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REPUBLIC OF NIGER

**FIELD RESEARCH IN BIRNI'N KONNI
VITAMIN A COMMUNICATION PROJECT**

March - June, 1991



NUTRITION COMMUNICATION PROJECT
Academy for Educational Development

in collaboration with:

The Ministry of Public Health
and
Helen Keller International

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Vitamin A Communication Project
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THE RESEARCH TEAM

The Nutrition Communication Project (NCP) would like to recognize the contribution made by the following individuals to conducting the field research for the Vitamin-A Social Marketing Mini-Project:

- Dr. Nancy Keith, consulting researcher with over a decade field experience in Niger in the study of village cultural patterns and child care, directed the formative research;
 - The Phase I field work was carried out by M. Rabi Adamon, Mme Mamane Fati, Mme Zeinabou Sow, M. Boureima Hamani, Mme Zeinabou Djibrilla, and M. Ali Laya.
 - The Phase II research was conducted by M. Moussa Salifou, Mme Handou Kadi, and Mme Mohamed Zeinabou.
 - The Vitamin A Mini-Project Committee participated in the design and execution of the study and in reviewing the data. The members of this committee were M. Idé Djermakoye, Mme Issa Soumana, Mme Mamdouitaibou Aissa, and Mme Mohamed Zeinabou.
 - The Vitamin A Mini-Project Management Committee administers the implementation of the Project. The members of this committee are M. Issa Camara, Mme Kadija Maouloud Babi, Mme Mohamed Zeinabou, and Mme Mamadouitaibou Aissa.
- Ms. Sylva Etian, USAID Nutrition Advisor to the Ministry of Health and Social Development, provided guidance and support throughout the research phase.
- Ms. Margaret Parlato, NCP Project Director, provided technical assistance in designing the research. She and NCP Program Officer, Mr. Peter Gottert assisted in analyzing the research and developing the parameters for a communication strategy;
 - Ms. Man Ming Hung, NCP Consultant Nutritionist, conducted background research on vitamin A status, dietary patterns and food sources and provided technical input in designing the research.
 - The staff of the Helen Keller International (HKI) office in Niamey, played a key role in providing the field work logistics.

I. EXECUTIVE SUMMARY

The Academy for Educational Development's Nutrition Communication Project (NCP) in collaboration with Helen Keller International (HKI) and the Republic of Niger's Ministry of Health and Social Affairs launched a Vitamin A Mini-Project in early 1991. The Vitamin A Communication Project, designed as an 18-month test program, applies social marketing techniques to the development of culturally appropriate interventions to increase consumption of Vitamin A-rich foods in Niger among high risk groups: pregnant and nursing women and children under six. The research planning stage began with a study of nutritional and food consumption patterns. This was followed in May-June by a two-phase study conducted in Birni'N Konni using focus groups, in-depth interviews and other rapid assessment techniques to collect information on local knowledge, attitudes, and practices in the areas of nutrition and the consumption of Vitamin A-rich foods. Message concepts were developed, taking into account resistance points to the desired behavior changes. These concepts were then field-tested. This report presents the findings of this study and recommendations for the development of a communication strategy.

Findings

Findings pertaining to nutritional knowledge and practices regarding pregnant and nursing women and children under six include:

1. Existing diets are low in Vitamin A and place high percentages of pregnant and nursing women and children under six at high risk of Vitamin A deficiency.
2. Night blindness is known and has its own name in Hausa and is associated with poverty and a lack of good food.
3. Men and women have little knowledge of the nutritional needs of pregnant and nursing women and children under six, although women have learned some nutritional advice from health workers.
4. High percentages of women fast during Ramadan when they are pregnant and nursing.
5. No special diet is followed during pregnancy and lactation except that women eat more beans to encourage milk production during nursing.
6. No special diet is followed for children under three and they are expected to eat adult food as soon as they are able. The ability to feed oneself to the point of getting full is the sign of good health and the skill which will increase the likelihood that the child will survive. A very high value is placed upon getting full rather than upon eating certain foods for their nutritional value.

7. Adults of both sexes purchase snacks for children, women doing the purchasing more often than men. These snacks may contribute significantly to the proteins, calories, vitamins and minerals in the diet.

Findings regarding consumption and availability of liver include:

8. Liver is purchased as a snack for women and children and it is usually the man who makes the purchase. Cash-flow for non-staple foods such as liver, beans, fruits, and vegetables is highest during the December - May period after the harvest.
9. Liver is also a "special" food and is associated with illness, night blindness, and rituals such as naming day.

Findings related to production, consumption and availability of dark green leaves include:

10. Leaves are well liked by all, associated with good health, and eaten often. Many wild leaves are gathered during the rainy season (June - August), eaten fresh as kopto (cooked greens served cold with oil and spices), and dried for use in sauces the rest of the year.
11. Leaf gathering is the domain of women; old women, however, generally do the gathering and drying for sale. In dry-season gardens, wild leaves are gathered by the women and leaves associated with cultivation are gathered by men.
12. Dry season gardening is done in a variety of ways, depending on the source of water. The season during which fresh leaves are available could be extended by growing indigenous (wild) leaves and other cultivated leaves in the dry-season gardens.
13. The season of availability of fresh green leaves has the potential to be expanded along the following lines:
 - a. Squash, beans (for leaves) and red sorrel (for leaves) can be cultivated during the dry season to produce a second crop annually.
 - b. Moringa, if cared for and watered year round can be harvested every two weeks and can earn up to 5000 francs CFA weekly for the gardener.
 - c. Farmers traditionally gather wild amaranth and other indigenous plant seeds and put them in their pocket at millet harvest as a sort of insurance. These have the potential to be sown broadcast in dry season gardens to produce year round crop.
14. The percentage of families with gardens varies greatly from one community to another ranging from villages with no gardens, to communities with only a few gardens owned by rich families with access to water, to the other extreme in one village where most families have wells and gardens.

Findings about communication channels include the following:

15. Nearly half of the women attend PMI (health center) functions regularly, and many can cite new information learned from the dispensary nurse.
16. One third of the women said they listened to the radio, preferring dance, song, dramas, and lectures on proper Muslim behavior.
17. In many villages the national women's organization, one of the few formal groups specifically for women, is viewed negatively, so caution must be used in utilizing this organization for community outreach.
18. There are big, local markets held on a regular basis that are important commercial and social events and provide a good opportunity for reaching village leaders and male members of the family.

Project sites

The villages surveyed fall into three categories:

- Dispensary villages have large commercial gardens, extensive commerce, exposure to new ideas, transportation, more disposable income, and a better understanding of and openness to biomedical ideas of nutrition.
- Villages with gardens, but without dispensaries tend to have some information on nutrition picked up by the women who have had occasion to go to the dispensary. These villages tend to be medium-sized, have some commerce, some transportation, and appear very open to new ideas.
- Villages with no dispensary and no gardens tend to be small, isolated, poor, without resources, without government services, and not exposed to the educational activities of the dispensaries.

Based on these findings the Mini-Project Committee recommends that the project be implemented only in certain categories of villages. Specifically, in four dispensary and 12 villages with at least the rudiments of vegetable-growing gardens or a socioeconomic level which provides the potential to increase Vitamin A consumption by most of the population from sources readily available in the local market. Possible villages are listed in the Recommendations Section.

Recommendations

The suggested overall strategy is as follows:

1. Incorporate the Vitamin A nutrition intervention into a comprehensive nutrition strategy with a focus on improving child feeding practices, including increasing the frequency of feeding and encouraging and helping them to eat certain quantities each day.
2. Focus on increasing consumption of well-liked Vitamin A food sources presently available in the markets and existing family gardens. Increasing the frequency of consumption rather than portion-sizes appears to be the most promising approach.
3. Encourage increased production of green leaves year round by seeking to change the behavior of established vegetable gardeners who already have the required skills (and infrastructure -- land, water, etc.). (The project will not work to develop new gardens or teach people basic gardening skills.)
4. Develop a strategy which addresses men's need for nutritional information, including drama performances and market events for village leaders and groups of men, and nutritional information to accompany gardening information and supplies.
5. In each village where there are gardens explore the possibility of a female sarkin noma (honorary title given to model farmers) serving on the village animation committee and of women gardeners receiving seeds and information on growing leaves.

Message concepts to be tested:

1. Women buy and consume 50 francs worth of liver per week to be shared with their children under six.
2. Men buy 50 francs worth of liver per week to be shared by each wife and her children under six.

Use the association of liver with night blindness only to make sense of the intervention in terms that the target group will understand. Use other symptoms associated with Vitamin A deficiency as motivators such as frequent and longer episodes of diarrhea, measles and respiratory illness, more frequent death associated with these illnesses and health effects on mothers.

3. Women and children eat fresh green leaf kopto or other fresh greens with oil twice per day.

4. A number of possible ways to increase the supply of Vitamin A-rich leaves were identified. Some of the following will be included in the initial testing of strategies and others may be tested in a follow-up effort, depending on the season, and availability of technical assistance.

Increased cultivation of moringa for profit in existing gardens where gardeners already possess the skills and the proper environment.

Broadcast sowing of indigenous seed of gynandro, amaranth, and jute in all dry season gardens.

Dry season planting or a second annual crop of beans (niébé as well as dan wari), red sorrel, and squash.

Distribution of Asian amaranth seeds (Asian Vegetable Research and Development Center, AVRDC) to experienced gardeners.

Planting and harvest of greens every two weeks for sale for profit.

Exploring through the female sarkin noma the possibility of women gardeners planting greens.

5. The field research did not set out to look at availability and consumption patterns for squash, although the research team noted they are available in some villages in limited quantities. This is an additional Vitamin A food source that will need to be studied in follow-up research; particularly regarding how to increase the supply and local demand.

Communication strategies and channels:

1. Develop role plays and drama pieces for use in communities on mother-child nutrition and Vitamin A.
2. Hire traditional entertainers to visit the big, local markets once each month.
3. Develop a training plan which includes gathering women together at the home of the midwife for the presentation of the drama pieces, food demonstrations, and possible gardening information.
4. Develop a training module for agricultural agents and Peace Corps Forestry Volunteers in the region to enable them to support the leaf gardening effort.
5. Develop a learning module for school children. Provide amaranth and squash seeds for school gardens along with information on how to collect the seed at the end of each season to be planted the following year.

6. **Develop a training module for the health personnel including dialogue between the service provider and the mother-child pair, or service provider and pregnant woman, a causerie or a demonstration.**
7. **Develop a training plan for all professionals which will include the following:**
 - a. **Basic information on the importance of Vitamin A.**
 - b. **Basic information on the nutritional needs of pregnant and nursing women and children under six.**
 - c. **Basic information on appropriate breast-feeding and young child feeding practices.**
 - d. **Assessment of sources of Vitamin A in the agent's village.**
 - e. **Use of communication channels and community problem solving in the agent's village.**

II. INTRODUCTION

The Vitamin A Mini-Project is a pilot effort applying social marketing techniques to improve the Vitamin A status of the populations at greatest risk, pregnant and nursing women and children under six, through dietary change. Social marketing, an approach based on a thorough understanding of the consumer, uses a variety of methods including focus groups and market studies to understand what consumers like and can afford; to uncover resistance points to the desired behavior change and identify culturally appropriate messages and ways of presenting them.

The formative research for the project consisted of two parts. Phase I was the data gathering stage, in which information on knowledge, attitudes, and practices was gathered using in-depth interviews, key informant interviews, and focus groups. Phase II consisted of testing promising concepts identified during Phase I.

The Phase I study conducted in May, 1991 included the following components:

- A. Market study to identify the availability, cost and acceptability, and seasonality of Vitamin A-rich foods.
- B. In-depth study of knowledge, attitudes, and practice of the population regarding nutrition and Vitamin A-rich foods.
- C. Study of gardening practices in the area.
- D. Study of existing communication channels in the project area.
- E. Study of the training needs of professionals who could provide face-to-face education: health care providers (including village health teams), school teachers, and agricultural workers.

One of the most important aspects of the social marketing approach is the testing and revision of educational interventions before their diffusion. In Phase II of this study promising message concepts were developed based on the information gathered during Phase I, and tested in the field in June. The preliminary results of both phases are presented in this report, as well as recommendations for a communication strategy.

A Committee, comprised of representatives from the Nutrition Division and the Health Education Division of the Ministry of Health and Social Services, Helen Keller International, and the Ministry of Agriculture, is responsible for the administration and implementation of the Vitamin A Mini-Project. This Committee participated in the design and execution of this study and participated in the first phase of data analysis at a three-day workshop held in Niamey in September, 1991.

Margaret Parlato of the Nutrition Communication Project (NCP) collaborated in designing the research. She and NCP Program Officer Peter Gottert participated at various stages in the analysis of survey results and development of recommendations for the communication strategy.

III. SUMMARY OF RELEVANT EXISTING RESEARCH

The current field study was designed based on results of an earlier qualitative study conducted in the same area (see Keith, 1990). Other background research included a review of nutrition studies (Hung, 1991) and a synthesis of other recent field surveys in Niger (Keith, 1991) which examined infant feeding practices. The results of these studies are summarized below:

A. Nutritional Findings and Recommendations

Ming Hung, a nutritionist and consultant to the Project, reviewed existing food consumption research as well as the data collected during Phase I of this research. Her task was to assess the gap in Vitamin A consumption among the target populations: pregnant and nursing women and children under six. Then, based on foods available in Niger, she proposed ways in which these target groups could meet their Vitamin A requirements. The following summarizes key findings from her report:

Intakes:

Using data collected during Phase I as well as from previous research Hung calculated the following estimations of risk categories for levels of Vitamin A intakes:

- Three quarters of pregnant women fall into the high risk category.
- Two thirds of nursing women fall into the high risk category.
- None of the children aged 0-6 months fall into the high risk category because they are consuming breast milk, although 43% are estimated to be at moderate risk, because the mothers' consumption of Vitamin A may be insufficient.
- Nearly half of children aged 13-36 months fall into the high risk category.
- Sixty-two percent of children aged 37-72 months fall into the high risk category.

Consumption:

The most commonly eaten Vitamin A-rich foods, in order of importance in the diet are as follows:

- a. green leaves
- b. red peppers
- c. mango
- d. liver
- e. yellow squash (pumpkin)

a. Green leaves:

Prepared leaf sauces, although eaten with relative frequency, are very diluted and do not represent a good source of Vitamin A. The cooked salads or kopto, if made from fresh leaves are an excellent source of the vitamin. The kopto made from dried leaves, as it is prepared during the dry season, however, is only a moderate source of the vitamin.

Green leaves are the second best source of Vitamin A but they are generally available only during the rainy season. Dried green leaves are available year round, but the drying and storage process greatly diminishes the Vitamin A content. Attempting to change the practice of sun drying leaves would not be worth the effort, since the amount of Vitamin A gained would likely be minimal, and the amount of dried leaves added to sauces is small. Dry season gardens could extend the period of availability of green leaves, but gardeners are currently cultivating lettuce and cabbage, neither of which is rich in Vitamin A.

b. Red peppers:

It is not possible to increase the amount of red pepper consumed. Tatassey, the larger, more mild red pepper, is a better source because more of it can be eaten.

c. Mangos:

Mangos are seasonal and according to the market survey are relatively expensive for the amount of usable Vitamin A provided.

d. Liver:

Liver is the cheapest and most efficient source of Vitamin A and is generally available year round. (Liver is also an excellent source of iron and folate which are both a public health problem in Niger). Of the six villages in which all available livers in the market were weighed, two of the larger, more commercial villages sell a quantity of liver which would provide twice as much as needed to meet the requirements of the target population. Two of the villages sell enough liver to meet the needs of the target population. Two of the villages sell only enough liver to meet one-third of the need.

The Vitamin A content of liver would be the highest during the rainy season when pasture is plentiful, and diminishes with the advancement of the dry season¹.

e. Other food containing Vitamin A:

Milk was eliminated as a possible food to promote because consumption is very low in Niger and it is nearly always skimmed.

Tomatoes do not contain enough Vitamin A and are too seasonal to make any significant contribution.

Yellow squash is very rich in Vitamin A, especially after storage which allows it to ripen completely, but little is known about its availability in the region outside of the short harvest period.

Increasing Intakes:

With the exception of liver, fresh greens, and mangoes for pre-school children, the amounts habitually eaten need to be increased either by increasing the portion sizes or the frequency of consumption. It may be possible to increase the consumption of liver and fresh green leaves enough to meet requirements, but the costs of the other foods in quantities required are prohibitive for most of the rural population.

It is not possible to eat sufficient quantities of certain vegetables (hot peppers, yellow squash, kopto (cooked salad made with dried leaves), or sauce made with dried leaves to provide enough Vitamin A from one source to suffice for the whole year. In order to allow loading of Vitamin A during the season when Vitamin A-rich foods are available, a person would have to eat 258 grams of green leaves six times per day or 675 grams of mango 11 times per day, for example. Therefore a combination of good sources such as cooked greens, leaf sauce, and mango would need to be consumed in the same day.

Absorption of Vitamin A:

¹Theoretically goats which are allowed to go to pasture would likely have a better supply of Vitamin A than cows, since goats reach up into bushes and eat the green leaves during the dry season. Cows, however, graze down to the grass roots; when the grass is gone, they have no more Vitamin A source available to them. Fodder given to animals throughout the dry season is niébé bean and other plants which have been stored in full sun on the roof for weeks or months, probably depleting most of the Vitamin A.

Oil or fats must be consumed at the same time as Vitamin A sources, in order to assure the body's access to the Vitamin A (a fat soluble vitamin). The per capita consumption of fats is low, especially in the rural villages, making absorption of Vitamin A uncertain in some cases.

Nutritional Recommendations:

1. After examination of the food consumption situation, Hung advised the inclusion of all nursing women in the target population. It had previously been thought that nursing women of children under six months would be the only nursing women included in the target population, as children over six months were thought to consume enough Vitamin A.
2. Promote the consumption of liver, specifying the quantities to be consumed each week: for children - 10 francs CFA weekly; for women - 25 francs CFA weekly.
3. Promote the consumption of dark green leaves, at least two servings daily. This will necessitate an increase in the production of green leaves which can probably not be accomplished without addressing increased production during the dry season. There are several leaves which could be introduced which produce greater quantities of leaves than the local varieties, and in a small amount of time. People could be encouraged to grow these.
4. Promote the consumption of yellow squash; the amount consumed in a typical serving must be doubled and the frequency with which it is consumed must be increased to 2-3 times per week. This will require an increase in production of these squash since the supply is presently inadequate.

B. Horticultural Findings and Recommendations

The Asia Vegetable Research and Development Center project in Niger conducted interviews both in the Niamey and Konni areas and in the Maggia valley, as well as research on Vitamin A vegetable crops. This resulted in a list of plants (Turner, 1991) recommended for cultivation, to alleviate Vitamin A deficiency in the Sahel. The selection of these species is based not only on their beta carotene content, but also on their adaptability to the agroecology of the area. That is, they require the least intensive cultivation, have some degree of drought tolerance and insect and disease resistance and are already familiar to and consumed by people in the area. The list of plants recommended for Niger is as follows:

- 1) Amaranthus - common names: pigweed (Eng.), amarante (Fr.), rukubu, aleahu (Hausa), tchappate (Djerma). Usually cultivated and also gathered as a weed. Most often used fresh, but can be dried.
- 2) Corchorus - common names: jute (Eng.), corete (Fr.), lalo, maloheya (Hausa), fakou (Djerma). Traditionally gathered as a weed during the rainy season, now cultivated in

the dry season in Burkina Faso and Mali. Extremely well adapted to drought, poor soils and plagued by few pests. Used fresh and dried.

- 3) *Moringa oleifera* - common names: drumstick tree (Eng.), neverdie (Fr.), tamaka (Hausa), windi bundu (Djerma). A small tree usually deliberately planted and very popular throughout the Sahel. If properly cared for and watered can be harvested year round. If receiving no care, can be harvested in the rainy season.
- 4) *Hibiscus sabdariffa* - common names: red sorrel (Eng.), oseille (Fr.), yakawa, sure (Hausa), gisima (Djerma). Used fresh or dried. Primary cultivation during the rainy season, but is grown some during the dry season.
- 5) *Gynandropsis gynandra* - common names: gynandro (Eng.) (Fr.), gasaya (Hausa), foubeye (Djerma). Well liked; used fresh or dried. Cultivated in Burkina Faso and Mali, but usually only gathered during the rainy season in Niger.
- 6) *Cassia* - common names: séné (Fr.), tafasa (Hausa), oula (Djerma). Used fresh or dried. A shrub, usually growing wild or only semi-cultivated. Use varies by region.
- 7) *Portulaca oleracea*: common names: pourpier (Fr.), rubda-tunkuna, k'aro, halshen sanya, halshen sa'a (Hausa). Usually gathered as a weed, found in both the rainy and dry season. Consumption common in Niger.
- 8) *Adensonia digitata*: common names: baobab (Eng.) (Fr.), kuka (Hausa).
- 9) *Solanum aethiopicum* - common names: aubergine (Fr.), yalo (Hausa), goma (Djerma). Cultivated for its fruit with leaves used as a vegetable in Burkina Faso, Mali, but seldom in Niger.
- 10) *Talinum triangular* - common names: grasse (Fr.), gure (Hausa), yao-foye (Djerma). Cultivated to a small extent in Niger. Used fresh only.

A phone conversation with Anne Turner yielded the following ideas which suggest further exploration:

When organized irrigated gardening first started in Niger, European varieties of vegetable such as lettuce and cabbage were encouraged. Although these vegetables have some nutritional value, they have relatively little Vitamin A. Generally gardeners allow traditional leaf plants to grow as weeds in their gardens as well as gather them during the rainy season from where they grow wild. But some farmers gather the wild plant seeds and sow them broadcast in their gardens during the dry season.

One problem experienced in working with farmers is trying to get them to plant every two weeks instead of making one planting and harvesting only once. As a result some

farmers have not been able to sell their lettuce before it turns bitter because of a glut on the market.

C. Qualitative and Quantitative Research on Mother and Child Nutrition

The author reviewed a number of qualitative and quantitative studies conducted in Niger recently in the area of child survival (See separate document, Keith, 1991c). Certain themes reappear across these studies of different ethnic groups and geographical areas.

Women lack accurate information on how to enhance the effectiveness of their breast-feeding, including not offering other liquids and foods before six months, completely emptying one breast at a time, and offering the breast before offering non-breast milk foods. Although breast-feeding is nearly universal, many women complain of not having enough milk, and new mothers are said to "be afraid of" breast-feeding. Colostrum is thought to cause illness and death to the newborn; therefore it is not given by the majority of women. Behavior of the mother and environmental factors are thought to cause the breast milk to go "bad", which in turn is thought to cause diarrhea and lead to malnutrition and death. These beliefs sometimes lead to premature cessation of breast-feeding when the child is sickly.

Men and women lack knowledge of the nutritional needs of children under six. A high value is placed on millet as "food", and the nutritional value of other foods is not understood. Attitudes are that the child must learn to feed itself, to like the food offered by the family, and show food seeking behaviors. Children tend to regulate food consumption by indicating to their caretakers when and how much they want to eat. The research suggests that child feeding practices may be as important a goal for educators as the actual food recommended. This might include increasing the frequency of feeding, encouraging and helping children to eat, and making sure that they eat certain quantities at each feeding.

Generally children are beginning mixed feeding long before the cessation of breast-feeding. Among the Djermas mixed feeding begins later than among the Hausas or the Beriberi, but even among the Djerma, young children are seen tasting and nibbling before they are said to be "eating (non-breast milk) food". Children are not generally thought of as having special food needs. When special foods are given they are usually connected with a ritual, such as the day of the cessation of breast-feeding, and are not continued in the long term.

Eating and food are much more important for their ability to "fill the stomach than for their taste of nutritional attributes. This finding has enormous implications for nutrition education which typically seeks to increase nutrient density of foods or encourage consumption for nutritional reasons.

Pregnant and nursing women are not thought of as having special food requirements, and in fact, may be pressured not to demand special attention. As with children, special foods may be

associated with rituals, such as the tradition of dividing liver among the women guests at a baptism, but are not continued in the long term.

D. Priorities for the Field Study

The research team worked closely with the nutritionist in reviewing previous research, in setting priorities, and in designing the field study. The conclusion was that the study should focus on foods which have the potential to furnish nearly the total requirement of Vitamin A rather than try to meet Vitamin A needs through a number of different foods. Other Vitamin A-rich foods would be researched, but the greatest effort would be made to examine the two Vitamin A-rich foods thought to have the greatest potential: liver, and green leaves.

Preliminary research found that liver is the most efficient approach to making a difference in Vitamin A consumption. A goal of the field research, therefore, was to ascertain if each of the communities butchers enough animals per day (or week) to meet its own requirements, and if people would be willing to buy and consume more. Liver could meet the total Vitamin A requirements if it were available year round, whereas many Vitamin A-rich foods are seasonal.

The earlier research suggested that leaves are the second best potential intervention, since they are already eaten frequently by almost everyone and can supply fairly large quantities of Vitamin A. The remaining question was to determine whether people could be encouraged to increase the quantity consumed. A number of approaches to increasing the consumption of green leaves needed to be explored. In those villages where there is no contre-saison gardening, this would mean increasing the quantity of gathered wild leaves (probably not possible) and increasing cultivation of red sorrel (oseille de Guinée) in the fields during the rainy season. In villages with gardens this might mean encouraging more cultivation of moringa (drumstick tree) and red sorrel around the edges of the onion patches. Another possibility would be to increase the time in which fresh wild green leaves are available by growing them in dry season gardens. More information was also needed on the different leaves, their production, their storage, and use.

IV. METHODS - PHASE I: FIELD RESEARCH

The qualitative study conducted in May was designed to gather data on the market, training needs, communication channels, and knowledge, attitudes and practices regarding Vitamin A dietary practices. Nutritional data were also collected, including 24-hour food recalls, food frequency lists, and weights of purchased samples of Vitamin A foods. The nutritional analysis of the data is discussed in the Hung report (Hung, 1991) and is summarized in Section III of this report.

A. Research Questions - Phase I

Research questions fell generally under these categories: liver, leaves, training needs, communications channels, and agro-economic considerations. Some specific questions which guided the research are listed below:

Liver:

How much is currently eaten by the target groups? When and under what circumstances and who pays for it? Would men be willing to buy more for women and children or would women be willing to buy it for themselves and their children? Under what circumstances? How do people currently view the eating of liver and its role in the body? How much does it cost? Would people be willing to buy it for women and children? How many grams of liver are available in the community over two weeks? Based upon the population of the community could the current supply of liver meet the Vitamin A needs of lactating and pregnant women and children under 6 years? What are the possible constraints of such a change in eating habits?

Green leaves:

How much is currently eaten by the target groups? Would people be willing to grow more? gather more? dry more? Would people be willing to add greater proportions of leaves to their sauces? Would people be willing to eat more cooked greens? Is there another form in which people would be willing to eat more leaves? Which leaves are preferred, by whom, and for what reason? Which leaves are available during which months and in what form? How are leaves dried? Who cultivates, who picks, who dries, and who sells leaves? What might be the constraints attached to increasing leaf consumption among women and children?

Training:

What are the knowledge and training needs of the various health, education, and agricultural personnel? How might these people contribute to the communication of health messages? How much do community members currently follow the advice from these professionals?

Communication Channels:

What are the communication channels in existence and how might they be used to communicate health messages about Vitamin A? How do women and men learn new practices and under what circumstances might they be convinced to change their practices? Are women getting new health information primarily from the health professionals, or from other women? Are men getting new ideas about gardening from the agricultural professionals or from other gardeners? How aware of biomedical information about mother and child nutrition are men? Would they be willing to make changes because a health professional advises them to? Would they make changes because their wives come home from the dispensary and report advice from the nurse?

Agro-economic considerations:

Is there a sufficient quantity of Vitamin A-rich food available in villages so that Vitamin A deficiency can be eliminated through education and behavior changes alone? Or are there areas in this poor Sahelian country where there are simply not enough Vitamin A food sources available, so that other strategies must be devised in order to eliminate the deficiency? Do poor isolated villages without markets, gardens, commerce, and little transportation have the resources to meet their own needs in Vitamin A?

B. Methods

Training of Interviewers:

The team consisted of four women and two men, as well as the Committee chair and the consultant. Two vehicles enabled the men to go to the slaughterhouse to study liver questions while the two women's teams each went to a different quartier. A five day training was conducted in Konni and included food weighing and 24 hour recalls as well as administration of the questionnaires.

Selection of Villages and Respondents:

Six villages in the Konni Arrondissement were used for the formative study. The villages selected for the study were not selected randomly, but were chosen on the basis of the following criteria:

- 1) Two villages with dispensaries and gardens
- 2) Two villages without dispensaries but without gardens
- 3) Two villages without dispensaries and without gardens
- 4) Villages chosen should be as similar in size as possible.
- 5) Two dispensary villages were not included in Phase I (Guidan Ider and Galmi) since the Keith research was done in one and the missionary hospital with a strong educational outreach is in the other, both of which could affect the data.

Stratifying the sample into dispensary villages and non-dispensary villages is a convention often followed in health surveys in Niger, as it is assumed that villages with a dispensary have the potential for more health education and health services. It should be noted as well that in this arrondissement (Konni) the dispensary staff have received some training by Helen Keller International to distribute Vitamin A capsules and to some extent to do some nutrition education in the area of Vitamin A. But perhaps as important as the existence of a dispensary are the differences inherent in the villages with dispensaries. They tend to be the largest villages in the area, important commercial centers, and usually on the tarmac road. These villages may be more exposed to new ideas and tend to have a greater variety of foods available.

The villages selected and their populations are the following:

Village	Type of Village	Population
Tsarnawa	Dispensary/garden	3719
Doguerawa	Dispensary/garden	3794
Dossey	Garden	4373
Maifoula	Garden	2744
Tajae	No disp., no garden	3716
Tafouka	No disp., no garden	1869

Tsarnawa is a large village located at the cross-point where the country's only extended north-south paved road turns off from the only east-west paved road. Doguerawa is a large village on the east-west tarmac with a lot of commerce and the home of the traditional Chef de Canton.

Dossey is a large village with a large permanent body of water. It has many large gardens and many merchants who travel back and forth regularly to Konni with their goods. It is only about 15 kilometers from Konni, but is impossible during parts of the rainy season. Maifoula is off the road and does not have the commercialism of Dossey. Although Maifoula had been selected as a village with gardens, the team found that the gardens are limited mostly to manioc.

Tajae is a smaller, isolated village equidistant from Tsarnawa, Malbaza, and Guidan Ider. Although it is not far from any of these three large villages and the road is dry and passable, Tajae is not well served by any services. Although it was selected as a village "without gardens", the team found that some people had begun to plant gardens. There seems to be very little commerce in the village. Tafouka is only 1 kilometer off the main east-west tarmac; it has an elementary school, but few other services, except the recent installation of a Peace Corps Forestry Volunteer.

Six villages were selected for the Phase I study, using the following criteria:

- 2 villages with dispensary and with gardens
- 2 villages without dispensary, but with gardens
- 2 villages without dispensary and without gardens

An attempt was made to choose the largest villages possible in each category.

In each village men and women respondents were selected according to the following criteria:

- 8 nursing mothers (child 0-6 months)
- 8 pregnant women
- 8 mothers with children 6-12 months
- 8 mothers with children 12-36 months
- 8 mothers with children 3-6 years
- 10 men with either a nursing wife, a pregnant wife or a child 0-6 years
(The men were not necessarily related to the women interviewed.)

The interviewers went to the center of town and divided, with two going in one direction and two in the other. They began at the third house in that direction, always going to the left, stopping at each door until they had found a family fulfilling the criteria for which they were responsible. Each interviewer had a different set of criteria for which she was responsible. There were some difficulties in equalizing the number of interviews and in completing all interviews assigned in the allotted time. Logistical decisions were made during the gathering of data which resulted in a greater number of mothers of 12-36 month old children than planned and a smaller number of 3-6 year old children.

Men interviewers had difficulty following any kind of random selection process, since men are seldom found in their homes during the day. The rainy season was just beginning so the men were in the fields on the day when the team was in several of the villages. This may have biased the sample in that those men who were not in the fields were probably either too old or too ill to work on that day.

Several techniques were used to gather data (see the questionnaires in Appendix D):

1. In-depth individual interviews with women (216) and men (60):

The questionnaire included closed as well as open-ended questions designed to assess knowledge, attitudes, and practice. Each individual interview included a 24-hour food recall and food frequency lists. An attempt was made to measure all Vitamin A-rich foods prepared or purchased during the course of the day and eaten by the respondent and sample child.

2) In each of the six villages focus group discussions were conducted with the following groups:

- butchers
- gardeners
- leaf sellers
- sauce sellers
- men
- women (two groups)

3. Interviews with the following key informants were conducted in the villages:
 - teachers
 - agricultural agents
 - nurses
 - village health workers
4. All of the livers butchered in each of the six villages during the day of the Field Study were weighed.
5. Samples of Vitamin A-rich foods available in the village were purchased and weighed.
6. Information was gathered on local market, seasons, and prices.
7. Information was gathered on leaf preference, prices, use, and cultivation. Groups and individuals were asked to name all the edible leaves they knew, their desirable qualities, their preparation and use, and their season. Ranking techniques were used to gauge preferences and characteristics of consumer interest.

V. FINDINGS - PHASE I: FIELD RESEARCH

The data presented in this section are from several sources:

1. Closed question responses of the women and men in the in-depth interviews were coded and entered into a computer to determine frequencies of certain responses.
2. The findings of the focus groups and the open-ended questions from the in-depth interviews are analyzed and reported.

The report presents the data by subject matter, rather than by source, so the presentation alternates between sources, dealing with one issue at a time, as follows:

- A. Nutrition
- B. Food Decision Making and Purchasing
- C. Night Blindness
- D. Liver
- E. Green leaves
- F. Communications
- G. Training Needs Among Professionals
- H. Villages

The description of the population sampled is found in Appendix C.

A. Nutrition

This section reports the results of questions which sought assess the interviewee's knowledge about the nutritional needs of nursing and pregnant women and children under six, as well as the practices in these areas.

Nutrition During Pregnancy and Nursing:

Twenty-seven percent of the 216 women interviewed were pregnant at the time. Women were asked whether they had changed their diets the last time they were pregnant, and what foods they added or eliminated during these periods. Only twenty-seven percent of the women questioned said that they changed their diet either during the current pregnancy or the last time they were pregnant. Eighty-six percent of these said that the changes they made were to eliminate something in their diet because of nausea. This suggests that women make changes in response only to nausea, rather than for nutritional reasons.

Men were asked if, in their view, there are foods which are recommended for women when they are pregnant. Seventy-five percent of the 60 men said "no", and many explained "They eat what we eat" or "I don't have the means." Of those who said "yes", 36% said that pregnant women should eat meat or fish, in order to maintain good health.

Focus group discussions with both men and women suggested that there is a general comprehension that women need to eat enough food, and good food in order to assure their health and the health of the fetus. The Mini-Project Committee felt that generally women are aware that they need more food during pregnancy but they are not aware of a need to eat certain foods for their nutritional value. Since this idea did not come out of the individual interviews, it may be that the questions were actually posed in such a way in Hausa that the focus was on specific foods rather than on changes in the diet. It may also be that in the ideal people are aware of the need for more food, but in reality there are limits to how much they can realize it. Some people also commented that there is often pressure in the village not to make special demands during pregnancy.

Sixty-two percent of the women said that they were nursing at the time of the interview. Women were asked whether they changed their diet during the last period of nursing. Only 30% of the women said that they changed their diet and 86% of those said that they changed their diet to increase milk production. Beans were mentioned by one third of the women as a galactagogue, or food thought to increase the quantity of breast milk.

Discussion:

In the earlier Keith research in the Konni area, women sometimes complained that they were unable to gain weight or lost weight as long as they continued to nurse, suggesting that they were not consuming enough calories. When it was suggested that they eat more, they responded that their husbands could not afford to provide more. In general, it probably could be said that

women would eat "better" and more if the means were available in the family. But what is understood by "better" is probably more meat, the prestigious food, and beans during lactation to increase milk production. This research suggests that neither men nor women have much knowledge of biomedical views of the nutritional requirements of pregnant and nursing women.

Fasting During Pregnancy:

In the Keith study, women in the Konni area were found to fast during Ramadan in large numbers, even though they are specifically exempted by the Koran from fasting during pregnancy and nursing.

Half of the women interviewed in the current study performed the fast during their last pregnancy. The women were about equally divided as to when during their pregnancy they performed the fast: 1st, 2nd, or 3rd trimester. If women said they fasted during the last pregnancy they were asked why; if they did not fast they were asked why not. The results are reported in the following two tables.

TABLE 1 (FEMALE)		
If you fasted, why?		N=84
Reason	Number	Percentage
My husband made me	44	52.4
Because of faith	25	29.8
I wanted to do it	8	9.5
Other reasons	7	8.4

TABLE 2 (FEMALE)		
If you didn't fast, why not?		N=95
Reason	Number	Percentage
I was sick; I suffered too much	32	33.7
My husband didn't make me	17	17.9
So as not to make the child suffer	13	13.7
The nurse advised against it	06	6.3
Other	27	28.4

The strongest reason given for fasting was that the husband obligated the woman to fast and the second strongest was the woman's religious faith. The most often given reason for not fasting was that the woman was ill or suffered. Eighteen percent said that their husbands did not oblige them to fast. Thirteen percent said that they did not want to make the child suffer and six percent said that the nurse recommended that they not fast while pregnant.

Sixty-six percent of the men interviewed said that their wives fasted during pregnancy. Fewer men (19%) than women (33%) said that their wives fasted during the last trimester. The Keith study (Konni) found that fasting is thought to be easier during the early part of the pregnancy rather than during the later part when the woman is "heavy" with the pregnancy. More men seem to be endorsing the ideal of not fasting during the last trimester, whereas women showed no preference for one part of the pregnancy over the other in their actual behavior. Men said that 2/3 of their wives fasted whereas only half of the women interviewed said that they fasted during the last pregnancy.

For 80% of the men the reason for the woman doing the fast is the husband's faith in God. Of the men who said their wives did not fast during pregnancy, half said "so as not to make the child suffer" and one quarter said that their wives suffered too much.

Fasting During Nursing:

The Keith research found that fasting women express concern about the health of their nursing children. Eighty-two percent of the women in the current study said that they fasted the last time they were nursing, half because of their faith and one third because their child had begun to eat non-breast milk foods. Eighty-five percent of the men interviewed said that their wives fasted while they were nursing and 93% of these said because of religious faith or obligation.

Only 13% of the women said that they fasted during the first three months of the child's life before the child had begun to eat non-milk foods. Sixty percent of the men said that their wives fasted as soon as the forty days after child birth had been completed. Only 17% of the men said that their wives wait until the child has reached an age where he or she is eating other foods besides breast milk.

Discussion:

Fifty to sixty percent of pregnant women fasted in this study and over 80% fasted during nursing. The fast is a religious obligation which everyone in the Hausa village is expected to observe, for their family as well as for Allah. The Keith study found that some villagers view the fast as a kind of bank account of grace, in which younger family members can accumulate days of fasting which will benefit the older family members or ill family members who can no longer fast. Although exempted by the Koran from fasting during pregnancy and nursing, women seemed to feel that it was easier to do the fast when everyone else in the village was doing it, especially since they would be expected to make up any days lost at a later date.

People seem to be aware that some women cannot support the fast, that is that they seem to suffer or it makes them feel ill, but there does not seem to be an understanding that it may be doing actual damage to the developing fetus or the nursing child.

The Keith research found that most respondents say that a nursing mother should not fast until the child is old enough to eat other foods, and the women in this study seemed to support this idea. The men, in contrast, do not seem to support this idea and take the more rigid position that as soon as the obligatory forty days after birth are over, the woman may fast. The men in this study were not necessarily related to the women respondents, but if the sample is representative, there seems to be little communication between family members about these matters.

Another important finding is that the women are beginning to get information from their dispensary nurse about appropriate behavior during pregnancy and that advice is being taken seriously by some of them.

Nutrition of Children Under Six:

When asked if they thought children under six have special needs in terms of food, 72% of the men answered "No" and many explained "They eat what we eat", or "That's all we can afford". Of the 16 who said that children do have special needs. Milk and beans were both named by several people. Five men said that the child needs special foods during the first three years of life to assure growth.

Previous research has shown that women who are asked these questions recite various messages they have learned from the dispensaries. When asked about children's food needs mothers name the various PMI bouillies, beans, and milk. Research on their behavior, however, suggests that for whatever reason, women are not adopting recommended bouillies on a long term basis.

Discussion:

Traditionally the period of mixed feeding is viewed as a process of socialization in which the child learns to feed itself and become satisfied with the staple eaten by the family. Once the child is able to eat solid foods the child is expected to eat adult foods. The male child over four or five is allowed to wander at will around the village, scrounging for food and eating food wherever he can find it, although the mother will set aside a portion of the family pot until the child comes home.

The dispensary nurse, from the PMI, has had an effect on the cognitive knowledge of women. Large percentages of women can list foods which one "should" give to young children. But little of this knowledge has reached the men. Since men control the food expenses in the household there is a need to find ways to increase their knowledge of the nutritional needs of women and children.

B. Food Decision Making and Purchasing

In the Hausa culture the husband and wife are responsible for different aspects of daily life: The husband is responsible to feed and clothe his wives and children and the woman bears his children, cares for the children and the household, and prepares food. The vast majority of adult males report dry land agriculture during the rainy season as their main occupation, but most households depend on other economic activities during the dry season. Those men who have second and third occupations have enough capital to be able to buy food if the harvest falls short. Those families with very little land or not enough able-bodied men in the family, and whose men do not have a second occupation, can not grow enough millet to feed their family for the year. These men must hire themselves out to larger land owners in order to buy the millet to feed their family for the rest of the year.

A Hausa man's money and his wife's money are kept completely separate and women are not expected to contribute to the general welfare of the family. Any money the woman earns is hers to keep and to spend on her own needs and the inheritance which goes to her daughters. The man is responsible to feed and clothe his wives and children, but the way in which the man's familial responsibilities are defined varies among individuals and from one socioeconomic group to another. For the poor man this may mean millet, milk, condiments, and two outfits of clothing per year. If the woman is able to earn money and the man is too poor to provide fully for his family she may actually be providing some of the support for the family, although it is not talked about because of the shame involved for a man who has to depend upon his wife for support.

Women have various legitimate ways to obtain money, such as trades, asking the husband for an allowance of spending money, and adashi, or traditional women's credit organizations. Most women say that they use their money for decorations for their homes, obligatory gifts for the wedding or childbirth of friends, and clothes and snacks for their children and themselves beyond those provided by the husband.

In this study men were asked a number of questions to try to learn something about how food consumption decisions are made in the family and who pays for what. The men were asked what portion of the family expenses they furnish. Ninety percent said that they furnish the staples, the milk, and the condiments. The remaining 10% said that they assure everything. Although men unanimously responded that their wives never contribute to the food for the family, when asked if there were circumstances under which the men might not contribute, over three quarters said that at times they experience constraints which prevent them from furnishing all of the family's food.

Men were asked who decides the menu for the family. Exactly 50% said they decide themselves and 50% said that their wives decide. When asked who actually buys the food in the family, sixty-two percent said that they purchase it themselves and bring it home and 31% said that they give the money to their wives and the wives purchase it. Four percent added that they are the ones who buy the meat in the family. Generally the Hausas in the Konni region aspire to an

ideal of cloistering their wives. Although few can afford to follow this practice in its strictest form, it is rare to see married Hausa women of reproductive age at the market.

Traditionally each morning before leaving the house, the man presents the woman with the ration of millet and any cash to buy other ingredients for that day's food preparation. The men were asked what they had given to their wives that morning for the family's food for the day. The men responded as shown in table 3.

TABLE 3 (MALE)		
What did you give your wife today?		N=60
	Number	Percentage
Millet	49	81.7%
Money for condiments	8	13.3
Millet for the tuwo	1	1.7
Money for sour milk	1	1.7
Money for meat	1	1.7

Eighty-two percent of the men responded that they gave their wife millet to prepare, not mentioning other foods or money to purchase other foods. Whether or not these men actually gave the women other foods or money for foods, their response would seem to support the idea that men may consider their responsibility that of providing the millet. If providing millet is seen as fulfilling their responsibility as providers, this could have implications for educational strategies which seek to increase consumption of fruits, vegetables, and high protein foods.

Research in northern Ghana found that of all the factors examined, such as quantity of millet grown by the family, whether or not the woman has a trade was the factor most highly associated with the nutritional status of the child.

Thirty-two percent of the women in the sample said they had a trade. Of those who had a trade 75.8% said that they made some money from their trade. Table 4 shows what the women gave as their trade. Table 5 shows what the women said they did with the money they earn from their trade.

TABLE 4 (FEMALE)		
Women's trades		N=60
Trade	Number	Percentage
Sells snacks/prepared dishes	42	23.6%
Sells foodstuffs	13	21.7
Sells condiments	5	8.3
Sells mats	16	26.7
Other	16	26.7
Multiple responses allowed		

TABLE 5 (FEMALE)		
What do you do with the money you earn from your trade?		N=51
	Number	Percentage
Ceremony/clothes/decorations/house/trousseau	41	80.4%
Foodstuffs	6	11.8
Snacks	3	5.9
Animals/animal feed	1	2.0
Other	4	7.8
Multiple responses allowed		

Since previous research (Keith, 1991) had shown that most women use the money from their trade to pay for ceremonies, clothes, house decorations, and trousseau for their daughters, the question was asked mainly to see if women would volunteer the information that they buy food for the family with their trade money. Although 80% of the responses fell into the expected category, 12% said that they buy food and 6% said that they buy snacks for the family.

A number of questions were asked about the purchase and consumption of snacks, since liver and greens are usually consumed as snacks (snacks being anything that is not the main staple meal of either fura or tuwo). The extent to which the man is expected to buy meat and snacks for the family seems to depend on his situation. Ninety-three percent of the men said that they bring home snacks for their wives and children. Table 6 shows how often they said they did this.

TABLE 6 (MALE)		
How often do you bring home snacks?		N=54
	Number	Percentage
2 times per day	7	13.0%
Every day	3	5.6
2 to 4 times per week	15	27.8
Once per week	27	50.0
Once every two weeks	1	1.9
Other	1	1.9

Half of the men bring home snacks once per week, probably reflecting the common practice of the man going to the market and buying a treat to bring home to the family.

Men were asked if their wives ever purchased snacks for themselves or their children with their own money. Eighty percent said that their wives did not purchase snacks with their own money. Women were asked if they purchased snacks for their children and themselves. Ninety-three percent said "Yes". (The women were not asked to specify whose money was spent for the snacks.). Twenty-four percent said that they spend 10-25 francs CFA per day and 20% said they spend 26-50 francs per day on snacks. Sixty-two percent said that they buy snacks every day. Those who don't buy snacks every day said they didn't have enough money. Then they were asked what they purchase; Table 7 shows the responses.

TABLE 7 (FEMALE)		
What kinds of snacks do you buy?		N=178
	Number	Percentage
Mangoes	73	41.0%
Millet pan cakes	43	24.2
Bean fried cakes	41	23.0
Beans	28	15.7
Leaves (kopto)	19	10.7
Meat	19	10.7
Liver	1	.6
Other	82	46.1
Multiple responses allowed		

These snacks are providing vitamins, protein and additional calories.

Men were asked if there is a time of year when they have a lot of pocket money. Table 8 shows their responses.

TABLE 8 (MALE)		
When are you more likely to have cash to spend?		N=48
	Number	Percentage
Before the rainy season	14	29.2%
When I have lots of clients (season depends on the vocation)	12	25.0
When I work in the gardens (Feb-May)	5	10.4
When I go elsewhere seeking work (Dec-May)	4	8.3
Market days when I carry on my trade (1 day per week)	2	4.2

Focus groups, with men discussed when they were more likely to have money to spend. In general, there is more spending money between the end of the millet harvest and the beginning

of the new planting season, that is, approximately from December to May. Around January, those who have produced extra millet may begin to sell that millet. From December to May, those who do not have gardens, especially the young, may go en exode to the coastal countries to find work. The cash earned by these efforts may be sent home by postal money order with instructions to divide the money between millet for family members at home and purchases such as donkeys and charettes.

In many villages, especially in the Konni arrondissement, there is now the possibility of producing vegetables in contre-saison gardens. For those who engage in gardening there may be a profit realized between February - March, from onions, lettuce, cabbage, and other cash crops. Ninety-eight percent said that they use that money for family expenses.

The men were asked whether, if recommended to buy a little liver for their wives and children, they would be willing to do it. Sixty-eight percent said "Yes". Of those who said "No", virtually every man said "I don't have enough money".

It is sometimes suggested that many men eat street food rather than eat at home, so that they may be eating a wider variety of foods than their wives and children who are provided with the day's ration of millet only. Ninety percent of the men in this sample said that they ate that day's morning meal at home and 100% said that they ate their noon meal that day at home. Although it may be because of the poor quality of the food recalls conducted on the men, the men in this research appear to eat a less varied diet than the women and children. On the other hand, it may be that women are making a nutritional difference through purchases of snacks with their own money.

Discussion:

Although men are traditionally responsible for feeding their wives and children, women, through their own efforts, often buy non-staple foods for themselves and their children. The nutritional impact of these small purchases of 10-50 francs CFA, may be very important, since it is in these "snacks" that legumes, fruits, vegetables, meat, liver, and high calorie fried foods enter the diet.

Nearly half of the women said they buy snacks for themselves and their children every day, half of the women spending 10-50 francs CFA per day. Half of the men bring home snacks once per week, with another 46% bringing home something more often. It is not always clear whose money is being used when the women buy the snacks, so the men and the women may be reporting the same snack purchases in some cases. Whatever the situation, this research suggests that both the men and the women need to be targeted in a communication strategy involving the purchase of liver and cooked green leaves.

Although no analysis has been done of the entire diet, the snacks purchased in this study suggest that a significant proportion of the vitamins, protein foods, and fat calories may be provided through snacks, for those who can afford to make these purchases.

C. Night Blindness

Night blindness is well known in Niger, especially by older people, and goes by the name dundumi in Hausa. Focus group discussions and conversations with villagers tried to find out how people perceive this health problem. At first, when asked the cause of night blindness, villagers invariably answered that they didn't know. But upon further probing some groups talked more freely about their experiences.

For men the phenomenon was associated with older people, women and occasionally with men. Some villagers were familiar with night blindness in their animals. When asked what caused night blindness, the men said that it was from a lack of good food. Old people, for example, or pregnant women, if they were too poor to afford to eat well or to eat enough, might get night blindness. Some men associated night blindness with pregnancy, both in animals and in humans. When asked why animals have night blindness, they responded that it is also a lack of good food. During the dry season, when the animals cannot get enough to eat, particularly if they are pregnant, they may get night blindness. But when the rains start and there are leaves sprouting again the problem disappears.

When asked why humans get night blindness the men said that it was a lack of good food, particularly a lack of meat. When asked why for goats it was a lack of leaves and for humans a lack of meat, they explained that it was from a lack of good food. Finally they explained that poverty and being unable to meet one's needs were associated with the illness.

Groups of women talked about night blindness as an illness associated with pregnancy. They often knew someone who had experienced it or they had experienced it themselves when pregnant. For them night blindness occurs after the 6th month of pregnancy and disappears within a week or two after childbirth. Often the woman apparently did nothing to treat the condition, knowing that it would disappear after childbirth.

Liver was consistently mentioned as a treatment for the condition, although the way in which the liver was used changed somewhat from village to village. Most often the treatment consists of cooking liver and pinching a piece of it between one's teeth while very hot, causing the heat from the hot meat to rise into the eyes and forehead, correcting the condition. Some said that the liver is then consumed by the person seeking a cure; others (particularly women) said that one should then give the liver to a child or an old person. When the liver was eaten, it was said to increase or replace the blood which has been destroyed by illness. Liver is thought to bring the quantity of blood back up to the optimal level, enabling the body to function properly.

Some people described a treatment which consisted of making small cuts in the person's forehead to let out a small quantity of blood. Night blindness occurs when too much blood accumulates in the forehead or eye area, causing the eyes to cease to function properly. When asked how one reconciles the idea of letting out excess blood and the idea of attempting to increase insufficient blood, both as a treatment for the same condition, the committee explained that there must be a certain quantity of blood, not too much, and not too little.

Only 32% of women respondents said they knew of a traditional treatment. Of these, 60% mentioned pinching liver in one's teeth, and 28% described eating liver. In the individual questionnaires both men and women were asked whether they knew someone who had night blindness. Forty-one per cent of the women said "Yes". Of these, 81% percent said the person they knew was a woman and 68% said the person they knew was a nursing or pregnant woman. Others cited were old people, children, and men. When asked what that person had done as treatment, women gave the responses presented in Table 9.

TABLE 9 (FEMALE)		
What treatment did he receive?	N=49	
	Number	Percentage
Pinched liver between teeth without eating the liver	21	42.9%
Received no treatment	8	16.3
Capsule (VAC)	5	10.2
He ate liver	5	10.2
Pinched liver between teeth and ate the liver	4	8.2
Small cuts in forehead	1	2.0
Other	5	10.2

Forty-three percent of the women reported a treatment of pinching liver between the teeth without eating it. A total of only 18.4% reported actually eating the liver. Eighty-one percent of all treatments were said to have a positive result.

Ninety eight percent of the men said that they knew dundumi or night blindness. Half said it was caused by a lack of meat and 31% said by a lack of food in general. Two thirds had known someone who had night blindness and two thirds of these victims were men. Table 10 presents the treatment received by those victims:

TABLE 10 (MALE)		
What treatment did he receive?	N=32	
	Number	Percentage
He ate liver	17	53.1%
Pinched liver between teeth without eating the liver	6	18.8
No treatment	4	12.5
Pinched liver between teeth and ate the liver	2	6.3
Scars in the forehead	1	3.1
Other	2	6.3

Fifty-nine percent of the men reported a treatment involving eating liver and an additional 19% reported a treatment in which liver is used, but not necessarily eaten by the victim himself. Virtually all of the ill acquaintances were cured no matter what treatment was followed.

Discussion:

Night blindness is known and has its own word in Hausa, although not everyone has known someone who had had the condition. Traditionally night blindness is associated with poverty and a lack of good food, specifically, green leaves in animals, and meat in humans. Liver is the traditional treatment, although it is not always eaten. Liver is seen to restore the blood which has been damaged by illness, thus restoring the person to good health. In terms of experience of night blindness, men are more likely than women to know someone who actually ate the liver as treatment and according to reports, men's acquaintances were more likely to achieve a cure.

D. Liver

Previous research yielded little information about who eats liver or how it is eaten, but observation suggested that perhaps men were the most frequent consumers of liver, since it is cooked in the street and sold as a snack, and men tend to congregate in the streets rather than remain at home.

The individual in-depth interviews attempted to assess how often women and children are eating liver, how much they are eating, and who buys it. Mothers of children who had begun to eat non-breast milk foods were asked how long ago they and their child had eaten liver, how much they had purchased (for how many francs), and who had paid for it. The results are shown in the following tables:

TABLE 11 (FEMALE) When did you last eat liver?				
	N=184 Mother		N=129 Child	
	Number	Percentage	Number	Percentage
1-7 days	95	51.6%	86	66.7
1-2 weeks	20	10.9	14	10.9
2-4 weeks	37	20.1	21	16.3
Several months	32	17.4	8	6.2

TABLE 12 (FEMALE) What was the price?				
Francs CFA	N=131 Mother		N=102 Child	
	Number	Percentage	Number	Percentage
25	18	13.7%	37	36.3%
50	26	19.8	34	33.3
75	3	2.3	3	2.9
100	25	19.1	13	12.7
More than 100	15	11.5	2	2.0
We butchered/feast	13	10.0	13	12.7
It was given to us	31	23.7	--	--

TABLE 13 (FEMALE)				
Who paid for the liver?				
	N=149 Mother		N=114 Child	
	Number	Percentage	Number	Percentage
My husband	100	67.5	83	72.8
A family member	11	7.4	10	8.8
I did	25	16.8	19	16.7
Other	13	8.8	2	2.0

About half of the women reported that they and their children ate liver in the last week. Two thirds apparently purchased 25-50 francs worth of liver for the child (liver costs about 10 francs per ounce). For mothers the most commonly named amount spent was 50-100 francs CFA. It should be noted that the total amount of money spent for mother and child is probably not accurate, as the interviewers did not probe enough to determine the amount of money the mother spent on herself as apposed to that spent on her child. That is, the mother may have answered that she ate 50 francs of liver and a minute later she may have answered that her child ate 50 francs of liver. This may have represented only one purchase of 50 francs of liver shared by herself and her children, rather than 100 francs of liver. Approximately 70% of the time it was the husband who purchased the liver and brought it home, slightly more often for the children than for the wife.

Mothers were asked what they thought was the use of liver to the human body (a literal translation of the Hausa idea). Over 92% responded that liver either increases and replaces the blood.

Several questions were asked to learn how liver is customarily prepared, by whom, and who usually eats it. When designing the questionnaire, it was learned that liver is prepared in three ways. First it is grilled whole in the street, usually covered with the liquid Maggi². In this form it is cut into bite sized pieces and sold wrapped in small pieces of paper, usually for 50 or 100 francs CFA. Secondly it is sold by the meat sellers in small piles along with a mixture of tripe and other organ meats to be prepared at home. The third form is to add pieces of liver, along with other meat, to a sauce. Of the women respondents, twenty-one per cent said that they prepare liver themselves at their homes. Sixty-three per cent said that they buy it already prepared in the street and 12% said that they did both. When asked how it is prepared 93% said that they eat liver grilled, 5% in sauce, and 1% prepared with tripe and other organ meat.

²Maggi is a condiment consisting of salt, monosodium glutamate, and sometimes beef or chicken stock.

Focus groups discussions yielded some other ideas about liver consumption. Because it is the woman who cleans and prepares the food in the home, when an animal is butchered in the home she has the prerogative to remove the liver and other organs. Traditionally she will place these on the fire, cook them and serve them as a treat to the children who may be too hungry to wait until the main meal for the family is ready to serve. Liver is also distributed to the women of the community at the naming ceremony when a new child is born. As soon as the animal for the feast is cooked, the liver is brought to the women and is cut up and distributed to the parturient and her women guests to eat.

Both men and women were asked who usually ate the liver in the family. Table 14 shows the responses of the women and Table 15 shows the responses of the men:

TABLE 14 (FEMALE)		
Who usually eats liver? N=83		
	Number	Percentage
My whole family	44	53.0%
My children	22	26.5
My children and myself	19	22.9
Myself	2	2.4
My husband	1	1.2
Someone else	1	1.2

TABLE 15 (MALE)		
Who eats liver in your family? N=60		
	Number	Percentage
The children	24	40.0%
The whole family	14	23.3
Those who are ill	11	18.3
Women	5	8.3
Those who have night blindness	3	5.0
No one	1	1.7
Other	2	3.3

Men name children most often as those who eat liver and over 1/5 named illness as a reason to eat liver. Half of the women said the whole family while only 1/4 of the men named the whole family.

Men were asked when they ate liver the last time. The results are shown in the table 16.

TABLE 16 (MALE)		
When did you last eat liver? N=56		
	Number	Percentage
1 - 7 days	34	60.7%
1 - 2 weeks	12	21.4%
2 - 4 weeks	3	5.4
Several weeks	7	12.5

Comparison of Table 11 and Table 16 shows that only ten percent more men than women and children reported eating liver during the last week.

Discussion:

Although the recall of how recently liver was eaten does not give an accurate picture of liver consumption, it suggests that it is not the exclusive domain of the man in the Hausa family. Indeed the women and children are eating liver fairly often, according to the questionnaires and it is most often the men who are buying the liver and bringing it home to the family. Liver is usually eaten in the grilled form sold in the street in small packets for 50 or 100 francs.

Liver is traditionally associated with weakered body states and is eaten by sick people, the women at baptism and is passed out to children when animals are butchered at home.

E. Green Leaves

The aim of this part of the study was to assess the possibility of increasing leaf consumption and possibly the quantity of Vitamin A (Beta Carotene) provided by the leaves eaten. This section will report the results of group and individual interviews, as well as with gardeners and agricultural agents.

Groups of men, women, and villagers, as well as individual men and women were asked to list the edible leaves known and used. The list of leaves most often mentioned are shown in Chart #1 with their names given in Latin, English, French, Hausa, and Djerma.

Chart No 1

Some Leaves Used in the Region of Konni

Latin	English	French	Hausa	Djerma
Amaranthus spp.	Amaranth	Amaranthe	Alehu/ Rukubu	Tchap- pata
Adansonia digitata	Baobab	Baobab	Kuka	Koo
Cassia	Senna	Séné	Tafasa/ Albarka	Oula
Corchorus spp.	Jute	Corète	Lalo/ Maloheya	Fakou
Ceratotheca sesamoide	False sesame	Ceratotheca	Yodo	Ganda foy
Gynandro gynandra	Gynandro	Gynandro	Yar ango/ Gasaya	Hubey foubey
Hibiscus sabdariffa	Red sorrel	Oseille de Guinée	Sure/Yakwa	Gisima
Moringa oleifera	Drumstick tree	Néverdie	Tamaka/ Bagaruwa'n Maka	Windi bundu
Portulaca oleracea	Purslane	Pourpier	Halshen sanya/ Halshen sa'a	Hawdeni
Urena lobata	Urena	Urena	Rama	Horgey ba

Villagers were asked whether these leaves were cultivated or picked in the wild, who typically harvests them, and how these leaves were used. Chart #2 shows the results:

Chart No. 2

Leaf	Cultivation		Who Harvests	Utilization		
	Cultivated	Wild		Dried	Sauce	Cooked
Amaranth	X	X	W		X	X
Baobab		X	W	X	X	
Senna		X	W	X	X	X
Jute		X	W	X	X	X
False sesame		X	W			X
Gynandro	X	X	W	X	X	X
Red Sorrel	X		W,M	X		X
Drumstick Tree	X		W,M			X
Purslane		X	W			X
Urena	X	X	W		X	X
Cowpea	X		W		X	X
Sweet Potato	X		W	X	X	X

Urena, amaranth, gynandro, and corète although they are native plants which are usually gathered in the wild, can be cultivated by gathering seeds at harvest time and planting them later. Most leaves are traditionally picked by women on their way back from the fields. Oseille and néverdie are both cultivated in dry season gardens, the domain of men who grow vegetables for profit, so they are often picked by men. The use or preparation of the leaves depended somewhat on the village and the individual; the chart shows all the uses possible, according to those interviewed. Some leaves are not dried, perhaps because they do not work as sauce thickeners when dried and pounded into a powder. The column labeled kopto, or boiled salad, has the most potential to increase Vitamin A consumption, since this preparation most often uses fresh leaves.

Groups of villagers and women were asked what characteristics they looked for in sauce leaves. Then they were asked to classify or rank the leaves used in their area according to the characteristics which they had named. Chart #3 shows the responses most often given to these questions.

Chart No. 3 Characteristics of Leaves

Most = 1 Least = 8	Bitter	Gummy	Thick (Kabri)	Price (Most expensive = 1)	
				Rainy Season	Dry Season
1	Red Sorrel	False Sesame	Baobab	Baobab	Drumstick Tree
2		Red Sorrel	Oseille	Red Sorrel	Gynandro
3		Baobab	Jute (fresh)	Jute	Baobab
4				Senna	Red Sorrel
5				Amaranth	Jute
6				Drumstick Tree	Amaranth
7				Gynandro	Senna
8				False Sesame	

Individuals as well as groups were asked to give the specific time of the year when certain Vitamin A-rich foods are available for consumption. Chart #4 gives the responses to this question. This does not represent the entire growing season of leaves, but the period during which they can be harvested.

Chart No. 4

CALENDAR OF VITAMIN A SOURCES IN NIGER

Vitamin A Source	Cool Dry Season		Hot Dry Season			Rainy Season				Cool Dry Season		
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Amaranth	+	+	+				—————					+
Baobab					—————							
Senna					—————							
Jute	+	+	+			—————						+
False Sesame						—————						
Gynandro	+	+	+		—————							+
Red Sorrel	+	+	+			—————						+
Drumstick Tree	+	+	+	+	—————					+	+	
Purslane					—————							
Urena	+	+	+			—————						+
Cowpea	+	+	+		—————							+
Sweet Potato						—————						
Mango				—————								
Squash (pumkin)	—————		+	+	+	+	+				—————	
Liver	—————											
Spending Money	—————											

The solid lines represent the natural harvesting period under rain-fed cultivation. The crosses represent the possible harvest period if watered in a garden during the dry season.

Moringa, if properly cared for can be harvested every three or four weeks. A gardener who has stand of 50-60 trees can make 5000-10,000 francs CFA per week. Gynandro, jute, urena, and

amaranth, if planted broadcast in the dry season garden as one plants lettuce, can be picked every two weeks and sold as lettuce is currently sold.

Fruits, liver, and mangos were also placed on this calendar to permit a comparison of the season of different sources of Vitamin A. Without dry season gardening, mangos cover the period in April and May when green leaves are scarce. Liver is available most of the year, but probably fewer people can afford to butcher or eat liver during the rainy season (green leaves are abundant, however at this time). The period when men are more likely to have spending money is between December and May.

Leaf Preferences -

Women were asked in the in-depth individual interviews a number of questions about their use of green leaves. The first question was "What sauce leaves do people around here use?" The responses are given in Table 17.

TABLE 17 (FEMALE)		
Which leaves (sauce) do you use around here?		N=164
	Number	Percentage
Jute	149	90.9%
Baobab	122	74.4
Senna	34	20.7
Red Sorrel	25	15.2
Drumstick Tree	3	1.8
Gynandro	2	1.2
Other	52	31.7

The answers to this question probably depend to some extent on the time of year in which the question is asked.

Women were asked which leaves their husbands preferred and which leaves they preferred. Many people responded with the very popular okra (gombo) sauce, but those responses have been left out since the okra used is the fruit of the plant and has very little Vitamin A. Tables 18 and 19 present the preferences of the women and their husbands.

TABLE 18 (FEMALE) Which leaves does your husband prefer? N=168		
	Number	Percentage
No preference	73	43.5%
Gynandro	46	27.4
Baobab	19	11.3
Jute	12	7.1
Red Sorrel	12	7.1
Drumstick Tree	5	3.0
Other	1	.6

TABLE 19 (FEMALE) Which leaves do you prefer? N=181		
	Number	Percentage
No preference	83	45.9%
Gynandro	51	28.2
Jute	19	10.5
Baobab	12	6.6
Red Sorrel	8	4.4
Senna	3	1.7
Other	5	2.8

Over 40% of both men and women gave no preference for one leaf over another. These are well liked and many people eat whatever is available or affordable at the moment.

Perceived value of liver: -

Men were asked what they thought the value or use of leaves is to the human body. Table 20 gives the results of this question:

TABLE 20 (FEMALE) Of what value are these leaves to people? N=74		
	Number	Percentage
Bring good health	43	58.1%
Increase strength	10	13.5
Only for the taste	7	9.5
Other	14	19.1

Fifty-eight percent of the women said that leaves bring good health and 14% said that leaves increase one's strength. These responses suggest that leaves are associated with good health, although not with a specific part of the body.

Leaf Drying -

Thirty-six percent of the mothers said that they gather sauce leaves. Every woman said that she dried these leaves in the sun (as apposed to drying in the shade), and 99% said that they dried them for only 1-2 days. The women who gathered leaves were asked what quantity of leaves they usually stock in one year. The following table gives these responses:

TABLE 21 (FEMALE) What quantity of leaves do you store? N=65		
	Number	Percentage
0-3 calabashes	35	55.4%
0-3 (50 kg size) millet sacks	11	16.9
0-3 (50 kg size) millet sacks	9	13.8
Other	9	13.8

The vast majority of women gather relatively small quantities of leaves, less than three 50 kg millet sacs full. Since this quantity would not last the typical family very long, the question arises where women are getting the leaves that they use in the family's sauces. We also asked

all women, not just those who said they had gathered leaves, how much they spent per week on sauce leaves. Their answers are shown in the following table:

TABLE 22 (FEMALE)		
How much do you spend per week for sauce leaves?		N=185
	Number	Percentage
< 100 FCFA	21	11.4%
100-199 FCFA	88	47.6
200-399 FCFA	44	23.8
400-500 FCFA	6	3.2
I have enough without buying	26	14.1

Even women who say they gather and dry leaves are purchasing dried leaves every week. Many women told us that the older women in the families gather the leaves and the table above shows that 74% of the women buy leaves weekly, presumably from the older women who gather, dry, and sell the leaves as a business.

We interviewed several old women who claimed that their business was gathering, drying, and selling leaves. These women reported that they go to the fields or the bush every other day during the rainy season and bring home one large calabasse full of fresh leaves. One day they gather leaves; the next day they sell as many of those leaves fresh as possible. This pattern continues throughout the rainy season. Some plants can be harvested as many as six times, as they keep growing back after being picked.

Those plants which are not sold are dried in the sun, usually spread on a bed in the woman's dooryard. When there is too much wind or rain, the leaves are spread in the house to dry. Most leaves require only one day to dry, but *tafassa* may require two days. Some women told us that they traditionally dried the leaves in the bush and returned with the leaves already dried.

Wild leaves which are abundant such as senna are inexpensive, but leaves which are less abundant or which are cultivated are more expensive. These include gynandro and moringa.

Discussion:

Leaves are well liked and eaten by most people nearly every day, in one form or another. Without dry season gardening, the season of leaves is restricted to the rainy season, usually from June through September. If the plant is mainly used for its fruit, such as red sorrel, beans, or sweet potato, the leaves are picked throughout the season in very small amounts so as not to greatly interfere with fruit production.

Dry season gardening has the potential to greatly increase the availability of fresh green leaves. Red sorrel and beans can be planted during the dry season for a second crop. Amaranthe and the other wild plants spring up as weeds in the dry season garden and are allowed to grow. Dry season gardens are usually the domain of men in this part of the country. Women are often allowed to come into the garden and harvest the wild leaves for their small business, whereas the higher profit margin from the cultivated crops is usually reserved for the man who owns or works the garden.

The team learned that there is a very old tradition among farmers of gathering a pocket full of wild plant seeds on the way home from the millet harvest as a sort of insurance. Some farmers have sown these seeds broadcast in their dry season gardens, to guarantee a dry season harvest of wild leaves. Garden specialists assured the team that if gardeners were to reserve one or two plots for these wild seeds and sowed them broadcast in the bed, they could be harvested every two or three weeks like lettuce.

Néverdie requires a very specific kind of cultivation in order to be harvested year round; it must be grown by someone who has had training in fruit tree gardening, as the roots and watering require a care similar to fruit trees. If cared for in this manner it can be harvested weekly or bi-weekly throughout the year, with only a slow down during the hottest season. The advantage of this plant is that it is always eaten as fresh leaves and it is well loved. In Dossey, farmers grow whole stands of this plant and it is harvested throughout the year. The team bought a bushel of this plant in early May (the end of the dry season) and prepared and ate the fresh greens. The gardener in Dossey who showed the consultant his plants said that he earns 5000 francs per week year round from his trees.

F. Communications

Women were asked questions to find out where they get new information, particularly on health related subjects. Forty-five percent go to the dispensary regularly to attend the well-baby clinic, the maternal health clinic, or both. Thirty-nine percent use the services of a secouriste regularly and 86% use the services of a matrone regularly.

Thirty-three percent said that they had learned something new from the dispensary nurse lately. Table 23 shows what the women said they had learned recently from the nurse.

TABLE 23 (FEMALE) What women learned from the nurse. N=49		
Subject	Number	Percentage
Information for pregnant women	17	34.7%
Information on diarrhea	6	12.2
Information on nutrition for children	6	12.2
Information on maternal nutrition	6	12.2
Information on hygiene	4	8.2
Information on family planning	4	8.2
Information on vaccination	2	4.1
Other	4	8.2

When asked to cite an innovation they had learned recently in the area of mother-child health their responses were as presented in Table 24.

TABLE 24 (FEMALE) Innovations in the area of mother/child health. N=46		
Subject	Number	Percentage
Infantile diarrhea	20	43.5%
Family planning	9	19.6
Advice for pregnant women	6	13.0
Nutrition	5	10.9
Other	6	13.0

Then they were asked to say where they had heard this new idea. The results of this question is presented in Table 25.

TABLE 25 (FEMALE)		
Where did you hear it? N=34		
	Number	Percentage
The nurse	14	41.2%
Prenatal clinic	7	20.6
Growth monitoring clinic	5	14.7
Public crier	3	8.8
The matrone (trad. midwife)	3	8.8
The radio	1	2.9
Other	1	2.9

Seventy-five percent said that they followed the advice that they received with the following results:

- 75% were able to maintain their good health
- 30% were able to regain their good health
- 9% were able to prevent bad health

These findings suggest that a certain percentage of women, at least one third, are going regularly to the dispensary for maternal health or child health clinics and are taking seriously the advice and information that they are receiving there in the areas of preventive health practices for mothers and children.

Women were asked if there were an organization for women in their village. "AFN" Association des Femmes du Niger was the only one mentioned. When asked what that organization did women gave the responses shown in Table 26.

TABLE 26 (FEMALE) Activities of the National Women's Association (AFN) N=113		
Activity	Number	Percentage
Come to the naming day and demand money	36	31.9%
They do nothing	24	21.2
Call women together	7	6.2
Bring new ideas	3	2.7
Other	43	38.1

Seventy-one percent of the women said that they liked the activities of the AFN. When asked why they responded as follows:

TABLE 27 (FEMALE) What women like the AFN? N=53		
Reason	Number	Percentage
What they teach us	17	32.1%
They are interested in us	9	17.0
Solidarity between us	9	17.0
Other	18	34.0

The responses to the above question may be misleading. Although 17 women said they liked what the AFN taught them, only seven women could name something they had learned from the organization. Those who said that the AFN was interested in them were a part of the group which said that in their village the role played by the AFN representative was to come to their childbirth and demand to be given a gift of money. Four women were outspoken about their feelings on this practice and said that the women who came to the childbirth did not contribute enough to earn the money which they had come to expect as payment. For these women the AFN representatives exploited them. In contrast, in one village (Doguerawa) the women were taught gardening by the AFN and those who participated were very pleased with this opportunity.

Thirty-three percent of the women questioned said that they listen to the radio. Of these (55 women), 40% listen to the Nigerian station, the Voix du Sahel and 78% to the Voix du Sokoto from south of the border in Nigeria. Men told us that one can get the Niamey station from the

Konni area but not if one's radio antenna is missing. It should be noted that traditionally the people who live in the Konni area, are related culturally and ethnically to the people to their south in Nigeria, not to the people to the west in Niamey. Many of the social announcements made in Hausa concerning the important Hausa leaders are of interest to the Hausa people of Konni, who may have relatives who live over the border.

Only 7% said that they watch television. Most of these watch variety programs and broadcasts in the Hausa language.

Discussion:

Around one-third of the women are attending the PMI functions regularly, can recite new information they have learned there, and three quarters of those had positive experiences in terms of their own health. In most villages with dispensaries the population in general seems to have positive feelings about the dispensary because they feel that the PMI services are there to promote the good health of women and children. That does not necessarily mean that they are comfortable with the service they get. In the dispensary villages the nurses have developed a working relationship in which they use the traditional midwives to relate health messages to the women in their homes, perhaps as a result of the Vitamin A capsule distribution. In many cases some of the more talented midwives have been taught to do the food demonstrations.

The women's organization, AFN, has been organized as a political group in many communities, but often does not represent the women and is viewed negatively. In some communities it seems to have piggy-backed on an old tradition of participating at naming ceremonies for the purpose of collecting a sum of money or gift. This function is often seen as exploitive by the women. Some instances were reported of the AFN initiating beneficial meetings for the women. In short, in each community the villager would have to be asked whether or not to use the AFN to gather the women for educational purposes. If the AFN is respected they could be useful; if they are not they should be ignored.

Only one third of the women said they listen to the radio, and three quarters of those said they listen to the Sokoto station from in Nigeria. Radio would probably be a good media to reinforce messages, but one would require dealing with the Nigeria radio station. Television reaches few rural women. Those who do watch television and listen to the radio prefer drama, music, dance, and the didactic Muslim broadcasts about how to behave properly as a good Muslim woman.

G. Training Needs of Health and Other Personnel

Interviews with nurses revealed that they have general ideas about Vitamin A being found in vegetables, but often do not know the difference between lettuce and cabbage and the darker green leaves in terms of amount of Vitamin A (beta carotene) provided. Most are aware that liver contains Vitamin A, but they may not be aware that it is many more times potent than vegetable sources. Some said that meat was also a good source.

Most school teachers had some general knowledge about the sources and value of Vitamin A, but had the same gaps in understanding as the nurses. One school director was extremely well informed; he had participated in a workshop by HKI.

These fonctionnaires generally depend on meetings to get information out to the community. Some school teachers said that in the absence of a dispensary and other health personnel they are consulted by mothers in the absence of a dispensary and other health personnel.

The agricultural agents generally do not have a good appreciation of the nutritional implications of their work, outside of the idea of food self-sufficiency. The emphasis has been to promote growing food during the dry season instead of sitting idle or leaving the country en exode to seek employment elsewhere. The gardeners have been encouraged to grow crops which will make a profit, including lettuce, cabbage, tomatoes, and to some extent eggplant and zucchini.

VI. METHODS - PHASE II: CONCEPT TESTING

In Phase II the Vitamin A Mini-Project Committee reviewed the initial findings of the Phase I research along with Ming Hung's analysis of available Vitamin A-rich foods. Each Vitamin A source was studied as to its cost, its availability, its current use by the population, and its potential to ameliorate Vitamin A deficiency. On the basis of this, tentative message concepts were developed. These concepts were then tested in the field during June to assess resistance points, comprehension, believability, receptivity, actionability, and motivation. In addition, several graphic images were tested to assess visual literacy -- the ability of the population to understand drawings and photographs.

A. Development of Possible Message Concepts

The following general message concepts were selected to test in the field:

1. Once each week, pregnant and nursing women should eat 50 francs CFA of liver and a child under six should eat liver worth 15 francs CFA.
2. Women and children should eat fresh green leaves every day.

In addition to testing these messages, there remained many unanswered questions about how the population might actually implement these changes in practice and how the information might be transmitted to the target communities. Working under the assumption that the more community input, the more effective the intervention would be, the decision was made to go to a sample of villages and explore the concepts with community members to see what in their view would be appropriate and feasible behavior changes.

B. Research Questions

The research team identified a number of issues to resolve. Research questions fell generally under these areas: liver, green leaves, appropriate communication channels, and choices of villages for the project. Specific questions to be addressed were as follows:

Liver -

Would the advice of buying liver weekly for women and children be acceptable to men? Did it make sense to them? Did they think they would do it? What would be the constraints for the man or the community?

Would women be willing to eat liver with their children on a weekly basis? Did it make sense to them? What would be the constraints?

What would be the best way to word the message so that it would be understandable and would fit into people's lifestyles; i.e., buying liver every week, on market day, or every two weeks, for 100 francs for each wife and her children, or should one specify the amount for each woman and child?

Green leaves -

What would be the best way to advise people to increase the consumption of green leaves? Would they be willing to increase the ratio of leaves in sauces? Would they be willing to eat boiled fresh green leaves more often? Would they be willing to eat the kopto salad of cooked green leaves more often? How would they see ways of increasing the amount of green leaves in the diet?

Would there be a way of extending the season of fresh green leaves by growing more leaves and different varieties of leaves in the dry-season gardens? Are there different kinds of gardens which require different kinds of cultivation?

Communication -

What would be the best way to get communities interested and involved in solving this problem? What would be the best way to get this information out to women? to men? to gardeners?

Choice of villages-

Which types of villages should be included in the project? Does it make sense to promote dietary change in the villages with no existing gardens and with seemingly not enough income flexibility to purchase Vitamin A-rich foods in more distant markets?

With supply of leaves and liver so inadequate how realistic is an approach dependent on demand creation to effect supply?

C. Selection of the Sample for the Concept Testing Phase

For this step it was important to interview different groups from those of the first phase. It was decided that going to the same communities would mean that the team would talk to most of the same people they had met during Phase I, due to the protocol of going through the village chief. So a new set of villages was chosen, using the same criteria of two villages with dispensaries, two villages without dispensaries but with gardens, and two village with neither dispensaries, nor gardens.

To address the research questions it was decided to go to Guidan Ider because the gardeners there have been innovative. Two gardening communities, Guidan Kadi and Mozagué were chosen on the flooded lake South of the main tarmac, since these villages represent another type of gardening.

Village	Criteria	Population
Guidan Ider	Dispensary/Gardens	5178
Malbaza	Dispensary/Gardens	3253
Mozague	Gardens	4454
Guidan Kadi (Gwindogoro)	Gardens	3792
Tounga Yakouba	No dispensary, no gardens	856
Bingire	No dispensary, no gardens	2145
Kakou (substitute for Bingiri)	No dispensary, no gardens	1854

On the last day of the trip, the chauffeur and one of the interviewers were both ill, so Kakou was substituted for Bingiri as it appeared to meet the same criteria, but required much less travel. This enabled the team to finish on time, while giving the sick team members time to rest before heading home.

D. Methods

For this step the team included two women from the Ministry of Health and one male sociologist from the Division of Health Education. A day of training in conducting focus groups was held in Niamey before driving to the area. In each village two focus groups were conducted with women by the team of women. The male sociologist and the consultant conducted one focus group with men and another with the gardeners. (The sociologist conducted the main interview with the consultant posing additional questions for clarification and to explore new ideas suggested by the villagers' comments).

In each group various symptoms of malnutrition of women and children were described and the villagers were asked to talk about their perception of these situations as well as their ideas about a possible solution. (Starting on page 12 of Appendix D.) Then they were asked to react to the tentative behavior change concepts developed by the Committee. Finally they were asked how one could best get such information to the villagers.

VII. FINDINGS - PHASE II

Villager reactions to the identified problem and the proposed solutions will be discussed, by village type. This will include reactions to specific concepts.

A. Villager Reactions to the Recommendations

There was a great difference in villager reaction among the different types of villages.

Dispensary villages:

Generally the dispensary village men, women, and gardeners responded that there was indeed a nutrition problem among women and children and that the biggest obstacle to solving it was ignorance. All that was necessary would be for the project to inform people; those who are willing and who had the means, villagers reassured the team, would follow the recommendations whenever they could afford it. Some people would not be able to afford the recommendations as often as recommended. Others would not be willing to try a new idea, no matter what the situation, because they are not cooperative. But most people would make an effort if they understood that it would benefit the health of women and children.

The women of the dispensary villages showed that they have learned a lot about nutrition during pregnancy, the dangers of births too close together, and the value of a varied diet including vegetables, fruits, meat, liver, eggs, and legumes. Dispensary village women said that they knew that pregnant and nursing women and young children should eat these foods, but not everyone could afford it. In general, they assured the team that there were no constraints in the large village because all of the things mentioned were available to them. It was simply a matter of the economic means of the individual family.

Some women said they already eat too many leaves and others said they would eat them every day if they could be grown in the gardens year round. Most women insisted that one can not change the ratio of leaves in the sauce without ruining the sauce, but one woman said you could add more leaves as long as one added a lot of natron³ to neutralize the sour taste caused by the additional leaves.

The gardens in the dispensary villages are large commercial enterprises, with some plants growing year round. Many of these gardens have fruit trees, which their owners learned to grow from the training conducted at the tree nursery in Guidan Ider. The gardeners of Malbaza have very large highly commercial gardens which are owned by a few wealthy men. Their cultivation calendar is shown on Chart #5 on the next page.

Anyone in Guidan Ider can have a garden with its own well, if he/she follows through with care and harvest of the produce. This system has the potential of making more of the produce available to more of the villagers than the Malbaza system, in which the gardens are owned by a very few people. Some women were found to have gardens in Guidan Ider and Doquerawa, and they appeared to use their produce to feed the family.

Most women in the dispensary villages said that the purchase of liver was not a problem; if the husband did not have the money the woman could often obtain it. Some women said that the team should tell the men about the need for liver, presumably because the men usually buy the meat for the women and children. Other women were very adamant that they would take care of it themselves. "The health of women and children", they asserted, "is a woman's affair and men just do not involve themselves. It is easier to take care of it yourself than to involve the man." "The men don't believe us and they don't listen to us, so you need to explain it all to them", others insisted.

The gardeners in these large villages told the team that they consume about 25% of their dry season garden produce and sell about 75%.

³Natron is a byproduct of the salt mines, sometimes used as bicarbonate of soda, sometimes used for medicinal purposes (see Keith, 1991a).

Chart No. 5

CALENDAR OF MALBAZA GARDENS

Vitamin A Sources	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Salad	Planted and harvested every 4 weeks, until the end of April.								Plant seeds.			
Carrots	Harvest Feb. 1 - end of April.								Plant seeds.			
Tomatoes	Harvest Feb. 1 - end of April.								Plant seeds.			
Drumstick Tree	<-----				Tree is not watered during the rainy season.				----->			
Amaranth	<-----								----->			
Senna	<-----								----->			
Gynandro	<-----								----->			
Mangoes					Harvest from mid April.							
Squash	They are not grown in these gardens.											

Villages without dispensaries, with gardens:

The people in the villages with gardens, but not dispensaries were very interested in learning from the team and in sharing ideas about problem solving. They seemed willing to learn about the problem and to try suggested solutions. They seemed much less used to getting attention from outsiders and very flattered at our interest in their problems. They were very frank, however, about their difficulties. They explained the limitations of their resources and asserted that certain things would not be possible. They always concluded the discussion with requests for help in obtaining schools, school teachers, seeds, fertilizer, and other services which they felt had been promised or deserved, but not provided.

Women in one group explained that they had learned (probably from those who had attended the PMI clinic in the dispensary village) that women needed to eat meat, liver, and leaves and that children should eat bouillies and meat. "But", said one woman, "if you want us to change our diet you have to help us find meat and rice and beans." The men in these villages seemed to have much less scientific information on the needs of women and children than the women in these villages, but the men discussed the general ideas of the lack of food, too much work, and too many children as reasons for women's poor health.

As to changing one's diet, one man said, "What do we have if we don't have tuwo and fura? That is what we eat! If you see someone eating liver it's because he is sick. One can go for a whole month without eating liver. Others pointed out the problem that you might go to the butcher only to learn that someone else had already bought the entire liver, so it would often be difficult to buy small quantities of liver for 50 or 100 francs. The men added that some women could afford to make these purchases of liver themselves through the profit they make from their trades.

The villages on the dammed lake have a special cultivation in which the lake rises during the rainy season. Planting begins around the edges; then as the lake recedes the gardeners plant further and further down the slopes of the lake bottom following the receding waters. Chart #6 gives some idea of the calendar of this type of cultivation.

Chart No. 6

Vitamin A Sources A	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Crop	Gardening continues until the return of the water (mid to 30 May).				< Rainy season - mid to end of May until mid to end of Sept.			Beginning gardening: beans, corn, sorrel, melon, okra				
Squash	Harvest and sale - Feb 1 - April 30							Plant Squash				
Wild leaves in the gardens	-----> Jan 1 - April 30				June 1 - Sept 30			Dec 1-->				

The villages on the dammed lake eat green leaves all year, but they have difficulty growing drumstick tree successfully, because of the unevenness of the water level. Dry season greens

are primarily bean leaves grown by the men in the gardens. The beans are harvested and sold by the men, whereas the bean leaves are sold to and picked by the women, who, in turn, sell the leaves in the village. The men complained that the agricultural agent in this area did not follow through. They had been promised insecticides and drumstick tree plants, but had not received them. They expressed willingness to grow more but were frustrated with the lack of help from the agricultural service providers.

Villages with no dispensaries and no gardens:

The small villages with no dispensary and no gardens seemed offended that the team would talk to them about solving a specific nutrition problem when they need to use 100% of their energy and resources just to get enough food to fill their stomachs. One village chief said, "You work all day until you are so tired you drop, but you don't get enough to fill your stomach". Women said that one could not change one's diet of tuwo and fura. "You're the people who know other foods", said one woman. Others said that everyone wants to eat well but if you don't have the money there is nothing you can do. "If you want us to eat differently you have to give us food aid", exclaimed one woman.

The men explained, "Our food is beans, millet, and sorghum. One does not find other foods here. There is nothing else to say. If we have enough to set aside, it is these foods that we set aside. We know that in the big cities when there is a feast, people buy all kinds of foods from here and there, but it is not like that in the bush. If you have an animal to milk, you put milk in your fura. You eat the produce from your fields. Nowadays people carry on a little commerce almost everywhere. This has caused an evolution of the population; now people sell fried cakes, rice, and macaroni. But we don't have a market. We have to go to Guidan Ider or Illela (Nigeria) or Doquerawa."

"We can only eat leaves in the rainy season. During the dry season you have to go to Mozague and buy leaves and bring them here." It's a matter of one's means. There are leaves available if you can afford it, at any price. But if you don't have a garden you cannot eat leaves in the dry season."

As for liver, "You know there are weeks where you do not have even five francs. There are those who could buy liver every week". One man could buy liver every day. Another man could not. Some women could do it, those who have their small trades of weaving mats and selling food. There are butchers who have the capital to kill an animal every day; but there are others who cannot".

These villages do not have markets and very little transportation or commerce, making it difficult to bring in produce from other villages where it may be grown or sold.

These villages have very little biomedical information from the PMI. Unlike the larger villages these villagers recite almost exclusively traditional ideas about what causes malnutrition of mother's and children, namely illnesses, the weather, and other behavioral and environmental

factors. But the men express a fundamental concept that many of the situations the team is describing are associated with poverty and hunger.

VIII. DISCUSSION AND RECOMMENDATIONS

Liver:

Liver is thought of as a special food, associated with illness, night blindness, and rituals such as the naming day following child birth. Liver is highly valued by everyone, and people are willing to increase their liver consumption within their means. Traditionally, even very young children will be fed liver mashed with the fingers for those who can not yet chew.

Liver is purchased in broiled bite-sized chunks for 50 or 100 francs and brought home as an occasional treat for women and children. Liver is viewed as expensive, as is all meat, but when encouraged to give liver to their children, mothers are willing to find the money to buy it from time to time.

The liver currently sold in large dispensary villages and the more commercial villages is sufficient to meet the needs of the target population. The small rural villages without gardens and dispensaries only butcher enough liver to meet one third of the needs of the target population. In large villages there seems to be little problem, since enough liver is sold there to amply meet the needs of the target population and is it not difficult to make the necessary purchase.

Since 25 francs per week are recommended for each woman and 10 francs for each child, and since liver is sold in amounts for 50 and 100 francs, it may make sense to formulate the strategy in such a way that it would apply to most families. If the woman has one child she would need to buy 35 francs of liver to share with her child, for two children under six, 45 francs, for three children, 55 francs. Perhaps the best message would be to buy 50 francs worth of liver every week for the mother and her children under six. Women may be more likely to buy 50 francs worth on a weekly basis than they would to buy 100 francs worth, and women who had more money would probably buy more if they have more than one child with whom to share the liver. Men need to be made aware of the need to buy liver for their women and children, but women may often be the ones who will buy it, especially when their husbands cannot afford it.

Squash:

Squash is traditionally planted during the rainy season and harvested in September or October. It can also be planted again in November and harvested in February or March. Squash can theoretically be stored up to a year, but in Niger it is difficult to store squash without losing them to insects. They must be carefully placed in sand in a dark room without touching each other. Few people have the extra storage space to store any quantities of squash.

Squash also requires a lot of space in the field and it takes a long time from planting to harvest. For the poor farmer all the squash that is grown is eaten soon after harvest. For those who have the land to devote to growing large quantities of squash, they are sold to merchants and loaded on to large trucks to be taken to Niamey and other large cities.

When squash is sold out of season it is because a few merchants with extra storage rooms store the quantity of squash that the market will bear. Then they bring out one squash at a time to sell at the local market in small pieces at twice the price it commanded at harvest time.

In the large onion producing garden villages like Guidan Ider, some gardeners said that they do not grow squash in their dry season gardens because they require too much space and too much time to mature. The farmers would prefer to devote their space to onions because they turn a profit sooner than squash.

Squash is sometimes eaten in sauce, sometimes serving as a thickener for the sauce. It is also cooked in season as a side dish or main meal with oil and seasonings. The team found it difficult to obtain information on the preparation of squash; many people said that they just do not eat squash very much. When asked what benefit squash is for the human body, people responded to the team that most squash is sold for profit.

Unfortunately, squash was not originally included in the list of foods to research thoroughly, so the growers and merchants of squash were not interviewed and there are gaps in information, which do not permit the formulation of a strategy with confidence at this point.

Certain villages in the area grow large quantities of squash but most of them are sold for profit to be shipped elsewhere. Some villages said they simply weren't used to eating squash. In order to increase squash consumption, it would be necessary that cooking demonstrations and storing information be included. Perhaps with time, enough of a demand could be created that growers could make as much profit selling locally as they currently do selling for shipment to distant places.

Leaves:

Leaves are well loved and eaten often by most people. In those villages where there are greens available during the dry season those villagers who have the cash buy and prepare fresh greens year round. Gardeners say that they would grow fresh greens if there were a market for them. Villagers say that they would buy and eat fresh green leaves every day if the gardeners would grow them year round. A campaign to encourage gardeners to grow more leaves should be accompanied by a campaign to encourage people to eat more fresh leaves year round.

The specifics of which plants to encourage in which gardens needs to be further elaborated. Those large garden villages with 200 wells (Guidan Ider) may require one type of strategy and those villages on the flooded lake may require another.

Communication Channels:

High percentages of pregnant and nursing women and children under six fall into the high risk category for Vitamin A deficiency. Women in dispensary villages, and to some extent in the larger non-dispensary villages, have learned some information about the nutrition needs of women and children, although there is much room for nutritional education. Women have a deep belief in the traditional lore of what causes diarrhea, malnutrition, and death. These include ideas that breast milk can go "bad" because of the behavior of the mother, and can cause the child to become ill and die. At the same time women have learned a great deal from the dispensary. For years this focused on PMI houillies and oral rehydration therapy. In the last several years women have begun to talk about the advice given by the nurses about pre-natal care and family planning.

Women in dispensary villages are ready to hear and be able to implement specific nutritional ideas about increasing the consumption of liver, dark green leaves and squash. These messages need to be embedded within more generic information about high protein and high calorie foods as well as breast-feeding and feeding practices for children under three.

All villages suggested calling groups of men together, calling groups of women together, and sending the health information through the health service providers. Women said that if a few women learned something new in a group or at the dispensary they would tell the rest of the women at the well or at a baby shower. Some women suggested cooking demonstrations. Men were always eager to have their wives receive new information on health and preferred to have the information pass through health service providers or at gatherings called by the midwives. In two villages the men suggested having the AFN call the women together.

For women in non-dispensary villages caution must be used not to divorce the Vitamin A messages from ideas about sound nutrition and feeding practices. These women have either been to the PMI or heard from their neighbors bits and pieces of PMI health messages. But they lack a solid foundation of knowledge of nutritional needs of mothers and children.

In the villages with neither dispensaries nor gardens, villagers have so little access to communication channels that basic health and nutrition information seems not to have penetrated. If the Vitamin A mini-project were to initiate a nutrition communication project in these villages it would be replacing the function of the health service providers; the project would be starting, in a sense, where the PMI's began their educational work 25 years ago in the dispensary villages.

Men, who are considered to be responsible for the feeding of their wives and children, have very little modern information about the nutritional needs of women and children. In contrast to women, men seem to have a traditional comprehension of the relationship between eating enough and the overall health of humans. When asked what causes night blindness, small birth weight babies, or malnutrition of young children, men are more likely to mention the lack of good food or sufficient food or too much work for women. But men do not have access to

information coming from the dispensary, and as woman say, "men do not occupy themselves very much with our health". Men tend to view their role as that of providing enough millet for their dependents. After this need has been satisfied men will provide as much as they can, if they understand its importance.

In Guidan Ider, when the consultant conducted her research the men asked for information, "We have become aware that our women and children are not eating the right foods, but what should they be eating?" A nutrition communication project must include a component for the education of the men so that they will support the efforts of the women to change their nutritional practices.

Motivation:

All focus groups, when asked how one might solve the problem of dundumi (night blindness) said that they did not know very many people with this problem. They continued, however, that if someone had this problem, they had only to eat liver or "bite" on liver. Night blindness, although it may be found in epidemic numbers in the Sahel, still only affects one to three percent of the population. For most people, being told to change one's behavior for the purpose of avoiding night blindness would not be a sufficient motivation, because they really do not expect to have night blindness.

The association of liver with night blindness in humans and leaves with night blindness in animals, should be used as a way of explaining the concept of nutritional needs in terms that people can understand because of their collective experience. But as motivation to change long-term nutritional behavior, the role of Vitamin A in overall good health for mothers and babies should be used. Shorter, less debilitating episodes of diarrhea, measles, and respiratory illness, and other effects of Vitamin A which people experience on a daily basis, will all serve as meaningful reasons for changing one's eating behavior.

Recommendations:

Message concepts to be tested:

1. Women buy and consume 50 francs worth of liver per week to be shared with their children under six.
2. Men buy 50 francs worth of liver per week to be shared by each wife and her children under six.
3. Women and children eat fresh green leaf kopto or other fresh greens with oil twice per day.
4. Use the association of liver with night blindness only to make sense of the intervention in terms that the target group will understand. Use other effects of Vitamin A deficiency

as motivators such as frequent and longer episodes of diarrhea, measles and respiratory illness, more frequent death associated with these illnesses and health effects on mothers.

5. Women and children eat squash three times per week, recipes currently in use which incorporate fats and encourage large servings per person. Encourage use of squash daily in the sauce to go with the staple grain (millet). (Market studies are needed to assess availability.)
6. A number of possible ways to increase the supply of Vitamin A-rich leaves were identified, although these strategies will probably be tested in a follow-up project effort, as the mini-project time schedule requires limiting the intervention to dietary change. The following are promising areas for exploration:

Cultivation of moringa for profit in existing gardens where gardeners already possess the skills and the proper environment.

Broadcast sowing of indigenous seed of gynandro, amaranth, and corète in all dry season gardens.

Dry season planting or a second annual crop of beans (niébé as well as dan wari), red sorrel, and squash.

Distribution of Asian amaranth seeds (AVRDC) to experienced gardeners.

Planting and harvest of greens every two weeks for sale for profit.

Exploring the possibility of women gardeners planting greens through the female sarkin noma.

Selection of Intervention Villages:

The following criteria are proposed for selecting the villages in which to implement the project:

1. Must serve as large a population as possible, including the villages within three kilometers.
2. Must have the potential to increase Vitamin A consumption as a result of communication strategies.
3. Project will not initiate new gardens but will seek to change behavior of gardeners who already have the required skills.
4. Project will not serve as the only or the first nutrition communication campaign in the village.

5. Must currently be served at least in a minor way by agriculture, health, and education services, so that these services can afford to implement the project in this area without additional funds.
6. Must not be the suburb or within less than five kilometers of a large dispensary village.

Villages which are within five kilometers of a dispensary village are being served by and affected by what goes on in that village. These satellite villages should rather be considered a part of the target dispensary village.

The writer feels that the research has shown that small rural villages with little commerce, transportation, or resources, do not have the potential to increase the consumption of Vitamin A without increasing the socioeconomic status of the population and initiating gardens. Small villages also have the disadvantage that they have had very little exposure to the health education which has been radiating out from the dispensary for 25 years. This suggests that if a project initiated a nutrition education intervention in these villages it would have to start from scratch by introducing basic nutrition concepts.

Based on these criteria it is recommended that the project be implemented in the following villages (... with their populations):

Dispensary:

1. Gidan Ider - 5178 -

Is the training center in the Tahoua Department for gardening, the largest market in the canton, has almost one garden per family. (If the decision is made not to use this village because of previous exposure to research, the committee might substitute Malbaza.)

2. Tsarnawa - 3719 -

A large pumpkin producer.

3. Doguerawa - 5005 -

A large community and the home of the canton chief, has some women gardeners.

4. Allela - 2511 -

Permanent body of water, on the other end of the arrondissement from Konni and the Maggia valley.

5. Malbaza Usine - 2651 -

Has very large commercial gardens, owned by a few individuals.

Non-dispensary with gardens:

The committee will need to fill in the gaps in information. This list is not exhaustive but should help by providing a selection with which to begin.

1. Dosey -4370 -

Large commercial village with permanent mar. Has a Peace Corps Forestry Volunteer.

2. Laweye Birni - 1373 and Goge -3469 -

Not sure where the gardens are located; these are two villages very close to each other. Might be treated as one village.

3. Kaoura Alassin - 1279 -

Check to see if this shares gardens with Laweye/Goge. Perhaps could all be included in one. Has a Peace Corps Forestry Volunteer.

4. Mozague - 4440 -

Flooded lake village. Grows squash.

5. Gwindogoro (Gidan Kadi) - 3772 -

Flooded lake village. Grows squash.

6. Maifoula - 3649 -

Limited gardens; should encourage cultivation of Vitamin A-rich vegetables.

7. Dan Makery - 1153 -

Probably similar to Maifoula.

8. Bazazaga - 4610 -

West end of arrondissement.

9. Baizo -1924 -
West end of arrondissement.
10. Dibissou - 3609 -
Do not know for sure if it has gardens.
11. Kourjebeyawa - 1000 -
Small, but with gardens. West end of arrondissement.
12. Guimbi Kano - 3772 -
Fruit tree gardens.
13. Malbaza on the water (Maibaza Bourgoun?) - 2286 -
Need to find out if this village has gardens.
14. Gidan Bahago - 2483 -
15. Balgaya - 1166 -
Have dug some wells; forage doesn't work well.
16. Yaya -
On the tarmac west of Konni, gardens not well developed.
17. Bazaga -
Large commercial gardens on the tarmac, west of Konni.
18. Mai Kairi - Only 3 k from Maifoula - may wish to combine.
19. Gidan Magagi
20. Sutura -

This village is the major cultivator and dryer of tomatoes for sale.

There are other villages with gardens in the Maggia Valley, but the Committee eliminated them because of the difficulty of access during the rainy season.

Non-dispensary villages without gardens:

Some large villages with the advantages of commerce and transportation may exist, but the writer is unable to provide such a list. If the project wishes to include villages in this category it might consider the following villages or similar villages about which little is known. In each case research will have to be done about the available resources, whether or not there is a garden, services, and transportation.

Kawara - 4968 - May have a dispensary. May have gardens. Must be approached from Magaria during the rainy season.

Sangaladam -population 4234-

Nobi Sedentaire -population 2012

Gidan Gwindo - 2176

Mai Kaya - 1279

Gidan Magagi - 2905

Subouga - 2515

Tajae - 3166 - Has four men who have begun gardens.

Bingiri -2145

Dan Gari - 1980

Soutoura - 1927

Many other villages exist, but some are inaccessible during the rainy season. The information provided here on the three types of villages is by no means complete, but has been gleaned from notes with conversations with farmers and agricultural agents. Some "facts" may be incorrect, as the research team has not been to all of the above named villages.

APPENDIX A

ABBREVIATIONS AND GLOSSARY

Note: For all plant names see page 36 for translations in all languages.

adashi -	(Hausa) Traditional women's credit or savings organizations.
AFN -	(Fr.) Association Féminine Nationale, the women's political organization.
arrondissement -	(Fr.) Division of a department.
AVRDC -	(Eng.) Asian Vegetable Research and Development Center
bouillie -	(Fr.) Baby porridge; traditional <u>bouillies</u> are made from millet and water. PMI recommended <u>bouillies</u> are enriched with bean flour, milk, sugar, oil, egg, or vegetables.
canton -	(Fr.) Division of an <u>arrondissement</u> .
charette -	(Fr.) A two wheeled cart pulled by humans, bulls, or donkeys.
contre-saison -	(Fr.) Off season or dry season gardens promoted after the drought of the 1980's. These gardens depend either on daily watering from a well, a permanent lake or pond, or flood waters.
dan wari -	"The little smelly ones", refers to a variety of beans which were given as seeds during the last famine.
department -	Largest governmental division in Niger, comparable to a state.
dundumi -	(Hausa) Night blindness, the first symptom of Vitamin A deficiency.
exode -	(Hausa) Exodus, in Niger, usually to leave the country during the dry season to seek work on the coast.
francs CFA -	(Fr.) Currency in Niger.
fura -	(Hausa) Cooked millet with sour skimmed milk and water stirred in, to make a cool refreshing beverage; serves as the meal at noon, and is thinned as a beverage for the next 24 hours until the new batch is ready.
HKI -	Helen Keller International

- kopto - (Djerma) Djerma word, understood by all, for cooked greens served cold in small piles for 5 or 10 francs CFA, mixed with kulikuli, oil, salt and pepper. The Hausa word used in the region of this study is haki yamace.
- kulikuli - (Hausa) Peanut solids left after the oil has been extracted; considered as a good, cheap source of protein and probably contained some residual oil.
- niébé - (Fr.) Cowpea.
- mar - (Fr.) Marais or swamp.
- matrone - (Fr.) Traditional midwife, trained by the government to attend childbirth, and given some instructions in diarrhea treatment and mother-child nutrition.
- pépinière - (Fr.) Tree nursery.
- PMI - (Fr.) Protection Maternelle et Infantile, or the mother child health services component of the dispensary.
- quartier - (Fr.) Quarter or neighborhood.
- sarkin noma - (Hausa) Chief of farming, an honorary title of someone considered to be a model farmer.
- secouriste - (Fr.) Village health worker, trained by the government to distribute basic medicines.
- tuwo - (Hausa) Heavy millet staple porridge served with a sauce based either on traditional leaves, tomato, or meat.

APPENDIX B

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APPENDIX C

DESCRIPTION DE LA POPULATION - PHASE I

Le tableau A présente l'âge des enfants par groupe d'âge. Vingt-trois pourcent des enfants avaient, selon les vérifications des enquêtrices des actes de naissances ou des carnets de santé de PMI.

TABLE A (FEMALE) Age of Children N=191		
Age group	Number	Percentage
0-6 months	48	25.1%
7-12 months	46	24.1
13-36 months	65	34.0
37-72 months	32	16.8

Les tableaux B et C donnent l'âge des femmes et des hommes interviewés.

TABLE B (FEMALE) Age of the women N=191		
Age group	Number	Percentage
15-20 years	21	11.2%
21-30 years	90	48.1
31-40	72	38.5
41-50	4	2.1
no response	4	2.1

TABLE C (MALE) Age of the Men N=60		
Age Group	Number	Percentage
15-20 years	2	4.0%
21-30 years	16	27.0
31-40 years	19	32.0
41-50 years	21	35.0
no response	2	4.0

Une comparaison entre les deux tableaux (B et C) montre que l'échantillon des hommes est quelque peu plus âgé que celui des femmes. Comme mentionné plus haut, il est possible que l'échantillon d'hommes n'ait pas été représentatif car il s'agissait des hommes trouvés sur place dans le village et dans certains villages, les travaux champêtres avaient déjà commencé.

Il a été demandé aux femmes de donner les principales occupations de leurs époux. Soixante quatorze pour-cent des femmes ont répondu que leurs maris avaient des occupations secondaires. Les tableaux D et E montrent la principale occupation et l'une ou l'autre des occupations secondaires comme indiqué dans les interviews des femmes.

TABLE D (FEMALE) Principal occupation of the husband N=191		
	Number	Percentage
Cultivator	126	66.0%
Businessman	31	16.2
Exodus to seek work	5	2.6
Muslim priest	4	2.1
Traditional healer	4	2.1
Gardener	3	1.6
Butcher	3	1.6
No husband	2	1.0
Nothing, no work	1	.5
Other	12	6.3

TABLE E (FEMALE)		
Secondary occupation of the husband N=133		
	Number	Percentage
Cultivator	29	21.8%
Exodus to seek work	29	21.8
Gardener	22	16.5
Businessman	16	12.0
Muslim priest	10	7.5
Porter	5	3.8
Traditional healer	3	2.3
Butcher	3	2.3
Other	26	19.6
Mutiple responses allowed		

Il a été demandé aux hommes interviewés de donner leur principale occupation, et celle qu'ils ont pendant la saison sèche. Les tableaux F et G montrent les réponses à ces questions.

TABLE F (MALE)		
Principle occupation of Men N=60		
	Number	Percentage
Cultivator	53	88.3%
Businessman	3	5.0
Butcher	2	3.3
Other	2	3.3

TABLE G (MALE)		
Occupation of the men during the dry season		N=56
	Number	Percentage
Exodus to seek work	14	25.0%
Businessman	12	21.4
Gardener	8	14.3
Traditional healer	2	3.6
Butcher	2	3.6
Cultivator	1	1.8
Porter	1	1.8
Other	14	25.0
Doesn't work	2	3.6

Trente-deux pour des femmes interviewées ont dit que leurs maris possédaient un jardin. A la question de savoir ce que leurs époux plantaient, les réponses suivantes ont été données :

TABLE H (FEMALE)		
What the husband cultivated in his garden		N=54
	Number	Percentage
Sweet potatoes	13	24.1%
Mangoes	12	22.2
Tomatoes/hot peppers	8	14.8
Drumstick Tree	1	1.9
Red Sorrel	1	1.9
Others	38	70.4
Multiple responses accepted		

Pour avoir des indications sur le statut socio-économique des familles, il a été demandé et aux femmes et aux hommes, combien de fois la famille mangeait de la viande. Les Tableaux I et D.H5 donnent les réponses.

TABLE I (FEMALE)		
Number of times per week the family eats meat - women		N=185
	Number	Percentage
Doesn't eat meat	13	7.0%
Less than once per week	13	7.0
1-2 times per week	75	40.5
3 times per week	48	25.9
more than 4 times per week	36	19.5

TABLE J (MALE)		
Times per week the family eats meat - men		N=59
	Number	Percentage
Doesn't eat meat	5	8.5%
Less than once per week	1	1.7
1-2 times per week	38	64.4
3 times per week	7	11.9
more than 4 times per week	8	13.6

On a aussi demandé aux hommes s'ils possédaient des objets, combien de femmes ils avaient, ainsi que le nombre d'enfants. Les tableaux K, L et M présentent les résultats de ces réponses du côté des hommes.

TABLE K (MALE) Do you own these objects? N=59		
	Number	Percentage
Donkey	28	49.1%
Radios	24	40.7
Garden	11	18.6
Charrettes (carts)	7	11.9
Pumps	3	5.1
Multiple responses allowed.		

Quarante et un pour-cent des hommes disent qu'ils ont un poste radio. Dix-neuf pour ont un jardin mais seulement 5 % ont une pompe à gasoil dans leur jardin pour pomper l'eau et arroser le jardin.

TABLE L (MALE) How many wives do you have? N=59		
	Number	Percentage
One	35	59.3%
Two	23	39.0
Three	1	1.7

TABLE M (MALE) How many children do you have? N=58		
	Number	Percentage
One	8	13.8%
2-4	26	44.8
5-8	17	29.3
9-12	5	8.6
More than 12	2	3.4

APPENDIX D

QUESTIONNAIRES - PHASE I
QUESTIONNAIRE DES BOUCHERS/VENDEURS DE VIANDE

VILLAGE _____
DATE _____
JOUR DU MARCHE _____
NOM D'ENQUETRICE _____
NOMS DES VENDEURS DE VIANDE/BOUCHERS _____

1) Dites moi les noms de tous les bouchers/vendeurs de viande dans ce village qui ne sont pas ici maintenant.
BOUCHERS _____
VENDEURS _____

2) Je voudrais savoir combien d'animaux on égorge dans ce village dans une semaine. Dites moi combien de vaches de moutons, de chevres sont égorgés par les bouchers. Et le jour du marché - combien d'animaux est-ce qu'on égorge?
JOUR BOUCHER VACHE MOUTON CHEVRE

3) Expliquez moi comment on vend la viande.....Qu'est-ce que vous faites avec les différents morceaux de l'animal.
PARTIE VENDRE POUR SAUCE GRILLER AUTRE

4) Qui achètent les différents morceaux de l'animal? Comment préparer chaque partie? D'habitude, qui mangent ça?
PARTIE DE L'ANIMAL PREPARATION QUI MANGE

- 5) Expliquez moi comment préparer le foie.
- VACHE _____
- MOUTON _____
- CHEVRE _____
- POULET _____
- PINTADE _____
- 6) Qui achete le foie d'habitude? Qui le mange? Ou est-ce qu'ils le mangent? Combien ils payent d'habitude.
- QUI ACHETENT QUI LE MANGENT OU(maison/rue) PRIX
- _____
- _____
- _____
- _____
- 7) A votre avis, qu'elle est l'utilité du foie pour le corps humain? Pour quelle raison est-ce qu'on le mange?
- _____
- _____
- _____
- Qu'est-ce qui vous arrive si vous ne le mangez pas?
- _____
- _____
- 8) Est-ce qu'il y a beaucoup de dundumi par ici?
- Qu'elle est la cause à votre avis? Qui a ce problème le plus souvent à votre avis? Quand? Est-ce que c'est pendant une certaine saison?
- QUELLES GENS QUAND/SAISON CAUSE
- _____
- _____
- _____
- 9) Est-ce qu'il y a un traitement traditionnel pour le dundumi? Expliquez? Autres traitements?
- _____
- _____
- _____
- 10) Est-ce que vous n'avez jamais remarqué le dundumi parmi vos animaux? Ou les maladies des yeux? (LES TACHES BLANCHES) Pendant quelle saison? Quelle est la cause, à votre avis?
- _____

QUESTIONNAIRE SUR LA COMMUNICATION

VILLAGE _____
DATE _____
NOM D'ENQUETRICE _____
QUELLE GROUPE _____

- 1) Est-ce que vous pouvez me dire quelques choses modernes que les gens d'ici ont appris récemment? _____

- 2) Ou est-ce que'ils l'entendu? Comment vous l'avez appris?

- 3) Est-ce qu'ils ont suivi les conseils? _____
Si oui, quel était le résultat? _____

- 4) Est-ce que vous pouvez me dire quelques innovations agricoles que les gens ont appris récemment?

- 5) Ou est-ce que'ils l'entendu? Comment vous l'avez appris?

- 6) Est-ce qu'ils ont suivi les conseils? _____
Si oui, quel était le résultat? _____

- 7) Est-ce que vous pouvez me dire quelques innovations dans la domaine du jardinage que les gens ont appris récemment?

- 8) Ou est-ce que'ils l'entendu? Comment vous l'avez appris?

- 9) Est-ce qu'ils ont suivi les conseils? _____
 Si oui, quel était le résultat? _____

- 10) Est-ce que vous pouvez me dire quelques innovations de la santé des femmes et les enfants que les gens ont appris récemment?

- 11) Ou est-ce que'ils l'entendu? Comment vous l'avez appris?

- 12) Est-ce qu'ils ont suivi les conseils? _____
 Si oui, quel était le résultat? _____

- 13) Est-ce qu'il y a une organisation des femmes? _____

- Qu'est-ce qu'elles font ici? _____

- Est-ce qu'il y a des innovations que les femmes ont appris d'eux?

- 14) Est-ce que vous avez des radios?

- 15) Qu'est-ce que vous écoutez comme émission d'habitude?
 Quand? A quelle heure? Qu'est-ce qu'ils ont dit récemment?
 STATIONS EMISSIONS HEURE CF QUE VOUS AVEZ ENTENDU

16) Est-ce que vous regardez le télé? _____
Lequel? _____

Quelle émission? En quelle langue? Jour? Heure?

17) Qu'est-ce que vous avez vue sur le télé au cours de la
dernière semaine? En quelle langue?

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QUESTIONNAIRE DES JARDINIERS

VILLAGE _____
DATE _____
JOUR DU MARCHÉ _____
NOM D'ENQUÊTRICE _____
NOMS DES JARDINIERS _____

1) Combien de jardins est-ce qu'il y a ici? Est-ce que vous pouvez me dire combien de jardiniers il y a dans le village qui ne sont pas ici maintenant? Est-ce qu'ils ont des grands jardins ou les petits? Est-ce qu'ils payent les autres à travailler? Est-ce qu'ils ont une pompe à essence?
NO. JARDINS NO. TRAVAILLEURS POMPE

PETIT JARDINS _____
GRANDS JARDINS _____
Il y a combien de puits ici? Quel sortes?

2) Qu'est-ce qu'on cultive dans ces jardins? Quand? Qu'est-ce que vous faites avec ces produits? Vendre ou manger à la maison? Quelle proportion de la récolte?
CULTURE ENTRE QUELS MOIS? VENDRE/MAISON PROPORTION

3) Est-ce qu'ils y a d'autres plantes, condiments, ou feuilles qu'on laisse pousser ou on cultive dans ces jardins aussi? Quand? Qu'est-ce que vous faites avec eux?
CULTURE QUELS MOIS? QUANTITE VENDRE/MANGER PROPORTION

- 4) Est-ce que vous seriez prêt de planter ou d'arroser des feuilles dans votre jardin après la récolte des oignons (ou autre culture)? _____
 Si non, pourquoi pas? _____
 Qu'est-ce qui peut vous motivé à le faire après la récolte?

- 5) Ou est-ce que vous obtenez les semences pour vos jardins?

- 6) Est-ce que vous n'avez jamais cueilli les pepins des plantes sauvage? Lequelles?

- 7) Qu'est-ce vous faites avec ce qui n'est pas vendu ni mangé? (dans l'immédiat) Est-ce que vous sechez les feuilles ou les légumes?

CULTURE	SECHER(oui/no)	VENDRE/MAISON	PORTION
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
- 8) Qui fait ce travail de secher les légumes? Comment est-ce qu'on les sechent? En plein soleil? Pendant combien de jours? Est-ce que vous les vendez?

LEGUME	COMMENT SECHEE	COMBIEN DE JOURS	VENDRE?
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
- 9) Qui travail dans les jardins? _____
 Semer _____
 Arroser _____
 Déherbage _____
 Récolte _____
 Secher _____
 Vendre _____
 Qui gagne le profit? _____
 Autre? _____

- 10) Ou est-ce que vous avez appris à faire le jardinage? Qui vous donne des conseils pour le jardinage? Quelle innovation est-ce que vous avez essayé dans ces derniers années? Qui vous a appris cette idée? Comment vous l'avez trouvé? Est-ce vous allez continuer à le faire? Pourquoi/Pourquoi pas?
QUI INNOVATION ESSAYE?(O/N) POURQUOI RESULTAT CONTINUER?

AUTRES QUESTIONNAIRES

- 11) FEUILLES _____
12) MARCHE

QUESTIONNAIRE DES VENDEUSES DES FEUILLES

VILLAGE _____
DATE _____
JOUR DU MARCHÉ _____
NOM D'ENQUÊTRICE _____
NOMS DES VENDEUSES DES FEUILLES _____

- 1) Est-ce que vous cueillez des feuilles fraîches? Quelles
feuilles? Quand? Des champs ou en daji?
FEUILLE QUAND/MOIS OU

Est-ce que c'est la seule raison pour laquelle vous y allez?

- 2) Est-ce que vous vendez les feuilles fraîches? _____
Qu'est-ce que vous faites pour les préparer à vendre?

Quelle quantité est-ce que vous pouvez amener à la fois?
(grande callabasse sur la tête, sac?) _____

Une fois qu'il a commencé à pleuvoir, combien de fois est-ce
que vous allez chercher les feuilles fraîches? _____
Et chaque fois vous amenez la même quantité? _____

- 3) Est-ce que vous pouvez faire une deuxième récolte de ces
plantes? Quand? Combien de fois est-ce qu'on peut
récolter? Et cette fois-ci, combien de fois est-ce que vous
allez chercher des feuilles?

(ESSAYEZ DE FAIRE UN CALENDRIER AVEC LA PERIODE (LES
PERIODES) DE RÉCOLTE)

- 4) Quand est-ce que vous commencez de faire sécher les feuilles
au lieu de les vendre?

5) Expliquez moi comment vous les faites secher? Ou? Pendant combien de temps?

6) Est-ce que vous les faites secher à l'ombre ou dans la maison?

Si non, pourquoi pas?

7) Qu'est-ce que vous faites avec l'argent que vous gagnez?

8) Quelles sont les feuilles que les gens d'ici préfère? Pourquoi?

Est-ce qu'il y a une feuille que les hommes préfère? Pourquoi?

Les femmes? Pourquoi?

9) Quelles feuilles coutent le plus cher? Pourquoi?

11) Le moins cher? Pourquoi?

QUESTIONNAIRES - PHASE II

GUIDE DE DISCUSSION DIRIGEE DES JARDINIERS

VILLAGE _____
ENQUETEUR _____
RAPPORTEUR _____
DATE _____

Introduction: Nous sommes ici pour discuter et chercher les solutions pour un problème qui s'agit de l'alimentation des femmes enceintes et allaitantes et les enfants sous l'age de six ans. Nous voulons vos opinions sur ces idées.

EXPLIQUEZ L'ENREGISTREMENT-

- 1) Nous avons remarqué que dans cette région il y a beaucoup de villages ou les gens ont des jardins (garaka). Est-ce que vous pouvez nous dire, quel est l'utilité des ces jardins? Pourquoi vous les avez? Est-ce que les produits sont destinés à la famille? Ou pour la vente?
- 2) Est-ce que vous faites du jardinage pendant toute l'année? Décrivez les cultures de toute l'année?
- 3) Un des aliments le plus utile pour les etres humains est la feuille que vous mettez dans la sauce et mangez en forme yamace. Qu'est-ce que vous avez dans vos jardins comme feuille?
- 4) S'ILS N'ONT PAS MENTIONNE TAMECCA, Est-ce que vous avez le tamecca? Décrivez-moi comment vous cultivez le tamecca et comment vous le récoltez. Est-ce que vous l'arrosez toute l'année? Est-ce que vous l'utilisez pour la famille? Est-ce que c'est possible de gagner un profit en cultivant le tamecca? Comment?
- 5) Nous avons entendu des jardiniers qui cueillent les semences des plantes sauvages tels que yar ango, aleahu, lalo, et rama? Est-ce que vous connaissez quelqu'un qui le fait? Avec quels feuilles? Est-ce qu'ils en consomment ou les vendent?
- 6) Qu'est-ce que vous pensez de l'idée de cultiver ces feuilles dans les jardins toute l'année pour l'alimentation de la famille et pour la vente? Quel sont les contraintes?
- 7) Comment plantez-vous la salade ici? Qu'est-ce que vous pensez de l'idée de planter les semences de yar ango par exemple, tous les deux semaines pendant l'année pour avoir des feuilles vertes à n'importe quel moment? Quels sont les contraintes?
- 8) Est-ce que vous pensez que gens qui n'ont pas de jardin les acheteront? Pensez-vous que les autres jardiniers suivront

l'exemple en cultivant ces feuilles toutes l'année?

- 9) Est-ce que vous cultivent le courge ici? Comment vous les cultivez? Quand? C'est destiné à la famille ou pour la vente?
- 10) Les courges ont beaucoup d'utilité pour l'organisme humain. Est-ce que vous pouvez pensez des façons d'encourager les gens de manger plus de courges? Est-ce que c'est possible d'en avoir toute l'année? Est-ce qu'on gagne un profit en cultivant le courge, ou ça prends trop de temps au champs pour être mur?
- 11) Est-ce que vous avez des manguiers dans vos jardins? Vous pouvez en consommer tous les jors? Si non, pourquoi?
- 12) Est-ce que vous avez remarqué dans ce village qu'il y a parfois des jeunes enfants qui maigrissent et qui ont la diarrhée souvent et tombent malade facilement? A votre avis quelle est la cause de l'amaigrissement des enfants?
- 13) Est-ce que vous avez remarqué qu'il y a parfois des femmes qui maigrissent pendant la grossesse ou pendant l'allaitement? Si oui, quelle est la causes à votre avis?
- 14) Est-ce que vous avez remarqué qu'il y a parfois des bébés qui sont nés très petits et ils ne sont pas assez forts à survivre? Si oui, quelle est la cause, à votre avis?
- 15) Est-ce que vous avez remarqué que les femmes enceintes et même les animaux enceintes ont le dundumi? Selon la tradition, quel est la cause de dundumi parmi les femmes et les animaux enceintes?
- 16) Nous disons que tous ces problèmes sont due au problème de l'alimentation des enfants et des femmes. Parce ce que le corps de la femme nourrit un nouveau être humain qui grandit tous les jours et l'enfant grandit vite, ils leurs faut une alimentation spéciale pour maintenir la bonne santé. Les gens de cette région disent souvent que leur alimentation c'est la boule et la pate. Est-ce que vous pensez que les gens sont au courant que les femmes et les enfants ont besoin des aliments spéciaux pour maintenir la bonne santé?
- 17) Est-ce que vous pouvez nour aider à pensez d'une solution à ce problème? Pour maintenir la bonne santé il faut manger beaucoup de feuilles. Surtout les femmes enceintes et allaitantes et les enfants jusqu' à six ans.
- Nous avons déjà parlé des feuilles que vous pouvez planter dans vos jardins toute l'année. Ou'est qui peuvent motiver les jardiniers à faire cela? Autres idées?
- 18) Quelle est la meilleur façon de passez ces messages aux villageois? Comment passer ces messages aux femmes?

GUIDE DE DISCUSSION DIRIGEE DES HOMMES

VILLAGE _____
ENQUETEUR _____
RAPPORTEUR _____
DATE _____

Introduction: Nous sommes ici pour discuter et chercher les solutions pour un problème qui s'agit de l'alimentation des femmes enceintes et allaitantes et les enfants sous l'âge de six ans. Nous voulons vos opinions sur ces idées.

- 1) Est-ce que vous avez remarqué dans ce village qu'il y a parfois des jeunes enfants qui maigrissent et qui ont la diarrhée souvent et tombent malade facilement? A votre avis quelle est la cause de l'amaigrissement des enfants?
- 2) Est-ce que vous avez remarqué qu'il y a parfois des femmes qui maigrissent pendant la grossesse ou pendant l'allaitement? Si oui, quels sont les causes à votre avis?
- 3) Est-ce que vous avez remarqué qu'il y a parfois des bébés qui sont nés très petits et ils ne sont pas assez forts à survivre? Si oui, quel est la cause, à votre avis?
- 4) Est-ce que vous avez remarqué que les femmes enceintes et même les animaux enceintes ont le dundumi? Selon la tradition, quel est la cause de dundumi parmi les femmes et les animaux enceintes? Ou parmi les vieux?
- 5) Nous disons que tous ces problèmes sont due au problème de l'alimentation, surtout des enfants et des femmes. Parce ce que le corps de la femme nourrit un nouveau être humain qui grandit tous les jours et l'enfant grandit vite, ils leur faut une alimentation spéciale pour maintenir la bonne santé. Ils ont besoin de manger une variété d'aliments pour maintenir la bonne santé. Selon votre tradition, qu'est-ce qu'il faut donner à manger aux femmes enceintes et allaitantes? Pourquoi? Et aux enfants.

ECOUTEZ BIEN LEURS IDEES ET CLAIRIFIEZ POUR BIEN COMPRENDRE

Les gens de cette région disent souvent que leur alimentation est la boule et la pate. Est-ce que vous pensez que les gens peuvent accepter l'idée que les femmes et les enfants ont besoin d'une variété d'aliments pour maintenir la bonne santé? Si non pourquoi?

ECOUTEZ BIEN LEUR CONTRAINTES

- 6) Est-ce que vous pouvez nous aider à penser d'une solution à ce problème?

7) S'ILS N'ONT PAS DIT LES FEUILLES ET LE FOIE: Quelques aliments qui ont beaucoup d'utilité pour le corps humain sont le foie et les feuilles vertes. Si nous vous conseillons de donner aux femmes et aux jeunes enfants un morceau de foie chaque semaine et des yamace des feuilles fraîches tous les jours quels seront les contraintes?

ECOUTEZ LES CONTRAINTES; POSEZ ENCORE DES QUESTIONS POUR BIEN COMPRENDRE DES CONTRAINTES.

PASSEZ L'INFORMATION

8) Pour la femme enceinte et allaitante il faut un morceau de foie de 50 fCFA chaque semaine; Pour un enfant de moins de six ans il faut un morceau de 15 f CFA chaque semaine.

Est-ce que vous pensez que les hommes seront prêts de l'acheter pour leurs familles? Ou est-ce que la femme qui va l'acheter? Si non, quel sont les contraintes?

9) Est-ce qu'il faut recommander le jour de marché? Ou est-ce que le jour de marché est pour la viande dans la sauce?

10) Les feuilles vertes sont aussi très bonne pour les gens à manger tous les jours, pour garder la bonne santé. Est-ce vous aimez aimé les feuilles vertes? Lesquelles?

11) Est-ce que vous pouvez nous aider à élaborer un plan pour augmenter la consommation des feuilles vertes parmi les gens, surtout les femmes et les petits enfants?

12) Est-ce qu'on peut augmenter la quantité de feuilles dans la sauce si on n'augmente pas la quantité de sauce? Qu'est-ce qui arrivera si on double la quantité de suré dans la sauce par exemple? Ou de kuka? Ou de lalo? Quel sont les contraintes?

13) Combien de fois par semaine est-ce que vous mangez les feuilles fraîches maintenant? Est-ce qu'on peut augmenter la quantité de feuilles qu'on mange en forme de yamace? Quels sont les contraintes?

14) Est-ce que vous avez l'habitude de manger les feuilles vertes pendant la saison sèche? Pourquoi? Est-ce que vous pensez que les gens augmenteront les consommation de feuilles si les jardiniers cultivaient les feuilles fraîches, comme le temecca, yar angowa, lalo, et aléahu, toute l'année?

- 15) Quelle est la meilleur façon de passez ces messages aux villageois?
- 16) Comment passer ces messages aux femmes? Ou est-ce qu'elles rassemblent?
- 17) Qui va passer cette information aux femmes à votre avis?
- 18) Qu'est-ce qui pourraient motiver les femmes à changer leur alimentation quotidienne? Quel sont les contraintes?
- 19) Qu'est-ce qui pourraient motiver les femmes à changer l'alimentation quotidienne de leurs enfants? Quel sont les contraintes?
- 20) Qu'est-ce qui pourraient motiver les hommes à changer l'alimentation quotidienne de leurs femmes et leurs enfants? Quel sont les contraintes?

GUIDE DE DISCUSSION DIRIGEE DES FEMMES

VILLAGE _____
ENQUETEUR _____
RAPPORTEUR _____
DATE _____

Introduction: Nous sommes ici pour discuter et chercher les solutions pour un problème qui s'agit de l'alimentation des femmes enceintes et allaitantes et les enfants sous l'âge de six ans. Nous voulons vos opinions sur ces idées.

- 1) Est-ce que vous avez remarqué dans ce village qu'il y a parfois des jeunes enfants qui maigrissent et qui ont la diarrhée souvent et tombent malade facilement? A votre avis quelle est la cause de l'amaigrissement des enfants?
- 2) Est-ce que vous avez remarqué qu'il y a parfois des femmes qui maigrissent pendant la grossesse ou pendant l'allaitement? Si oui, quels sont les causes à votre avis?
- 3) Est-ce que vous avez remarqué qu'il y a parfois des bébés qui sont nés très petits et ils ne sont pas assez forts à survivre? Si oui, quel est la cause, à votre avis?
- 4) Est-ce que vous avez remarqué que les femmes enceintes et même les animaux enceintes ont le dundumi? Selon la tradition, quel est la cause de dundumi parmi les femmes et les animaux enceintes? Ou parmi les vieux?
- 5) Nous disons que tous ces problèmes sont due au problème de l'alimentation, surtout des enfants et des femmes. Parce ce que le corps de la femme nourrit un nouveau être humain qui grandit tous les jours et l'enfant grandit vite, ils leur faut une alimentation spéciale pour maintenir la bonne santé. Ils ont besoin de manger une variété d'aliments pour maintenir la bonne santé. Selon votre tradition, qu'est-ce qu'il faut donner à manger aux femmes enceintes et allaitantes? Pourquoi? Et aux enfants.

ECOUTEZ BIEN LEURS IDEES ET CLAIRIFIEZ POUR BIEN COMPRENDRE

Les gens de cette région disent souvent que leur alimentation est la boule et la pâte. Est-ce que vous pensez que les gens peuvent accepter l'idée que les femmes et les enfants ont besoin d'une variété d'aliments pour maintenir la bonne santé? Si non pourquoi?

ECOUTEZ BIEN LEUR CONTRAINTES

6) Est-ce que vous pouvez nous aider à penser d'une solution à ce problème?

7) S'ILS N'ONT PAS DIT LES FEUILLES ET LE FOIE: Quelques aliments qui ont beaucoup d'utilité pour le corps humain sont le foie et les feuilles vertes. Si nous vous conseillons de manger et de donner aux jeunes enfants un morceau de foie chaque semaine et des yamace des feuilles fraîches tous les jours quels seront les contraintes?

ECOUTEZ LES CONTRAINTES; POSEZ ENCORE DES QUESTIONS POUR BIEN COMPRENDRE DES CONTRAINTES.
PASSEZ L'INFORMATION

8) Pour la femme enceinte et allaitante il faut un morceau de foie de 50 fCFA chaque semaine; Pour un enfant de moins de six ans il faut un morceau de 15 f CFA chaque semaine.

Est-ce que vous pensez que les hommes seront prêts de l'acheter pour leurs familles? Ou est-ce que c'est vous les femmes qui vont l'acheter? Si non, quel sont les contraintes?

9) Est-ce qu'il faut recommander le jour de marché? Ou est-ce que le jour de marché est pour la viande dans la sauce?

10) Les feuilles vertes sont aussi très bonne pour les gens à manger tous les jours, pour garder la bonne santé. Est-ce vous aimez aimé les feuilles vertes? Lesquelles?

11) Est-ce que vous pouvez nous aider à élaborer un plan pour augmenter la consommation des feuilles vertes parmi les gens, surtout les femmes et les petits enfants?

12) Est-ce qu'on peut augmenter la quantité de feuilles dans la sauce si on n'augmente pas la quantité de sauce? Qu'est-ce qui arrivera si on double la quantité de suré dans la sauce par exemple? Ou de kuka? Ou de lalo? Quel sont les contraintes?

13) Combien de fois par semaine est-ce que vous mangez les feuilles fraîches maintenant? Est-ce qu'on peut augmenter la quantité de feuilles qu'on mange en forme de yamace? Quels sont les contraintes?

14) Est-ce que vous avez l'habitude de manger les feuilles vertes pendant la saison sèche? Pourquoi? Est-ce que vous pensez que les gens augmenteront les consommation de feuilles si les jardiniers cultivaient les feuilles fraîches, comme le temecca, yar angowa, lalo, et aléahu, toute l'année?

15) Quelle est la meilleure façon de passez ces messages aux villageois?

- 16) Comment passer ces messages aux femmes? Ou est-ce qu'elles rassemblent?
- 17) Qui va passer cette information aux femmes à votre avis?
- 18) Qu'est-ce qui pourraient motiver les femmes à changer leur alimentation quotidienne? Quel sont les contraintes?
- 19) Qu'est-ce qui pourraient motiver les femmes à changer l'alimentation quotidienne de leurs enfants? Quel sont les contraintes?
- 20) Qu'est-ce qui pourraient motiver les hommes à changer l'alimentation quotidienne de leurs femmes et leurs enfants? Quel sont les contraintes?