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**NIGER**

**A Summary of Findings Related to the  
Consumption of Vitamin A-Rich Foods  
and  
Suggestions for a  
Communications Strategy**

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## TABLE OF CONTENTS

I.	INTRODUCTION . . . . .	1
II.	VITAMIN A-RICH FOOD CONSUMPTION IN NIGER . . . . .	3
	The Staple Foods in Niger . . . . .	3
	Animal Sources of Vitamin A . . . . .	5
	Plant Sources of Vitamin A . . . . .	8
III.	PRACTICES RELATED TO THE FEEDING OF CHILDREN . . . . .	15
	Colostrum and Breastfeeding . . . . .	15
	Complementary Feeding . . . . .	15
	"Feeding" or "eating?": The child knows best . . . . .	16
	The meaning of food: Getting enough to eat, getting full and getting fat . . . . .	18
	Introduction of first foods . . . . .	19
IV.	QUESTIONS FOR EXPLORATION . . . . .	20
V.	GUIDANCE FOR A COMMUNICATIONS STRATEGY . . . . .	22

## **I. INTRODUCTION**

Vitamin A deficiency is considered to be a serious problem in Niger and throughout the Sahel - not only because it can lead to blindness, but because of its association with morbidity and mortality among young children. This report will summarize what is currently known about Vitamin A food consumption in Niger and will make suggestions for a culturally appropriate communications strategy to increase consumption of Vitamin A-rich foods.

Most of the findings discussed in this report have been gleaned from a preliminary analysis of the consultant's own in-depth ethnographic study conducted between January, 1987, and March, 1989, in a rural Hausa village in the Tahoua Department in Niger. Other ethnographic and related research on nutrition was also reviewed in preparing this report. This included ethnographic studies of shorter duration conducted by the Academy for Educational Development and CARE International in the Niamey (1988) and Zinder (1989) areas respectively. Where possible, therefore this report will point out regional and ethnic differences from that observed in the consultant's study area. Recent cross-sectional research has also been conducted in the departments of Dosso and Diffa by Africare although data were not available at the time this report was prepared. Once available, data from these studies should also be reviewed.

The consultant's research and most of the other studies reviewed looked only at feeding patterns of infants and children under three years of age. So this report will reflect very little data on the mother or on the practices of older children. Additional research on these groups might need to be conducted prior to developing Vitamin A communications targeted to these vulnerable populations.

### **Relevant Facts About Vitamin A<sup>1</sup>**

To provide a common frame of reference for developing a Vitamin A communications strategy, the following scientific facts about how Vitamin A is used by the human body were considered of central importance. These facts include:

1. Vitamin A is found in animal foods, particularly in liver, egg yolks, and milk fat. The Vitamin A precursor, Beta-Carotene, is found in dark yellow and red fruits and vegetables and dark green leaves.
2. As a fat-soluble nutrient, Vitamin A can be eaten in large quantities when it is available and stored in the body

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<sup>1/</sup> The consultant expresses her appreciation to Lauren Blum, Helen Keller International VITAP, for verifying this information.

tissues, particularly the liver. Theoretically, people can consume extra quantities of Vitamin A-rich foods in season and the liver stores will carry them through approximately three months. Apart from rare instances of animal liver consumption, dietary toxic levels of Vitamin A have not been reported.

3. Pre-formed Vitamin A found in animal foods is about six times as potent as the Vitamin A found in plant sources; Thus, short of taking capsules or injections, eating liver, for example, is a more efficient way to recuperate from a Vitamin A deficiency than eating plant sources of Vitamin A.

4. Up to 80% of Vitamin A is destroyed by ultraviolet rays, so sun drying vegetables and green leaves greatly decreases the amount of Vitamin A available.

5. Since Vitamin A is fat soluble, a greater quantity is absorbed by the body when it is consumed along with fats or oils. For example, adding oil or peanut solids to green leaves would increase the availability of the Vitamin A to humans.

Similarly, skimmed milk contains very little Vitamin A, since the nutrient is removed along with the butterfat. Since Vitamin A is not water soluble, leaves boiled in water would not lose much Vitamin A into the water.

6. The leaves themselves would have to be eaten in order to get the benefit of the Vitamin A from the leaves.

7. Heating in itself does not destroy Vitamin A. There may be some destruction of Vitamin A when the food is cooked in oils for a very long time or at very high heats.

8. When animals are grazed or fed insufficiently, their milk, eggs or liver will not contain as much Vitamin A as they would from an animal which has been eating properly. Animal sources are therefore not completely reliable in areas recovering from drought or other ecological imbalances.

9. Measles, fevers, and diarrhea-causing diseases deplete the Vitamin A stores of the body, so that a child who was not deficient before the illness or who was only borderline, may become Vitamin A deficient as a result of such an illness.

10. Lactating women and babies after six months of age have special needs for Vitamin A.

## II. VITAMIN A-RICH FOOD CONSUMPTION IN NIGER

A number of Vitamin A-rich foods are available to people in Niger but there are problems which may interfere with the amount of Vitamin A that consumers actually get.

This report will first discuss the diet and the most common sources of Vitamin A in the community where the researcher conducted her study, a rural village in the Tahoua Department. Examining one food category at a time, the report will summarize what is known about food availability and cost, food acceptability, including taboos, how foods are viewed, how foods are prepared and eaten, and how they are preserved.

Having discussed food availability and consumption, this report will then summarize practices and beliefs which surround food and the feeding of children in the Hausa culture. An understanding of these practices is crucial to the development of culturally appropriate nutrition interventions.

### The Staple Foods in Niger

Tuwo is a thick porridge of millet flour boiled in water which is the plat de famille in Hausaland. Tuwo is "food" to Hausas and if they have not eaten tuwo, they feel they have not eaten. Eating tuwo is associated with feeling satisfied; "You eat your tuwo, you get full, you are content. It is usually eaten after it has cooled and solidified, with a sauce poured over it. Tuwo is heavy and "sticks to your ribs", and most people feel full after eating it. The problem with this diet for very young children is that it is not calorie-dense enough. Even though their small stomachs feel full, they have not been able to eat enough to get the calories, protein, and other nutrients they need.

Fura or boule is consumed by almost all Nigeriens every day. Fura is considered a drink and is made by mashing cooked balls of millet dough into sour skimmed milk. The pounding for fura is done in the morning and the balls of dough placed into the water to cook. The balls are then mashed into sour skimmed milk and water is added to thin the mixture. The fura is usually ready to drink around noon and people sip it day and night whenever they feel thirsty or hungry. The mixture is usually at least 50% water, and water is added throughout the day as the standing mixture gradually thickens.

Fura is associated with good health and people do not feel healthy or happy if they are forced to go a day without drinking it. In kana sha fura kana samin lafiya kullum, translates, "If you drink fura you will always be healthy."

Tuwo and fura comprise the two staple dishes of the Tahoua Department. If a man has provided the millet for these two dishes he feels he has provided the food for his family. If a child has eaten these two dishes to the point of getting full, the mother feels that the child has eaten satisfactorily. (See section on Supplementary Feeding)

All other foods are considered to be condiments or snacks. Meats and vegetables, although both eaten alone as snacks, are valued for the way in which they contribute to the sauce which is served on the tuwo. Fruits are viewed as snacks, and for those who do not have the money to buy them, a luxury.

The typical diet of three ethnic groups in Niger:

	<u>A.M.</u>	<u>Noon</u>	<u>Evening</u>
HAUSAS (Tahoua, Maradi Zinder)	leftover <u>tuwo</u>	<u>fura</u>	<u>tuwo</u> and sauce
DJERMAS (Niamey & Dosso)	leftover <u>tuwo</u>	<u>fura</u>	<u>tuwo</u> and sauce
BERIBERI (Diffa)	leftover <u>brabusco</u>	<u>fura</u>	<u>brabusco</u> /sauce (usually red sorrel sauce)

Note: Brabusco is a couscous made from millet so, essentially, the nutrition content would be the same as the evening meal of the other two groups.

In the Hausa area of the consultant's research there is typically no special diet for a pregnant or lactating woman, except during the first 40 days after childbirth. During this period women put a greater emphasis on drinking more liquids. Although all groups may talk about special diets for pregnant women, whether or not they really receive extra food probably depends on the socio-economic status of the husband.

In general there is no special diet or extra food offered when someone is sick or after the illness. In fact, as discussed in Section III, children (and people of all ages) are not encouraged to eat if they do not feel hungry, even to the point of starving to death. So the anorexia which can be a normal occurrence during an illness can be very dangerous for the sick child.

## Animal Sources of Vitamin A

### Liver

Meat, including liver, is highly valued as a prestige food throughout Niger. In most villages small animals are butchered daily and larger animals once a week on market day. The majority of families in the consultant's study bought 200 to 300 CFA of meat once a week on market day to put in the sauce for the tuwo. More well-off families may eat meat two or three times a week, and the wealthy eat once or twice daily. Poor families said that they went from fête to fête (from one religious feast to the next) without meat, and then some families only had meat on the fête day because someone else gave it to them. Generally, when meat is served in the family sauce, each person gets a very small piece consisting largely of bone and gristle.

Most liver is not served in sauce but is cooked as a snack, roasted over a fire and basted with Maggie (a widely available commercial seasoning containing MSG). Meat sellers hawk the cooked meat from large basins carried on their heads, walking around the village and stopping wherever men gather. Office workers often take a mid-morning break from their work to purchase roasted meat delivered to the workplace.

Men purchase most of the liver, sometimes for a mid-day snack for themselves, and sometimes bringing a small packet home to the family. With the advent of educational talks at the village health post (PMI), women are aware that they should try to give their small children liver whenever they can afford it. Occasionally a small amount of liver (about 50 CFA) is purchased for a weanling, but seldom more than once per month (in the consultant's study) unless the child is perceived to be ill.

Fortunately for health educators liver is the traditional treatment for night blindness in much of Niger as well as in other areas of the Sahel. Among Nigeriens I have heard several variations in the treatment. Some say that you first place a piece of raw liver on the eyelids; then you cook and eat the meat. Others simply advise eating cooked liver.

I have not seen evidence of any taboo associated with liver. There is usually some for sale in every village every day although, if the buyer gets there too late, it may have been sold. The main obstacle to consumption of liver is the cost, but I have found that upon being told that their children need liver, mothers and fathers will make an effort to buy a small amount for their children as often as they can, especially if the child is perceived as being ill.

## Whole Fish

In areas far from lakes or rivers whole sun-dried fish is sold. In the consultant's study, older children from age five through puberty purchase small whole dried fish and eat them as a snack whenever they obtain a little cash. Dried fish about five inches long sell in the village for 10 CFA. Many adults tell me that they consider fish to be too smelly for adult consumption and too bony to give to small children. In areas such as Niamey or Diffa where there are rivers or lakes, fish becomes a much more important part of the diet.

## Milk

Sour milk (nono) is well loved by most Nigeriens and is seen as a cooling drink. There is even a word (anago) used for the kind of withdrawal symptoms that one experiences when going all day without drinking milk, such as during the Ramadan fast. Milk is consumed daily by almost everyone in the form of fura. People working in the field drink sour milk or fura when they take a break, not only because it takes away the hunger, but because of its cooling properties.

Fura is viewed by Hausas as making one feel full and as making one fat. This is probably because the large quantity of liquid makes the stomach feel full temporarily and makes the abdomen protrude. But in reality it must be a very low calorie drink. It is a watery liquid, typically about one or more liters of water to one liter of 100% skimmed sour milk, with partially boiled millet flour mashed into it.

There are two things which may limit the amount of Vitamin A that anyone actually receives from fura. The first is that the milk in this drink, at least in the consultant's study, is always skimmed. The second is that there is actually little milk in most people's fura. Villagers say that if you buy your milk from Foulani (Peule) women, you get the amount of milk that you pay for. But everyone insists that Hausa women who sell milk in town always water their milk down to increase their profits. Most families buy 25 CFA worth of milk per day, or less than a liter. This is stirred into a huge calabash with the cooked millet balls, and one or more liters of water are added. When you figure that eight or ten people are drinking from this one calabash of fura, it becomes clear that one person, especially a tiny person, is not getting much skimmed milk, and certainly not much Vitamin A.

There are times of the year when there is less milk available. At these times people turn to buying powdered milk in the market for their daily fura. I was never able to determine whether this powdered milk was skimmed or whole milk, and whether or not it came from free food aid sacks from the United States, or was spooned out of "Nido" or other canned powdered milk commonly sold by the can

in stores. If it comes from the canned powdered milk, it may be as high as 25 percent fat, which would probably mean a high percentage of Vitamin A, depending upon the drying process used to preserve the milk.

In cities where Solani is available, people on the street hawk plastic bags of chilled sweetened whole sour milk, and many families use this milk in their fura. Wherever Solani is available (meaning a town with electricity and a merchant with a working freezer) people who can afford it have the possibility of increasing their caloric as well as their Vitamin A intake.

### Butter

When a woman milks her cow or goat, she sets the milk aside overnight to sour. In the morning the cream is skimmed off and the skimmed milk is sold or traded. The butter fat accumulates several days and is then shaken to make butter. The rancid-tasting butter thus produced is expensive, costing about the same as one pays in the French grocery store in Niamey for French creamery butter. Those who have a milking animal sell the butter to get money and are reluctant to sell whole milk. Even when told that a child needs whole milk, mothers rarely will pay the extra money it would cost to buy whole milk.

The butter will not keep without refrigeration, so it is boiled to make clarified butter, or ghee, which will keep indefinitely. Those who consume butter regularly are probably getting some Vitamin A, depending upon how long the butter has been boiled during the clarification process. For most people butter is a luxury and is purchased only occasionally to pour over the evening tuwo.

### Eggs

When asked, Nigeriens will say that children should not be allowed to eat eggs, but this study did not show that people really take this taboo seriously. When families had eggs available in the compound they ate them and they gave them to small children. Whenever women were asked if their children had eaten eggs recently the reply was almost always along the lines of, "Where would I get eggs? They are for people with money," or, "Our guinea fowl are not laying now - it's not the season."

During the rainy season the guinea hens are laying and people who have guinea fowl eat these eggs with their very yellow yolks. Chicken eggs are sometimes available, but the consultant's study found that women tend to save the chicken eggs to produce more chickens which can be sold when fullgrown for up to 500 CFA each. The other source of eggs nowadays is the flats of large chicken eggs imported from Nigeria. The yolks in these eggs are often very nearly white in color, which may mean that they have a lower

Vitamin A content. More importantly, they are seen to be very expensive and few people will pay cash for them. Not eating eggs seems to be truly a function of availability and cost, not of taboo. When urged to give their children eggs, mothers occasionally comply, but not nearly so often as they will follow advice to buy 50 CFA of liver for their young children.

### Plant Sources of Vitamin A

Plant sources of Vitamin A found in Niger fall into three groups: red and yellow vegetables, dark yellow fruits, and green leaves. In terms of how Nigeriens use these foods they might be grouped as follows:

1. Foods eaten raw as snacks:
  - raw fresh tomatoes
  - raw carrots (found in the large city markets and sometimes grown in contre-saison gardens)
  - mangos in season (available in most villages where traders carry in wares to sell)
  - papayas (found in the large city markets and grown sometimes by people with fruit trees in their yard or contre-saison gardens).
2. Sauce condiments used fresh in sauces during the rainy season, then dried to be used in sauces the rest of the year:
  - tomatoes
  - cayenne pepper and other hot peppers
  - green leaves
3. Fresh vegetables eaten as a separate dish (perhaps as the only dish for the meal), or put into sauces in small quantities as a treat:
  - yellow squash
  - red sorrel
  - various cultivated and wild greens listed on page 12

Some of these plant sources of Vitamin A are consumed by most Nigeriens every day. In season, fresh vegetables are consumed by any family which can afford them or which grows their own. But the season is usually very short. So vegetables which are considered primarily as sauce condiments are dried in the sun to preserve them for use during the rest of the year.

## Fresh Vegetables

Fresh tomatoes and carrots are almost exclusively contre-saison (November through February) crops in Niger. Although agriculturists are always urging people to grow tomatoes during the hot season or during the rainy season, anyone who has tried it knows that it is very difficult and usually very disappointing. Tomatoes are seen in the markets in Niamey year round, but this is not true in the rest of the country. Most small villages only see fresh tomatoes in the market during a few weeks each year. During their peak tomatoes are eaten as snacks much as we eat apples.

Those villages lucky enough to have contre-saison gardens seemingly may have tons of tomatoes, all ready to eat at once. This may be one reason why tomatoes are cut in half and dried in the sun and sold in their dried form. In rural villages it is rare to find families who use canned tomato puree or fresh tomatoes in their sauces. Dried tomatoes are sold in small bags for 25 CFA and pounded into a powder which is then put into the sauce.

Carrots seem to come only from seeds given or sold to the farmer by agricultural agents or Westerners. This probably means that the farmer cannot harvest his own seed and must depend on getting a new packet of hybrid seeds each gardening season. Those who obtain a packet of carrot seeds in a community of contre-saison gardeners, plant the entire packet at once. This means that the carrot season lasts, at most, two to three weeks. Then they are gone until the next year. (All vegetables which are cultivated seem to be handled in this way. Lettuce, tomato, and zucchini squash, all have a season of only two or three weeks because all of the seed is planted at the same time.)

Carrots are enjoyed as a snack and eaten raw. Nigeriens in the village do not seem to be aware that carrots can be cooked or added to sauces. Carrots in Niger are seen as a specialty vegetable and, if they are available, they are too expensive for most families.

A large yellow squash similar to our pumpkin is grown in many areas of Niger during the rainy season. It is sometimes eaten as a main dish but usually it is cut into two inch square pieces and cooked in the sauce for two. Although some families eat this squash regularly in season, each person only gets a small piece in the sauce. In the community where the consultant did her research, the people did not grow this squash and it was almost never seen for sale on the market. When asked why it was not sold here some people responded that the people of this village traditionally never ate squash. Others explained that since the community had become a large onion producer, squash were found to take too long to mature, and did not bring the same profit as onions.

Red pepper (usually cayenne) seems to be available everywhere in

Niger all year round and is used in almost everything, including greens, fura, candy, and of course meats and sauces. The red pepper should provide a lot of Vitamin A, but for most of the year and for most uses it is sun dried and pounded into a powder.

Large mild chili peppers, tatasai (similar to the Anaheim), are also abundant in Niger and are dried in the sun and stored for year-round use in sauces.

#### Dark yellow fruits

Mangos are abundant during mango season in all areas where traders bring them to the market by bush taxi. In those areas fortunate enough to have a fruit tree nursery or a grove of mango trees, one finds many low-priced mangos on the market. Where there are no fruit tree gardens, mangos are often brought in from Nigeria or the coast. Small stringy mangos are only 5 or 10 CFA each and are affordable by most as a snack. A mother may typically buy one to share with her two smallest children several times a week during mango season. The large grafted mangos can cost up to 50 or 75 CFA each.

Mangos are thought to cause diarrhea and other symptoms of zahi (heat) when eaten in excess, and they are not given to children who already have diarrhea.

Papayas are in the same position as carrots, in that they are relatively foreign to most people and require special circumstances to cultivate. In villages where there are fruit tree nurseries or in the large cities, some papayas are sold, but their cost is prohibitive to most.

#### Green leafy plants

Green leaves are eaten almost every day by the typical villager in one of two ways: Leaves are eaten fresh as "greens" with oil and condiments during the rainy season and they are dried and used year round in sauces as the thickening agent and to add viscosity and flavor. Some leaves are cultivated or shipped to Niger from coastal countries and tend to be more expensive and more prestigious. Others are gathered where they grow wild near the village and are free for the gathering.

#### Sauce leaves

There are a number of standard sauces used on the family tuwo, including tomato sauce, sauce containing meat, sauce with vegetables, okra sauce, and Baobab leaf sauce. Baobab and okra often accompany the tuwo sold by the street vendor. Baobab leaves must be gathered and dried in a region where Baobabs are plentiful and brought by merchants to other areas, so it is relatively expensive and is not seen year round.

Probably the most common sauce on the family's tuwo among rural people in the Tahoua area is bakin miya, or miyan baka, a "black sauce" named for its dark color brought about by the addition of dried wild leaves (most often jute). Remarks made by the women suggest that this leaf-based sauce, although well loved by the rural people, is less prestigious than other types. Women talk about making bakin miya for themselves and the children to eat when the husband is not home. When the husband is in town the women make okra or some other sauce that men like. When probed about the difference, the women explain that if they have to pay for the sauce ingredients themselves they will choose the less expensive ingredients, or dried wild leaves gathered by themselves and other women in the neighborhood.

The sauce leaf which is most commonly cultivated in all but the nomadic areas of Niger is the red sorrel (sure in the Tahoua region and yakawa in other Hausa speaking areas). This plant is grown and loved in Djerma areas as well as in Beriberi areas and is very high in Vitamin A.

As a sauce ingredient the flavor of the leaf must be acceptable but the thickening properties of the leaf seem to be equally important. The viscosity of the well loved okra sauce is familiar to all who have visited Niger. At certain times of the year certain leaves are not used because they do not have the correct properties. Women told the researcher that during August, when the plants are young, they can be put into the sauces fresh, but during the harvest when the plants have begun to mature and get "hard", they have to be dried and pounded into a powder because they are tough. (Possibly the thickening properties are only there when the plant has matured and dried.)

Leaves are usually dried in the sun, probably because they dry more quickly than they would in the shade. During August, however, I found one woman drying leaves inside her sleeping room. When I asked her why she was drying in the shade she said that the village chief would scold them if he found they were spreading out food to dry in a place where everyone could see it before the millet was harvested. When I asked people about this, informants said that a surplus of food being prepared for storage, especially spread out in full view, suggests that you have more food than you need and could bring bad luck to the millet harvest. They said that once the millet was harvested, it is acceptable to spread food out to dry.

Post-menopausal women are often seen gathering leaves to dry and sell. The older woman is free to go to the fields to gather leaves and to go to the market to sell the product. Leaf drying is a trade which requires no initial capital; all that is required is the time and labor to gather and dry the leaves.

### Leaves Eaten as Greens

During the rainy season the leaves are boiled and served as greens with onions, oil, salt, red pepper and kuli kuli (peanut solids left after the oil has been extracted). In the Tahoua area fresh greens in general are called amadi, and the word becomes a verb as in tana amadi, "She is gathering greens." Some of these leaves are eaten alone, but there are combinations which are considered especially tasty such as tamaka (see the list on page 13) with yar ango or lanji with yar ango, or sure, lalo, and rukubu together. During the farming season women or older children are often seen carrying fura to the workers in the field at midday and returning to the house with large calabashes heaped full of a mixture of wild greens. The family will then share a large pot of greens as a main dish that evening.

Leaves are also cooked by women and hawked in the streets by children. They are sold in small piles arranged on a large enamel tray for 5 or 10 CFA per pile, and are considered a snack food. During the months of August and September those families who have money to spend on prepared food may buy some cooked greens almost every day. A 10 CFA pile (about one cup) will often be shared by the mother and one to three children. One poor family in which the two wives are cloistered and therefore have to purchase their greens, reported that they ate fresh greens only about five times during this past rainy season.

The green leafy plants most often gathered during the rainy season as food plants are listed below:

**GREEN LEAFY PLANTS GATHERED DURING THE RAINY SEASON**

<u>Name of Plant</u>			<u>Preparation</u>	
<u>Hausa</u>	<u>Eng</u>	<u>Latin</u>	<u>Greens</u>	<u>Sauce</u>
<u>sure, yakuwa</u>	red sorrel	<u>Hibiscus sabdariffa</u>	x	x
<u>lalo, maloheya</u>	jute	<u>Corchorus olitoriu</u> <u>Corchorus triden</u> <u>Corchorus trilocularis</u>	x	x
<u>tafasa</u>	Senna	<u>Cassia obtusifolia</u>	x	x
<u>tamaka, bagaruwan maka</u>	drumstick tree	<u>Moringa oleifera</u>	x	x
<u>rukubu, aleahu, zarangadi, zalangade</u>	pigweed	<u>Amaranthus spp.</u> <u>Amaranthus veridus</u>	x	x
<u>rama</u>	<u>Indian hemp</u>	<u>Hibiscus cannabinus</u>	x	x
<u>lanji, lauji lamje</u>	-----	<u>Nothosaerva brachiata</u>	x	
<u>yar ango, gasaya</u>	gynandroc	<u>Gynandropsis gynandra</u>	x	
<u>kuka</u>	Baobab	<u>Adensonia digitata</u>		x
<u>gashiya</u>	-----	<u>Cleome viscosa</u>	x	
<u>saregomi</u>	-----	<u>Crotalaria atrorubens</u>	x	
<u>halshen sanya</u>	purslane	<u>Portulaca oleracea</u>	x	
<u>yodo</u>	-----	<u>Ceratotheca sesamoides</u>		x

**Note:** Another plant often mentioned as being included in batches of greens is tsaida. I have been unable to identify this plant, unless it is tsada - Ximenia americana, which is supposed to be somewhat toxic.

Some plants are cultivated and therefore can be planted along the edges of the onion beds during the contre saison gardening from November through February, extending the period in which one can eat cooked greens. These include sure, tamaka, cabbage, and possibly others. Cabbages are grown for sale, but the outer leaves, which are darker and probably contain more Vitamin A, are brought home to the family to put in sauces.

The village studied by the consultant is blessed with a water table at three to five meters during all but the last few months of the dry season. The newer houses have large concessions with their own wells and many have planted a contre saison garden in the outer part of the compound. In the older part of town the concessions are too small to permit the digging of a well and nothing is grown in the compound except an occasional basil (Ocimum canum sims lamiaciae) plant next to the water jar. Most people in this village have a fadama. This is translated by Abraham<sup>2/</sup> as "marshy ground", but in this case it is a plot surrounding one of two-hundred wells dug a few years ago. The plots are used mostly to grow contre saison onions for commercial sale, but some farmers keep small crops growing in them year-round.

According to Ann Turner, a horticulturist at Cornell University who spent some time in Niger, many other Vitamin A-rich leaves are available to Nigeriens and could be consumed. In the area of the consultant's study, people do not eat the leaves of vegetable plants such as squash, yams, cassava, or beans. The entire bean (nièbé) plant, however, is pulled up after bean harvest, rolled into bundles, and stored on the roofs of the houses to be fed to the animals throughout the year.

When asked about eating these other leaves, people's response was, "Oh, I've heard that they eat those in Nigeria, but we don't eat them. It's not our tradition."

When people cook a large pot of greens as a main dish, everyone eats two or three cups full, along with peanut oil or peanut solids and condiments. When a mother buys 5 CFA of cooked greens for her child, he is probably consuming about one-half cup of greens. One-half cup of dark green leaves once a day can greatly increase the Vitamin A, Vitamin C, protein and calcium of that child's diet. These quantities are only eaten when leaves are consumed as greens.

When leaves are dried for use in sauces the quantity consumed by each person eating from the family bowl is very small. Depending on the size of the pot of sauce there may be only one-half to one cup of powdered green leaves added to the sauce and shared by the whole family. The idea of the sauce is to flavor and moisten the

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<sup>2/</sup> Abraham refers to the Dictionary of the Hausa Language, by R. C. Abraham, University of London Press, 1961.

tuwo, similar to the way in which we eat gravy on our mashed potatoes. The idea is not to provide large portions of vegetables for each person as we might think of a stew full of vegetables.

The advantages of encouraging the use of dark green leaves in Niger are that they can be grown or collected cheaply or free, they have a high Vitamin A content, and Nigeriens like them. The problem is that leaves are usually sun-dried and, except during the "greens" season, people eat very small quantities of the dried leaves at one time.

### **III. PRACTICES RELATED TO THE FEEDING OF CHILDREN**

Understanding how children are fed is central to a developing nutrition communication strategy. In Niger the mother's perception of her responsibility for feeding the child may be as important as the question of which foods to encourage.

#### **Colostrum and Breastfeeding**

Children in most of Niger are breastfed unless the mother dies or is ill. It is very rare to see a bottle used even temporarily to feed young children. Breastfeeding is traditionally delayed a few days after birth to avoid giving the child colostrum, but this practice IS CHANGING now all over the country wherever people come into contact with dispensaries or with midwives who have been trained in modern birth practices.

Women's discussions suggest that the rewards for adopting the new behavior of giving colostrum are greater than the rewards were for keeping the old behavior of withholding the breast at birth. Women suffer physical and emotional pain by withholding breastmilk; there is less work and less expense involved in giving the breast; there are immediate positive results which are clearly visible and attributable to the child having drunk colostrum. As long as they continue to take all of the traditional precautions many seem to feel safe with the new practice.

Breastfeeding generally is successful and milk is given on demand until the child reaches one and one half to two years of age, or until the mother becomes pregnant again (on the average, around sixteen to eighteen months).

#### **Complementary Feeding**

The assumption made in most nutritional programs is that the mother sees her responsibility as that of "feeding" the child. The Western mother is supposed to have an idea of how much of certain nutrients the child "needs" to be healthy, and each day she tries

to make sure that he gets a optimal quantity of these. If the baby refuses to eat his fruit or vegetables, the Western mother tends to worry that he has not had enough of certain necessary foods, and she will do all she can think of to try to convince, fool, or coerce the baby to eat the disliked food, so that his diet will be balanced and nutritionally complete. She will play "Here comes the airplane" and swoop the spoonful of mashed liver or carrots into the child's mouth while he thinks he is still playing airplane. Or she will mix the liver with bananas and the carrots with something that he likes, trying to trick him into swallowing the food before he realizes what is going on.

The goal of complementary feeding in the Hausa mother's view is to get the child used to eating so that he can eventually eat independently everything that the rest of the family eats. Once the child is eating adult foods the mother will not have to make a separate preparation and the child will be able to survive because he conforms to the every day diet of the family and the village.

#### "Feeding" or "eating?": The child knows best

The Western mother's view is that it is her responsibility to "feed" the child what he "needs" and to make sure he eats it. The Hausa child must show interest in food, gesture or otherwise indicate to the mother that he is hungry or wants food in order for her to offer it to him. When asked how they know the child is old enough to eat food, mothers say that the child looks at the food when other people are eating and reaches for it. The Hausa mother follows the child's cues as to whether or not he "wants" the food and he usually is offered what he wants.

By the same token when a mother is offering a baby something and he sticks out his tongue or turns his head away, she takes this as a signal that he is not hungry or doesn't want the food. Instead of trying to encourage him to eat "what is good for him", by putting small bits of food in the child's mouth, the Hausa mother follows the child's signal and takes the food away.

Hausa mothers do not force or even gently encourage their child to eat when he is ill or anorexic. In one instance I was trying to get a mother to feed her anorexic child, while she kept trying to make me understand that the child was the one who was refusing to eat, and there was nothing she could do. Mothers feel that children should not be forced to eat against their will, even if they are starving to death. It should be noted here that contrary to what many Western observers seem to believe, the Hausa mother is terribly distressed when she perceives that her child is anorexic, because she feels powerless to intervene.

The women of Sabon Gari seem to have a different idea from

Westerners about who knows best what is good for the child. The Western mother feels she has to control what the child eats for his own good. The Hausa child, I would suggest, is seen as having the right to decide for himself and it is not the mother's place to interfere.

The child, it is believed, will determine for himself when he is full or has eaten enough, and he will signal this by not eating any more. When health personnel are trying to get mothers to feed children the recommended bouillies, the mothers often say, "He's full," when the child doesn't reach for more. It is the child who decides if, when, what, and how much he will eat at a given moment, rather than the mother. In the Hausa view it is the child's responsibility to get himself fed, or to feed himself as soon as he is developmentally able.

#### Developmental Stages of Child Food Acquisition

The stages of Hausa child development in the acquisition of food seem to be as follows:

- . crying of hunger (usually the breastfeeding baby who has no other way to signal the mother except to cry)
- . staring at other people's food
- . licking from someone's finger
- . gesturing towards the food to indicate that he wants some
- . looking for or going after food
- . getting some with his hands, squeezing it into a ball and putting it into his own mouth
- . eating whatever he wants with his hands without wasting food and making a mess, and
- . finally, at an older age than this study addresses, being able to get food by gathering it, buying it, and even preparing it himself.

The older Hausa child is allowed to forage or scrounge for himself. Children are seen scraping last night's tuwo burned on the pot for breakfast. They ask people for coins to buy bits of street food, such as greens, fruit, or peanuts. Boys roam freely in the village bringing home eggs, grasshoppers, or even rodents which they cook for themselves and eat. During the farming season the father is often seen walking into the compound carrying a large rat or mouse by the tail. When asked what he doing with it he replies that he

killed it near the granary and that the children like to eat them. The children will grab the prize and excitedly begin to look for wood or millet stalks to light a fire in the compound. The animal will be skewered on a stick and roasted and eaten by any children who are around.

This does not mean that nothing is prepared for children to eat. Except for the month-long fast during Ramadan, when there may sometimes be almost nothing to eat in the house during the day, there is usually something prepared, even if it is just fura. In the typical household, children and adults go to the fura calabash whenever they feel hunger, any time of the day or night. In all but the poorest households there is usually something prepared or purchased for the family to eat in the evening besides fura. Usually this will be some form of pate, or beans, or something special from the garden or fields prepared in season, such as greens, onions, or yams. The children then have the opportunity to eat a regular meal with the family. Sometimes they may not even be present when this meal is served because they are roaming from house to house with other children. Often the mother will set aside a small dish of food for her youngest if he is sleeping or not at home when the food is eaten. But for the children who are old enough to wander around the assumption is that they have already been snacking on things they found or bought or that they have eaten in the household where they found themselves when a meal was served.

#### The Meaning of Food: Getting Enough to Eat, Getting Full and Getting Fat

The Hausas attach a different meaning to food and eating than we do. Westerners go to great lengths to create an atmosphere and provide the opportunity for conversation over the dinner table. If the food is good everyone compliments the cook and much of the talk over dinner may concern the food and its preparation. Hausas exhibit modesty towards food. They seldom talk during the meal and never comment on the taste or preparation of the food. In fact there is a tradition called santi which holds that the person who talks during the meal is caught off guard by his enjoyment of the food and he is likely to say things that reveal hidden meanings or show a lack of self control.

Hausas eat to get their stomachs full, rather than for the purpose of getting what they "need" nutritionally or to have an enjoyable social experience. One often hears, "I ate; I got full". The happy healthy child is one who is eating what is provided and getting full. "Getting full" is equated with weight gain and "not getting full" is equated with weight loss.

A mother sang a spontaneous song to show me how healthy her child had been in the past month: "She eats her tuwo; she drinks her

water; she sits herself down!"

The assumption is that if the child "sits herself down", she has gotten full. If she has gotten full she has eaten enough food. If she has eaten enough food she will get fat.

### Introduction of First Foods

The ideal age given by mothers in Sabon Gari for the introduction of foods in addition to breastmilk is seven months. Developmentally, this is about the time that the child should be able to reach out, grasp some food in his fingers, and put it into his mouth. Upon further probing however, many children begin tasting adult foods at five or six months when the mother or older children hold a finger up to the child's lips for him to lick or taste.

The foods most often cited as the first food offered to the child are, in order of most frequent to least frequent, koko, the fermented, hot, millet and water liquid gruel, fura, or boule, the cold sour skimmed milk and cooked millet mash which is the most common meal of adults, and the sauce which adults put on the millet tuwo usually eaten for the evening meal. Fruit juice and PMI bouillies are now the first food offered to many children of mothers who attend the baby weighing clinic regularly, but the juices and bouillies are usually soon dropped in favor of traditional Nigerien foods.

### Complementary Foods: Transitional Foods

The word saba (to get used to something) represents a very important idea in Hausa therapeutics, which is that people have to get used to new things or they will suffer. Very often when someone complains of diarrhea, stomach aches, headaches, etc., they will be told that they have done something that they are not used to doing. Doing things the way they have always been done and eating foods that one has always eaten, prepared in the usual way, is better for one's health, in the Hausa view, than eating or doing things one is not used to.

Modern nutrition interventions emphasize that complementary feeding gets the child used to eating food. This idea is very compatible with Hausa thinking. The problem is that the idea of getting used to eating may be the only part of the intervention that is understood. The complementary bouillies recommended by health personnel seem to be thought of only as serving the transitional purpose of preparing the child to eat adult food, rather than as a more long term nutritional necessity to the growing child.

To some extent the PMI bouillies are viewed as medicine. This has the advantage that people like medicines and will give them as long as they perceive that their child is ill. It has the obvious disadvantage that as soon as they no longer see visible symptoms that the child is ill, the "medicine" will probably be discontinued.

The consultant's study found that the most compelling reason why mothers do not make the bouillies recommended by the local MCH Center (PMI) is that children are expected to learn to eat the adult food provided by the family, and to be able to feed themselves as soon as they are physically able.

The reasons most commonly given by mothers for not preparing the recommended supplementary foods are as follows:

1. "She eats now", meaning she feeds herself with her own hands, implying that she therefore has no more need for the food which purpose is to teach her to eat by herself.
2. "She eats food now", meaning that she eats tuwo, implying that once she is living on our staple food, she has achieved that important developmental step which will help her to survive in our society.
3. "She eats our food now", meaning that she eats whatever we have at the house to eat and therefore she no longer needs to have other special foods prepared.
4. "She eats; she gets full", meaning that she gets enough to eat with what we have, implying that getting full is what will keep her healthy and it is all that we are obligated to provide for her.

#### IV. QUESTIONS FOR EXPLORATION

A plan to prevent Vitamin A deficiency might include some of the following general objectives:

1. To increase consumption of already available and acceptable Vitamin A-rich foods, especially by the more vulnerable groups in the population.
2. To increase consumption of Vitamin A-rich foods during the season in which they are available, to enable the body to stock up on Vitamin A.
3. To increase the amount of Vitamin A available to the consumer by preparing and preserving foods in a way which does not destroy the Vitamin A content.

4. To increase the amount of Vitamin A available in animal food sources by increasing the amount of Vitamin A in animal feeds.

In deciding which specific objectives to address, the project might wish to explore further some of the following questions in the area in which the project is to take place. (Before looking at any of these questions I would call Ann Turner at Cornell University and see if she already has some of the answers or knows who does.)

1. Is liver accessible and acceptable to target women and children?
2. Is fura consumed with skimmed milk, whole milk, or no milk? Is whole milk readily available?
3. How long is butter boiled to clarify it, and, at what temperature?
4. Are eggs readily available and viewed as affordable and acceptable for the target population?
5. How widespread is the reluctance to dry large quantities of greens during their peak? Does this belief prevent people from harvesting as many vitamin A-rich leaves as possible when they are available?
6. Do people ever dry leaves in the shade? If not why not? Could something be done to encourage a change in the practice of drying leaves in the sun?
7. Which greens are cultivated, when, and by whom? Where do they get the seeds? Are they grown for family use only or for sale? When are they harvested?
8. Which plants grow wild, when, where, and in abundance? Are they accessible? Do people utilize them fully?
9. Would women add more leaves to sauces in order to give each person greater quantities of the leaves?
10. If encouraged, would women cook greens as a separate dish more often? (Preparing greens is a lot of work.)
11. Is there a way of drying mangos which is easy and acceptable to Nigeriens? Could dried mangos be developed as an industry and sold very cheaply?

I would recommend that further research be done using an informal ethnographic method rather than using a survey format. The problems in knowing how to ask about what people have eaten and in getting an accurate response are enormous. It should be informative to look at the surveys done recently by Africare and by this consultant for clues about daily diet.

If it is possible to have laboratory testing done on some of the foods in Niger I would suggest examining the following:

1. Nigerian eggs
2. Boiled (clarified) butter
3. Whole dried fish
4. Loose powdered milk sold in markets
5. Leaves dried in the sun compared with the same leaf dried in the shade, and the same leaf fresh.

(If one had to choose one or two leaves, start with red sorrel, and perhaps for the second one jute. These seem to be used the most often, at least in the area in which the researcher worked.)

#### **V. GUIDANCE FOR A COMMUNICATIONS STRATEGY**

The following pages outline some thoughts about a communications strategy. In my own thinking, I am not yet at the point of having a complete plan in my mind. Instead, I have suggested some concepts that should be useful in considering the wording of interventions, the audience, and the directions which seem at the moment the most fruitful for the development of a Vitamin A communications strategy.

#### **Priorities for Educational Strategies**

At this point the following strategies seem to me to be the best bet to explore:

1. Liver - more often for special needs groups
2. Mangos - in greater quantities and more often - when they are available
3. More eggs and whole fish, particularly for older children
4. More green leaves in sauces, and more greens for everyone when in season

5. More squash, tomatoes, and vegetables in sauces in general
6. Shade-drying of peppers, tomatoes, and sauce leaves
7. Special foods for sick children
8. Cultivation and gathering of more green leaves and Vitamin A-rich plants
9. Helping sick children who are too weak to eat by themselves, to eat, so that they will get better

### Hausa Cultural Ideas

#### Prevention versus medicine

This is a discussion of the use of the word magani, or "medicine" in health messages. People like medicine and like to take it. Although health educators may feel squeamish about telling people that certain foods are medicine, rather than emphasizing permanent changes in food habits, Hausas have a different concept of "medicine" than Westerners. Indeed, medicine is often used for prevention in the Hausa way of thinking.

The word magani or medicine has three meanings in Hausa:

1. The idea of medicine to cure an illness, the way we use the word "medicine".
2. The idea of medicine to "prevent" something, as in maganin buga, medicine to prevent one from being beaten by someone else.
3. The idea of medicine to "procure" something, as in maganin mata, medicine to bring one a woman or to bring one success with women in general.

The curative meaning can be used in the case of Vitamin A, in talking about the value of liver to a child or woman who already has dundumi, or night blindness. Thus the person might be advised to eat 50 CFA of liver every day for two weeks to cure the nightblindness. Maganin dundumi ne, "This is nightblindness medicine", suggesting that one has to follow this advice if he or she wants to be cured.

The preventive meaning of the word magani is very appropriate for talking about the role of vitamins and minerals in the body: that they are protection against certain illnesses. For example, in the context of telling a mother about the value of eating liver once

per week or of offering children some mango and green leaves every day, maganin dundumi ne, means that eating more of these things will prevent your child from getting nightblindness.

The procurement idea of maganin can be used to talk about the positive side of the vitamin. In other words, if you increase the amount of these foods in your child's diet, it will make him stronger or it will make him healthier. Then, green leaves, or mangoes, or liver become maganin karfi (medicine to make you strong) or maganin lafiyar jiki (medicine to make his body healthy).

### Some Hausa Health Concerns

In putting together a culturally relevant communications strategy, educators should try to put health messages in terms which reflect the health concerns of the population. For example, if you are addressing middle-class Americans, you might try to find a way in which your health intervention improves physical fitness, lowers blood cholesterol, strengthens the heart, or helps one control weight. Hausa health concerns are quite different from current Western ideas.

Some examples of Hausa health concerns and how they might be used in wording an intervention are the following:

1. Hausa health concern: The quality and quantity of blood in the body  
Possible health message: Urging mothers to serve more liver because it "increases the blood," "Yana kara jini."
2. Hausa health concern: Having a good appetite or being able to eat enough to get full  
Possible health message: Eating fruits and vegetables daily increase one's appetite so that one can eat and get full. In ka ci x kullum, c'est ka ci abinci, ka koshi. (If you eat x every day, then you will eat food and get full.)
3. Hausa health concern: Getting fat or having a good body.  
Possible health message: Urging mothers to serve more butter to children or to add oil to greens because it will make them fat (maganin kiba means medicine to make one fat).

## Audiences

There are several groups which must be included in the communications project:

- Village leaders - You cannot have villagers participate in something without their approval.
- Gatherings of men - They need to be informed about what their wives are being told.
  - They provide the money for food and give the approval for purchases made within the household.
  - Most men genuinely want to do the right thing for their family, but they do not understand that women and children have special nutritional needs. They are still operating on the theory that the man needs the best foods - usually the animal proteins and the more expensive fruits and vegetables eaten as snacks - because he does the heavier farm work.
- Older women - They advise and aid the young mother in childbirth and childrearing practices and even young women who have been to school will follow the traditional advice of the grandmother.
- School children - Their education is not very practical. Relevant health information taught in an interesting way could make a difference in the 20- 25% of Niger's population that attends elementary school.
- Farmers or gardeners - They need to know the importance of growing more Vitamin A-rich foods for their own wives and children, rather than growing only foods which may yield a high profit. Men view this as a way of fulfilling their responsibility to the family by using the profit to buy extra millet. They need to understand that a variety of foods are needed for good health, especially by women and children. To be a good provider, they need to provide a greater variety of foods, and not just the staple, millet.

### Incentives

Some possible incentives for adopting new Vitamin A practices include:

- As in the example of the adoption of giving colostrum mentioned in this report, I believe that women will respond if they see that they can save time, money, and physical and emotional pain for themselves.
- What does this mean? Appeals such as, "He will let you work more," or, "He won't cry all the time," are more effective than, "Your small child needs to have five small meals per day because his stomach is small".
- Loss of eyesight is a terrible tragedy in Niger, as it means that the person can no longer be a contributing member of society. The idea of medicine to prevent blindness might be a good motivator.