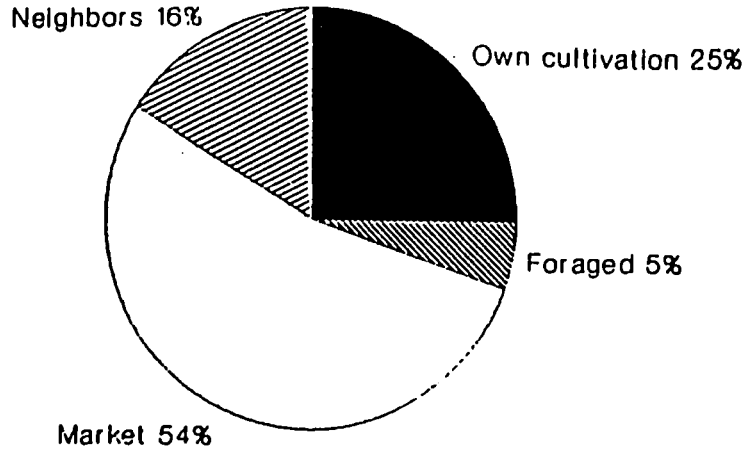


FIGURE 49

N=98

SOURCES OF VEGETABLES IN THE TOWNSHIPS OF LA FRAGUA AND TRIUNFO, ZACAPA

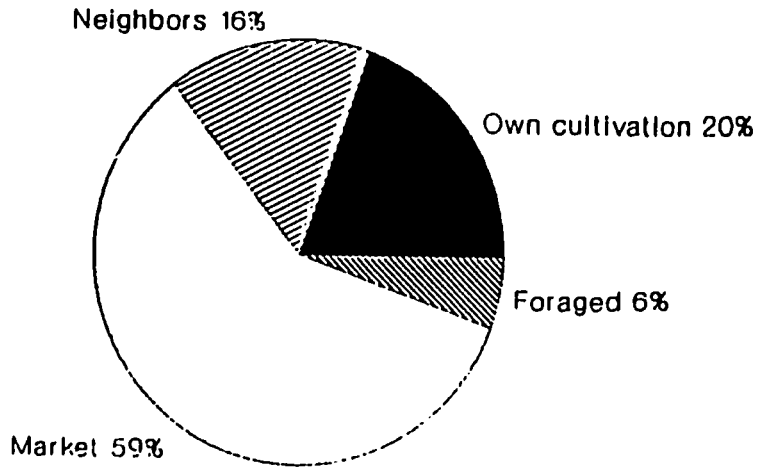


FIGURE 50

N=37

SOURCES OF VEGETABLES IN THE HAMLETS OF TERRERO AND SANTA LUCIA, ZACAPA

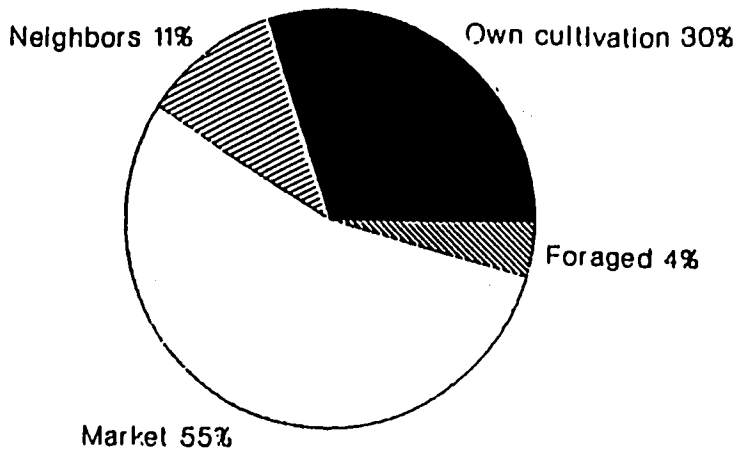


FIGURE 51

N=34

SOURCES OF VEGETABLES IN THE CASERIOS OF COBAN AND SAN NICOLAS, ZACAPA

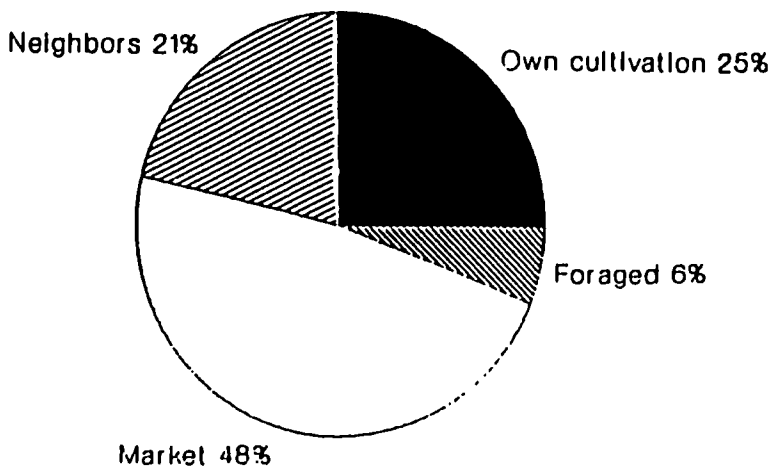


FIGURE 52

N=27

LEADING CAROTENE-CONTAINING VEGETABLES* CULTIVATED IN THE TOWNSHIPS OF LA FRAGUA AND TRIUNFO, ZACAPA

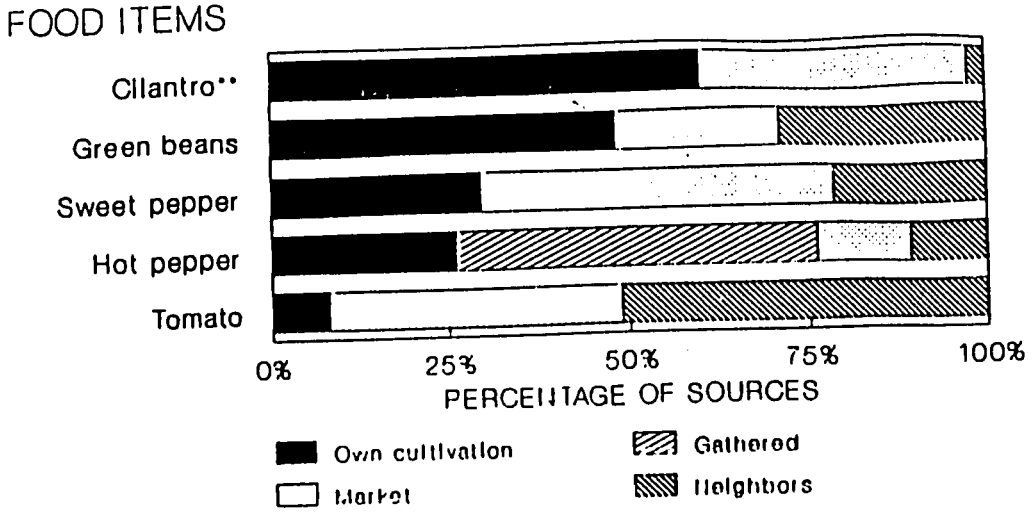


FIGURE 53

N=37
*>80% of Households reported consuming food items, ** townships only reporting

LEADING CAROTENE-CONTAINING VEGETABLES* CULTIVATED IN THE HAMLETS OF SANTA LUCIA AND TERRERO, ZACAPA

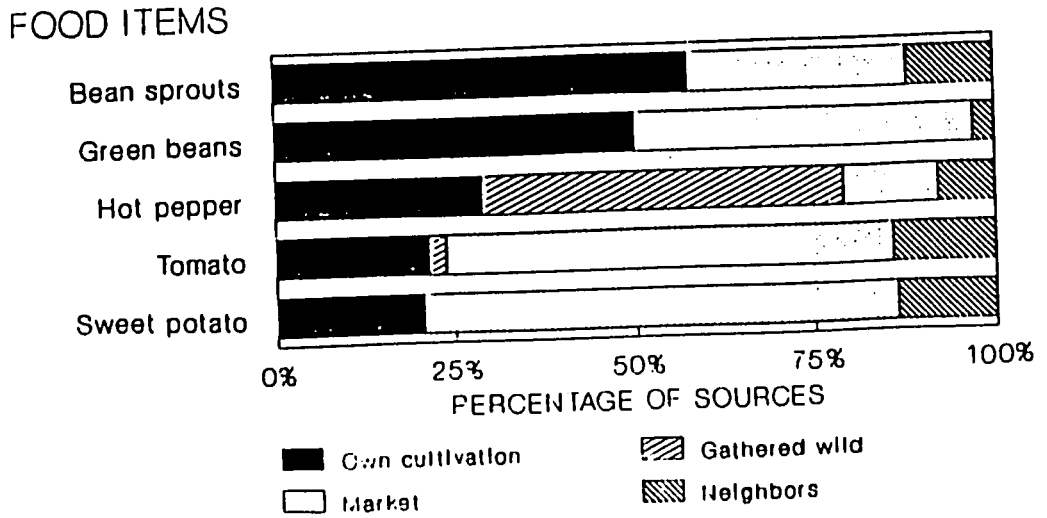
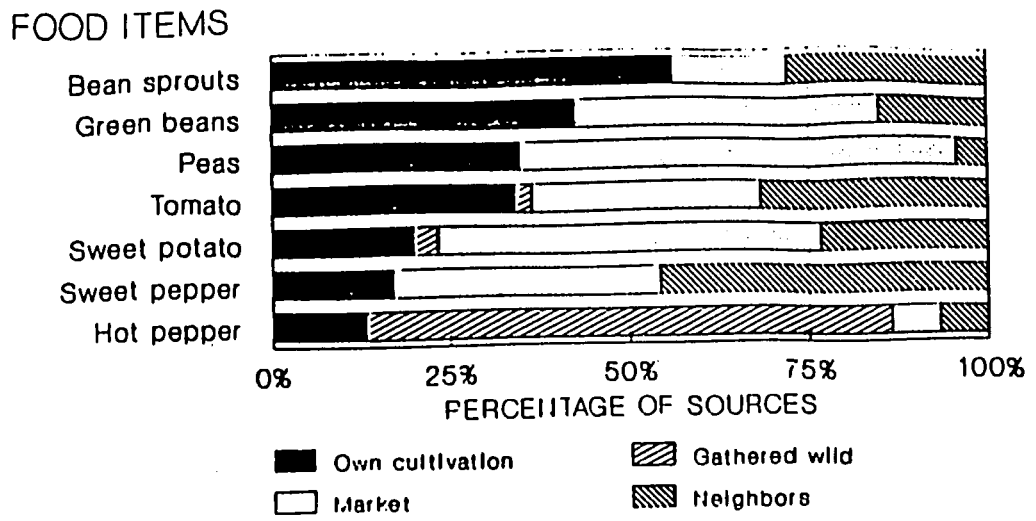


FIGURE 54

N=34
*>80% of Households reported consuming food items

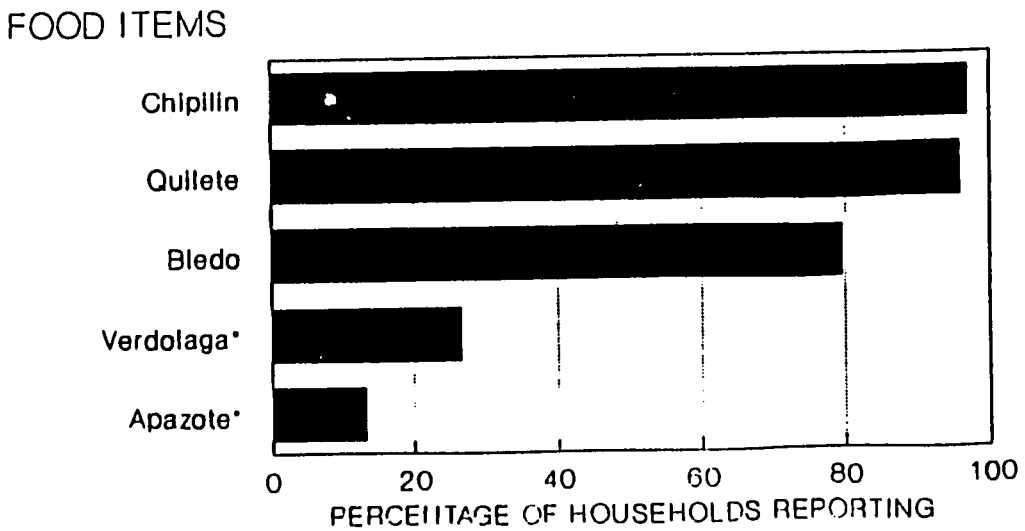
LEADING CAROTENE-CONTAINING VEGETABLES* CULTIVATED IN THE CASERIOS OF COBAN AND SAN NICOLAS, ZACAPA



N=27
*>80% of Households reported consuming food items

FIGURE 55

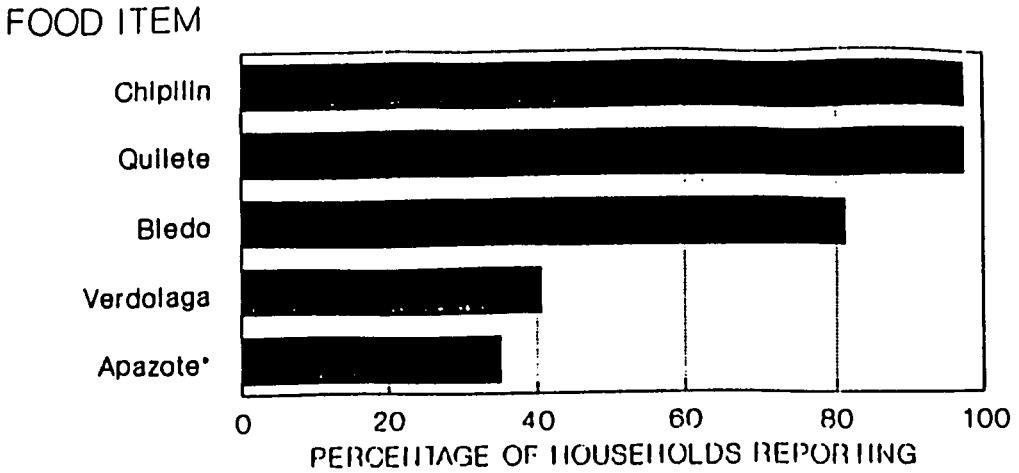
REPORTED WILD GREEN CONSUMPTION IN THE DEPARTMENT OF ZACAPA



N=98
*Data obtained not obtained for hamlet of Santa Lucia

FIGURE 56

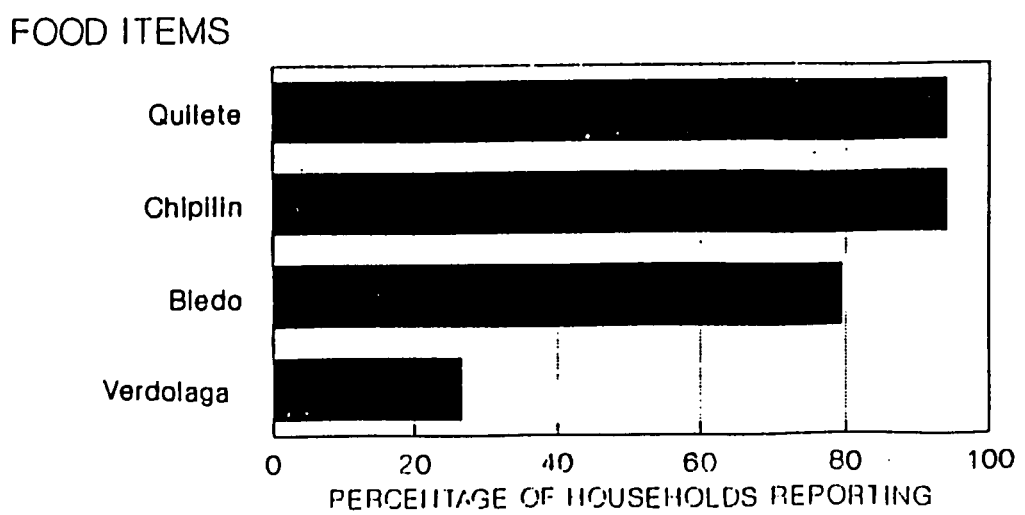
REPORTED CONSUMPTION OF WILD GREENS IN THE TOWNSHIPS OF LA FRAGUA AND TRIUNFO, ZACAPA



N=37
*Apazote is used only as a medicine in Zacapa

FIGURE 57

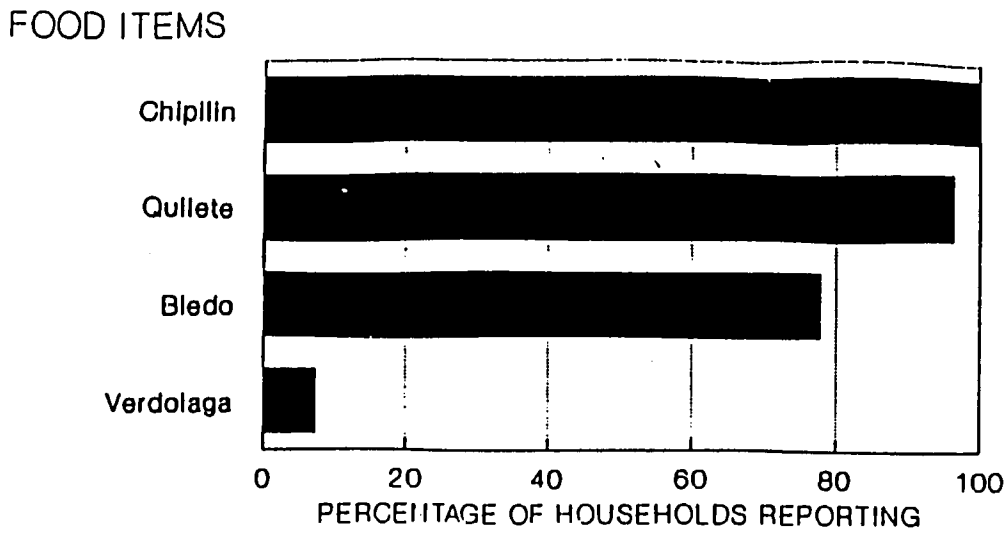
REPORTED WILD GREEN CONSUMPTION IN THE HAMLETS OF TERRERO AND SANTA LUCIA, ZACAPA



N=34
*Data obtained only in Terrero

FIGURE 58

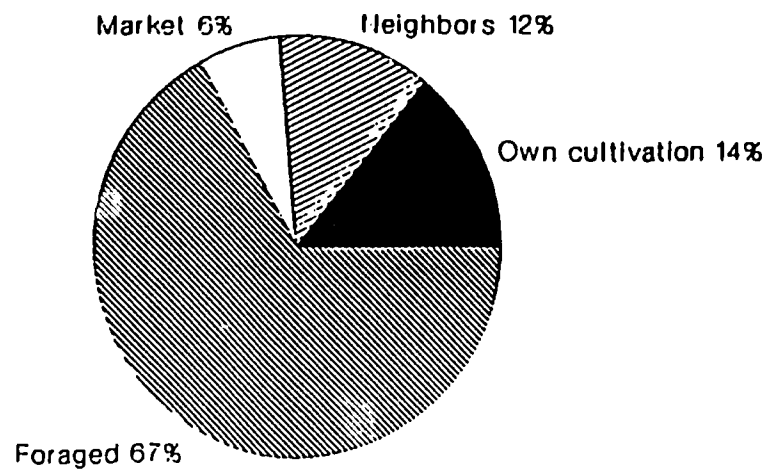
REPORTED WILD GREEN CONSUMPTION IN THE CASERIOS OF COBAN AND SAN NICOLAS ZACAPA



N=27

FIGURE 59

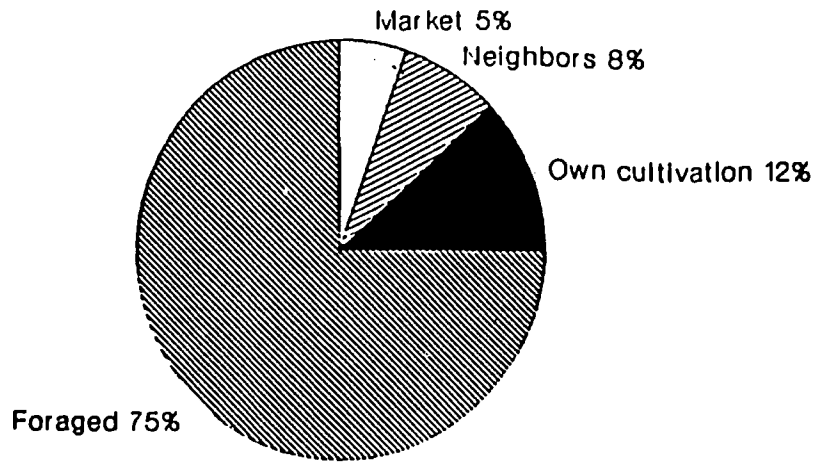
SOURCES OF WILD GREENS IN THE DEPARTMENT OF ZACAPA



N=98

FIGURE 60

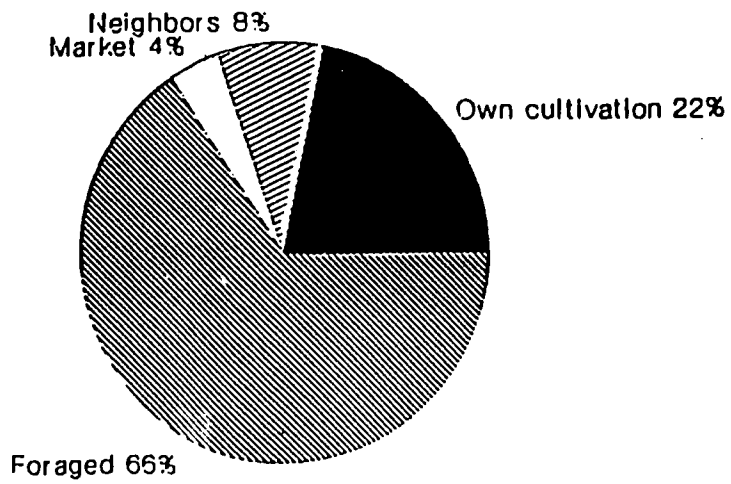
SOURCES OF WILD GREENS IN THE TOWNSHIPS OF LA FRAGUA AND TRIUNFO, ZACAPA



N=37

FIGURE 61

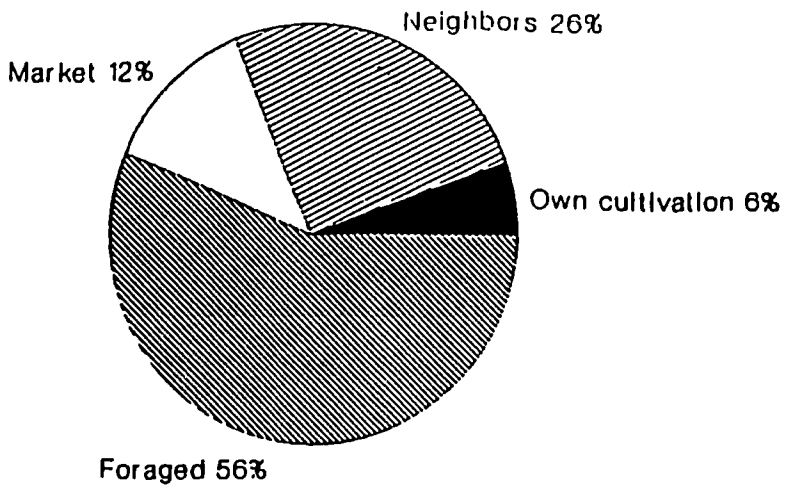
SOURCES OF WILD GREENS IN THE HAMLETS OF TERRERO AND SANTA LUCIA, ZACAPA



N=34

FIGURE 62

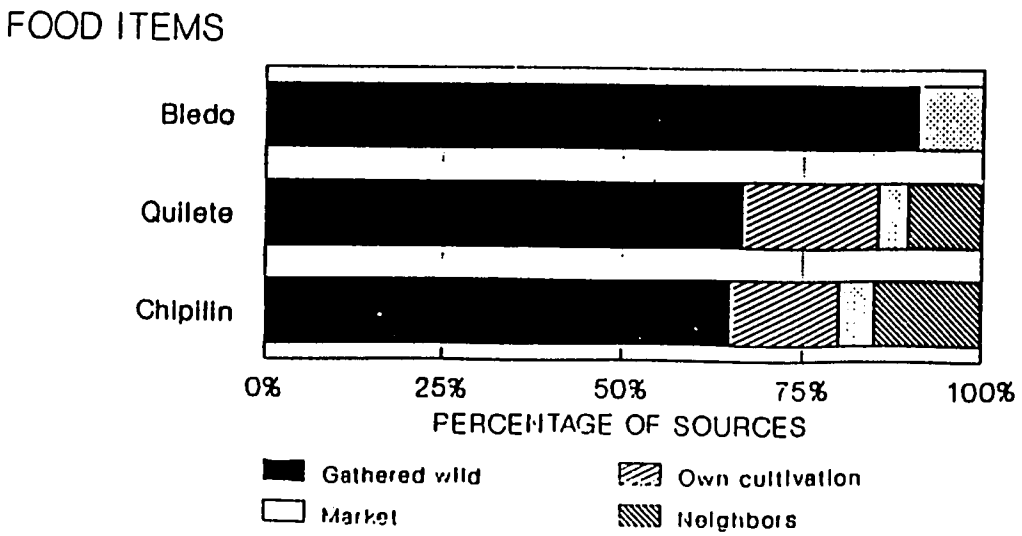
SOURCES OF WILD GREEN IN THE CASERIOS OF COBAN AND SAN NICOLAS, ZACAPA



N=27

FIGURE 63

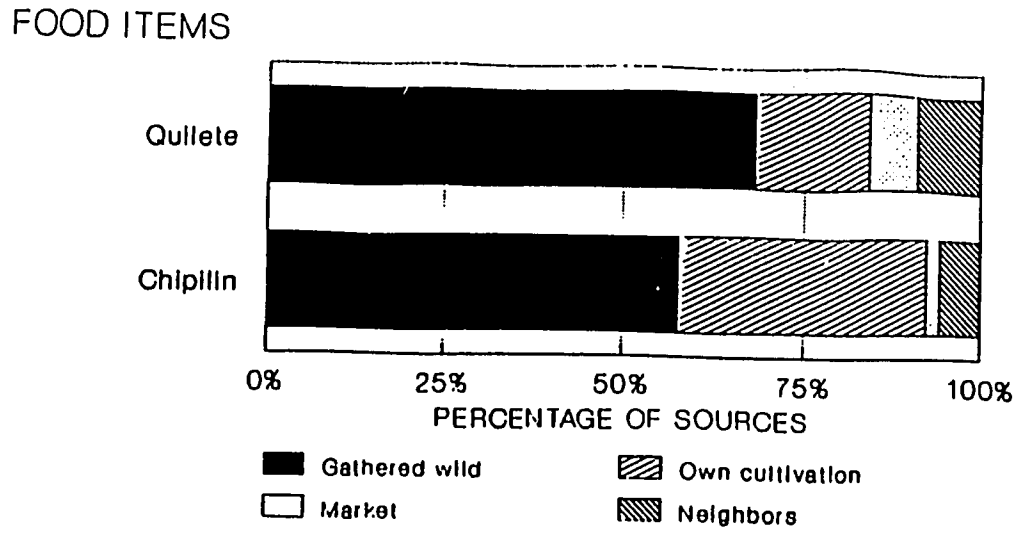
LEADING WILD GREENS* GATHERED IN THE TOWNSHIPS OF LA FRAGUA AND TRIUNFO, ZACAPA



N=37
*>80% of Households reported consuming these foods

FIGURE 64

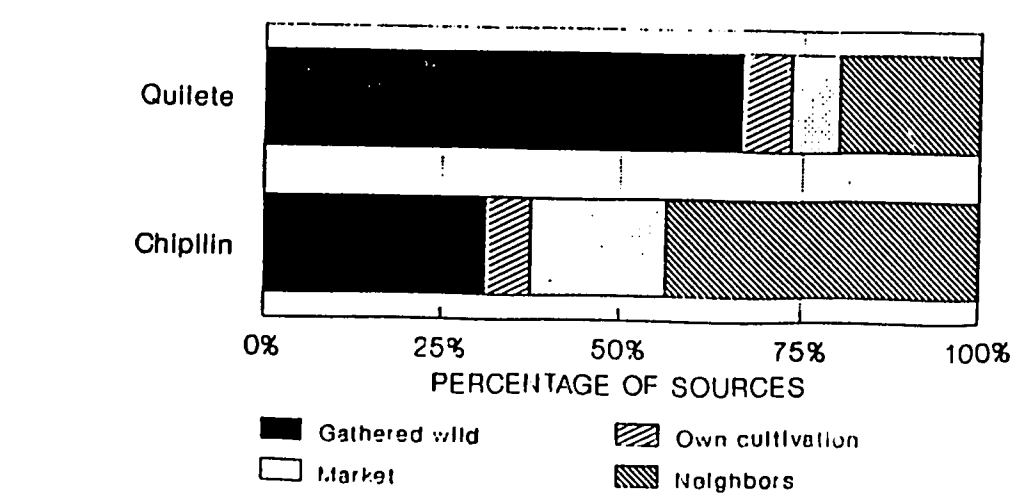
LEADING WILD GREENS* GATHERED IN THE HAMLETS OF SANTA LUCIA AND TERRERO, ZACAPA



N=34
*>80% of Households reported consuming food items

FIGURE 65

LEADING WILD GREENS* GATHERED IN THE CASERIOS OF COBAN AND SAN NICOLAS ZACAPA



N=27
*>80% of Households reported consuming food items

FIGURE 66