THE ROLE OF SWEET POTATOES IN THE DIET AND NUTRITION OF RURAL HAITIAN FAMILIES

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THE ROLE OF SWEET POTATOES IN THE DIET AND NUTRITION OF RURAL HAITIAN FAMILIES

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Summary

The goals of this project were to: 1) assess the dietary quality and food security status of women and their families in Camp-Perrin, South Haiti, 2) estimate the frequency of consumption of sweet potatoes in the diet of the target community, 3) examine beliefs, attitudes and behaviors related to sweet potatoes, 4) examine the level of consumer acceptability of sweet potato leaves in terms of flavor, aroma, taste, color, and texture, 5) simulate the potential contribution of Orange Fleshed Sweet Potatoes (OFSP) to alleviate vitamin A deficiency in Haiti, and 6) examine the potential acceptability of OFSP in Haiti. Four studies were conducted from June to late July 2007 to meet these goals.

We applied a Food Frequency Questionnaire (FFQ) to 153 mothers of children under five years old in rural South Haiti. The FFQ contained 55 items and used a 3 months reference time period. Over the previous 3 months, the majority of women reported consuming fruits (98.7%), rice (98.7%), local bread (96.7%), mangoes (96.7%), corn (95.4%), plantains (94%), carrots (93.5%), and sweet potatoes (92.8%), followed by fish (85.0%), salty snacks (85.0%), raw milk (83.0%), chicken (81.0%), beef (80.4%), papaya (78.9%), pumpkin (78.4%), kola (60.8%), concentrated milk (60.8%), liver (53.6%), and watermelon (52.3%). However, the median frequency consumption for most nutrient dense foods was less than 2 times per week. Only mangoes, plantains, rice, local bread and beans were consumed 3 or more times per week by the majority. Vegetables, fruits other than mangoes and animal protein sources were infrequently consumed by the majority. The above results suggest a need for micronutrient enhanced foods in the area to alleviate potential micronutrient deficiencies.

The 16-item Latin American and Caribbean Household Food Security Scale (ELCSA) was used to assess the degree of food insecurity. ELCSA had a strong internal validity (Cronbach's alpha=0.92) and adequate criterion and convergence validity. All the households were food insecure with 49% of them being very food insecure and 7% of them extremely food insecure. These results were consistent with the extreme poverty conditions in the target communities (65% of study households earned a dollar or less per day). In addition, one-third of the women participating in the study were underweight.

Results from 2 focus groups (n=22) showed that sweet potatoes were part of the traditional diet and that they were thought of as being highly nutritious and beneficial to human health. Participants indicated that they were not used to consuming sweet potato leaves but that they would be willing to try them. Results from the sensory analysis panel showed that participants were indeed very satisfied with the sensory properties of one of the two dishes prepared with sweet potato leaves.

Computer simulations showed that OFSP has a strong potential to increase vitamin A intake in rural Haiti. Its introduction into Haiti deserves to be seriously considered.

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CHAPTER I

Haiti's Geography and Topography

Haiti is located in the West Indies between Puerto Rico and Cuba (Appendix 1). It is bounded in the north by the Atlantic Ocean. On the south and west, the country is bounded by the Caribbean Sea and shares a land border with the Dominican Republic to the East[1]. The country's co-ordinates are: 19°00'N, 72°25'W[2] and is 5 hours behind the Greenwich Mean Time or GMT[2]. Although the country is separated into ten administrative regions, physically it is divided into three main regions: Center land, Northern and southern Peninsula[3].

About the size of Maryland State, 75% of the country is mountainous with slopes ranging from 20 to 85%[4]. The highest elevation of the country is found in Mount La Selle (8,773 feet) in the southern peninsula[5].

By the end of the year 2007, the total population in Haiti had reached an estimated 8.74 million people only 3.6 million of which are actively integrated in the formal workforce system. Sixty six percent of that workforce is involved in agricultural activities. However, that does not prevent 80% of the Haitian population from living under the official poverty line in 2006. Haiti is among the countries classified as having the worse caloric deficit in the world with an average daily calorie intake of less than 1,730 [6, 7].

Climate

The annual rainfall in Haiti averages 1,461mm and is not evenly distributed. The southern peninsula has two rainy seasons (from March to June and from August to

October) while the northern peninsula and the center land have each one rainy season from April to October and from September to June, respectively [2].

Nutritional and health profile

80% of the total Haitian population is living under the poverty line and half of the children are undernourished[1]. Only 30% of the population has access to appropriate sanitation[8]. Maternal mortality in Haiti is approximately 523 for every 100,000. In comparison, it is only 16 in the Netherlands[9] and 12 in the USA[10]. Life expectancy in Haiti is 57 years; in comparison, it is 72 years in Brazil, 76 years in Cuba and 78 years in Puerto Rico[11]. The under five mortality rate in Haiti is 80.3/1,000[12]. In comparison, it is 7 in the USA and 2.3 in Singapore[13]. Peri-natal infections and infectious intestinal diseases are the leading causes of death among children under five in Haiti. Malnutrition by itself accounts for over 22% of the child mortality in the country[14].

Malnutrition in Haiti

In 2002, Haiti was the fourth most undernourished country in the world (after Eritrea, Ethiopia and Somalia) [19]. As a colony of France, Haiti in the past produced 60% of the world's coffee[3]. Currently, Haiti imports approximately 75% of its foods mostly from the Unites States of America. The three main exportable cash crops in Haiti are coffee, mangoes and cocoa[7]. The annual per capita income of Haiti is the lowest in the region, at only $450. The country's inflation rate is currently 15% and is on the rise. Haiti has also a few natural resources like bauxite, copper, calcium carbonate, gold and marble[1, 20, 21].

Identification of the specific geographical location and target communities

Camp-Perrin is located in the southern peninsula of Haiti (Appendix 2). About 16 miles from Les Cayes, Camp-Perrin occupies an area of 82.6 square miles. Its estimated population is 65,000. Administratively, this location is divided into three districts called sections. The first section is made up mostly of a valley. The second and the third sections are characterized by high mountains. However, the third section differs from the second in that deforestation has happened to a lesser extent than in the second[15]. The main crops raised in Camp-Perrin are: beans, corn, tubers (yam, sweet potatoes, and cassava), coffee, peppers and fruits. The average rain fall from 1994 to 2005 is 2065mm.[15] Camp-Perrin has 2 main traditional markets (Marché de Cances and Marché de Bas Camps) as well as several local ones.

LITERATURE REVIEW

Justification for the study

Over three million pre-school aged children in the world have visible eye damage due to vitamin A deficiency. About half of them go blind each year and about one third of those who go blind die months later[16]. Iodine deficiency is the greatest single cause of preventable brain damage and mental retardation in the world. Finally, iron deficiency during childhood and adolescence impairs physical growth and hinders mental development and learning propensity. In adults, it reduces not only the capacity to do physical labor but also is a leading cause of death among childbearing aged women.

There is no doubt whatsoever that micronutrient deficiencies also known as 'hidden hunger' has caused the loss of millions of lives each year in the world[16].

In order to solve that hidden hunger predicament, several solutions have been put on the table. Some people want to promote capsule supplementations to the ones most at risk. This approach may have become a reasonable solution to the crisis if its cost-effectiveness was proven. In order to manage a problem of this magnitude, billions of dollars would have to be spent on a regular basis to provide the needed capsule supplementation[17]. People in a country like Haiti who suffer from hidden hunger have very low if any purchase power. Therefore, as promising as this capsule supplementation approach might be, it would not go a long way unless it was totally subsidized by the government and/or foreign institutions. The addition of specific micronutrients to processed foods, i.e., food fortification is another approach that has been proposed to address micronutrient deficiencies worldwide. However, in an extremely poor country like Haiti, the most vulnerable people do not have enough money to buy fortified foods on a regular basis in order to avoid micronutrient deficiencies[18]. Also, fortification policies are very difficult to implement in countries like Haiti with serious political instability and social unrest.

Alternative approach

In a world where the agricultural production increases arithmetically while the population increases exponentially, hunger, malnutrition and famine threaten hundreds of millions of individuals. This in spite of the emergence of the green revolution which was supposed to put an end to food insecurity by improving yields of staple foods through revolutionary agricultural techniques[22, 23]. Over the years, the magnitude of hidden hunger (i.e., food

quality problem) has been increasingly recognized. Currently it is estimated that three billion people (more than half of the world's population) suffer from one or more micronutrients deficiencies, including vitamin A[24] deficiency. These deficiencies have a strong negative impact on human, social and ultimately in national development.

In order to address micronutrient deficiencies in extremely poor countries, several agricultural based alternatives have been proposed. International and philanthropic organizations such as the World Bank, The Melinda and Bill Gates Foundations, and the Consultative Group on International Agricultural Research (CGIAR)[25] strongly advocate for the biofortification approach. This approach seeks to produced micronutrient enhanced staple crops based on sustainable agriculture through plant-breeding strategies.[8] The initial problem with that approach is that staple crops that are consumed in great amounts in poor countries are not good sources of micronutrients. Should this approach work, it would be an almost certain guarantee that micronutrient deficiency would be alleviated[26,27]. As a result, foods rich in essential micronutrients could find their ways to the table of the poor at a relatively low cost (if any at all). This approach could perhaps be less sensitive to political instability, social turbulence or funding concerns.

Staple food biofortification is the process of fortifying foods at the source by growing micronutrient enhanced staple crops. The process of plant breeding has been known for thousands years. It is the mean by which plant breeders transplant genes [dominant or recessive traits] from one variety to another within the respective limits of the same species. The ultimate goal in this process is to capitalize not so much on the food quantity as was the case for the green revolution but first and foremost on the nutritional

quality of the food supply. These techniques have been proven with potential to control some of the health damages that micronutrient deficiencies are capable of inflicting on a universal scale[28]. Because biotechnology has been used to develop biofortified foods, this technique is discussed in the following section.

Biotechnology

Biotechnology can be understood as a four-sector application: Red technology (the engineering of living organisms through genomic manipulation to produce antibiotics), white or grey technology (a technique applied in industrial processes), blue technology (used to describe marine and aquatic applications), and the plant-based green technology. This literature review will limit itself to the green technology.

The green technology is a type of biotechnology that has been mostly applied in the field of agricultural development. The green biotechnology works across different kingdoms, genus and species thus it is capable of producing transgenic or GMO (genetically modified) organisms. In this process, genes from one genus and species can be implanted into a totally different genus and species of a plant or aminal[5]. This technique enables researchers to transfer some genetic characteristics for example from the amaranth (genus: Amaranthus, species: acutilobius) to rice (genus: Oryza, species: sativa). As a direct result of this technology, the first version of 'golden rice' was introduced in the year 2000. Five years afterwards, a second version was introduced. This time it was loaded with up to 23% more pre-vitamin A content than the first version. This biofortification approach has become more controversial when researchers combine

together genes from two completely different kingdoms, genus and species. The main concerns raised have been related to ethical, as well as human health issues[29].

More than 6 million farmers worldwide planted biofortified crops in their fields in 2002. A year later in 2003, over 145 million acres of agricultural land were planted with biofortified plants of which 96.3 million acres are in the United Stated of America alone. Clearly, this approach has not eliminated the hunger problem in the world or lessened the problem of micronutrient malnutrition[30, 31].

Methods of Biofortification

As a comprehensive strategy[16], biofortification comprises two main techniques:

1. ***Traditional plant breeding***

This technique is the purposeful manipulation of plant species in order to create desirable traits. It has been practiced for thousands of years[32]. Using the traditional genetic modification technique such as cross-fertilization or pollination, scientists/farmers can produce a desired trait in most domesticated plants by combining many genes of the same species at the same time. This process has to be repeated over and over again for years before the desired trait can be successfully separated from the undesired ones. The problem with this technique is that it is both time consuming and can be costly[33]. While its practice is still greatly encouraged, scientists have developed biotechnology techniques that produce the desired results quicker. This technique is called modern plant breeding or genetic engineering and is discussed in the following section.

2. *Modern plant breeding (Genetic engineering)*

With this technique, scientists use plant biotechnology to add a desired single gene deemed of greater importance to a same species in most cases[34]. Therefore, this technique is relatively more precise, faster, and more predictable[27, 34]. Scientists can confer a specific new characteristic to a plant without transferring the undesirable traits. Greater attention has been given to this technique because of its high level of specificity and precision [33].

Vitamin A and Child growth

Vitamin A is a fat soluble organic compound consisting structurally of a four-member ring and a side chain with 4 conjugated double bonds. It is required in very small quantity for normal functioning of the body. It is present in small amounts as opposed to the macronutrients consumed. Vitamin A is essential for skeletal growth or growth development, survival, normal reproduction, skin and mucous membrane health. It also promotes cognitive development[35]. The current Recommended Daily Allowance (RDA) of vitamin A for women (14->70 years old) is 700µg per day. The requirement for children under five is 400µg per day[36]. Its deficiency can lead to neurological symptoms resulting from the nervous system, depressed immune system, high morbidity and mortality due to diarrhea, respiratory tract infection, measles, night blindness, keratomalacia and xerophthalmia, (or eye inflammation) that is a precursor to irreversible blindness [37, 38].

Epidemiology of Vitamin A deficiency

Vitamin A deficiency occurs when the body reserves of this nutrient become depleted and the amount provided in the diet that is needed for equilibrium within the tissues is insufficient[39]. Children under five are the most vulnerable group of individuals to be affected by vitamin A deficiency. More than 50% of all infant deaths occurring in developing countries are related on one form or the other to Vitamin A deficiency[40, 41].

According to the Micronutrient Deficiency Information System (MDIS) established by the World Health Organization (WHO) in 1991, the prevalence of vitamin A deficiency in the world is higher in Africa, Asia and Latin American countries except in Chile where this problem is under control. In those parts of the world, the prevalence of vitamin A deficiency has been classified from moderate to severe for the most part. Another interesting observation made is that Haiti is the only country in the Americas where severe vitamin A deficiency remains. The US, Canada, Russia and Australia are among the few countries in the world that seem to have complete control over the vitamin A deficiency problem[42].

Vitamin A deficiency control

Comparing with the relatively high cost and complex logistics involving vitamin A fortification and supplementation programs, the biofortification approach has the potential to be more cost effective and sustainable. Biofortification based on traditional plant breeding has the potential to increase the nutrient intakes of micronutrients like vitamin A by over 50% in developing countries. Foods that are produced according to this technique usually do not require major attitude changes by the target consumers. This is why the World Bank has doubled its commitment toward this goal from $25

million to over $50 million. This is encouraging as for most part traditional plant breeding biofortified food crops are safe for human consumption, more resistant to adverse environmental conditions and have higher yield than the traditional varieties[16].

Orange Fleshed Sweet Potato (OFSP)

Sweet potatoes

Sweet potatoes belong to the family Convolvulaceae, of the genus Ipomea and species batata. They were domesticated over five thousand years ago. Sweet potatoes are mostly propagated by their adventitious roots called slips or vines. The seeds of the sweet potatoes are used for breeding purposes only. They grow better in an average temperature of 24 °C (75 °F). Varieties mature from two to nine months [43].

Sweet potatoes in general are rich in dietary fiber, complex carbohydrates, and vitamin C and contain a varied amount of beta carotene (a vitamin A carotenoid precursor) depending on the variety. Sweet potatoes are the fifth most important staple crop grown in developing countries, thus they are key for addressing the global food insecurity problem. According to the International Potato Center (CIP), 1.9 million tones of sweet potatoes are produced each year in Latin America alone. The importance of this crop for human nutrition explains why CIP started collecting cultivars in 1985 and currently holds 6,500 samples [44]. Sweet potatoes can produce more edible energy per hectare per day than wheat, rice or cassava. Sweet potatoes are among the 7 most important crops grown worldwide[45]. In 1992, the Center for Science in the Public Interest (CSPI) ranked the nutritional value of sweet potatoes higher than similar crops. In addition to their nutritional attributes, sweet potatoes have been studied for their health promotion

benefits. Recent animal studies have shown that sweet potatoes (in general) may play an important role in controlling blood glucose level and may lower insulin resistance. Traditionally, sweet potatoes have been used in the treatment of hemorrhage, asthma and abscesses. Furthermore, it has been suggested that sweet potatoes have antioxidant properties that help prevent chronic diseases and cancer [46, 47, 48, 49].

Orange Fleshed Sweet Potatoes (OFSP)

Extensive research on potential contribution of orange fleshed sweet potatoes (OFSP) in addressing vitamin A problems has been conducted in several parts of the world. Low et al. reported that the white fleshed sweet potatoes which contain very little if any vitamin A are widely consumed and are important sources of calories in Kenya. In that country they are consumed by people of all age groups particularly by the children who are more vulnerable to vitamin A deficiency[50]

K'Osambo et al. conducted an agronomic trial of seventeen different sweet potato varieties in Kenya (6 white fleshed, 3 cream fleshed, 3 orange pale fleshed, 2 intermediate orange fleshed, 1 pigmented fleshed and 2 orange fleshed) [51]. The purpose of this study was to investigate if there is significant variation of carotene (precursor of vitamin A) among sweet potato varieties. The carotenoid content assessment of the sweet potatoes was determined spectrophotometrically 12, 16, 20 and 24 weeks after planting. Four carotenoids were found in trace amount and 6 others were found in significant amounts. The following three of the six were positively identified: β-carotene-5, 6-monoepoxide, β-carotene-5,6,5,6-diepoxide and all-trans-β-carotene. The highest amount of carotenoid was identified from the plants aged 12 and 16 weeks. The white

fleshed sweet potatoes had considerably less carotenoids and less β-carotene than the others. The mean RE of the six cultivars of white fleshed sweet potatoes ranged from 0.1 to 3.4mcg/100g of fresh roots. On the other hand, the mean RE among the orange fleshed (including the pale cultivars) varied from18.5 to 1,338.2 mcg/100g of fresh roots. According to Low et al. in order for a sweet potato cultivar to be considered as good source vitamin A, its fresh flesh roots must contain at least 100mcg/100g. From K'Osambo et al.'s results, the orange fleshed sweet potatoes were clearly a better source of vitamin A than the white fleshed. Therefore, a significant variation among the cultivars was clearly shown as a function of flesh color in this particular study[51].

Low et al. conducted a quasi-experimental, controlled longitudinal study in Mozambique mainly to assess whether the consumption of OFSP instead of white fleshed sweet potatoes could increase vitamin A intake and serum retinol concentration among 827 children between the ages of 6 and 59 months. About 71% of the children were vitamin A deficient. The OFSP group had a significantly greater intake of vitamin A as well as higher serum retinol levels. With respect to the intervention group, more farmers reported to have grown the OFSP than the control group. Both 24-hour recall and FFQ data showed that children in the intervention group were more likely to consume sweet potatoes. As a result, the OFSP was selected as one of the leading candidates for addressing micronutrient deficiencies in Mozambique [52].

Researchers at the International Potato Center (CIP), one of the 15 Consultative Group on International Agricultural Research (CGIAR) have developed new clones of OFSP that are higher in beta carotene (vitamin A precursor) than the traditional white fleshed sweet potatoes raised in Haiti. According to Dr. Gruenberg, the head researcher at CIP, the

health status of these clones is level 2 meaning that they are safe for propagation and human consumption anywhere in the world (personal communication). Similar clones to the ones introduced in Mozambique, have also been introduced in Kenya, Uganda and other parts of the world consistently demonstrating the great potential that OFSP has for alleviating vitamin A deficiency in cultures consuming sweet potatoes and/or related crops[53, 54, 55]. CIP is promoting the propagation and introduction of OFSP by making available scores of cultivars that are rich in β-carotenoids capable of preventing irreversible blindness, premature child and maternal death.

Why OFSP in Haiti?

Haiti has the highest rates of chronic malnutrition, anemia and vitamin A deficiency and maternal mortality in the Caribbean region[56]. Even though no recent nationally representative data on the prevalence of vitamin A deficiency is available, the deficiency of this vitamin is believed to be widespread in Haiti. Thus, Haiti is a top candidate to examine the potential contribution of OFSP toward the alleviation of vitamin A deficiency. Stanfield et al. conducted a randomized double blind placebo controlled trial to examine the impact of vitamin A supplementation (high dosage) on childhood diarrhea and acute respiratory infections in the Northwest region of Haiti. Unexpectedly, the researchers found a higher incidence of infectious diseases associated with vitamin A supplementation. Unfortunately, the serum retinol was not reported among the study participants making it difficult to understand the degree of compliance with the intervention.[57]. Menon et al. conducted a randomized controlled trial among pre-school aged children with the objective to determine whether 2 months sprinkles treatment containing 12.5 mg iron, 5 mg zinc, 400 mcg vitamin A, 160mg folic acid and 30 mg

could reduce anemia among pre-school aged children between the ages of 9-20 months old. The author did not specifically look at the vitamin A status of their study participants[58]. However, Chitharanjan et al. published in 1999 a vitamin A regional study conducted in part on the central region of the country called Maissade. This randomized double blind placebo controlled trial included 362 pre-school children. Though full results of the study have not been published yet, the initial results showed that 98 % of the participating children had marginal vitamin A status (<20 µg/dl) and 58% of the sample were vitamin A deficient (<10µg/dL). Other findings show that the mean concentration of vitamin A in plasma for 226 of the children was 13.2 µg/dL, 92% of the children were either vitamin A deficient or at risk, 58% had marginal vitamin A deficiency (10-20 µg/dL) and 34% were severely vitamin A deficient (<10 µg/dL). The plasma retinol levels was significantly lower among males (11.7 µg/dL with a SD ±4.9) than females (13.2 µg/dL with a SD ±4.9) [59]. These findings highlight the severity of the vitamin A problem in this part of the country.

Hypotheses

We first propose that white fleshed sweet potatoes are consumed in the target community and if they are not produced in great quantity it is because of economic constraints. Second, we hypothesize that the introduction of the OFSP is likely to help address vitamin A deficiency in Haiti. Third, we hypothesize that the target communities are willing to try the incorporation of sweet potato leaves into their diets even though they may not be familiar with them. This is because different types of green leaves are commonly consumed in Haiti.

Objectives

The goals of this project were to: 1) Assess the dietary quality and food security status of women and their families in Camp-Perrin, South Haiti, 2) estimate the frequency of consumption of sweet potatoes in the diet of the target community, 3) examine beliefs, attitudes and behaviors related to sweet potatoes, 4) examine the level of consumer acceptability of sweet potato leaves in terms of flavor, aroma, taste, color, texture, and overall appeal, 4) simulate the potential contribution of OFSP to alleviate vitamin A deficiency in Haiti, and 5) examine the potential acceptability of OFSP in Haiti. Three studies were conducted from June to late July 2007 to meet these goals.

CHAPTER 2

METHODOLOGY

The protocols for this study were approved by the University of Connecticut's Internal Review Board (IRB). Other participating institutions (CIAT and ORE) did not have an IRB submitted the appropriate documents of support. This study is divided into three parts. Part one involves collecting information on maternal socio-economic status (SES), demographics, sweet potato consumption habits and preferences, anthropometrics and maternal and child self-reported health indicators. In addition, a food frequency questionnaire and two 24-hour dietary recalls were collected (one during the week day and one during the weekend). We have applied the 'The Latin American and Caribbean Household Food Security Scale' (Escala Latinoamericana y Caribeña de Seguridad Alimentaría' also known as ELCSA) that is in full use in several Latin American countries[60]. Part two of the study entailed two focus group panels about potential contributions of OFSP in Haiti in alleviating vitamin A deficiency in Haiti. Part three of the study was the application of a sensory analysis panel of the traditional sweet potato leaves.

Study 1

Beside the face and content validation of the survey questionnaire translated into Haitian Creole, the selection and the training of three fieldworkers (two nurses and one agriculture technician) to help in the administration of the survey questionnaire. Participants included healthy non pregnant mothers between the ages of 17 and 45 years living in the target community for at least the past 12 months with at least one healthy

child between the ages of one and five years. The participant mothers had to agree to give informed consent and to provide reliable self-reported information (Appendix 3)

A sample of 153 participant mothers with children under the age of five was randomly chosen throughout the study location. Informed consent was obtained from the participant mothers after verbal explanation in Haitian Creole of the potential benefits of the study. Field supervisions of the interview sessions were conducted in order to ensure completeness and internal consistency of data. The completed forms were reviewed with the appropriate interviewer initially daily and later three times a week for the same reason stated above.

The modified US household food security module which contained 16 questions was applied in a word by word Creole translation. The best applicable back translation for the word 'worry' was translated into 'Pè' (afraid) in the food security questionnaire. The households were classified into four categories: food secure, mildly food insecure, moderately food insecure and extremely food insecure. The height and weight of the participant mothers and their children were measured with a graded wooden stick and Health-O-Meter digital scales, respectively. Both mothers and children were measured standing up. Nutritional indicators for children were calculated using the z-scores height for age (stunted), weight for age (undernourished) and weight for height (wasted) and were compared to the WHO child growth standards. Due to close monitoring and relative short period of time for the study, no participants were excluded or lost. All the participants were from very low socio-economic class or extremely poor [8]

Dietary Intake

Questionnaire administration (n=153)

The survey questionnaire contained both open-ended and pre-structured questions. It was divided into 6 different parts (Appendices 3, 4, 5)

a) ***Assessment of the household and respondent socio-economic and demographic characteristics:***

The structured survey collected data on: household size, family structure, age and gender composition, head of household occupation, family income, and household possessions.

b) Self-reported health status

Information collected on the health status of the participant mothers including their children were self-reported. The participant mothers were probed to evaluate their own health status as well as their reference children's. Information on episodes of diarrhea and occurrences of what they describe as malaria since birth were also collected.

c) Food security assessment

Food security (at the household level) occurs when enough healthy and nutritious foods are available at all times for everyone to meet their dietary needs and for an active and healthy life [61]. Food insecurity is present when food security is uncertain. It can be measured quantitatively and qualitatively by assessing its psychological and social risk factors on the household members [62]. Food insecurity is frequent in both developed and developing countries, affecting from 5% to 25% of the general population [63]. The most common food security scales used in the US were not applicable in Haiti. Therefore, we have applied a modified version that Dr. Rafael Perez-Escamilla pioneered and that is in

use in several Latin American Caribbean countries. This modified version was used for the first time in Haiti. The household level of food insecurity in our study was assessed by the 'The Latin American and Caribbean Household Food Security Scale' (Escala Latinoamericana y Caribeña de Seguridad Alimentaría' also known as ELCSA. The scale was translated from Spanish to French and then to local Creole prior to application. It contained 16 items or questions of which 9 pertained to the adults living in the household and 7 pertained to the children living in the household (Table 14). Each question answered positively was assigned a score of one. Additive score was used to assess the severity of the household food insecurity[60]. With the computed scores, we classified the severity as: food secure, mildly food insecure, moderately food insecure and extremely food insecure.

d) ***Food Frequency Questionnaire (FFQ)***

A FFQ was developed to estimate the frequency of consumption of sweet potatoes and other commonly consumed foods in the area using two different agricultural seasons (wet and dry) as points of reference. This questionnaire contains fifty five (55) items divided into seven groups: Fruits and vegetables (13 items), tubers (10 items), high protein foods (7 items), cereal and protein sources (8 items), regular beverages (5 items), occasional beverages (5 items), starchy foods and snacks (6 items). These data that were collected in relation to the past three months that preceded the survey administration were used to probe for seasonal variations regarding the consumption of sweet potatoes in the target community.

e) 24-Hour Dietary Recalls

Two 24-hour recall questionnaires were administered to each of the 153 study participant mothers selected by chance. Our sample was selected in an unbiased way so that every individual in the population had the same chance of being selected to participate. In order to facilitate the follow up, the majority of the participants (98%) were recruited in their homes. One 24-hour recall covered a weekday and the other one a covered a weekend day. The four-pass methodology [64] together with culturally appropriate portion size measuring utensils were used to measure as precisely as possible the different foods consumed inside and outside the household, the time of the day when they were consumed, the meal type (breakfast, lunch, dinner or snack), the portion size consumed, and the methods of preparation. Detailed information on recipes was collected to be able to break mixed dishes down into their individual ingredients (Appendix 5)

Study 2: ***Focus Groups panels (n=22)***

Two focus groups were conducted in Camp-Perrin to assess community knowledge, attitudes and behaviors regarding sweet potato consumption. Both focus groups (FG) were moderated by the study field coordinator (Michael Dessalines) at the headquarters of the Organization for the Rehabilitation of the Environment (ORE). Focus groups were conducted in Haitian Creole in two different days but in similar settings. The discussions were tape recorded for later transcription. The first focus group took place on July 19th, 2007 and was attended by 12 mothers. The second focus group was conducted on July 20th, 2007 with the participation of 10 mothers. Both focus group sessions lasted two

hours each and included two note takers and two observers. Every eligible participant mothers in the target community had an equal chance to participate.

Study 3: ***Sensory Panel (n=35)***

Assessment of the sensory properties of dishes containing traditional sweet potato leaves:

Originally, this part of the study was designed to compare the taste, smell, color, texture and overall appeal of the biofortified OFSP with the sweet potatoes traditionally consumed in the target area. Due to logistic issues, the biofortified OFSP were not available on our tight time table. Therefore, we decided to conduct the sensory analysis with the sweet potato leaves. 36 participant mothers were recruited similarly as in the previous studies. They were invited at least three days in advance to attend. The day before the panel took place, they (the participants) were reminded and given proper instructions on how to get to the place where the sensory panel was going to take place. Standard sensory analysis methods were used.

Two dishes of sweet potato leaves were prepared and served to the participants. The first dish was prepared the same way people prepare local recipes with leaves that uses broth, meat, onion and spices. The second dish (SP leave salad) was steamed in salted water, drained and drizzled with vegetable oil. Both dishes were served with starchy foods such as yam and plantain (Appendix 6). Before the beginning of the tasting session, instructions were given out loud to all participant mothers and copies of those instructions were written in large print and attached to different corners of the table where

the dishes were displayed. Each participant mother was served one dish and was sent alone for the tasting. At the end of the tasting, the participant mother met with trained field workers who asked questions about the appearance, the color, the taste, the texture and the over all appeal of the dish. Upon the completion of this session, the participant mother was served plain water to drink. Minutes later, the same participant was served dish number two and the same procedure was repeated again for each of the 32 participants.

CHAPTER 3

RESULTS

Study 1: Survey Questionnaire

The study participants were recruited mostly at home (99.3%) where most interviews took place (94.1%). Mean maternal age was 30.8 ±7.06 years. More than three quarters (76.5%) of the respondent mothers were home makers and 23.5% identified themselves as the head of the household. That last category was made up of single mothers. The great majority (88.9%) of the respondents practiced a religion. Over half (58.8%) of the participant mothers were Catholics, 24.2% were protestants and 7.8% were Baptists.

Farming seemed to be the principal occupation of the participants with over half (59.5%) identifying themselves as farmers. Almost 20% reported trading making it the next most common occupation. The "other" occupation category (20.9%) included daily workers, wood charcoal makers, tailors, custodians and evangelists. Household size was relatively large. Over half (56.2%) of participant mothers lived in households with 5-7 members. The largest households had 14 people living in them. It is individually remarkable that these large families lived under heavily crowded conditions. Indeed, 47.1% of the homes only had two bedrooms and almost 29.4% of the homes were reported to contain only one bedroom. Only 23.5% of the homes contained more than 3 bedrooms. In a country with inadequate sanitation where the prevalence of the contagious diseases like tuberculosis, malaria and flu is so high, the overcrowding living conditions raise serious health concerns (Table 1).

Socio-Economic Status

About 44% of the respondents did not complete elementary school. Furthermore, 26.8% of them did not have any formal schooling at all. The proportion of respondents who completed high school was only 16.3%. The marital status observed among the study participants was consistent with what would be expected in Haiti. Common law status was twice as common as the married status. Only 10.5% of the women reported to be either single/never married or separated/divorced/widowed. A total of 43.1% of the participants reported that the head of their household was working on a full time basis. Furthermore, 37.9% of the heads of households were reported to work part-time, and 19.0% were unemployed at the time the present study. Almost two-thirds (65.3%) of the participants' households had a monthly income < $31.00. All of these participants were living under extreme poverty conditions as they were earning <$1.00 a day. Among the rest, monthly income ranged from $31-$60 for 21.6%, and it was > $60 for only 13.1% of participants' households (Table 1).

Land ownership is relatively common in Haiti. However, land size is usually very small, seriously constraining the amount of crops that can be cultivated. In addition, the land is greatly over used seriously affecting the quantity and quality of the foods harvested. In our study 69.3% of the households reported owning land. However, 87% of the participating households had a land area of <1/2 ha, almost 6% had a land area of less than half. Only 7.5% of the participating households had a garden that was larger than a half hectare. The data on land area were collected in Haitian unit of land called carreau.

A carreau is a unit land area (in the *20th century)* that approximates 1.29 hectares (approximately 3.19 acres) [65]. Therefore, the figures in carreau were converted according to the following relation: 1 carreau = 1.29ha (with 1 carreau = 12,926.32 squared meters and 1 ha =10,000 squared meters). Moreover, 37.9% of the households are part of the Métayage crop sharing system. Under this system, the majority of land owners decide what proportion of the harvest will be taken away from the farmer (Table 1).

According to the DHS survey[66], 80% of children are born at home in Haiti. Among the study participants, 85.6% of the total reference children deliveries took place at home as opposed to only 14.4% that took place in the only hospital in the Region. Almost 50% of the participants reported to have given birth to 1 to 3 children, 36.6% stated that they gave birth to between 4 and 6 children, and 14.4% have had between 7 and 13 deliveries. Over 6% reported that they had experienced at least one still birth, and over 20% reported losing at least one child before the age of five (Table 2).

Table 1: Household characteristics (N=153)

	N	%
Occupation of head of household		
Farming	91	59.5
Trading	30	19.6
Other (daily worker, wood charcoal maker, tailor, custodian)	32	20.9
Household size:		
2 to 4 people	29	19.0
5 to 7 people	86	56.2
8 to 14 people	38	24.9
# of bed rooms:		
1 bed room	45	29.4
2 bed rooms	72	47.1
3 to > 4 bed rooms	36	23.5
Educational status		
No formal schooling	41	26.8
Elementary not completed	68	44.4
Elementary completed	18	11.8
High school not completed	1	0.7
High school completed	25	16.3
Marital status		
Common law	97	63.4
Married	40	26.1
Single/never married	11	7.2
Separated/divorced/widowed	5	3.3
Employment status of head of the household		
Working full-time	66	43.1
Working part-time	58	37.9
Unemployed	29	19.0
Monthly household income:		
$1.00 to $30.00	100	65.3
$31.00 to $60.00	33	21.6
$61.00 to $120.00	20	13.1
Savings in bank (yes)	23	15.0
Métayage (sharecropping system) (yes)	58	37.9
Land ownership (yes)	106	69.3
How much land in ha (m^2)?	N=106	
From none to < 1/4 of a ha (3,225)	92	86.8
From 1/4 to < than half of a ha (6,450)	6	5.6
From 1/2 to < 1/3 of a ha (8,600)	3	2.8
From 1/3 to < one carreau (10,000)	3	2,8
> than one carreau	2	1.8

Infant feeding habits: Reference child (1 to 5 years old)

The WHO recommends that a child be EBF for the first six months of life to receive the optimal benefits that breastfeeding has to offer. Afterwards, breast milk should be given along with nutritious and safe complementary foods. Over 20% of the mothers participating in the study did not know what EBF was. Furthermore, 42.5% of the mothers did not exclusively breastfed the reference child for 6 months. Less than 20% of the mothers did not feed colostrum to their youngest child. Some mothers reported not giving colostrums because the child did not want to suck the milk from the breast. Others reported that either the child or the mother was too sick, that not enough breast milk was available when the child was born, or that colostrums (which they referred to as the 'first milk') could be very detrimental to the child's health. A few of the mothers stated that BF was not part of their family traditions. At the time of the interview, when the children were 32.8 months old on average, only 15% were still breastfeeding (Table 2).

Almost half of the women (47.7%) started to BF the study child immediately after birth. About 16% of the mothers initiated BF < one hour after birth, 17% did so 1-12 hours post-partum and the remaining waited > 12 hours to start BF. Almost 42% of the respondent mothers had no knowledge of what vitamin A was at the time of the interview. After defining what it was to the participants, 92.8% of them reported that they had ever fed their reference child with vitamin A rich foods such as green leafy green leaves (95.4%) and fruits (94.1%) (Table 2).

Because an important goal of this study was to evaluate the potential contributions of OFSP in Haiti to alleviate vitamin A deficiency, the information on the child's

consumption of sweet potatoes is of central interest. Almost 91% of the respondent mothers reported to have fed the study child with sweet potatoes. The remaining 9% were not fed with sweet potatoes for various reasons including; sweet potatoes were too expensive, or could trigger heart burn or child's stomach ache, or the child didn't like eating sweet potatoes. About 56% of the mothers introduced sweet potatoes to the study child ≥ 12 months after birth. By contrast, 23.5% of the study children were fed sweet potatoes between the ages of 8 to 12 months, and 10.5% were introduced to them between the ages 6 and 8 months (Table 2).

Vitamin A knowledge assessment

Study participants had mixed opinions as to the foods they considered to be rich in vitamin A. Interestingly, almost 70% of participants reported that within the past 12 months, the content of vitamin A of foods had greatly influenced their food purchases. About 43% of participant mothers stated that within the past 12 months they have consumed vitamin A rich foods frequently, and almost 38% said they did not do so frequently. By contrast, 18.3% said that they consumed vitamin A rich foods only once in a while, and 1.4% reported doing so hardly/never in the past 12 months (Table 3).

In order to assess the participants' knowledge, they were asked to name foods they believed to be rich in vitamin A. Almost half of them (49.7%) named sweet potatoes as being rich in vitamin A. This was followed by corn (48.4%), green leafy vegetables (42.5%), carrots (24.8%), pumpkin (10.5%), liver (8.5%), mangoes (17.0%) and papaya (16.3%) (Table 3).

Table 2: Demographic and child feeding characteristics

	N	%
# of children delivered		
1 to 3 children	75	49.0
4 to 6 children	56	36.6
7 to 13 children	22	14.3
Place of study child delivery		
Home	131	85.6
Hospital	22	14.4
Child deaths		
# of still born	10	6.5
Only one child	8	5.2
Two children	2	1.3
# born alive but died before one year old	31	20
Only one child	20	13.1
Two children	7	4.6
Three children	4	2.6
Mother's knowledge EBF (yes)	110	79.7
Child EBF (yes)	88	57.5
Child fed colostrums (yes)	124	81.0
Child currently BF (yes)	23	15.0
Timing of first BF		
Immediately after birth	73	47.7
< 1 hour after birth	24	15.7
1-12 hours after birth	26	17.0
13->24 hours after birth	27	17.6
Did not BF	3	2.0
Maternal vitamin A knowledge (yes)	89	58.2
Child fed with vitamin A rich foods in past 3 months (yes)	142	92.8
Child fed with any green leafy vegetables in past 3 months (yes)	146	95.4
Child fed any fruits in past 3 months (yes)	144	94.1
Child's consumed sweet potatoes in past 3 months (yes)	138	90.8
Child's age when sweet potatoes introduced		
6 to 8 months	16	10.4
8 to <12 months	36	23.5
≥12 months	86	56.2
Did not consume	15	9.8

Following this question, a list of 12 food items was read to the participants for them to determine if each of them was rich or not in vitamin A. The 4 food items that were identified more frequently as being good sources of vitamin A were: green leafy leaves (96.7%), mangoes (90.8%), corn (88.9%), papaya (86.9%), liver (79.7%), sweet potatoes (73.2%), plantain/banana (69.3%) and fish (63.4%). Interestingly, over 50% of the participants identified water as being rich in vitamin A. The items that were identified least often as being rich in vitamin A were rice (27.5%), Yam (26.8%) and soda (6.5%). These responses can be contrasted against the list of foods that are actually good sources of vitamin A: papaya, carrots (correctly identified by < 25% of participants), green leafy vegetables, pumpkin, liver and mangoes (correctly identified by 90.8% of participants). This comparison documents the need for vitamin A specific nutrition education in the target communities (Table 3).

The WHO has recommended to countries with an infant mortality rate > 70 to supplement their infants with vitamin A. The great majority (86.3%) of the respondents reported that the reference child had received vitamin A capsules since birth more than once. When asked where those vitamin A capsules were given, 25.7% of the mothers said they received them from the area Hospital (Saint-Anne), 63.6% from the dispensary, and 10.6% from other locations including clinics, health centers or family members (Table 3).

Table 3: Participants' self-reported dietary sources of vitamin A

	N	%
Foods rich in vitamin A in past 3 months		
Participant list		
Sweet potatoes	76	49.7
Corn	74	48.4
Green leafy vegetables	65	42.5
Carrots	38	24.8
Mangoes	26	17.0
Papaya	25	16.3
Rice	21	13.7
Pumpkin	16	10.5
Liver	13	8.5
Survey list		
Any green leafy leaves	148	96.7
Mangoes	139	90.8
Corn	136	88.9
Papaya	133	86.9
Liver	122	79.7
Plantain/banana	106	69.3
Fish	97	63.4
Yams	41	26.8
Sweet potatoes	112	73.2
Water	79	51.6
Rice	42	27.5
Soda	10	6.5
Vitamin A capsules since study child birth (% yes)	132	86.3
Source of vitamin A supplement		
Dispensary:	84	63.6
Hospital:	34	25.7
*Other:	14	10.6

*Other means clinic/health centers, family members

Overall maternal self reported health status

As reported earlier, the great majority of the study children, as in the rest of Haiti, were born at home. The majority of women perceived their health and that of their children to be 'average'. This is not surprising as a substantial number of children had been struck by malaria and diarrheal diseases. With respect to child mortality, 6.5% of the mothers responding to the dietary intake survey questionnaire (study 1) reported to have still

births. 20% of the participant mothers reported to have given live birth to at least one child who died before reaching the age of 1 year (Table 4).

Only 2.6% of the households had sewage (Table 4). Because the water supply comes from the nearby river that doesn't contain water all the time, it is understandable that participants used latrines instead of sewage-dependent sanitation systems. The majority of women (58.2%) reported to have collected the study child wastes (feces) and dropped them into latrines (open latrine systems in most cases). In almost 20% of the households, wastes were left in open air, and 2.5% were placed in the trash or buried. Only 2.6% of the study children used latrines by themselves. By contrast, over three-fourths (77.1%) of the women reported using latrines by themselves, and only 4.6% stated that they collected their own wastes and dropped them into the latrines. Among women, 15% reported leaving their wastes in open air while 3.3% of them either dumped them to the trash or buried them (Table 4).

Study child's gender and health status

Most of the reference children (53.6%) were males, 64.0% of them were described as being in average health, and only 29.0% of them reported them to be in either good or very good health. The poor/very poor rating was given for 6% of the study children (Table 4).

Among the study children, 29.4% were reported to have had diarrhea in the past two weeks that preceded the interview. 9.2% of those children had one episode of diarrhea, 10.5% of them had two episodes of diarrhea and 9.8% had 3 or more episodes of diarrhea

during the previous 2 weeks. One third (33.3%) of the study children were reported to have suffered from malaria at least once in past two months (Table 4). Finally, in terms of water availability in the home, 85.6% of the mothers fetched water outside the homes, 69.3% collected water from community wells, 28.8% got water from rivers and 2.0% collected water from other sources.

Table 4: Child health and waste disposal locations

	N	%
Study Child		
Male	82	53.6
Female	71	46.4
Child Health rating		
Good/Very Good	45	29.4
Average	99	64.7
Poor/very poor	9	5.9
Diarrhea		
In past 2 weeks (%yes)	45	29.4
1 time	14	31.1
2 times	16	35.5
>3 times	15	33.3
Malaria		
In past 2 months	51	33.3
Uses latrine	31	20.3
Mother drops fecal matter into latrine	89	58.2
Feces left in open air	29	19.0
Feces buried w/ other trash	4	2.5
Mother		
Sewage at home	4	2.6
Uses latrine	118	77.1
Mother drops fecal matter into latrine	7	4.6
Feces left in open air	23	15.0
Feces buried w/ other trash	5	3.3

Household infrastructure and possessions

Only 35.9% of the study participants had electricity at home. Almost all households used wood charcoal as the main cooking fuel. Due to inadequate living spaces, over three

quarters (76.5%) of the participants reported to have cooked foods within the house where breathing carbon monoxide can be a serious health hazard. The floor of over 20% of the participants' houses was of dirt (mud). Most of the houses (73.2%) had concrete floors and < 5% had floors made with other materials including woods and rugs. The house windows were made up of small wood doors (71.2%), dried woods (pailles) (17%), and other building materials including curtains (7.2%) and dried leaves and other support materials (4.57%). Finally, the ceiling of 85.0% of the houses was made up with metal sheet and 15.0% were made up of other support materials (Table 5).

Study participants reported that they go about their daily business by walking (43.1%) often times carrying loads on their heads to take to the market place. The most popular means of motorized transportation among the study participants were tap-tap (32.7%) and motor-taxi (13.1%). Other means of transportation (11.2%) included animals and canoe (Table 5).

Livestock and Household Possessions

Livestock was common in the study households (76.5%) and included chicken (58.8%), cattle (39.9%), pork (29.4%), goats (21.6%), sheep (7.2%), horses, donkeys, mules, and turkey (11.8%). Over half of the study participants reported to own a radio, 29.4% a cell phone, 4.6% a TV, 2.6% a refrigerator, and 3.9% a sewing machine (Table 5).

Table 5: Household infrastructure and possessions

	N (%)	%
Kitchen inside the household	114	76.5
Electricity	55	35.9
House floor		
Concrete	112	73.2
Mud	34	22.2
Other[1]	7	4.6
Windows		
Woods	109	71.2
Dried leaves	26	17.0
Curtain	11	7.2
Other	7	4.7
Ceiling		
Metal sheet	130	85.0
Dried leaves	8	5.2
Other[2]	15	9.8
Transportation		
Walking	66	43.1
Tap-tap	50	32.7
Motor-taxi	20	13.1
Other[3]	17	11.2
Livestock	117	76.4
Animals of any nature	117	76.5
Chicken	90	58.8
Pigs	45	29.4
Cattle	61	39.9
Goat	33	21.6
Sheep	11	7.2
Other*	18	11.8
Appliances		
Radio	79	51.6
Cell phone	45	29.4
TV	7	4.6
Sewing machine	6	3.9
Refrigerator	4	2.6

[1]dried leaves, woods; [2]: wood, concrete; [3]: bike, animals, boat
Other*: horses, donkeys, mules, turkey

Food frequency questionnaire

In reference to the past 3 months that preceded the survey administration, we applied a food frequency questionnaire that contained 55 items grouping as follow: fruits and

vegetables (15 items), dairy and protein group (10 items), breads and cereals (10 items), snacks and drinks (11 items), tubers (3 items) and sweet potato seasonality (6 items) (Tables 6, 7, 8).

Dietary Assessment of fruits and vegetables

Within the fruits and vegetables group, the only vitamin A rich food items, over 80% of the participant mothers reported to have consumed mangoes. Two fundamental reasons could explain why. First, the survey administration was done during the mango season and second because of the great efforts of the Organization for the Rehabilitation of the Environment to promote fruit trees (including mangoes) in the target community. Subsequent to that were beans and rice that over 50% of the mothers reported consuming them at least 3 times per week in the past 3 months that preceded the survey administration. Less than 50% of the mothers reported consuming the remaining items in the fruits and vegetables at least 3 times per week (Table 6).

Dietary assessment of tuber consumption

The tubers most frequently consumed by the study participants were white fleshed sweet potatoes, and white and yellow fleshed yams. As in other tropical countries, Haiti has a dry and a wet season. About 30% consumed white, yellow and red skin sweet potatoes three times a week during the wet season. By contrast over 52% did so during the dry season is. The consumption of white skin sweet potato at least 3 times per week was more common during the dry than during the wet season (55% vs. 23%). The

corresponding figures for yellow skinned sweet potato were 49% vs. 39%, and for red skin sweet potato they were 53% vs. 44% (Table 6).

Table 6: Food Frequency Questionnaire (Past 3 Months)

Fruits and vegetables	< 3 times/week		3 times/week		>3 times/week	
	N	%	N	%	N	%
Any fruits	94	61.4	19	12.4	40	26.1
Mangoes	16	10.5	8	5.2	124	83.8
Papaya	87	79.1	7	6.4	16	14.5
Watermelon	65	81.3	6	7.5	9	11.3
Lettuce	54	91.5	1	1.7	4	6.8
Pumpkin soup	117	90.0	5	3.8	8	6.2
Plantain	62	43.1	10	6.9	72	50.0
Pumpkin	97	80.8	6	5.0	17	14.2
Okra	153	100	0	0	0	0
Carrots	153	100	0	0	0	0
Beets	65	79.3	6	7.3	11	13.4
Green peas	75	70.1	10	9.3	22	20.6
Beans	29	19.3	16	10.7	105	70.0
Sweet potatoes	100	71.4	18	12.9	22	15.7
White yam	98	86.0	6	5.3	10	8.8
Yellow yam	109	89.3	3	2.5	10	8.2
Seasonality						
White skin- wet season	46	76.7	3	5.0	11	18.3
Yellow skin- wet season	54	60.7	35	39.3	0	0
Red skin- wet season	56	56.0	44	44.0	0	0
White skin- dry season	25	44.6	31	55.4	0	0
Yellow skin- dry season	44	51.2	42	48.8	0	0
Red skin- dry season	46	46.9	52	53.1	0	0

Rainy seasons: March-June and August-October

High Protein Food Consumption

Study participants were more likely to consume pork (28.5%) than beef (8.9%), chicken (7.3%), liver (14.6%), fish (17.7%) and shrimp (15.4%) > 3 times a week. Among

consumers, 20% consumed crabs >3 times a week, making crabs the second animal protein food source most commonly consumed after pork (Table 7).

Cereal and protein sources

In the target communities, corn was consumed significantly less often than other food crops. Over two-thirds of participant mothers consumed rice >3 times a week, 11% have reported consuming it three times a week, and 21.2% less than three times a week. By contrast, 100% of participant mothers have reported consuming corn < 3 times a week. With regards to rice (includes mixed dishes), 37.8% of consumers reported to consume rice and spaghetti > 3 times a week, and 60.0% reported doing so < 3 times per week. Among consumers, rice and okra was consumed by 23.4% of participants > 3 times a week, and 67.2% consumed it < 3 times a week. Among consumers, 22% ate mixed dishes made up of rice, beans and pork > 3 times a week and 67.8% did so < 3 times a week. Finally, only 7.5% of participant mothers said that they consume rice and beans and chicken > 3 times a week as opposed to 91.7% who said they consume the same mixed dish < 3 times a week (Table 7).

Regular Beverages

The beverages are divided into two categories, 'regular' and 'occasional'. On the regular beverage consumption, over % of participant mothers said they consumed coffee (72.9%), herb tea (65.9%) and fruit juices (54.2%) > 3 times a week. Over 60% of participant mothers reported to have consumed kola (78.5%) and powder juice (65.0%) < 3 times a week. Occasional beverages are usually consumed on special occasions such as weddings, first communion or political rallies. 88.2% of the participants said they have

consumed wine in past three months. 87.5% of them said they have consumed both soda and Rhum Barbamcourt <3 times a week. 20.0% of the participants self-reported to have consumed beer >3 times a week in past 3 months. Among the most luxurious beverages in the study location are wine, soda and Barbamcourt (Table 7).

Starchy Foods and Snacks

Local bread is widely consumed in the area. It can be found anywhere on the streets and on the markets in open air and it is affordable. Among consumers 83.1% said they have consumed local bread >3 times a week. Salty snack commonly known as 'bonbon sèl' was reported to have been consumed by 33.8% of the participants at least 3 times per week. 21.6% and 12.7% of the participants said they have consumed peanut butter and sweet cookies respectively at least 3 times per weeks. 89.7% of the participants reported to have consume white bread and 63.6% reported to have consume whole wheat bread <3 times per week (Table 7).

Intake assessment of Dairy and protein group

Only about 45% of the participant mothers reported consuming raw milk in the above group at least 3 times per week. Less than 30% of the mothers reported consuming other nutrient dense food in this group at least 3 times per week. Over 65% of the participant mothers reported consuming coffee and herbal tea at least 3 times per week. The rest of the food items in the group were reported to have been consumed by less than 35% of the mothers at least 3 times per week.

Table 7: High protein food, cereal, beverage and snacks consumption

Protein	< 3 times/week		3 times/week		>3 times/week	
	N	%	N	%	N	%
Chicken	113	91.1	2	1.6	9	7.3
Beef	108	87.8	4	3.3	11	8.9
Pork	81	65.9	7	5.7	35	28.5
Liver	64	78.0	6	7.3	12	14.6
Fish	91	70.0	16	12.3	23	17.7
Shrimp	31	79.5	2	5.1	6	15.4
Crabs	36	72.0	4	8.0	10	20.0
Peanut butter	72	64.9	15	13.5	24	21.6
Cereal and breads						
Rice	32	21.2	17	11.3	102	67.5
Corn	153	100	0	0	0	0
White bread	26	89.7	3	10.3	0	0
Whole wheat bread	7	63.6	4	36.4	0	0
Local bread	14	9.5	11	7.4	123	83.1
Rice and protein sources						
Rice, beans & pork	82	67.8	12	9.9	27	22.3
Rice, beans & chicken	110	91.7	1	.8	9	7.5
Rice & okra	84	67.2	12	9.6	29	23.4
Rice & spaghetti	27	60.0	1	2.2	17	37.8
Beverages						
Fruit Juices	45	31.3	21	14.6	78	54.2
Kola (Haitian drink)	73	78.5	5	5.4	15	16.1
Coffee	23	17.8	12	9.3	94	72.9
Powder juice	39	65.0	6	10.0	15	25.0
Herb tea	34	25.8	11	8.3	87	65.9
Occasional Beverages						
Beer	19	76.0	1	4.0	5	20.0
Wine	15	88.2	1	5.9	1	5.9
Barbamcourt	7	87.5	1	12.5	0	0
Regular soda	20	71.4	3	10.7	5	17.9
Diet soda	7	87.5	1	12.5	0	0
Snacks and cookies						
Salty snack	76	58.5	10	7.7	44	33.8
Sweet cookies	56	78.9	6	8.5	9	12.7

White fleshed sweet potatoes cultivation and seasonality

Haiti has two main seasons: the dry and the wet seasons that vary in themselves depending on the geographic location within the country. According to the survey, there is no particular month of the year in which the participant household grows sweet potatoes. Only 10% of the participants said they plant sweet potatoes in the month of September. For all other months, less than 10% of the participants said they planted sweet potatoes in any given months. Therefore, we conclude that sweet potatoes are planted year round or 'whenever people find enough rain in the area'. Almost 21% of the participants said they consumed more sweet potatoes in the month of April. Besides that, in no other given month does the sweet potato consumption exceed 20%. We also conclude that white fleshed sweet potato seasonality does not have any influence on sweet potato consumption. The participants reported consuming sweet potatoes as well as growing them year round (Table 8).

Almost 70% of the study households cultivated sweet potatoes at or close to the time of survey administration. April and May (19.6%) were the months where the highest percent of households reported consuming sweet potatoes (close to 20% in each month). By contrast, only 10% of households self reported consuming sweet potatoes during February and July. It was common for households to cultivate different kinds of sweet potatoes (45.1%). By contrast only 17% of them cultivated red skin sweet potatoes and 9.2% have cultivated either the white or yellow skin varieties. Orange fleshed sweet potatoes were not available in the study area. When asked, some participant mothers reported not knowing what the orange fleshed sweet potatoes look like because they have never seen the. The vast majority of households (90.8%) had a sweet potato cultivation area less than one quarter ha. Most of the sweet potatoes harvested in the household

were either consumed by the household or sold at the local traditional markets (52.3%). Only 16.4% exclusively consumed the sweet potatoes they grew and only 2.0% of them cultivated potatoes only for sale (Table 8).

Table 8: Sweet Potatoes: use and cultivation

	N	%
Month with high sweet potato consumption		
April	32	20.9
May	30	19.6
February	16	10.5
July	16	10.5
Sweet potato variety cultivated by head of household		
White/yellow skin	14	9.2
Red skin	26	17.0
All kinds	69	45.1
Did not cultivate sweet potatoes	44	28.8
Sweet potato cultivation area (in hectare)		
< ¼	139	90.8
¼ to < ½	2	1.3
½ to < ¾	7	4.6
¾ to 1	2	1.3
>1 ha	3	2.0
Sweet Potatoes Use:		
Sale only	3	2.0
Consumption only	25	16.4
Sale/consumption	80	52.3
Did not cultivate sweet potatoes	45	29.4

Sweet potato consumption and purchase

The great majority of participant mothers (94.1%) had consumed sweet potatoes during the previous 12 months. Almost half bought the sweet potatoes from the local traditional markets, 35.9% obtained the sweet potatoes from their farms, and 7.9% got them from other locations. The sweet potatoes consumed more often were the red skin variety (56.2%), followed by white/yellow skin (21.6%) and both varieties (17.0%). Among

consumers, 37.3% of the participants believed that sweet potatoes were very expensive. It is interesting to notice that 28.1% did not know the cost of sweet potatoes, perhaps because most of these households grew them or obtained them as gifts. About 23% of the participants said that sweet potatoes were not very expensive. Sweet potatoes are sold in bundles or loads called 'lots'. Over half of the respondents indicated that they usually bought from 1 to 2 bundles or loads and 37% reported that they bought over six bundles or loads at a time. The average price for one bundle or load varied as a result of the size of the sweet potatoes. The highest percentage of participants (38.6%) reported an average price for a lot of sweet potatoes to range from US$.66 to US$1 (Table 9).

Almost 40% of sweet potato consumers preferred medium sized sweet potatoes. Interestingly, 20% did not have a preference for a particular tuber size. The remaining consumers preferred small (19%) or large sized (16%) sweet potatoes. (Table 9) Participants prepare the available white fleshed sweet potatoes for consumption in many different ways. However, the preferred method by most of the participant mothers (42.5%) is either boiled (in raw milk of salted water) or fried in vegetable oil. The second preferred way of preparing the white fleshed sweet potatoes is with rice and vegetables combined (28.8%). Following those two methods of white fleshed sweet potatoes for consumption, less than 12 % of the mothers reported preparing sweet potatoes roasted on firewood (11.8%), sweet potato bread, bullet or tom-tom (5.9%), bouillon/stew (3.3%). Almost 8% of the participant mothers reported not preparing sweet potatoes and the rationale behind it is that they do not necessary have to prepare the sweet potatoes at home; when sweet potatoes are prepared in the household, they consume them.

Table 9: Sweet potatoes consumed

	N	%
Sweet potato consumption in past 12 months	144	94.1
Source for sweet potatoes consumed:		
Traditional markets	75	49.0
Farm	55	35.9
Other*[1]	11	7.9
Did not consume sweet potatoes	12	7.8
Kinds of sweet potatoes consumed:		
White/yellow skin	33	21.6
Red skin	86	56.2
Any kind	26	17.0
Sweet potato perceived cost		
Very expensive	57	37.3
Average price	30	19.6
Inexpensive	6	3.9
Don't know	43	28.1
Other*[2]	10	11.1
# of loads*[3] bought at a time		
1 to 2 lots	88	57.5
3 to 6 lots	8	5.3
>6 lots	57	37.3
Average price each time you buy of sweet potatoes		
$0.33 < $0.66	10	6.5
$.66 to <$ 1.00	59	38.6
1.00 to <$1.66	1	.7
> $1.66	27	17.7
Don't buy	56	36.6
Sweet Potato preferred tuber size		
Small	29	19.0
Medium	60	39.2
Large	25	16.3
Any size	30	19.6
Don't know	9	5.9
Methods of preparation	N	%
Boiled or fried	65	42.5
With rice & veggies	44	28.8
Roasted of firewood	18	11.8
Bouillon (stew)	5	3.3
Sweet potato bread/bullet/tom-tom*[4]	9	5.9
Do not prepare	12	7.8

*[1]Other: grow own, gifts
*[2]Other: don't buy but grown own, not applicable
[3]Load of a certain amounts of individual sweet potatoes

*[4]The sweet potato bread, bullet and tom-tom are three special mixed dishes prepared with sweet potatoes. Complete description is provided in the focus group discussion analysis.

Sweet Potato Preferences

The OFSP could not be found at the time of the study either at the farmer's gardens or at the markets. However, the white fleshed sweet potato is the most common in the study area. The participants nevertheless identified the kinds of sweet potatoes available in the area according to their skins. For example, 17% of the participants said they preferred to grow the red skin sweet potatoes in their garden because they are sweet and dry. We could not find any participants who said they preferred to plant white skin sweet potatoes alone. Those who planted it did so in association with the red skin. For example, 45% said they preferred to plant together red, white and yellow skins of sweet potatoes in their gardens. White and yellow skins together were reported to have been planted by 9.2% of the total households participating in the study. Also, 28.8% of the participants did not raise sweet potatoes in the last agronomic season. While sweet potato was consumed by all the survey participants, a wide range of preparation methods were used. The most popular methods were boiling/frying (42.5%) followed by mixing with rice and vegetables (28.8%), roasted on firewood (11.8%), bouillon (3.3%) and (7.8%) of the participants reported using it as sweet potato bread, bullet and tom-tom (Table 10).

Meal skipping habits

The vast majority of participant mothers (94.1%) were responsible for preparing the meals at home. 70% of them were the ones who make the shopping for the households. About a third of the participant mothers reported that shopping was done by other people in the household like husbands and boyfriends (Table 10).

The concept of meals broken down as breakfast, lunch and dinner does not have the same meaning in Haiti as in other societies. For example, in the study communities breakfast means having as much as a cup of coffee or eating a mango or orange juice or just a piece of sweet potato in the morning. Over 95% of the participants stated that they have had breakfast in the past 7 days and about three quarters said they had it every day. A similar proportion of participants reported having lunch in the past 7 days and 71.2% reported having lunch everyday. About 80% of the participants reported having had dinner in the past 7 days but only 59.5% reported doing so every day. Financial problems were reported as their primary reason for skipping meals (Table 10).

Street Foods in past 12 months

Over 33.0% of the study participants reported that they had eaten foods on the streets during the 12 months preceding the survey. The main reasons for doing so were: no foods at home (18.3%), being far from home trading at the market (15.7%) and hungry while on the streets (14.4%). Almost 16% of the study participants reported consuming lunch, 13.1% consuming breakfast and 3.3% consuming other meals on the streets during the previous year. (Table 10) Among the study participants who ate on the streets 10.5% reported consuming dishes prepared with sweet potatoes, 5.9% reported consuming foods on the street on a weekly basis as opposed to 3.9% who did so on a bi-weekly basis. About 7% consumed dishes prepared with boiled sweet potatoes, fried plantain and sauce and 2.1% of the participants consumed dishes prepared with sweet potatoes along with leafy green vegetables, corn meal and beans. About one-fifth of the participants could not remember the content of the dishes that they ate on the street in the past 12 months (Table 10).

Table 10: Meal skipping habits

Person doing cooking at home		
Respondent	144	94.1
Other*	9	5.9
Person doing household food shopping		
Respondent	101	66.0
Other*	52	34.0
Breakfast in past 7 days	148	96.7
< 3 times	12	7.8
3 to 6 times	21	13.7
All days	115	75.2
Lunch in past 7 days	145	94.8
< 3 times	17	11.1
3 to 6 times	19	12.4
All days	109	71.2
Dinner in past 7 days	123	80.4
<3 times	8	5.2
3 to 6 times	24	15.7
All days	91	59.5
Eating on the street in past 12 months	51	33.3
Reasons		
Hungry in the street	22	14.4
Trading in the market	24	15.7
No food at home	28	18.3
Types of foods eaten in the street in past 12 months		
Lunch	24	15.7
Breakfast	20	13.1
Other*	5	3.3
Sweet potatoes dishes in the street in past 12 months		
Every day	16	10.5
Once/week	9	5.9
Twice/week	6	3.9
Dishes consumed in the streets:		
Sweet potatoes with plantain, sauce	11	7.2
Mixed dishes with sweet potatoes	3	2.1
Can't remember	37	22.2

Other*: snack, dinner, all types in one day

Obesity rate is still low in Haiti now. However, experts believe that the country is in the early stages of the nutrition transition phase and if nothing is done at this level, it will be apparent in the decades to come (Pérez-Escamilla, personal communication). According

to our study, almost 29% of the participants were underweight, 13.1% overweight and 2.6% obese (Tables 11, 12).

Table 11: Maternal and child anthropometrics

Maternal	Min	Max	Mean	SD
Weight (kg)	29.7	92.8	54.3	±9.5
Height (m)	1.1	1.9	1.6	±0.1
BMI (kg/m^2)	11.6	35.5	21.6	±3.6
Infant				
Weight (kg)	6.5	28.6	12.2	±3.0
Height (m)	0.5	1.4	0.8	±0.1
BMI (kg/m^2)	8.0	27.0	16.4	±3.0

Table 12: Maternal BMI

	N	%
underweight (<20 kg/m^2)	44	28.8
normal range (20-< 25 kg/m^2)	85	55.6
pre-obese (25-< 30 kg/m^2)	20	13.1
obese (> 30 kg/m^2)	4	2.6

Child nutritional indicators (height for age, weight for age and weight for height) were computed using the height, weight and age compared with the WHO child growth standards. The data show that over 42% of the children were stunted (height for age) and over 22% of them were severely stunted (for the same indicators). The data also indicate that over 18% of the children were undernourished (weight for age) and almost 6% of those who were undernourished were severely undernourished (for the same indicators). Almost 5% of the study children were shown to be wasted (weight for height) and less than 1% of them were severely wasted (for the same indicators (Table 13).

Table 13: Child's nutritional indicators

Height for age	N	%	z-score range
Stunted	61	42.7	-2.01 to -5.81
Not stunted	82	57.3	
Severely Stunted	32	22.4	-3.02 to -5.81
Not severely stunted	111	77.6	
Weight for age			
Undernourished	28	18.3	-2.06 to -4.15
Not undernourished	125	81.7	
Severely undernourished	9	5.9	-3.81 to -4.15
Not severely undernourished	144	94.1	
Weight for height			
Wasted	7	4.8	-2.06 to -3.16
Not wasted	138	95.2	
Severely wasted	1	.7	-3.16 to -3.16
Not severely wasted	144	99.3	

Assessment of severity of household food insecurity

The food security questionnaire contained 16 items, 9 of them addressed the adults and the remaining 7 addressed the children living in the household. The questions were asked in relationship to the three months preceding the survey administration. Almost 89% of the adult participants stated that they ran out of foods at some time in the past three months, 72.5% of them stated that they worried that they might run out of food, 71.9% that they were unable to eat healthy foods. Almost two-thirds of adults living in the household ate the same type of foods (64.7%), 63.4% didn't eat for a whole day or only once, and 13.1% reported having done embarrassing things like begging or sending theirs to work for food (Table 14).

Almost 80% of the respondents indicted that they couldn't serve enough food to their children, 61.4% reported that their children ate the same kind of foods almost everyday,

56.2% reported that they could not provide healthy foods to their children, 49% let their children go the bed hungry, and 54.9% that their children used to eat only once a day or did not eat for a whole day. None of the participants were found to be food secure. We found that 43.8% of participant mothers were moderately food insecure, 49.0% others were very food insecure and the remaining 7.2% of the participants were extremely food insecure (Table 14).

Table 14: Food security assessment during previous 3 months (N=153)

Adult Items	N	%
Worried of running out of food	111	72.5
Ran out of food at any time	136	88.9
Unable to eat healthy foods	110	71.9
Eating same types of foods	99	64.7
Meal skipping	92	60.1
Eating less than needed	108	70.6
Hungry but didn't eat	90	58.8
Didn't eat for whole day or only once a day	97	63.4
Did embarrassing things	20	13.1
Child items		
Couldn't provide healthy foods	86	56.2
Eat same food almost every day	94	61.4
Ate less than needed	119	77.8
Served child less food	119	77.8
Felt hungry but couldn't feed child	86	56.2
Went to bed hungry	75	49.0
Didn't eat for the whole or just once a day	84	54.9

Study 2: Focus Groups panels (N=22)

The transcripts of the FG were analyzed by the study field coordinator, and two nutritionists (Rafael Pérez-Escamilla and Amber Hromi-Fiedler). The goal of this analysis was for each of the analysts to identify common themes and sub-themes and to

extract representative quotes to represent them. The independent analysis of each individual was followed by a consensus meeting where all three analysts met to present their results to each other. At this meeting final decisions were made regarding major themes identified. The focus groups materials, consent forms and transcripts are presented in Appendices 7, 8 and 9.

The mean ages of the participating mothers and of their children were 31.8 years and 33 months, respectively. Almost 55% of the mothers reported to have had between 1 and 4 deliveries and 45.4% of them reported to have had between 5 and 15 births. Twenty seven percent of the mothers had given birth to children who died before they were 1 year old. Only one mother (4.5%) gave birth to a still born. The majority of participants (68%) did not have any formal schooling at all, 9% attended elementary school and 13.6% were HS graduates. Half of the participants reported to be living in common law unions and 31.8% to be married. About 18% of the participants were single, never married, separated, divorced or widowed. Over half of the participants (54.5%) worked part-time, 31.8% worked full-time, and 13.6% were unemployed. The great majority of the participants (86.4%) reported to have a monthly income between 1 and $30.00. 9.1% between 31 and $60.00 and 4.5% between 61 and $120.00 (Table 15).

Table 15: Participant characteristics: Focus groups panels (N=22)

	N	%
# of child births		
1 to 4	12	54.5
5 to 8	9	40.9
9 to 15	1	4.5
Highest grade in school		

No formal schooling	15	68.2
Completed/incomplete elementary	4	9.1
HS graduate	3	13.6
Marital status		
Common law	11	50.0
Married	7	31.8
Other*[1]	4	18.2
Current employment status		
Working part-time	12	54.5
Working full-time	7	31.8
Unemployed	3	13.6
Monthly income		
From 1 to 30 US$	19	86.4
From 31 to 60 US$	2	9.1
From 61 to 120 US$	1	4.5

Other*[1]: single, never married, separated, divorced and widowed

Major Themes

The two major themes identified were 'sweet potatoes' and 'sweet potato leaves'. The sub-themes identified within each major theme are presented in the following section.

Sweet Potatoes

Sweet potatoes are widely consumed (Appendices 9, 10, 11, 12, 13)

The first major theme that emerged form the FG was that sweet potatoes are widely consumed. The following representative quotes illustrate this point. (Appendices 14,15)

'…everyone here eats sweet potatoes.' (participant 1, FG 1)

'I think that every one on earth likes sweet potatoes.' (participant 4, FG 2)

Participants rationalized this widespread acceptance of sweet potatoes as part of their diets to a number of attributes including:

Enjoyment

'I eat sweet potatoes for several reasons. First because I like to eat them a lot, second because it is easy to grow and because it fills me up easily and it is sweet and dry at the same time.' (participant 3, FG 2)

'…sweet potato is one of the foods that when you start eating it you can't stop…' (participant 8, FG 1)

Nutritional value

As shown through the following representative quotes, participants thought of sweet potatoes as being very nutritious. Indeed they thought that they were very good sources of vitamins, protein, and energy. Several participants believed that sweet potatoes contained 'milk'.

'I eat sweet potato because it contains lots of vitamins…' (participant 1, FG 1)

'I eat sweet potatoes because they contain lots of milk in them…' (participant 3, FG 1)

'…sweet potatoes are good in legume…' (participant 5, FG 1)

'Sweet potatoes contain lots of proteins…' (participant 11, FG 1)

'When I boiled the red and white skin sweet potatoes, everyone in the household eats a piece and are ready to face the day ahead…' (participant 12, FG 1)

'I like consuming sweet potato because it contains lots of vitamins in it…' (participant 1, FG 2)

'I like all kinds of sweet potatoes because they all contain lots of vitamins…' (participant 2, FG 2)

'I eat sweet potato because it is a good source of nourishment for the body…' (participant 5, FG 2)

'I eat sweet potato because it contains proteins and vitamins…' (participant 8, FG 2)

'I like to eat sweet potato because it contains more vitamins that any other foods as well as lots of proteins…' (participant 9, FG 2)

'Sweet potatoes are among the good foods that release great amount of vitamins into our body.' (participant 4, FG 2)

Health promotion properties

Consistent with the participants' perception of sweet potatoes as being highly nutritious, they also felt that they had a positive impact on their health. Specifically, they linked sweet potato consumption with improved child growth and development, improved gastro intestinal tract function, anemia amelioration.

'I know that sweet potato is good for bones growth and development and it contains lots of milk in it…' (participant 9, FG 1)

'The main reason why I eat sweet potato is because they are good for my body…' (participant 3, FG 2)

'When I eat sweet potato, my stomach feels good…' (participant 7, FG 2)

'…I eat sweet potatoes it is because they are good treatment for anemia.'. (participant 4, FG 1)

'I used to hear people say that nurses at the hospital or the dispensary encouraged then to eat sweet potatoes for more blood and to combat anemia.' (participant 3, FG 2)

'The first time I knew that sweet potatoes are good for health was when my daughter became anemic.' (participant 8, FG 2)

'Sweet potatoes are very good for our chest and stomach. They give strength and energy.' (participant 3, FG2)

Tradition/Religion

Participants thought of sweet potatoes as part of their cultural traditions that get transmitted from one generation to the next. They also found a specific traditional use of sweet potatoes for weaning their children from the breast.

Family tradition

'I saw that my father grew it [sweet potatoes] a lot in his gardens...' (participant 9, FG 1)

'I grew up seeing my parents eating sweet potatoes.' (participant 7, FG 2)

Infant feeding traditional practices

'I used sweet potato as a weaning food for my reference child. Here is how I did it: The day before, I fetched for the sweet potato I know that my child liked and put it in the house for her to see. At sun down, I put the sweet potato on fire wood and let it there until it is cooked. I do not give the sweet potato to her at night. Early in the morning before brushing my teeth and before greeting anyone, I stepped outside the room and left the door half way open. With part of my body hidden behind the door, I called my child's name. She woke up and took the sweet potato from me without seeing my face and ate it. Since that day, her appetite for breast milk started to fade away until the day he did want to touch my breast any more…' (participant 7, FG 1)

'I weaned my youngest child with a piece of sweet potato burnt on firewood… My mother taught me to burn a piece of sweet potato on firewood on the afternoon. At night, I placed it under my pillow for a while and then covered it with a bed pan for the whole night. Early in the morning, I woke up and left the door half way open and half way closed. With one foot inside and the other outside the room, I handed the sweet potato over to my child while saying: "This is what mom gives to you to forget taking the breast milk"…..' (participant 3, FG 1)

'…when I was taking my children off breast milk, I boiled the sweet potato in milk and feed them with it. When they are consuming the milk in the sweet potato, they believed it was the same as the breast milk…' (participant 8, FG 1)

'…You can also use the sweet potato to wean your children as well…' (participant 10, FG 2)

'When I planned to stop Breastfeeding my (study) child, I boiled the sweet potatoes in raw milk and fed it to the child. I do that over and over again until the child refuses to take the breast milk.' (participant 2, FG 2)

'What I used to do is that I boil the sweet potato that is sweet and fed the child with it as the child is still taking breast milk. As time goes by, I used more sweet potatoes with raw milk and less breast milk until the child has lost all the appetite for the breast milk.' (participant 6, FG 2)

'When I am weaning my children, I have to have more sweet potatoes available at home. The only time I breastfeed the child is around noon. In the morning and the afternoon, I feed the child with sweet potatoes and milk.' (participant 10, FG 2)

One participant reported that 'sweet potatoes are foods created by god. That's why I eat them' (participant 2, FG 1)

Convenience

Participants perceived that sweet potatoes were suitable for growing and that they were

relatively easy to prepare for family consumption.

'I eat sweet potatoes because I can grow them in my garden.' (participant 7, FG 1)

'…when you have sweet potato at home, you have food that is almost ready for consumption at anytime…' (participant 10, FG 2)

Sweet potato consumption among children

Children were commonly fed sweet potatoes. In addition to traditional uses for weaning children from the breast, sweet potatoes were also fed for nutritional and health reasons to children.

'My child is one year old and I feed her sweet potatoes at least two times a week…' (participant 1, FG 1)

'My child is 2.5 years old...He likes sweet potatoes a lot…' (participant 2, FG 1)

'My child is almost 5 years old. I used to feed him with sweet potatoes more than 3 times a week when they are available…' (participant 3, FG 1)

'Sweet potatoes are not only good for grown ups but also for children because the body can get the necessary vitamins it needs…' (participant 10, FG 2)

In summary, these findings indicate that sweet potatoes are widely consumed and enjoyed in the community. Indeed sweet potatoes are part of the cultural heritage and are considered to be quite nutritious and healthy. However, it is important to recognize that as illustrated by the following quotes, several participants did report possible negative consequences related to excessive sweet potato consumption, especially heartburn and other gastro intestinal conditions.

'For me and for some people, sweet potato consumption is the main source for heart burn, stomach acid, gas and diarrhea…' (participant 3, FG 1)

'I don't like any particular characteristics in a sweet potato. I just like it even when I eat it gives me heart burn, I still eat it…' (participant 1, FG 1)

'… most of the time, they give me heart burn when I eat them too much…' (participant 8, FG 2)

'In some rare cases, sweet potatoes can cause heart burn…' (participant 3, FG 2)

'I usually have heart burn when I eat the roasted sweet potatoes.' (participant 8, FG 2)

'…people say that if you feed your child with sweet potatoes more than once a week, the child may have diarrhea…' (participant 3, FG 1)

Whatever the negative consequence of eating sweet potatoes may be, this does not appear to be a major issue as in FG2 when prompted by the moderator, only 2 out of the 10 participants reported that sweet potatoes had made them sick before.

It is important to note that one participant did not like sweet potatoes but for reasons unrelated to health.

'*I don't like sweet potato that much. It is not because it causes harm to me. Mostly, I don't like their colors. This attitude is not only toward sweet potatoes but also towards other vegetables as well. For example, I don't like the color of pumpkin and because of that I don't eat it that much…'* (participant 8, FG 1)

Access to sweet potatoes

Participants reported that they either grew the sweet potatoes themselves in their home gardens and/or that they purchased them in the market.

Home grown sweet potatoes

'I eat sweet potatoes because I can grow them in my garden. I don't usually buy it because they are very expensive at the traditional market.…' (participant 7, FG 1)

'…when sweet potato is not raised in my husband's garden, I can't afford buying them…' (participant 12, FG 1)

'When I harvest sweet potato from my garden, I use to eat it every day…' (participant 3, FG1)

'I consume sweet potato that come from my own garden…' (participant 7, FG 1)

'I eat sweet potatoes mostly from my garden…' (participant 10, FG 1)

'When the sweet potato is ready from the garden, I can eat it three times in a week…' (participant 10, FG 2)

Household production appears to be an important source of these tubers. Indeed, in FG 2 after prompting from the moderator, 4 out of the 10 participants reported growing all the sweet potatoes that they consume.

Access through market

Markets were important sources for sweet potatoes as well. Markets either supplemented home production or were the source of all the sweet potatoes consumed at home.

'When I don't grow sweet potato or I am waiting for the one from my garden to get ready for consumption, with money on hand, sweet is not difficult to find. It is found great quantity at the traditional markets…' (participant 1, FG 1)
'When I don't grow them, I usually buy them at the traditional market...' (participant 2, FG 1)

'I can find or get sweet potatoes at any time. I may not be able to buy it but I always see it available on the market…' (participant 1, FG 2)

Agronomic issues and seasonality

Participants believed that the type of soil where sweet potatoes are grown determines the sensory attributes of the crop. Participants agreed that the planting and harvesting of sweet potatoes was seasonal, although there was disagreement as to when the sweet potato seasons were. This is perhaps explained by participants' reports indicating that this may vary by community location. One participant commented on the importance of access to transportation to markets, for market supply of sweet potatoes to actually reflect the agricultural seasonality of their cultivation.

'The type of land you raise your sweet potato determines whether your sweet potatoes will be sweet and dry…' (participant 6, FG 1)

'Any sweet potato that is grown in a cold soil will eventually be too soft and moist. Dry soil gives you better sweet potatoes…' (participant 7, FG 1)

'The type of land where the sweet potatoes are planted will determine how long they will take before they are ready for consumption…' (participant 2, FG 1)

'…sweet potatoes are always available every two or three months on the community…' (participant 4, FG 1)

'When sweet potato season arrives, my household and I eat it (sweet potato) sometimes three times a week.' (participant 7, FG 2)

'I think that there are two sweet potato seasons in my community: August and December.' (participant 1, FG 2)

'…season begins in September and ends in August…' (participant 2, FG 2)

'…in my community…at home, we start harvesting sweet potatoes in November through December.' (participant 3, FG 2)

'During the months of October and November, we plant sweet potatoes. The harvest time is April and March.' (participant 3, FG 2)
'The real sweet potato season where I come from starts in August and ends in December.' (participant 6, FG 2)

'June and July are when we have sweet potatoes in abundance where I come from.' (participant 9, FG 2)

'…at the market. Sometimes, they [sweet potatoes] are very expensive and sometimes they are not.' (participant 10, FG 2)

'To me, the real season of sweet potatoes depends on whether or not the peasants are able to get the sweet potatoes from the high mountains to the markets.' (participant 10, FG 2)

Preferred sweet potato varieties

Findings from both FG clearly indicated that the red skin sweet potato is by far the preferred variety. This is illustrated by the fact that in FG 2, 7 out of 10 participants chose this variety when asked to vote on which variety they preferred. This preference is also demonstrated by several quotes, although some participants enjoyed equally all varieties.

'I like them all…' (participant 5, FG 1)

'I don't discriminate about sweet potato…' (participant 7, FG 1)

Sensory attributes

When asked to explain their preference for the red skin variety, the main attributes that came up were sensory in nature. Specifically, the participants felt that the dryness and sweetness characteristic of this variety made it ideal for consumption and enjoyment. This is illustrated by the following quotes:

'There are red skin sweet potatoes that are very sweet and dry. I think that the red skin sweet potatoes are dry enough to prepare tom-tom with…' (participant 1, FG 1)

'The red skin [is better to prepare tom-tom] because it is dry and sweet…' (participant 12, FG 1)

'The red skin sweet potato is the one that I used to eat because it is not only sweet but also dry as well…' (participant 9, FG 1)

'I eat sweet potato because it is a good fruit. It is sweet…' (participant 7, FG 2)
'Another reason why I eat sweet potato is because it is sweet and dry…' (participant 8, FG 2)

It is important to report that the sensory attributes preferred by adults were not necessary the same ones they thought were ideal for their children.

'I like the one that is dry and sweet fro myself but my child likes the one that is soft…' (Participant 3, FG 1)

Sweet potato preparation

As shown by the following quotes, participants reported preparing sweet potatoes boiled, roasted and/or fried and to consume them by themselves or as part of more elaborate traditional dishes (e.g. Tom-Tom, sweet potato bread) with or without special sauces.

'I used to prepare sweet potato in different ways: sometimes I use to boil it in water with salt or in milk or fry it or sweet potato tom-tom…' (participant 1, FG 1)

'I used to burn it on fire woods…' (participant 2, FG 1)

'The most common ways that I prepare the sweet potatoes is to boiled in raw milk. I use to fry the sweet potatoes along with plantain and bread nut…' (participant 5, FG 1)

'At a personal level, I rarely eat sweet potato along. I always accompany it with yam, amaranth, and other leafy green vegetables. However, my children like to eat the sweet potato by itself because it is sweet.' (participant 6, FG 1)

'I don't have a particular way of preparing sweet potato to eat. I can boil it in milk or in water. I can also put it in stew (bouillon), or fry it…' (participant 8, FG 1)

'I use to boil the sweet potato and eat it with either sauce [fish, herring] or eat it with milk…' (participant 12, FG 1)

'I use to roast or boil it [sweet potato] for myself and for my (study) child…' (participant 7, FG 2)

'I…roast or boil sweet potatoes in raw milk' (participant 1, FG 2)

'…boiling them in either water with salt or in raw milk. I also prepare (boil) them to be eaten with sauce made up of fresh or salty fish.' (participant 2, FG 2)

'I…roast the sweet potatoes on fire woods.' (participant 4, FG 2)

'What I do with sweet potatoes most of the time is either boil in raw milk or fried them.' (participant 5, FG 2)

'I like eating roasted sweet potatoes. I also use to fry or boil them in raw milk.' (participant 6, FG 2)

'I boil them in water and then we eat them with sauce…' (participant 8, FG 2)

- **Tom-tom**

'[To prepare sweet potato tom-tom] I used to put together corn flower, wheat flower or France flower with sweet potato, malanga and plantain. I left them to boil together. When I think that everything is well cooked, I put them in a 'pilon' to mix everything together very well done. Then I take the mixture out of the pilon and put it into plates to serve to family members. The best way to eat the tom-tom is to have either bean sauce or okra sauce and everyone will eat it all the way…' (participant 2, FG 1)

*'Here is the way is that I prepared the most recent sweet potato tom-tom I have consumed: I boil the corn flower and the sweet potato separately. I put both of them in the **pilon** and then mix them together. When the mixture is ready, I eat the whole thing with okra sauce.'* (participant 1, FG 1)

'The way I use to do it is that I buy already made cassava bread and put it in very warm water. Second, I boil the sweet potato. When the sweet potato is ready, I put it in the ***pilon*** *to mix it with the cassava bread. When I am done, I eat my tom-tom with okra sauce…'* (participant 3, FG 1)

'I…prepare tom-tom with breadnuts, yucca and sweet potatoes.' (participant 3, FG 1)

- **Sweet potato bread**

'I used to dry the sweet potato up for a couple of days and then add water to it along with kernel, sugar, milk and so forth if they are available to me. Then I put the mix in a plate and put it in a stove made with dried dirt for three to four hours. When it is cooked all the way, I share it with my family members as well as with visitors…' (participant 9, FG 1)

'Not everyone likes milk to be in their sweet potato bread…' (participant 1, FG 1)

Sweet potato frequency of consumption

Participants reported to consume sweet potatoes at least 2 to 3 times per week when available.

'I eat sweet potato at least twice in a week…' (participant 11, FG 1)

'It is not uncommon for me to spend two or three months without eating sweet potatoes…' (participant 12, FG 1)

'When I harvest sweet potato from my garden, I use to eat it every day until it is finished…' (participant 3, FG 1)

'…almost every three months I harvest sweet potatoes and that allows me to eat it at least twice a week...' (participant 4, FG 1)

'When there is a lot of sweet potato, for everybody at my house, it is time to eat sweet potato all the time…' (participant 10, FG 2)

'When I can, I eat sweet potato twice or three times a week and even more in its season…' (participant 9, FG 2)

'…I regularly consume them at least two times a week…' (participant 8, FG 2)

'I eat sweet potatoes more than two times a day because every body at home likes them a lot.' (participant 3, FG 2)

Sweet potato perceived cost

Overall, participants perceived sweet potatoes to be quite expensive. In fact, several participants indicated that they simply could not afford buying them and that they could only consume them when they grew them at home.

'I don't usually buy it [sweet potatoes] because they are very expensive at the traditional market…' (participant 10, FG 1)

'I use to buy some at the traditional market for about $4.00 Haitian or 0.6 cents each time…' (participant 11, FG 1)

'…the farmers sell them to the traders who sell them in retail by small piles of 4, 6, 7 sweet potatoes called 'Lot'…' (participant 4, FG 1)

'*If you buy a lot (pile) of sweet potato for 10 gourdes [0.33 cents], in December, in April I may pay between 25, 35 gourdes [from 0.80 to $1.00]'* (participant 4, FG 1)

'Sweet potato is more expensive according to a certain time of the year. For example, where there is a lot of it, it is not expensive at all. When there is less to harvest in the gardens, it is more expensive.' (participant 1, FG 1)

'…regardless of what other people are saying, sweet potato is very expensive for me.' (participant 3, FG 1)
'I do think that sweet potato is very expensive even when there seem to have lots of it at the traditional markets.' (participant 7, FG 1)

'We don't eat it every day. For example, if the sweet potato we planted is not ready, we don't have enough money to buy on the market…' (participant 10, FG 2)

'Sometimes, I spent two or three months without consuming sweet potatoes because it is not cheap to get…' (participant 9, FG 2)

'Because I don't raise sweet potatoes, I have to buy it at the traditional markets. That is why I eat them (sweet potatoes) only once a week but not because we don't like them at home.' (participant 1, FG 2)

'I find sweet potatoes to be cheapest in the month of November.' (participant 7, FG 2)

'When it is sweet potato season, it is not expensive. It is very expensive when it is it not easy to find.' (participant 2, FG 2)

'I seldom use to prepare sweet potato bread because it can be very expensive…' (participant 10, FG 2)

Even though the overall impression is that the participants found sweet potatoes expensive and often times inaccessible because of cost, two participants reported using sweet potatoes when nothing else was left to eat. Perhaps it is because they raised them at home.

'Sometimes when nothing else is available in the household I use to it sweet potatoes 3 times a day…' (participant 6, FG2)

'I can't really count how many times I eat sweet potatoes in a typical day. Where this is all there is I eat them as I feel hungry during the day whether I am on the field or at home.' (participant 4, FG2)

In response to prompting by moderator FG1 participants felt that in relationship to sweet potatoes yams were more expensive. A participant also reported that malanga was more expensive than yams.

'...in some localities like where I come from malanga is even more expensive than yam' (participant 5, FG1)

Orange Fleshed Sweet Potato

Participants indicated that they did not consumed Orange Fleshed Sweet Potato (OFSP). Some participants remember seeing OFSP in their communities many years ago. For reasons they did not understand, OFSP disappeared from the land and markets in Haiti.

'A very long time ago since I saw it…' (participant 2, FG 1)

'It is not easy to find it [Orange Fleshed Sweet Potatoes] both at the market or the field. The vines of the orange fleshed sweet potato are more difficult to find now than it was in

the past. In my community, people used to call it 'Madan abitan' (peasant's wife)…' (participant 3, FG 1)

'It is very rare to find at the markets because their vines have been destroyed over the years.' (participant 5, FG 1)

When prompted by the moderator, seven of the twelve FG1 participants raised their hands to say that they had seen OFSP in the past. Likewise, when prompted by FG1 moderator, 11 out of the 12 participants indicated they would be interested in growing OFSP in their gardens if this variety became available again in Haiti.

Vitamin A knowledge

Because we were interested in the potential improvement of vitamin A intakes via OFSP, participants were probed for their vitamin A knowledge. Overall, they believe that vitamin A was need for good health and that it was found in yellow fruits, green leafy vegetables, and many other foods, some of which are indeed good sources of vitamin A.

'It [vitamin A] is something you get when you eat lots of yellow fruits like eggs, banana, and milk.' (participant 1, FG 1)

'It [vitamin A] is something you can find when you eat lots of green leafy leaves like water cress, apricot, and banana.' (participant 2, FG 1)

'It [vitamin A] is important for health because it contains iron in it.' (participant 3, FG 1)

'I heard it can be found in yellow foods that we are eating. Those foods are good for both adults and children.' (participant 7, FG 2)

The following foods were reported to be rich in vitamin A by different FG1 participants: green leafy vegetables (n=3), carrots (n=1), sweet potatoes (n=1), mango (n=1), banana, papaya, avocado, yam, malanga, eggs, apricot beans, meat, sorghum, bread fruit, cassava.

The following foods were reported to be rich in vitamin A by different FG2 participants:

mangoes, papaya, apricot, sweet potato, eggs, plantain, banana, pumpkin, avocados, corn, fruit juice and juices made out of green leafy vegetables, beans, beets.

Vitamin A supplementation

Participants also reported that themselves and their children had received vitamin A supplements in the past. Indeed, when prompted by FG2 moderator, all participants indicated that their children had previously received vitamin A supplements. Also all the participants indicated that they feed the study child vitamin A rich foods about three times per week.

Sweet Potato Leaves

An important goal of our study was to assess if the target communities consumed sweet potato leaves and if not, why. We were also interested in finding out if they would be willing to consider incorporating them into their usual diets.

Some participants had never consumed sweet potato leaves even though they did consume other types of leaves. Most of them associated sweet potato leaves as food for animals and were indeed surprised to be asked this question.

'I haven't heard the notion of eating sweet potato leaves before today…' (participant 2, FG 1)

'I never consumed sweet potato leaves because my family never did when I was a little. Yet, the sweet potato is consumed a lot in my family.' (participant 5, FG 1)

'I have never heard about consuming the sweet potato leaves. The only thing I know the sweet potato leaves are good for is to wash hair…' (participant 3, FG 1)

'At home, we use the sweet potato leaves only to feed our animals.' (participant 12, FG 1)

'I never consumed sweet potato leaves because I have never heard of anybody who did it before. I think I might try is some day.' (participant 4, FG 1)

'…I have never seen my mother eaten them…'(participant 3, FG 1)

'The idea of people eating sweet potato leaves is totally new to me.' (participant 3, FG 2)

' I did not know that people could eat sweet potato leaves. As a matter of fact, I have never seen people selling them at the market.' (participant 4, FG 2)

'….I thought only animals consumed sweet potato leaves … I am glad to learn that today. I will start preparing dishes with sweet potato leaves soon and see how they taste.' (participant 5, FG 2)

'I personally will try sweet potato leave dishes at home. However, I don't know how much I will like them.' (participant 6, FG 2)

Health properties of sweet potato leaves

Other participants reportedly had previously consumed sweet potato leaves and considered them to be part of a healthy diet for both adults and children. Indeed, in response to the moderator's question 5 of the 12 FG1 participants raised their hands to indicate that they had consumed sweet potato leaves in the past. When prompted by moderator, 3 out of the 10 FG2 participants indicated that they had eaten sweet potato leaves before.

'I would say instead that the sweet potato leaves are the ones that are food for health because they contain lots of vitamins in them, not the sweet potatoes in themselves…' (participant 2, FG 1)

'*I used to consume the sweet potato leaves because it is good for anemia…'* (participant 6, FG 1)
'The reason why I started to eat the sweet potato leaves years ago was because I was sick with a hemorrhage...' (participant 9, FG 1)

'From time to time, I cook sweet potato leaves along with other green leafy vegetables because of their great health values.' (participant 9, FG 2)

'When there is a case of anemia in the household, I used to take the buds of the sweet potatoes and prepare them for the sick individual. I find out that sweet potato leaves are

very effective in fighting anemia, especially among children in soup, bouillon (stew)' (participant 9, FG 2)

'Sweet potato leaves are good for pregnant women. They cause the early release of breast milk after delivery and keep the breast milk flowing without interruptions.' (participant 8, FG 2)

'I used to give sweet potato leaves to my child when I serve tea to the child.' (participant 8, FG 2)

'When I am nursing, I do not feed the child with sweet potato leaves. I eat them and the child eats them from me in the form of the breast milk. It is not a good idea to feed young children with either sweet potato tubers or sweet potato leaves or any kinds of leaves. When the child is old enough then it is good to do so.' (participant 9, FG 2)

Preparation Methods

In terms of method of preparation 3 participants reported consuming raw sweet potato leaves.

'I used to eat the terminal buds with water cress.' (participant 6, FG 1)

'I use to eat the terminal buds with salt.' (participant 9, FG 1)

'I always use the terminal buds in stew, leafy dishes and for salad as well. I never used the mature or fibrous leaves.' (participant 7, FG 1)

'I think that sweet potatoes are good for my health. The buds for example are good medicine against anemia.' (participant 1, FG 2)

'I put the sweet potato leaves together with carrots and crush them together. Then I add water or milk and sugar to make a delicious juice out of it.' (participant 1, FG 2)

Willingness to pay

Participants were divided as to whether they would be willing to pay or not for sweet potato leaves, as shown by the following quotes.

'I would not buy them because I have them in my gardens…' (participant 1, FG 1)
'I would have bought them to cook as I always did for other leafy green vegetables.' (participant 10, FG 1)

In summary, some participants had previously eaten but the majority had never consumed sweet potato leaves. The main reason for not doing so was the perception that they were

only suitable for animal feed. However, after realizing that they may be suitable for human consumption as well, most participants indicated their willingness to try dishes prepared with sweet potato leaves. Indeed, when prompted by the moderator, 7 out of the 12 FG1 participants indicated their willingness to taste a dish made with sweet potato leaves. When prompted by moderator, all 10 FG2 participants indicated their willingness to taste a dish made with sweet potato leaves. These findings provided the justification needed for conducting the last phase of the study involving a sensory analysis of traditional local dishes prepared with these leaves.

Study 3: Sensory Analysis (*N=36)*

The literature supports the fact that green leafy vegetables are rich in B-carotene (a vitamin A precursor). Thus, we conducted sensory analysis on traditional of traditional dishes containing local sweet potato leaves which were kindly provided to us by The Organization for the Rehabilitation of the Environment (ORE).

Identification and collection of sweet potato leaves

First, the student investigator along with the head agronomist at ORE conducted field observations to identify the sites where the sweet potatoes leaves were going to be collected. For the leaves to be included, they needed to be between two and three months old and intact from any insect bites. After several fields were visited we reached agreement on a particular one that stood out or having sweet potato plants with healthy and dark colored leaves. Second, a farmer who raised sweet potatoes on his own, (an ORE employee) was scheduled to collect the sweet potato leaves from an ORE sweet potato field. The farmer was instructed to collect the first three leaves on the top of the

vine in an attempt to include the less fibrous leaves in the dishes that were going to be prepared for the sensory analyses. The dishes were carefully prepared by women farmers. Sweet potato leaves were not usually consumed in the target communities. Thus, the cooks were asked to prepare the sweet potato leaves the same way they prepare other leaves that consumed. As a result two different dishes were prepared, one clinch and one in the form of sweet potato salad. (Appendices 6, 17, 18, 19) The dish preparation and sensory analyses took place the same day the leaves were collected from the field. 91.7% of the participants for this study were recruited in their homes and 8.3% were recruited in their place of work. The recruitments were made a week before the scheduled date for the sensory analysis. 66.7% of the participants came from the first district, 16.7% equally came from the second and the third district. The mean maternal age was 31.44 years (SD: ±6.801).

In terms of educational status, 44.4% of the participants did not complete elementary school, and one- quarter of them had no formal schooling at all. Less than a quarter of the participants had completed high school. Over 58% of the participants were living in common law, and 31% reported to be married. A little over 11% were single or never married or separated or divorced or widowed.

Monthly income of participating households

Almost 42% reported to have been employed part time, 31% reported to be working full time, and almost 30% were unemployed. Over 63% of the mothers participating in the sensory analysis panel had a monthly income ranging from $1.00 to $30.00, 30.6% had a monthly income between $31.00 and $60.00, and 5.6% had a monthly income between

61 and US$120.00. Overall, almost two-thirds of the participants lived under extreme poverty conditions (i.e., they earned under $1.00 a day). Indeed, only two of the participants lived on a little more than $2.00 a day.

The average age of the participating mothers was 31.4 years and their children were on average 37 months. Almost 64% of the participants reported that they gave birth to 1 to 4 children and 33.3% reported to have had 5 to 9 deliveries. One mother had given birth to 12 children. About 11% of the mothers have experienced a still birth and 22.2% of them reported giving birth to children who died before they could reach the age of 1.

Sensory Analysis-Panel of Sweet potato leaves

Originally, the actual biofortified sweet potatoes were planed to be used for the sensory analysis along with the traditional sweet potatoes. Because of logistic issues, the biofortified orange fleshed sweet potatoes were not available for the sensory analysis. Because almost all the participant mothers reported consuming green leafy vegetables, we decided to conduct the sensory analysis with sweet potato leaves instead. The sweet potato leave dishes prepared for the sensory analysis was accompanied with white yam and bananas the same way the participants used to eat other typical leafy green vegetables. After tasting the first dish (Fwi Kase also known as sautéed or clinched), the participants were asked to evaluate its color, its odor, its texture, its taste and its overall appeal. Sweet potato leave dishes were totally new to all the participants (Table 16).

Table 16: Participants Characteristics: Sensory analysis

	N	%
Schooling level		
No formal schooling	9	25.0
Incomplete elementary	16	44.4

Completed high school	8	22.2
Other*[1]	3	8.4
Marital status		
Common law	21	58.3
Married	11	30.6
Other*[2]	4	11.1
Employment status		
Full time	11	30.6
Part time	15	41.7
Unemployed	10	27.8
Monthly income		
US$1-US$30.00	23	63.9
US$31.00-US$60.00	11	30.6
US$61.00-US$90.00	1	2.8
US$121.00-US$120.00	1	2.8
Child delivery		
# of child deliveries		
1 to 4	23	63.9
5 to 8	12	33.3
9 to 12	1	2.8
# of still born	4	11.1
# of deaths before age 1	8	22.2

Other*[1]: Completed Elementary & Incomplete High School
Other*[2]: single/never married, separated/divorced/ widowed

Acceptability of dish 1

All the participants (100%) said they liked the color, the odor and the overall appeal of the dish. On the other hand, 5.6% of the participants did not like the texture as opposed to94.4% who liked the texture. Almost all the participants (88.9%) said they liked the taste of the dish as opposed to 11.1% who said they did not like the taste. All the participants (100%) said they would prepare that dish at home and would encourage other family members to consume it as well (Table 17).

Table 17: Participants' acceptability test of dish 1

Dish 1: Sautéed (or Clinched) sweet potato leaves	N	%
What do you think about the color?		
I don't like it	0	0
Neither like nor dislike it	0	0
Like it	36	100

What do you think about the odor?		
I don't like it	0	0
Neither like nor dislike it	0	0
Like it	36	100
What do you think about the texture?		
I don't like it	0	0
Neither like nor dislike it	2	5.6
Like it	34	94.4
What do you think about the taste?		
I don't like it	0	0
Neither like nor dislike it	4	11.1
Like it	32	88.9
What do you think about the overall appeal?		
I don't like it	0	0
Neither like nor dislike it	0	0
Like it	36	100
Would you prepare this dish at home? (%yes)	36	100
Would you encourage family members to eat it? (yes)	36	100

Acceptability of dish 2

Among the consumers, 22.2% did not like the color of dish 2, 11.1% neither liked it nor disliked it and 66.7% said they liked it. In the case of the odor, 8.3% of the participants did not like it, 11.1% neither liked nor disliked it and 80.6% of the participants said they liked the odor of dish 2. Almost 20% of the participant mothers said they did not like the texture of dish 2, 30.6% neither liked nor disliked it and half of the participants said they liked the texture. Among consumers, 16.7% did not like the taste of dish 2, almost 20% neither liked nor disliked the taste and almost 64% said they like the taste. Finally, more than three quarters of the participants (80.6%) liked the overall appeal of dish 2 while 11.1% of them neither liked nor disliked the appeal and 8.3% did not like the overall appeal of dish 2. Upon completion of the sensory analysis of both dishes, each participant was asked about which one of the two dishes they liked the most. 72.2% of them said they liked dish 1 the most, 8.3% said they like dish 2 the most and 19.4% of

them said they like both dishes equally. Dish 1 (Fwi Kase) had a more favorable acceptability than the dish 2 (Salad Fèy Patat) when asked about what they like the most (Table 18).

Table 18: Participants' acceptability test of dish 2

Dish 2: Salad of sweet potato leaves	N (%)	N (%)
What do you think about the color?		
I don't like it	8	22.2
Neither like nor dislike it	4	11.1
Like it	24	66.7
What do you think about the odor?		
I don't like it	3	8.3
Neither like nor dislike it	4	11.1
Like it	29	80.6
What do you think about the texture?		
I don't like it	7	19.4
Neither like nor dislike it	11	30.6
Like it	18	50.0
What do you think about the taste?		
I don't like it	6	16.7
Neither like nor dislike it	7	19.4
Like it	23	63.9
What do you think about the overall appeal?		
I don't like it	3	8.3
Neither like nor dislike it	4	11.1
Like it	29	80.6

Table 19: Nutrient intake (24 hour dietary recalls) with white fleshed sweet potato dishes (n=15)

	Mean	Median	SD	RDA or AI*
Energy (Kcal)	1,172.4	1,037.3	514.6	-
Total Protein (g)	31.1	25.4	14.2	46
Total fat (g)	15.8	12.6	13.2	-
% calorie from carbohydrate	79.8	80.1	12.4	-
% calorie from fat	12.5	8.7	9.5	-
% of calorie from protein	10.9	10.2	3.1	-
Total carbohydrates (g)	236.8	205.8	125.2	130
Vitamins				

Total vitamin A activity (IU)	2,412.1	656.3	3,714.7	-
Retinol activity equivalent/REA(mcg)	149.2	71.3	190.0	700
Niacin equivalents (mg)	19.1	15.9	8.0	14
Pantothenic acid (mg)	4.3	3.7	1.7	5
Riboflavin (mg)	.7	.6	.5	1.1
Thiamin (B1) (mg)	1.2	1.1	.5	1.1
Dietary Folate Equivalent (mcg)	386.8	369.4	190.0	400.0
Vitamin B12/Cobalamin (mcg)	1.2	0.6	1.3	2.4
Vitamin B6 (mg)	1.8	1.7	1.1	1.3
Vitamin C/Ascorbic acid (mg)	109.0	48.1	153.2	75.0
Vitamin D/Calciferol (mcg)	2.3	.7	3.4	5.0
Vitamin E (mg)	3.3	1.2	4.0	15.0
Minerals				
Calcium (mg)	342.1	230.5	274.2	1,000.0
Copper (mg)	1.5	1.2	.8	.90
Iron (mg)	9.9	8.0	6.7	18.0
Manganese (mg)	3.0	2.3	2.5	1.8
Magnesium (mg)	300.5	266.5	187.1	310.0**
Phosphorous (mg)	668.7	542.2	330.6	700.0
Potassium (g)	3.0	2.6	2.0	4.7
Selenium (mcg)	38.6	34.9	24.0	55.0
Sodium (g)	2.5	2.1	1.1	1.5
Zinc (mg)	5.2	3.8	3.2	9.0

*RDA/AI given for women age range 19-50 years old
**RDA/AI given for age range19-30 years old

Table 20: Nutrient intake (24 hour dietary recalls) OFSP dishes (n=15)

	Mean	Median	SD	RDA or AI*
Energy (Kcal)	1,117.2	948.5	504.4	-
Total Protein (g)	29.6	24.2	14.0	46
Total fat (g)	15.8	12.7	13.2	-
% calorie from carbohydrate	79.1	79.7	12.9	-
% calorie from fat	13.2	9.0	9.8	-
% of calorie from protein	10.9	10.1	3.2	-
Total carbohydrates (g)	224.1	198.5	122.8	130
Vitamins				
Total vitamin A activity (IU)	4,653.3	4,164.3	2,453.5	-

Retinol activity equivalent/REA(mcg)	2,343.7	2,083.0	1,228.2	700
Niacin equivalents (mg)	16.0	13.3	7.2	14
Pantothenic acid (mg)	4.3	3.7	1.7	5
Riboflavin (mg)	0.8	0.7	0.5	1.1
Thiamin (B1) (mg)	1.1	1.0	0.5	1.1
Dietary Folate Equivalent (mcg)	375.5	362.9	189.4	400.0
Vitamin B12/Cobalamin (mcg)	1.2	0.6	1.3	2.4
Vitamin B6 (mg)	1.4	1.1	1.0	1.3
Vitamin C/Ascorbic acid (mg)	121.7	59.0	154.8	75.0
Vitamin D/Calciferol (mcg)	2.3	0.7	3.4	5.0
Vitamin E (mg)	5.7	3.5	4.5	15.0
Minerals				
Calcium (mg)	392.4	271.1	279.0	1,000.0
Copper mg)	1.2	0.9	0.8	.90
Iron (mg)	11.0	8.9	6.8	18.0
Manganese (mg)	3.3	2.5	2.5	1.8
Magnesium (mg)	288.6	252.1	187.9	310.0**
Phosphorous (mg)	633.7	528.1	332.9	700.0
Potassium (g)	2.6	1.8	1.9	4.7
Selenium (mcg)	38.2	34.3	24.0	55.0
Sodium (g)	2.4	2.0	1.3	1.5
Zinc (mg)	4.9	3.6	3.2	9.0

*RDA/AI given for women age range 19-50 years old
**RDA/AI given for age range19-30 years old

STUDY 4: Computer simulation of OFSP contributions to vitamin A intake

We used the University of Minnesota Nutrient Data System for research (NDS-R) to enter the first 15 cases of 24 hour recalls of 15 participants who reported consuming sweet potatoes within the past 24 hours prior to the interview. Because white fleshed sweet potatoes were not an entry in the data base, we used potatoes instead after confirming that their vitamin A content was equally low to that of the white fleshed sweet

potato varieties[55]. A second data set was created with NDS-R simulating what would have happened to the vitamin A intake if OFSP had been consumed instead of a white flesh variety. The results show that, assuming the best case scenario where all households consumed OFSP on a given day, the median vitamin A intake would increase from 71 mcg REA/d to 2083 mcg REA/d which is three times the RDA (i.e., 700 mcg REA/d) [67][Table 19, 20]. Thus, OFSP do have the strong potential to improve vitamin A intake in rural Haiti as it was shown in Mozambique[54].

CHAPTER 4

Discussion and Conclusions

This study shows how agriculture, nutrition and public health are completely intertwined and the strong potential of community and evidence based functional food approaches to addressing malnutrition issues in developing countries. It also demonstrates that people in the target community are sweet potato consumers. Should the OFSP be introduced in this area, it is likely that this crop will have a great impact in improving vitamin A status among children and adults there. The orange color of the OFSP biofortified it is unlikely to become an impediment for its adoption. In fact, participants who were familiar with OFSP associated this sweet potato with their favorite sensory attributes (sweetness, dryness) and health properties (high 'vitamin' content). Indeed, we predict that OFSP would be received with great enthusiasm in the target communities, particularly if it can be grown under local conditions at an affordable cost.

Vitamin A awareness and intake

Four out of every ten participants did not know what vitamin A was. This highlights the need for educational campaigns on the importance of foods rich in vitamin A to promote maternal and child health. Almost 93% of the mothers reported to have fed the study children with vitamin A rich foods after a vitamin A definition was provided to them. Children were much more likely to have been exposed to vitamin A supplements than women. It is unclear why this is the case. It is an area of inquiry that deserves further research.

Foods rich in vitamin A

Participants were not able to discriminate well between foods rich in and foods lacking vitamin A. This suggests that education is needed to help individuals in the target communities to identify foods that are good sources of vitamin A. Table 3 shows that less than 25% of the participants were able to successfully identify from their own foods which ones were rich and which ones were not rich in vitamin A. For example, over half of the participants have identified water as a major source of vitamin A.

Infant feeding habits

A significant proportion of women were unfamiliar with the term 'colostrum'. Through our research we identified that the term they used to refer to it is 'first milk'. This illustrates the importance of doing formative research to measure infant feeding outcomes in culturally appropriate manner. After explaining what we meant by 'colostrum', eight out of every ten women reported that they gave it to the study child soon after birth. Among those who discarded the colostrum, traditional beliefs came into play for doing so, including the perception that it could harm the child. Over half of the women did not start breastfeeding immediately after birth. This suggests a need in the target communities to implement culturally appropriate educational campaigns that highlight the health promotion and vitamin A value of colostrum, and the importance of starting to give it to the child as soon as possible after birth.

Almost four out of every ten participants did not exclusively breastfed (EBF) the study children during the first 6 months after birth. Because the great majority of births are still

happening at home, it is important to implement effective pre-, peri- and post-natal community-based EBF promotion programs in the target areas.

Sweet potato in target community

Sweet potatoes are consumed by the vast majority of women in the target communities. However, few of them were able to consume them frequently because of their relatively high cost in the market. Thus, the introduction of OFSP in Haiti should consider the feasibility of people growing them in their gardens. Participants could not reach consensus as to when the sweet potato seasons were. In fact, it appears that sweet potatoes were grown throughout the region perhaps as a function of cultivars and local microclimate and soil conditions.

Over 90% of the (study) children were reported to have been fed with sweet potatoes in past three months preceding the interview. Thus, OFSP is likely to benefit substantially the vitamin A intake of children under five as well. Given the experience in Mozambique, it is likely that Haitian children will receive very well the sensory properties of OFSP. It was found that the sweet potato consumed at home was not prepared differently for adults and children. Every one in the household, regardless of age was served the same dishes of sweet potatoes. The most common way for preparing dish sweet potatoes was boiling with raw milk or with water. The introduction of OFSP in Haiti should take into account the way sweet potatoes are currently being prepared in Haiti.

The results of this study confirm that Haiti is one of the most impoverished and poorest countries in the world. The extreme poverty living conditions were consistently detected

across the three studies that form this project. As expected, this translated into very low levels of education, a weak social support structures across studies, and major maternal and child health and nutrition problems. This was reflected by the high proportion of women living under common law union arrangements, a very high level of food insecurity and poor maternal and child health and nutrition outcomes.

Potential contributions of OFSP to vitamin A intake

Almost 80% of the calories consumed by the participants were from carbohydrates and the caloric intake was below the minimum recommendation of WHO, i.e. 2,240k/cal/day[68]. The median RAE intake from the diet containing white fleshed sweet potatoes (71.3mcg/d) was well bellow the RAE recommendation (of 700mcg/day). There is little doubt that a diet that contains so little retinol activity will eventually lead to vitamin A deficiency and all its consequences. Thus, it is encouraging that simply substituting the white fleshed sweet potato consumption with OFSP in the usual diet would increase the women's median RAE intake to 2,083mcg/d which is three time above the minimum recommendation. Thus, we conclude that the introduction of OFSP in Haiti has a strong potential to improve substantially the vitamin A intake in the target communities.

Finally, although most participants had never consumed sweet potato leaves, they enjoyed consuming dishes prepared with them. This is not surprising as leaves from other plants were routinely consumed in the study communities. Future studies examining the vitamin A activity and other potential nutritional contributions of sweet potato leaves are needed.

REFERENCES

1. Library of Congress-Federal Research Division-Country profile: Haiti, May 2006.
2. Available at: www.eoearth.org. Accessed on 09/20/2007.
3. Haggerty RA, Ed. Haiti: A country Study. Washington: GPO for the Library of Congress, 1989.
4. Jocelyn David: Haiti: From the Pear of the Antilles to an environmental disaster. Northern University 170 Dodge Hall in Huntington Avenue, Boston MA, June 2007.
5. Encyclopedia Britannica online: www.britannica.com/eb/topic-533701/Mount-la-Selle. Accessed on 09/22/2007.
6. Available from: www.trivialibrary.com. Accessed on 01/07/2007.
7. Available from: www.populationaction.org. Accessed on 01/07/2007.
8. Available at: http://www.earthtrends.wri.org. Accessed on 10/01/2007.
9. Available at: http://www.msf.org. Accessed on 05/01/2008.
10. Available at: http://www.cdc.gov. Accessed on 05/01/2008.
11. Available at: http://www.indexmundi.com. Accessed on 05/01/2008.
12. Institut Haïtien de Statistique et d'Informatique EMMUS II-III.
13. Available at: http://www.nytimes.com. Accessed on 05/01/2007.
14. Analyse des Causes de Décès. 1999 MSPP-OPS/OMS.
15. ORE (unpublished document) January 2007.
16. Howarth E. Bouis. Plant Breeding: A New Tool for Fighting Micronutrient Malnutrition. The Journal of nutrition 2002; 132:33, 491-494.
17. Available at: http://www.worldbank.org. Accessed on 05/01/2007.
18. Available at: http://www.ifm.net. Accessed on 03/14/2008.
19. Costello E, Lycée N. "Fighting Hunger in Haiti" Scholastic Action: "Economic Justice and Women's Human Rights." Madre: Demanding Justice for Women and Families around the World. 6 Sep. 2005. Available at: http://www.madre.org. Accessed on 03/14/2008.
20. Available at: www.infoplease.com. Accessed on 9/20/2007.
21. US department of State. Available at: www.state.gov. Accessed on 9/29/2007.
22. Available from: www.wikipedia.org. Accessed on 02/06/2007.

23. Available from: www.cgiar.org. Accessed on 01/23/2007.
24. Available from: http://www.feedinfo.com. Accessed on 12/17/2007.
25. Paarlberg R, Pray C, Political Actors on the Landscape. AgBioForum, 2007; 10:144-153.
27. Beyer P, Babili A, Xudong Y S, Paola L, Schaub P, Welsch, R, Potrykus I. Golden Rice: Introducing the Carotene Biosynthesis Pathway Into Rice Endosperm by Genetic Engineering to Defeat Vitamin A Deficiency. J Nutr. 2002; 132: 506S-510S.
28. Gregorio GB. Progress in breeding for trace minerals in staple crops. J Nutr. 2002; 132: 500S-502S.
29. Closing Gates to Biofortified Foods. Available at: http://www.fbfc.com. Accessed on 03/30/2007.
30. Días de la Gara RI Gregory III J F, Hanson A D. Proceedings of the National Academy of Sciences. 2007; 104:4218-4222.
31. Vasconcelos M, Karabi D, Norman O, Khalequzzaman M, Torrizo L, Krishnanb S, Oliveira M, Goto F, Datta S K. Enhanced iron and zinc accumulation in transgenic rice with the ferritin genes. Plant Science 2003; 371-378.
32. Data SK. Rice Biotechnology: A Need for Developing Countries. AgBioForum. 2002; 7: 31-35.
33. Available at: http://www.wikipedia.org. Accessed on 01/24/2008.
34. Available at: http://www.fda.gov. Accessed on 01/09/2008.
35. Randy V. Plant Biotechnology. Biotechnology Information. Virginia Polytechnic Institute and State University. Publication number 443-502. Year 2002
36. Underwood BA. The role of vitamin A in child growth, development and survival. Adv Exp Med Biol 1994; 352: 201-208.
37. Wardlaw GM, Hampl S. Perspectives in Nutrition Seventh Edition. Published by The McGraw-Hill Companies, Inc New York, 2007.

38. Neumann CG. Symposium: Food-based approaches to combating micronutrient deficiencies in children of developing countries. Background. Pediatr Ann. 2004; 33:658-674.

39. The World Almanac and Book of Facts, year 2006.

40. DeMaeyer EM. The WHO program of prevention and control of vitamin A deficiency, xerophthalmia and nutritional blindness. Nutr Health. 1986; 4:105-112

41. Neumann CG. Child nutrition in developing countries. Pediatr Ann. 2004; 33: 658-674.

42. Available at: www.childinfo.org. Accessed on 04/03/2007.

43. Available at: www.wikipedia.org. Accessed on 09/10/2007.

44. Available at: www.cgiar.org. Accessed on 03/ 06/2008.

45. Available at: www.bioversityinternational.org. Accessed on 04/28/2008.

46. Available at: http://www.whfoods.org. Accessed on 02/08/2008.

47. Available at: www.wikipedia.org. Accessed on 03/11/2008.

48. Available at: http://www.sciencedaily.com. Accessed on 11/12/2007.

49. Available at: http://www.cipotato.org. Accessed on 03/01/2008.

50. Low J, Kinyae P, Gichuki S, Oyunga MA, Hagenimana V, Kabira J. Combating Vitamin A deficiency through the use of sweet potato: results from phase 1 of an action research project in south Nyanza, Kenya. Lima: International Potato Center (CIP); Kenya Agricultural Research Institute (KARI) 1997.

51. K'Osambo LMK, Carey EE, Misra AK, Wilkes J, Hagenimana V. Influence of age, farming site, and boiling on provitamin A content in sweet potato (Ipomoea batatas (L.) Lam.) storage roots. Journal of Foods Composition and Analysis 1998; 11, 305-321.

52. Low J W, Arimond M, Osman N, Cunguara B, Zano F, Tschirley D.A Food-Based Approach Introducing Orange-Fleshed Sweet Potatoes Increased Vitamin A Intake and Serum Retinol Concentrations in Young Children in Rural Mozambique. J Nutr. 2007; 137: 1320–1327.

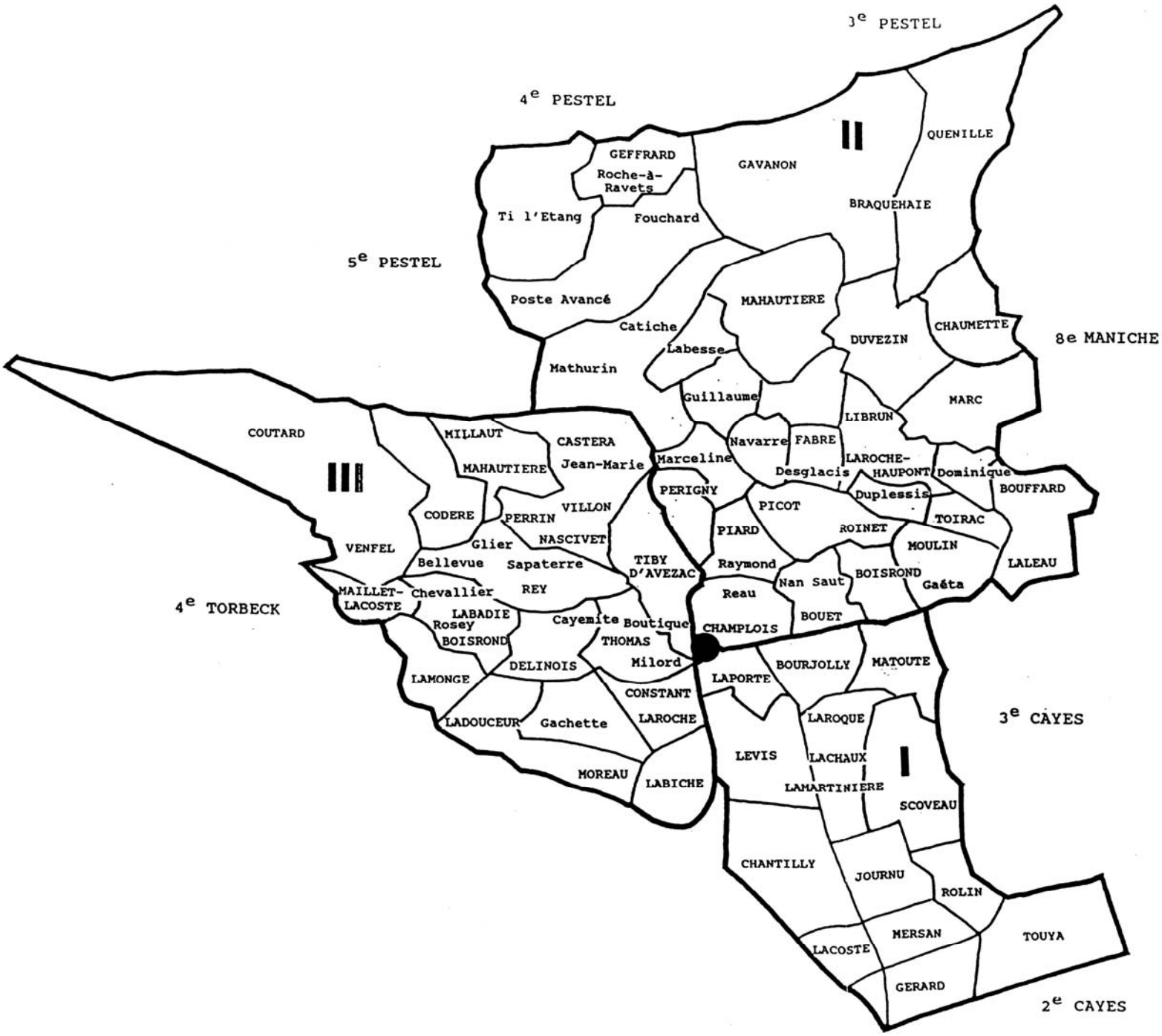
53. Jaarsveld PJV, Faber M, Tanumihardjo S A, Nestel P, Lombard C J, Benadé AJS. Carotene-rich orange-fleshed sweet potato improves the Vitamin A status of primary school children assessed with the modified- relative-dose-response test. Am J Clin Nutr 2005; 81:1080 –1087.
54. Low JW, Arimond M, Osman N, Cunguara B, Zano F, Tschirley D. A food-based approach introducing orange-fleshed sweet potatoes increased vitamin A intake and serum retinol concentrations in young children in rural Mozambique. J Nutr. 2007; 137:1320-1327.
55. Hagenimana V, Low J, Anyango M, Kurz K, Gichuki ST, Kabira J. Enhancing vitamin A intake in young children in Western Kenya: Orange-fleshed sweet potatoes and women farmers can serve as key entry points. Food Nutr Bull. 2001; 22:370–387.
56. Available at: http://docustore.wfp.org . Accessed on 03/14/2008.
57. Stansfield SK, Pierre-Louis M, Lerebours G, Augustin A. Vitamin A supplementation and increased prevalence of childhood diarrhoea and acute respiratory infections. Lancet. 1993 Sep 4; 342(8871):578-582.
58. Menon P, Ruel MT, Loechl CU, Arimond M, Habicht JP, Pelto G, Michaud L. Micronutrient Sprinkles reduce anemia among 9- to 24-mo-old children when delivered through an integrated health and nutrition program in rural Haiti. J Nutr. 2007; 137:1023-1030.
59. Available at: http://www.ars.usda.gov. Accessed on 09/08/2007.
60. Melgar-Quinonez H R, Nord M, Pérez-Escamilla R, Segall-Correa A M. Psychometric properties of a modified US-household food security survey module in Campinas, Brazil. European Journal of Clinical Nutrition advance online publication 18 April 2007; doi:10.1038/sj.ejcn.1602760.
61. FAO. The State of Food Insecurity in the World 2001. Rome 2002.
62. Campbell CC. Food insecurity: a nutritional outcome or a predictor variable? J Nutr. 1991; 121:408-415.

63. Dastgiri S, Toutounchi H, Ostadrahimi A, Mahboob S. Sensitivity and specificity of a short questionnaire for food insecurity surveillance in Iran. Food Nutr Bull. 2007; 28:55-58.
64. Novotny R, Boushey C, Bock M A, Peck L, Auld G, Bruhn C M, Gustafson D, Gabel K, Jensen J K, Misner S, Read M.. Calcium Intake of Asian, Hispanic and White Youth. Journal of the American College of Nutrition. 2003;22: 64–70.
65. United Nations. Department of Economic and Social Affairs. Statistical Office of the United Nations. *World Weights and Measures. Handbook for Statisticians.* Statistical Papers. Series M no. 21 Revision 1. (ST/STAT/SER.M/21/rev.1) New York: United Nations, 1966.
66. Cayemittes M, Placide MF, Mariko S, Barrère B, Sévère B, Alexandre C. Enquête Mortalité, Morbidité et Utilisation des Services, Haïti*, 2005-2006.* Calverton, Maryland, USA : Ministère de la Santé Publique et de la Population, Institut Haïtien de l'Enfance et Macro International Inc. 2007.
67. Kennedy E, Meyers L. Dietary Reference Intakes: development and uses for assessment of micronutrient status of women-a global perspective American Journal of Clinical Nutrition, 2005;81:1194S-1197S.
68. Available at: http://www.wfp.org. Accessed on 04/15/2008.

Appendix 1: Map of Haiti

Source: www.maps.com

Appendix 2: Map of (Camp-Perrin)



Source: ORE 2007

Appendix 3: Participation Criteria

Survey Questionnaire

Selection criteria
24 Hour dietary recall

1. Is the person a woman?
❒ Yes (Continue)
❒ No (Exclude from study)

2. Is the woman a mother?
❒ Yes (Continue)
❒ No (Exclude from study)

3. Is the woman between the ages of 17 and 45?
❒ Yes (continue)
❒ No (Exclude from study)
(Note: In Haiti, teen age mothers are generally considered as adults mothers)

4. Is the woman's youngest child between the ages of 1 and 5 years old?
❒ Yes (Continue)
❒ No (Exclude from study)

5. Is the woman in good heath?
❒ Yes (continue)
❒ No (exclude from study)

6. Is the woman's youngest child (between 1 and 5 years old) in good health?
❒ Yes (continue)
❒ No (exclude from study)

7. Is the woman living either in 1^{st}, 2^{nd} or third communal section of Camp-Perrin?
❒ Yes (continue)
❒ No (exclude from study)

8. Does the woman agree to get measurements done on her height, weight and arm and on her youngest child?
❒ Yes (continue)
❒ No (exclude from study)

9. Does the woman agree to be interviewed two times before receiving a financial incentive?

❒ Yes (continue)
❒ No (exclude from study)

10. Is the woman pregnant?
❒ Yes (exclude from study)
❒ No (continue)

11. Does the woman agree to provide accurate information to the best of her knowledge?
❒ Yes (continue)
❒ No (exclude from study)

Appendix 4: **Information Sheet**

University of Connecticut

24 HOUR DIETARY RECALL

Principal Investigator: Dr. Rafael Pérez-Escamilla
Student Researcher: Michael Dessalines
Study Title: Understanding the Sensory Acceptability and Potential Nutrient Contribution of Orange Fleshed Sweet Potatoes (OFSP) in Haiti: Formative Research

1. Invitation to Participate
   You are invited to participate in the study because you are a member of any of the following three sub-sections of Camperrin: 1st, 2nd and 3rd section Communales

2. Purpose
   The purpose of this study is to collect reliable information about the foods and recipes that families consume in the 1st, 2nd and 3rd section Communales of Camperrin.

3. Description of Procedures
   Should you agree to participate in this project, you will be asked questions on what, where and how much you have consumed in the past 24 hours by a student from the University of Connecticut with the help of project assistants from Haiti. This interview will last about one hour and 15 minutes (45 minutes for the 24 HDR and 30 minutes for the questionnaire). Detailed information on the recipes, methods of food preparation will be collected as well as the portion size of what has been consumed in each case along with anthropometric measurements. We will measure how tall you are and how much you weight. Information on your youngest child's dietary habits and anthropometric measurements will be collected as well. You will be asked about your household structure, social economic status and other family demographics. This interview will not be tape recorded. You will be also asked to give your name and date of birth.

4. Risks and Inconveniences
   There are no known risks associated with this project. In recognition of your time spent answering the questions, we will compensate you with a financial incentive at the end of the interview.

5. Benefits

The benefits of such a project can be substantial for the communities where it is conducted and beyond.

6. Economic Considerations

Should you choose to participate in this study, we will plan to meet with you at your place (Home or work) to conduct the interview so that you will not have to travel. You will be compensated by a financial incentive of US$3.00 for you time.

7. Confidentiality

All information collected from this interview will be confidential. It will be kept locked in file cabinets in Haiti and then transferred to a safe location at University of Connecticut at the end of the data collection process. Your name and personal identifiers will not be used in any written or oral report resulting from this study.

You should also know that the University of Connecticut's Institutional Review Board (IRB) and the Office of Project Compliance may inspect study records as part of its auditing program, but these reviews will only focus on the Project and neither on your response nor involvement. The IRB is a group of people who review Project studies to protect the rights and welfare of Project participants like you.

8. Voluntary Participation

You do not have to be in this study if you do not want to. If you agree to be in the study, but later change your mind, you may drop out at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate.

9. Do You Have Any Questions?

Take as long as you like before you make a decision. We will be happy to answer any questions you have about this study. If you have further questions about this project or if you have a Project-related problem, you may contact the principal investigator: Dr. Rafael Perez-Escamilla at Rafael.pèrez-escamilla@uconn.edu or the student Project coordinator : Michael Dessalines at 593 8958 or agrmike2@yahoo.com or the collaborating organization in Haiti ORE[Organization for the Rehabilitation of the Environment] Dr. Mousson Finnigan at 758 7565 or mail@oreworld.org). If you have any questions concerning your rights as a Project participant, you may contact the University of Connecticut Institutional Review Board (IRB) in the United States of America at 860-486-8802.

Appendix 5: Survey Questionnaire

OFSP: FORMATIVE RESEARCH SURVEY 2007
IDENTIFICATION SHEET

1. Name of Mother: _____

2. Mother's DOB: _____/_____/_____
Month day year

3. Mother's Age: _____years

4. Mother's address: _____

5. Mother's telephone #:_____

6. Today's date: _____/_____/_____
Month Day Year

7. Mother's Community: 1 2
3
(1st section=1; 2nd section = 2; 3rd section =3)

8. Place of recruitment: _____

9. Site of interview:
- ❒ Home
- ❒ Work place
- ❒ Other (please specify: _____)

10. Fieldworker's name _____

11. Is this a community with high migration?
❒ Yes
❒ No

11a. If yes, how long the mother has been living in this community for?
_____
❒ No applicable

11b. Where she came from? _____
❒ No applicable

1. Date of Interview: _____/_____/_____
Month day year

2. Start time of Interview: _____ AM PM (Please circle one)
3. End time of interview: _____ AM PM (Please circle one)

4. DEMOGRAPHICS: HOUSEHOLD STRUCTURE
(Note for fieldworker: Now, I am going to ask you questions that pertain to your household structure. The reference person is survey respondent)

Name	Gender	Age in years	Role of members of the household: blood relatives or not to the respondent mother. Please specify in each case.	Comments
1.	M F			
2.	M F			
3.	M F			
4.	M F			
5	M F			
6	M F			
7	M F			
8	M F			
9	M F			
10	M F			
11	M F			
12	M F			
13	M F			
14	M F			
15	M F			

5. Who is the head of the household?
❒ Yourself
❒ Someone else (Please specify: _____)

6. What is the primary occupation of _____ (the head of the household?)
❒ Trading
❒ Farming
❒ State employee
❒ School teacher
❒ Tailor
❒ Coal maker from wood
❒ Daily worker
❒ Other (Please specify: _____)

7. How many people including yourself are living with you in your household?

_____

8. How many children from 1-5 years old are living with you in your household?

_____

9. How many bedrooms are there in your house?

_____

SOCIAL RELATIONS/NETWORK

(Note for fieldworker: Now, I am going to ask you questions about your social relations)

10. Do you practice a religion?

❒Yes

❒ No (If no, please skip questions #11, #12)

11. What religion do you practice?

❒ Baptist

❒ Catholic

❒ Protestant

❒ Voodoo

❒ Other (Please specify: _____)

❒ Not applicable

12. Do you regularly attend religious services?

❒ Yes

❒ No

❒Not applicable

13. **During the past year** have you borrowed money from any neighbors, family members or friends?

❒ Yes (How often? _____)

❒ No

14. **During the past year** have you lend money to any neighbors, family members or friends?

❒ Yes (How often? _____)

❒ No

15. Do you have access to credit in small local stores?

❒ Yes

❒ No

16. Are you a land owner?

❒Yes (how big is your land? _____carreaux)

❒ No (why not? _____)

17. Do you rent land?

❒ Yes (How much do you rent? _____carreaux)
❒ No (If No, Please skip question #18)

18. In the past year, what crops did you grow on that land?
❒ Rice
❒ Maize
❒ Common beans (What color? _____)
❒ Sweet potatoes
❒ Cassava
❒ Not applicable

19. Are you in the Métayage system?
❒ Yes
❒ No (If no, please skip question #20)

20. Do you share the products of your land with someone else?
❒ Yes (what percentage of the harvest do you share with the land owner?
_____)
❒ No
❒Not applicable

BREASTFEEDING

(Note: In the "Métayage" system, poor farmers agree to grow crops on a land that they don't own. The output of the harvest is then shared between the land owner and the poor farmers according to an already agreed upon percentage).

(Note for fieldworker: Now, I am going to ask you questions about the breastfeeding habits of your children in general and about your youngest child in particular) I will also ask you about your youngest child's sweet potato consumption habits).

21. How many children have you given birth to? _____

22. Where were they born? (Check all that apply.)
❒ At home
❒ Clinic or health center
❒ Dispensary
❒ At the hospital
❒ Elsewhere (Please specify: _____)
❒ Maize

23. How many of them were born alive? _____
24. How many of them were still born? _____
25. How many were born alive but died before they were 1 year old?

26. What is your youngest child's name? _____
27. When was _____ born? _____/_____/_____

Month day year

28. How old is _____? _____ is: _____months/year (s) (Please circle only one)
(Note to fieldworker: If the youngest child is less than 1 year old, ask about the nest oldest child. If the next oldest child is older than 5 years of age, then discontinue the interview and head to another home.)

29. Do you know what exclusively breastfeeding is?
❒ Yes (please explain in a few words what it is:
_____)
❒ No
(Note for fieldworker: Should the mother answer the above question wrongly, please define exclusively breastfeeding to the respondent mother as: Only breast milk and nothing else)

30. Did you exclusively breastfeed _____(child's name)?
❒ Yes
❒ No

30a. (If yes, how long did you exclusively breastfeed _____(child's name)?
_____ Days weeks months (Please circle one)

31. When did you start breastfeeding _____(child's name)?
❒ Immediately after birth
❒ < 1 hour after birth
❒ 1h-12 hours after birth
❒ 13-24 hours after birth
❒ >24 hours after birth
❒ Can't remember

32. Do you know what colostrum is?
❒ Yes (please explain in a few words what it is:
_____)
❒ No
(Fieldworker: If mother doesn't know what colostrum is, please define colostrum as the yellowish first drops of milk that comes out of the breast soon after delivery)

33. Did you feed colostrum to your youngest child?
❒ Yes (Why?
_____)
❒ No (Why?
_____)

34. Are you still breastfeeding your youngest child?
❒ Yes (If Yes, please skip question #34a)
❒ No

34a. If no, for how long did you breastfeed your youngest child?
_____ Days weeks months years (Please circle one)

STUDY CHILD & SWEET POTATO CONSUMPTION

(Note for fieldworker: Now, I am going to ask you questions about your youngest child's usual sweet potato consumption habits).

35. Does your youngest child consume sweet potatoes?
❒ Yes
How often during the dry season? (_____times per: day week month year)
How often during the wet season? (_____times per: day week month year)
❒ No (If No, please skip questions #36, #37)

36. How old was your youngest child when you started feeding sweet potatoes to this child?

_____

__
❒ Not applicable

37. How do you usually prepare the sweet potatoes for _____ (child's name)? Please list at least 2 preparation methods.

_____
_____
_____
❒ Not applicable

STUDY CHILD & VITAMIN A RICH FOODS

(Note for fieldworker: Now, I will ask you questions about the consumption of vitamin A rich foods by _____ ***during the past 3 months****)*

38. Can you tell me what vitamin A rich foods are?

_____

_____
(Note to fieldworkers: Should the mother give you an incorrect answer, please define vitamin A rich foods as follows: Vitamin A rich foods are foods that are rich in vitamin A and Vitamin A is a nutrient that our body needs to function properly.)

38a. **During the past 3 months** did you feed your youngest child with vitamin A rich foods?
❒ Yes ((How often? _____ (times per: day week month) [Please circle one]
❒ No (If no, please skip question #39)
❒ Don't know

39. **During the past 3 months** how often did your youngest child consume foods rich in vitamin A?
_____ (times per: day week month) [Please circle one]
❒ Don't know
❒ Not applicable

40. **During the past 3 months** did you usually feed your youngest child with any leafy green leaves?
❒Yes
❒ No (If no, skip question #41)

41. **During the past 3 months** how often did you feed your youngest child with any leafy green leaves? _____ (times per: day week month) [Please circle one]
❒ Don't know
❒ Not applicable

42. **During the past 3 months** did you feed the youngest (child's name) with any fruits?
❒ Yes
❒ No (If no, skip question # 43)

43. **During the past 3 months** how often did you feed your youngest child with (any) fruits?
_____ (times per: day week month) [Please circle one]
❒ Don't know
❒ Not applicable

44. **During the past 3 months** how often did you feed _____ (child's name) with mangoes? _____ (times per: day week month) [Please circle one]
❒ Don't know
❒ Not applicable

45. **During the past 3 months** how often do you feed your youngest child with carrots?
___ (times per: day week month) [Please circle one]
❒ Don't know
❒ Not applicable

46. **During the past 3 months** how often do you feed your youngest child with yogurts (fromage)?
_____ times per: day week month [Please circle one ____]
❒ Don't know

47. **During the past 3 months** how often did you feed your youngest child with red skin and yellow sweet potatoes? _____ times per: day week month [Please circle one]

❒ Don't know
❒ Not applicable

STUDY CHILD HEALTH STATUS

(Note for fieldworker: Now, I will ask you questions about the health of the study child)

48. Has your youngest child experienced diarrhea in the past 2 weeks?
❒ Yes
❒ No (If No, please skip questions #49)

49. How many episodes of diarrhea has your youngest child experienced in the past 2 weeks? _____
❒ Not applicable

50. Has your (reference) child ever had malaria since birth?
❒ Yes (How many times since birth____)?
❒ No

51. How would you rate the health of your (reference) child during the past 3 months?
❒ Very poor
❒ Poor
❒ Average
❒ Good
❒ Very good

STUDY CHILD IMMUNIZATION AND VITAMIN A SUPPLEMENTATION

(*Note for fieldworker: Now, I am going to ask you questions about the immunizations and vitamin A supplementation of the study child. Please ask respondent to show you _____ [child's name] immunization card and look for shots update)*

52. Does your (reference) child have an immunization card?
❒ Yes
❒ No (skip questions #53, #54, #55)

53. Child's name: _____
❒ Not applicable

54. Child's DOB: _____
❒ Not applicable

55. Child's gender: _____
❒ Not applicable

56. Has your (reference) child ever received vitamin A capsules?
❒ Yes
❒ No (please skip questions #56a, #57)

56a. If yes, please specify how many times since birth _____
❒ Not applicable

57. From where has _____(child's name) received vitamin capsules? (Check all that apply)
❒ Immunization campaign
❒ Clinics or health center
❒ Hospitals
❒ Family members
❒ Other (Please specify
_____)
❒ Not applicable

MOTHER'S VITAMIN A SUPPLEMENTATION

*(Note for fieldworker: Now, I am going to ask you questions about **your** vitamin A supplementation)*

58. Have you (mother) ever received vitamin A capsules?
❒ Yes
❒ No (If No, please skip questions #59, #60)

59. How many times in the **past 3 years**? _____
❒ Not applicable

60. From where have you received vitamin A capsules? (Check all that apply)
❒ Clinics or health center
❒ Hospitals
❒ Health center
❒ Family members
❒ Other (Please specify _____)
❒ Not applicable

RESPONDENT AND STUDY CHILD SELF-REPORTED HEALTH STATUS AND MEDICAL CARE

(*Note for Fieldworker: Now I am going to ask you questions about your overall health status in the last 12 months).*

61. How would you rate your health during the past 3 months?
❒ Very poor
❒ Poor
❒ Average
❒ Good
❒ Very good

62. Who pays for your own medical bills? (Please check all that apply)
❒ Yourself
❒ Family
❒ Friends
❒ Government
❒ Other (Please specify whom: _____)

SOCIO-ECONOMIC STATUS

(Note for fieldworker: Now, I am going to ask you questions about the socio-economic status, the house you live in and the water you are using in your household)

63. What is your last grade in school?
❒ No formal schooling
❒ Elementary school incomplete (Please specify last grade completed: _____)
❒ Elementary school complete
❒ High school graduate
❒ More than high school
❒ Professional school attended
❒ Professional school graduate
❒ Other: _____

64. What is your current marital status?
❒ Single/never married
❒ Married
❒ Living together but not married
❒ Separated/divorced/widowed

65. Which of the following best describes your current employment status?
❒ Working full-time
❒ Working part-time
❒ Unemployed (Who supports the family monetarily? _____)

66. How much money does your family receive in the past month (from all sources of income?)

US currency (Dollars)		**Haitian currency (Gourdes)**
❒ US$0-US$30.00	or	HG0-1170.00
❒ US$31.00-US$60.00		HG1209.00- 2340.00
❒ US$61.00-US$90.00		HG2379.00-3510.00
❒ US$91.00-US$120.00		HG3549.00-4680.00
❒ >US$120		>HG4680.00

67. Is the Floor of the house you currently live in made up of?
❒ Mud
❒ Wood
❒ Concrete
❒ Other (Please specify: _____)

68. What the windows of the house you currently live in are made up of?
❒ Wood
❒ Glass
❒ Leaves
❒ Curtains
❒ Other (Please specify: _____)

69. What the ceilings/roof of the house you currently live in are made up of?
❒ Mud
❒ Wood
❒ Concrete
❒ Metal sheet
❒ Pailles (Palm leaves, Bamboo leaves etc…)
❒ Other (Please specify: _____)

70. How do you get the water you are using at home? (Please check all that apply)
❒ From the running river
❒ From community well
❒ Piped water (inside or outside household [circle one])
❒ From other sources (Please specify: _____)

71. Do you or someone else in your household have to fetch water?
❒ Yes
❒ No (If no, please skip question #72)

72. How long does the person have to walk to get the water you are using at home?
_____ Minutes hours [please circle one]
❒ Not applicable

73. Do you have sewage at home?
❒ Yes
❒ No

74. How do you get rid of _____(child's name)'s waste (feces, urine)?
❒ Child uses the latrine
❒ I drop it in the latrine
❒ Thrown away with other trash
❒ Buried
❒ Left in open air
❒ Other (Please specify: _____)
❒ Not applicable

75. How do you (respondent) get rid of your waste (feces, urine)?
❒ I use latrine
❒ I drop it in the latrine
❒ I throw it away with other trash
❒ I bury it
❒ Left in open air
❒ Other (Please specify: _____)
❒ Not applicable

(*Note for fieldworker: Now I am going to ask you questions about your Social Economic Status, your mean of transportation and where you usually prepare your meals)*

76. Does the family or the household own animals like? (Please check all that apply)
❒ Cows How many? _____
❒ Goats How many? _____
❒ Sheep How many? _____
❒ Horses How many? _____
❒ Donkeys How many? _____
❒ Chicken How many? _____
❒ Other (Please specify:
Name :_____)
How many owned: _____)
❒ None

77. Do you own one or more of the following? (Please check all that apply).
❒ Radio
❒ Telephone
❒ Cell phone
❒ Refrigerator
❒ Sewing machine
❒ Television
❒ None

78. Does your household have money saved in the bank?
❒ Yes
❒ No

79. Do you have electricity available at home?
❒ Yes
❒ No (if No, skip question #79a)

79a. If yes, for how long? _____ Hours per: day week month
❒ Not applicable

80. What do you usually use for transportation?
❒ Bicycle
❒ Taptap (camionnette)
❒ Animals (Horse, donkeys, cows)
❒ Motor-taxi
❒ Walk
❒ Car
❒ Other (Please specify: _____

81. What kind of energy sources do you use to cook your foods at home? (Please check all that apply)
❒ Electricity
❒ LPG (Liquefied Petroleum Gas)
❒ Natural gas
❒ Kerosene
❒ Coal
❒Woods
❒ Pailles (palm leaves, bamboo leaves…)
❒Other (Please specify: _____

82. Do you have a kitchen?
❒ Yes
❒ No (If No, please skip question # 83)

83. Is the kitchen in a separate room?
❒ Yes
❒ No
❒ Not applicable

FOOD FREQUENCY QUESTIONNAIRE (FFQ)

84. *I am going to ask you questions about foods that you have eaten* ***during the past 3 months.*** *For each food, I want to know whether you eat it (yes or no) and also approximately how many times you eat it (# of times a day, a week, a month)*

		How often did you eat it?	
FOOD ITEMS	Have you eaten in the past 3 months	# of times	Per
84a) Fruits (please do not include fruit juice)	Yes No	_____	d w m

84b) Mangos	Yes No	_____	d w m
84c) Papaya	Yes No	_____	d w m
84d) Water melon	Yes No	_____	d w m
VEGETABLES			
84e) Lettuce	Yes No	_____	d w m
84f) Pumpkin soup	Yes No	_____	d w m
84h) Banana	Yes No	_____	d w m
84i) Pumpkin	Yes No	_____	d w m
84j) Okra	Yes No	_____	d w m
84k) Corn	Yes No	_____	d w m
84l) Tomato	Yes No	_____	d w m
84m) Carrots	Yes No	_____	d w m
84n) Beets	Yes No	_____	d w m
84o) Green peas	Yes No	_____	d w m
84p) Beans	Yes No	_____	d w m
MEATS			
84q) Chicken	Yes No	_____	d w m
84r) Pork	Yes No	_____	d w m
84s) Beef	Yes No	_____	d w m
84t) Liver (beef, pork, chicken)	Yes No	_____	d w m
FISH AND SEA FOODS			
84u) Fish (local & imported).	Yes No	_____	d w m
84v)Shrimps (local & imported: including lobsters)	Yes No	_____	d w m
84w) Crabs (all sorts)	Yes No	_____	d w m

RICE					
84x) Rice in general (local & imported)	Yes	No	_____	d	w m
84y) Rice with beans and pork	Yes	No	_____	d	w m
84z)Rice with beans and chicken	Yes	No	_____	d	w m
84aa) Rice with okra	Yes	No	_____	d	w m
84ab) Rice with spaghetti	Yes	No	_____	d	w m
MILK & DAIRY PRODUCTS					
84ac) Raw milk	Yes	No	_____	d	w m
84ad) Concentrated milk	Yes	No	_____	d	w m
84ae) Fromage	Yes	No	_____	d	w m
BREADS & CEREALS					
84af) White bread	Yes	No	_____	d	w m
84ag) Whole wheat bread	Yes	No	_____	d	w m
84ah)Local bread	Yes	No	_____	d	w m
SNACKS, SWEETS & DESSERTS					
84ai) Peanut butter	Yes	No	_____	d	w m
84aj) Salty snack	Yes	No	_____	d	w m
84ak) Sweet cookies	Yes	No	_____	d	w m
DRINKS					
84al) Fruit juice (homemade and processed)	Yes	No	_____	d	w m
84am) Regular soda	Yes	No	_____	d	w m
84an) Diet soda	Yes	No	_____	d	w m
84ao) Kola	Yes	No	_____	d	w m
84ap) Coffee	Yes	No	_____	d	w m
84aq) Juice powder	Yes	No	_____	d	w m
84ar) Herb tea	Yes	No	_____	d	w m
84as) Beer	Yes	No	_____	d	w m
84at) Wine	Yes	No	_____	d	w m
84au) Rhum Barbamcourt	Yes	No	_____	d	w m

OVERALL SWEET & YAM POTATO CONSUMPTION

84av) Sweet potatoes	Yes No	_____	d w m
84aw) White yams	Yes No	_____	d w m
84ax) Yellow yams	Yes No	_____	d w m

SWEET POTATO CONSUMPTION

Now I will like to ask you how frequent do you consume sweet potato, including any sweet potato dishes during the 2 main seasons (winter [April to June and from October to November] and summer [November to March])

84ay) Do the seasons play a role in determining the frequency, the kind and the quality of sweet potato consumed?

❒ Yes

❒ No (skip questions # 84az through 84aa5)

Winter			
84az) White fleshed sweet potatoes during winter ❒ Not applicable	Yes No	_____	d w m
84aa1)Yellow fleshed sweet potatoes during winter ❒ Not applicable	Yes No	_____	d w m
84aa2) Red skin sweet potatoes during winter ❒ Not applicable	Yes No	_____	d w m
Summer			
84aa3)White fleshed sweet potatoes during summer ❒ Not applicable	Yes No	_____	d w m
84aa4)Yellow fleshed sweet potatoes during summer ❒ Not applicable	Yes No	_____	d w m
84aa5)Red skin sweet potatoes during summer ❒ Not applicable	Yes No	_____	d w m

SWEET POTATOES: ATTITUDES AND BEHAVIORS

(Note for fieldworker: Please display the different kinds of sweet potatoes that you have with you before asking the respondent the following questions. Then proceed with: Now, I am going to ask you questions about your sweet potato consumption habits)

85. Does someone in your household grow sweet potatoes in the last agronomic cycle?
❒ Yes (Please specify what kind:
_____)
❒ No (Please specify why and skip question #86, #86a)_____)

86. How much land did you or anyone in hour household grow sweet potatoes on in the last agronomic cycle? _____carreau
❒ Not applicable

86a. How much sweet potatoes do you use to harvest (in kg) in the last agronomic cycle?

❒ Not applicable

87. What month (s) of the year does your household consume any sweet potato in? (Please circle all that apply)
J F M A M J J A S O N D
❒ Not applicable (why?
_____)

88. What month (s) of the year does your household grow any sweet potato in? (Please circle all that apply)
J F M A M J J A S O N D
❒ Not applicable (Why?
_____)

89. What do you (respondent or head of household) do with the sweet potatoes you grow in the months specified on question 88?
❒ Sell them (to whom? _____)
❒ Consume them (methods of preparation:
_____)
❒ Both Sell and consume them
❒ Other (Please specify:
_____)
❒ Not applicable

90. In the past 12 months, have you ever consumed sweet potatoes?
❒ Yes
❒ No (If No, please skip questions # 91 though #100)

91. If yes, how often did you eat sweet potatoes? _____ (times per: day week month year)
❒ Not applicable

92. From where do you get the sweet potatoes you consume?
❒ Public markets (How time to walk to get there? _____minutes)
❒ Farms (How much time to walk to get there? _____ Minutes)
❒ Grow your own
❒ Other (Please specify _____)
❒ Not applicable

93. **During summer** how often do you buy sweet potatoes?
_____ Times per: day week month year (Please circle only one)
❒ Not applicable

94. **During winter** how often do you buy sweet potatoes?
_____ Times per: day week month year (Please circle only one)
❒ Not applicable

95. What kind of sweet potatoes do you like to consume?

_____
_____
_____
❒ Not applicable

96. What is the price for 1kg of the sweet potatoes you usually buy? (Fieldworker, please write down the name of the sweet potatoes bought and for how much in terms of Haitian dollars)

_____
❒ Not applicable

97. Do you consider sweet potatoes to be?
❒ Very Inexpensive
❒ Inexpensive
❒ Average Cost
❒ Expensive
❒ Very Expensive
❒ I don't buy them. I grow them
❒ Not applicable

98. How much sweet potatoes do you usually buy at a time? _____kg
❒ Not applicable

99. What is the sweet potato tuber size that your household usually gets?
❒ Small
❒ Medium
❒ Large
❒ Any size available
❒ Not applicable

100. How do you usually prepare the sweet potato dishes? (Please check all that apply)
❒ Mixed with rice
❒ Mixed with other vegetables
❒ Boiled alone and eaten with raw milk
❒ Fried with plantain
❒ Fried by itself
❒ Other (Please specify: _____)
❒ Not applicable

SWEET POTATO LEAVES

(Note for Fieldworker: Now I am going to ask you questions about sweet potato leaves.)

101. Have you ever consumed sweet potato leaves?
❒ Yes (If Yes, please skip questions #103)
❒ No (Please skip question #101a, #102)

101a. If Yes, how often? ____ (times per: day week month year (Please circle only one)
❒ Not applicable

102. What are your reasons for eating sweet potato leaves?
❒ Like them/taste good
❒ Part of the culture & habit
❒ Easier to get
❒ Other reason, please specify _____
❒ No particular reason
❒ Not applicable

103. What are your reasons for not eating sweet potato leaves?
❒ Don't Like them/taste bad
❒ Not Part of the culture & habit
❒ Not easy to find
❒ No particular reason
❒ Other reason, please specify _____
❒ Not applicable

24 HOUR RECALL (TO MOTHER ONLY)

1. Mother's Birth date: _____/_____/_____
   Month Day Year

2. Mother's Age: _____

3. Data collection date: _____/_____/_____
   Month Day Year

4. 24 hour dietary recall date: _____/_____/_____ Day of the week: _____
   Month Day Year

5. Recall #: _____1 or 2

Methods of preparation: for previous day

Food and beverage intake

6. (Fieldworker: Please start this way: Today, I will ask you questions about what you ate or drank from the time you woke up yesterday morning to the time you woke up in the morning today. Can you please tell me what did you eat and during that period of time? I will also ask you about the ingredients and how each food was prepared.)

			Mixed Dish Recipes				
Time of Day & Meal type*	Location (household, street, restaurant)	Food or Beverage	Dish Ingredients	Ingredient Amount	Method of Preparation (boiled, fried, etc…)	Amount Consumed by Mother	Unit of Amount Consumed by Mother (cups, slice, cm, etc…)

Time of Day & Meal type*	Location (household, street, restaurant)	Food or Beverage	Dish Ingredients	Ingredient Amount	Method of Preparation (boiled, fried, etc…)	Amount Consumed by Mother	Unit of Amount Consumed by Mother (cups, slice, cm, etc…)

Time of Day & Meal type*	Location (household, street, restaurant)	Food or Beverage	Dish Ingredients	Ingredient Amount	Method of Preparation (boiled, fried, etc…)	Amount Consumed by Mother	Unit of Amount Consumed by Mother (cups, slice, cm, etc…)

Time of Day & Meal type*	Location (household, street, restaurant)	Food or Beverage	Dish Ingredients	Ingredient Amount	Method of Preparation (boiled, fried, etc…)	Amount Consumed by Mother	Unit of Amount Consumed by Mother (cups, slice, cm, etc…)

Time of Day & Meal type*	Location (household, street, restaurant)	Food or Beverage	Dish Ingredients	Ingredient Amount	Method of Preparation (boiled, fried, etc…)	Amount Consumed by Mother	Unit of Amount Consumed by Mother (cups, slice, cm, etc…)

* Meal type refers to: breakfast, lunch, dinner, snack.

FOOD SECURITY

*(Note to fieldworkers: These next questions are about the food eaten in your household **in the last 3 months**, and whether you were able to afford the food you needed. Before I begin, I would like to ask you about your household during that time.)*

104. How many people lived with you in your household in the last three months? _____
105. How many of the children are between the ages of 1 and 5 years old?
_____

Name of children	Children's age		Children's gender	
1.	Months	Years	M	F
2.	Months	Years	M	F
3.	Months	Years	M	F
4.	Months	Years	M	F
5.	Months	Years	M	F
6.	Months	Years	M	F

*(Now, I am going to ask several questions about the food situation in your home during the **past 3 months.** Please be totally forthcoming pay attention to each question. Some may appear similar but it is important that you answer each one of them. The way you answer the following questions will not be used to determine program establishment or eligibility. Should you have the need for me to clarify any questions please don't hesitate to ask.)*

Questions referring to Respondent and/or Other Adults in the Household	
106) During the last 3 months, were you worried about running out of food?	1.Yes 2. No 88.Don't Know 99.Refused
106a) Did your home ran out of food at any time during the last 3 months?	1.Yes 2. No 88.Don't Know 99.Refused
106b) Was your home unable to eat the kind of foods that make you healthy at any time during the last 3 months?	1.Yes 2. No 88.Don't Know 99.Refused
106c) Did you or anybody in your home usually have to eat the same foods almost every day during the last 3 months?	1.Yes 2. No 88.Don't Know 99.Refused
106d) Was there any day during the last 3 month that you or any other adult in your home skipped a meal because of lack of food?	1.Yes 2. No 88.Don't Know 99.Refused
106e) During the last 3 month did any adult in your home eat less food than what they needed because there wasn't enough food?	1.Yes 2. No 88.Don't Know 99.Refused
106f) During the last 3 month was there any day when you or any other adult in your home felt hungry but did not eat because there wasn't enough food?	1.Yes 2. No 88.Don't Know 99.Refused
106g) Was there any day when you or any other adult in your home didn't eat for a whole day or just ate once during the day because there wasn't enough food during the last 3 months?	1.Yes 2. No 88.Don't Know 99.Refused

106h) During the last 3 months, did you do things that you would have preferred not to do, such as begging or sending children to work, to get food?	1.Yes 2. No 88.Don't Know 99.Refused
Questions referring to Children in the Household	
106i) During the last 3 months were you unable to provide the children in your home with the kinds of foods they need to be healthy?	1.Yes 2. No 88.Don't Know 99.Refused
106j) Did any children in your home usually have to eat the same foods almost every day during the last 3 months?	1.Yes 2. No 88.Don't Know 99.Refused
106k) During the last 3 month did any child in your home eat less food than what s/he needed because there wasn't enough food?	1.Yes 2. No 88.Don't Know 99.Refused
106l) During the last 3 month did you have to serve less food to any child because there wasn't enough food?	1.Every day or almost every week 1.Yes 2.No 88.Don't know 99. Refused
106m) During the last 3 month was there any day when any child in your home felt hungry but could not be fed because there wasn't enough food?	1.Yes 2.No 88.Don't know 99. Refused
106n) Did any child in your home go to bed hungry in any day during the past 3 months because of lack of food?	1.Yes 2.No 88.Don't know 99.Refused
106o) Was there any day when any child in your home didn't eat for a whole day or just ate once during the day because there wasn't enough food during the last 3 months?	1.Yes 2.No 88.Don't know 99.Refused

RESPONDENT NUTRITION KNOWLEDGE ON VITAMIN A

(Note for fieldworker: Now, I am going to ask you questions on what you may have heard about vitamin A)

107. In the past 12 months did you take into account the content of vitamin A of foods to decide what to buy?

❒ Yes
❒ No

108. List five foods you think that are rich in vitamin A

❒ _____
❒ _____
❒ _____
❒ _____

109. How often do you consume foods that are rich in vitamin A?

❒ Never
❒ Hardly ever
❒ Very often
❒ Frequently
❒ Once in a while
❒ Don't know

110. Which of the following foods do you think are good sources of vitamin A?

❒ Bananas
❒ Yams
❒ Sweet potatoes
❒ Rice
❒ Liver
❒ Green leafy vegetables
❒ Leafy vegetables
❒ Soda
❒ Water
❒ Mango
❒ Corn
❒ Fish
❒ Papaya

111. From where have you obtain the vitamin A supplements? (Check all that apply)

❒ Clinics or health center
❒ Hospitals
❒ Health center
❒ Family members
❒ Other (Please specify _____)

MEAL EATING PATTERNS

(Note for fieldworker: Now, I am going to ask you questions about your meal eating patterns)

112. Are you the person who has been doing the cooking at home **in the past 12 months**?

❒ Yes (If yes, skip question #112a)
❒ No

112a. If No, who does it?

❒ Family
❒ Friend
❒ Other_____)

❒ Not applicable

113. In the past 12 months, have you been invited to go and eat at family's or friends' homes?

❒ Yes
❒ No

114. Who usually does the shopping for foods for your household?

❒ Yourself
❒ Someone else (Please specify: _____)

115. Where do you usually go shopping for food?

❒ Local supermarkets (How much time do you have to walk from home to get there? _____minutes)
❒ Local traditional markets (How much time do you have to walk from home to get there? __minutes)
❒ Farms
❒ Elsewhere (Please specify: _____)
❒ Not applicable

116. Meals skipping habits

Meals	Do you usually eat?	How many times in the past 7 days?	If not daily, please explain why
Breakfast	Yes No		
Lunch	Yes No		
Dinner	Yes No		

117. In the past 12 months, did you eat food in the street?

❒ Yes
❒ No (If No, please skip questions # 117a, #118, #119, #119a, #119b)

117a. If yes, please explain why: _____

❒ Not applicable

118. What type of meals did you usually eat in the street in the past 12 months? (Please choose all that apply)

❒ Snacks
❒ Breakfast
❒ Lunch

❒ Dinner
❒ Not applicable

119. During the past 12 months have you ever eaten sweet potatoes or sweet potato dishes in the street?
❒ Yes
❒ No (If No, skip question #119a & 119b)
❒ Not applicable

119a. if yes, please specify how often: ___ (times per: day week month year (Please circle only one)
❒ Not applicable

119b. please specify the foods eaten
_____
_____
_____
_____
_____
❒ Not applicable

WOMEN ANTHROPOMETRIC MEASUREMENTS

120. Name of Fieldworker taken anthropometric measurements: _____

121. Weight	Kg
121a. Height	m
121b. Upper arm length (between elbow and shoulder in cm)	Cm
121c. Mid upper arm circumference (cm) (tape code: _____)	Cm
121d. BMI **Metric BMI Formula** BMI = (Weight in Kilograms / (Height in Meters) x (Height in Meters)	

REFERENCE CHILD'S ANTHROPOMETRIC MEASUREMENTS

122. Child's weight	Kg

122a. Child's height	cm
122b. Upper arm length (between elbow and shoulder in cm)	cm
122c. Mid upper arm circumference	cm
122d. Child's head circumference	cm
122e. BMI Metric BMI formula BMI = (weight in kilograms / (height in meters) x (height in meters)	

Appendix 6: Recipes of Sweet potato leaves for 3 people.

Dish 1: Sautéed or Clinched sweet potato leaves

-2.5 lb of fresh sweet potato leaves
-1.5 table spoon of vegetable oil
-1.0 chicken bouillon
-0.5 lb of meat (fresh beef)
-1 tea spoon of sea salt
-1/2 tea spoon of red pepper
-1.5 liters of tap water
Boiled the leaves in water for about 15 minutes.
-Add other ingredients and boil for 7 minutes until done.
Serve dish with starchy foods such as yam and plantain.

Dish 2: Salad of sp leaves for 3 people

-2.5 lb of fresh sweet potato leaves
-1.5 liters of tap water
-1/2 tea spoon of sea salt
-Boil leaves in salted water for about 15 minutes
-Drain water and serve hot

Appendix 7: Focus group panels

Selection criteria

1. Is the person a woman?
❒ Yes (Continue)
❒ No (Exclude from study)

2. Is the woman a mother?
❒ Yes (Continue)
❒ No (Exclude from study)

3. Is the woman between the ages of 17 and 45?
❒ Yes (continue)
❒ No (Exclude from study)
(Note: In Haiti, teen age mothers are generally considered as adults mothers)

4. Is the woman's youngest child between the ages of 1 and 5 years old?
❒ Yes (Continue)
❒ No (Exclude from study)

5. Is the woman in good heath?
❒ Yes (continue)
❒ No (exclude from study)

6. Is the woman's youngest child (between 1 and 5 years old) in good health?
❒ Yes (continue)
❒ No (exclude from study)

7. Is the woman living either in 1st, 2nd or third section Communale of Camperrin?
❒ Yes (continue)
❒ No (exclude from study)

8. Does the woman agree to provide accurate information to the best of her knowledge?
❒ Yes (continue)
❒ No (exclude from study)

Appendix 8: Information Sheet

University of Connecticut

FOCUS GROUPS

Principal Investigador: Dr. Rafael Pérez-Escamilla
Student Researcher: Michael Dessalines
Study Title: Understanding the Sensory Acceptability and Potential Nutrient Contribution of Orange Fleshed Sweet Potatoes (OFSP) in Haiti: Formative Research

1. Invitation to Participate
   You are invited to participate in the study because you are a member of any of the following three communal sections: 1st, 2nd, and 3rd of Camperrin.

2. Purpose
   This study aims to collect your personal opinion about your preferences and your thoughts about the acceptability of sweet potatoes in your community.

3. Description of Procedures
   Should you agree to participate in this study that will not last beyond 2 hours; your role will be to share your personal opinions about the acceptability of traditional sweet potatoes in your respective community. You will also be asked to talk about desirable and undesirable characteristics of sweet potato dishes. Finally, you will be asked whether the leaves of sweet potatoes are consumed in your community and if not, why. You will also be asked to give your name and date of birth. This Session will be taped, transcribed and coded for content analysis. Information about your household's structure and other family demographics will be collected as well.

4. Risks and Inconveniences
   There are no known risks associated with this Project. Your time spent in this discussion will be compensated by a financial incentive at the end of the Social Economic Status.

5. Benefits
   The benefits of this Project can be substantial for the communities where it is conducted and beyond as vitamin A deficiency and food insecurity affect hundreds of millions of people worldwide.

6. Economic Considerations
   Should you choose to participate in this Project, we will plan to meet with you at a public or private place located in either one of the three communal sections to carry out this focus group discussion. You will be compensated by a financial incentive of US$3.00 for your time.

7. Confidentiality

All information collected from this interview will be confidential. It will be kept locked in file cabinets in Haiti and then transferred to a safe location at University of Connecticut at the end of the data collection process. Your name and personal identifiers will not be used in any written or oral report resulting from this study.

You should also know that the University of Connecticut's Institutional Review Board (IRB) and the Office of Project Compliance may inspect study records as part of its auditing program, but these reviews will only focus on the Project and neither on your response nor involvement. The IRB is a group of people who review Project studies to protect the rights and welfare of Project participants like you.

8. Voluntary Participation

You do not have to be in this study if you do not want to. If you agree to be in the study, but later change your mind, you may drop out at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate.

9. Do You Have Any Questions?

Take as long as you like before you make a decision. We will be happy to answer any questions you have about this study. If you have further questions about this project or if you have a Project-related problem, you may contact the principal investigator: (Dr. Rafael Perez-Escamilla at Rafael.perez-escamilla@uconn.edu) or the student Project coordinator (Michael Dessalines at 693 8958 or agrmike2@yahoo.com) or the collaborating organization in Haiti [Organization for the Rehabilitation of the Environment: ORE]: (Mousson Finnigan at 758 7565or or mail@oreworld.org). If you have any questions concerning your rights as a Project participant, you may contact the University of Connecticut Institutional Review Board (IRB) in the United States of America at 860-486-8802.

Appendix 9: Participant characteristics

1. How many children did you give birth to? _____
2. How many of them were born alive? _____
3. How many of them were born dead? _____

4. How many of them were born alive but died before reaching the age of one?_____

5. What is your reference child's (between 1-5 years old) name? _____

6. What is your last grade in school?
❒ No formal schooling
❒ Elementary school incomplete (Please specify last grade completed: _____)
❒ Elementary school complete
❒ High school graduate
❒ More than high school
❒ Professional school attended
❒ Professional school graduate
❒ Other: _____

7. What is your current marital status?
❒ Single/never married
❒ Married
❒ Living together but not married
❒ Separated/divorced/widowed

8.. Which of the following best describes your current employment status?
❒ Working full-time
❒ Working part-time
❒ Unemployed (Who supports the family monetarily? _____)

9. How much money does your family receive in the past month (from all sources of income?)

US currency (Dollars)		**Haitian currency (Gourdes)**
❒ US$0-US$30.00	or	HG0-1,170.00
❒ US$31.00-US$60.00		HG1,209.00- 2,340.00
❒ US$61.00-US$90.00		HG2,379.00-3,510.00
❒ US$91.00-US$120.00		HG3,549.00-4,680.00
❒ >US$120.00		>HG4, 680.00

Appendix 10: Identification Sheet Focus Group Panel

1. Today's date: _____/_____/_____
   Month day year

3. Name of the respondent mother: _____

4. DOB of the respondent mother: _____/___/_____
   Month day year

5. How old is the respondent mother? _____

6. What is (your reference: between 1-5 years old) child's name? _____

7. How old is that child_____

8. DOB of that child? _____/_____/_____
   month day year

9. Where the respondent mother lives?
   Habitation: _____
   Communal Section:_____

Appendix 11: Focus group scripts

FOCUS GROUP INTERVIEW GUIDE

SCRIPT/INTRODUCTION

Good morning, and welcome to our focus group discussion this morning. First, I would like to thank you for taking the time to join our discussion on nutrition during pregnancy. My name is Michael Dessalines. I represent the University of Connecticut and will be the moderator/facilitator of this focus group discussion. Assisting me are Ms. Claudia Constant and Dr. Rafael Perez-Escamilla. Ms. Claudia Constant, one of our fieldworkers is the note taker today. Dr. Rafael Perez-Escamilla, who represents the University of Connecticut, AND Dr. Mousson Finnigan who represents ORE will be the observers. We have invited you here to hear your views on both the consumption of sweet potatoes itself and its leaves. We basically would like to know what you think about sweet potatoes how it affects your knowledge, behaviors, experiences and use.

Before we start I will like to read to you the informed consent form to make sure you understand the purpose of this project.

Read the information sheet
Make sure to read well.

After giving one information sheet to each participant:

Now I would like to explain to you some basic information about a focus group discussion

Introduction

What is a focus group? What is this focus group about?

A focus group is a small group of people that gather to share their thoughts and ideas about a particular subject. It is led by a moderator, assistant moderator, and an observer. The moderator will ask the questions and the mothers (you) will answer them. In this focus group, we will be talking about the consumption of sweet potato and its leaves.

How the focus group will proceed
My role as the moderator is to ask questions and listen. I won't be participating in the conversation, but I want you to feel free to talk with one another. I will be asking you questions, and will be moving the discussion from one question to the next. Each question that we ask will be written on the white board that is facing us now for you to refer to it if needed.

There is a tendency in these discussions for some people to talk more and some people not to say much. But it is important for us to hear from each one of you because you have different views and experiences to share. So if one of you is sharing a lot, I may ask you to let someone else talk. And if you are not saying much, I may ask for your opinion. Now, I will proceed with the ground rules.

Review Ground Rules

Before we begin, let me suggest some things that will make our discussion more productive. We are tape recording this focus group discussion because we don't want to miss any of your comments. Feel free to speak freely. There is no right or wrong answers. Please respect the right of someone else to express her opinions. Only one person should talk at a time and please speak clearly. To assure confidentiality, we will be on first-name basis, and there will not be any names attached to any reports. This focus group discussion will last 2 hours. Please turn off any cell phones and/or pagers to avoid any distractions.

If you need to use the bathroom before we begin please do so now. We will also give you 3 breaks to use the facilities. Please, let us know if you need to use the restrooms during the focus group discussion. During the breaks, please feel free to enjoy the freshly prepared mangoes that are on the other room.

Turn ON the Tape Recorders
Start ASKIND QUESTIONS

Let's begin our focus group discussion by going around the table, tell us your first name what section and habitation you are from.

Appendix 12: Moderator sheet

1. Moderator's name: _____

2. Note taker's name: _____

3. Observer's name: _____

4. Location of this focus group discussion: _____

5. Start time of the Focus group discussion: _____ AM PM

6. End time of the Focus group discussion: _____ AM PM

7. Today's date _____/_____/_____
Month Day Year

8.Obsèvasyon:_____

Appendix 13: Points for discussions

1. Are sweet potatoes typically consumed in your community?
2. Do you eat sweet potatoes?
3. Why or why not?
4. How often?
5. How easy or difficult is it for you to get them?
6. Where do you use to get sweet potatoes?
7. Can you get them year-round?
8. If you grow them, how many times per year do you grow them?
9. Does your (reference) child eat sweet potatoes?
10. In general, what is the cooking method of the sweet potatoes dishes you use to prepare?
11. In your own words/understanding: are sweet potatoes nutritious?
12. If so, what do they have that makes them nutritious (there anything in particular)?
13. How often do you feed your (reference) child sweet potatoes?
14. If you have a dish that calls for sweet potatoes, but you don't have any available, do you use another ingredient instead?
15. Are the sweet potatoes cheaper or more expensive than any other tubers at the local markets?
16. Do you think that sweet potatoes can make you sick?
17. What do you like the most in sweet potatoes (sweetness, dryness, sourness etc..)?
18. What kinds of sweet potatoes do you like the most?
19. How does your (reference) child respond to the consumption of the sweet potatoes?
20. Have you ever consumed sweet potato leaves? Why or Why not?
21. How often do you or would you consume it?
22. Do you use to give sweet potatoes to children less than 1 year of age or less than 2 years of age?
23. What have you heard about vitamin A?
24. What kinds of foods do you think have it in greater quantity?
25. Do you use to eat a particular food crop because you think it is rich in vitamin A?
26. What have you heard about vitamin A deficiency?
27. Do you use to feed your child with sweet potato leaves?
28. How are the leaves eaten or how could they be eaten: Raw, cooked, as garnish, as snack, in a drink, other?
29. What kind of sweet potatoes do you use to make tom-tom and sweet potato bread, sweet potato bullets (like meat balls)?
30. What characteristics those kinds of sweet potatoes have that make them appropriate for certain dishes.
31. Do you eat leaves from other plants?
32. How are sweet potato leaves different from other leaves that you do eat?

July 19th, 2007

Appendix 14: Transcript for Focus Group 1

This focus group panel took place on July 19th 2007 at the ORE facility in Cam-Perrin. 12 mothers participated in this panel. This session lasted two hours. The moderator asked the questions in Haitian Creole after translation from English to the participants. There were two note takers and two observers.

Introduction by moderator:
Good morning, and welcome to our focus group discussion this morning of July 19th, 2008. First, I would like to thank you and welcome you for taking the time to join our discussion about sweet potatoes today. My name is Michael Dessalines. I represent the University of Connecticut and will be the moderator/facilitator of this focus group discussion. Assisting me are Ms. Claudia Constant and Dr. Rafael Perez-Escamilla. Ms. Claudia Constant, one of our fieldworkers is the note taker today. Dr. Rafael Perez-Escamilla, who represents the University of Connecticut and Dr. Mousson Finnigan who represents ORE, will be the observers one and two respectively. We have invited you here to listen to your views on both the consumption of sweet potatoes itself and its leaves. We basically would like to know what you think about sweet potatoes, how they affect your knowledge, behaviors, experiences and use.

Note: All the participants sat quietly, listening at the moderator's words of introduction. Patiently, the participants waited until the rules and regulations of the discussion were laid down as clearly as possible. The participants were asked whether they understood the rules or not or was there a need to go over them once more. Some of the participants said out loud that they clearly understood the rules while others shrug their heads backwards and forward as sign of approval that they understood the rules of the discussion. On that, the moderator said: let us start our discussion today**.**

Moderator said: The first question I would like to ask is: Are sweet potatoes typically consumed in your communities?

All the participants answered together out loud: Yes. Subsequent to that answer, no one added a single word.

Moderator then asked: Do you (participants) eat sweet potatoes?

Participant one said: everyone here eats sweet potatoes. (Note**:** After that answer, no one said a word. The moderator proceeded to ask each participant separately whether they particularly consume sweet potatoes).

Participants two said: I like to eat sweet potatoes a lot. Upon that second answer, the eyes of the rest of the participants were focused on participant two. Some of them moaned that is the

same for me and my family while some others brought their heads backwards and forward as a sign of approval of the answer already provided by participant two.

Moderator said: OK! Because all of you showed that you consume sweet potatoes, **can you tell me why do you consume them?**

(**Note**: Everybody started to talk at the same trying to explain why they consume sweet potatoes. Moderator: I understand that everyone has something to say. Please be reminded that whatever you have to say is very important. Let us listen to one person at a time. You will have your chance to talk as well. A few seconds later, the room was quiet and)

Participant one raised her hand and said: 'I eat sweet potato because it contains lots of vitamins.

Immediately after participant one, **participant two** said: sweet potatoes are foods created by God. That is why I eat them.

Participant three followed by saying: 'I eat sweet potatoes because they contain lots of milk in them. When I was nursing my youngest child, I was advised by family members and friends to consume lots of sweet potatoes because they (sweet potatoes) the breast milk to flow better. I also wash my hair with the sweet potato when I could not buy shampoo. Sweet potato leaves protect my hair.

Participant four said: 'If I eat sweet potatoes it is because they are good treatment for anemia'.

Moderator: what do you say, participant five? After a little pause, Participant five said: the reason why I eat sweet potatoes is because sweet potatoes are good in legume for both adults and children at my house.

Moderator looked at participant six who looked a little bit shy. With her eye on the table participant six said: 'I eat sweet potatoes because they are fortifying foods.
(**Note**: participant six ended her statement by looking at participant seven. After a quick smile),

Participant seven said: 'I eat sweet potatoes because I can grow them in my garden. That is why I eat them.

Participant eight who was waiting for her time to talk said: 'sweet potato is one of the foods that when you start eating it you can't stop (the audience laughed). It encourages you to drink lots of water after eating it because water has vitamins in it.

When **moderator** turned eyes on **participant nine,** she said: 'I eat sweet potato because when I was growing up, I saw that my father grew it a lot in his gardens. Without hesitation, participant ten said: 'I eat sweet potato because I enjoy eating it'.

Moderator addressing to both participants eleven and twelve said: 'can you tell us why do you eat sweet potatoes?

Participant eleven said: 'I have nothing else to add to the answers that have already been given.

Participant twelve shrugged her head in sign of approval of what participant eleven has said.

Note: Moderator: Does anyone want to add anything else to those answers? The room was quiet. Then the moderator proceeded with the second question.

Moderator: How many times of the week do you eat sweet potatoes?

Note: All the participants started talking at the same time. Moderator: You will all have your chance to talk. Please let us listen to one person at a time. Because participants eleven and twelve hasn't said much, let us listen to them first.

Participant eleven: I eat sweet potato at least twice in a week.

Participant twelve answered: It is not uncommon for me to spend two or three months without eating sweet potatoes. The reason is that when sweet potato is not raised in my husband's garden, I can't afford buying them. That is why I used to spend so much time without eating sweet potatoes

Participant three immediately after the last word of participant twelve said: When I harvest sweet potato from my garden, I use to eat it every day until it is finished.

Note: participant four who raised her hand at the end of participant three's answer to say: My husband has several plots of land where he grows sweet potatoes. As a result, almost every three months I harvest sweet potatoes and that allows me to eat it at least twice a week.

Moderator said: let us continue with the following question should any one has anything else to add to that discussion. No one said anything as of they were waiting for the next question as it was being written on the flip chart by one of the observers (Dr. Mousson Finnigan)

Participant asked: Is it easy to get the sweet potatoes you use to eat at home?

All the participants said together: 'Yes' and no participant added any more to that answer.

When **moderator** ask: what about you, participant one?

Then participant one answered: When I don't grow sweet potato or I am waiting for the one from my garden to get ready for consumption, with money on hand, sweet potato is not difficult to find. It is found great quantity at the traditional markets.

Note: Some of the participants were talking at a low tone of voice or shaking their heads expressing their approval of the answer given by participant one. Some other ones were shaking their heads express their agreement with participant one's answer.

Moderator Said: I would like an answer from each one of you on the following questions. The next question that I have for you is: What kind of sweet potato do you like to eat and can you tell us why? Who would like to start first?

(**Note:** Instead of talking all at the same time, [I believed it was] **participant one** (who) raised her hand and said: 'I personally don't have a preference for any particular sweet potato. I eat them all.

Note. On that, some of the participants were talking out loud as to add to what participant one was saying. Moderator intervened and said: I understand that you may like a certain type of sweet potato. I am confident that you will have a chance to talk about your preferences. Let us listen to what participant one has to say and then I will turn around the table so that the others can hear what you have to say about the subject matter. Please remember that what you are saying is very important. Let us do it that way. Alright! Now, let us give participant one a chance to finish what she was saying. The room was quiet and participant one started to give some details on the type of sweet potato she likes.

Participant one continued: I like to eat the red skin sweet potato that we call patat ti jòji'n because it is sweet and very dry.

(**Note Moderator** ask participant one: what to you mean by Jòji'n?)

Participant ten said: George is the name of the average farmer who introduced that sweet potato in the region. Therefore, they call that sweet potato 'little Jòji'n' for little George.

Note: Participant two waited until participant ten ended her answer and said: you did not do it right. Everyone waited for their turn and you just started to talk ignoring the discipline rules that were just reminded to us. Let's do it in order so that we all have our chances).

Participant two continued to say: I eat all different kinds of sweet potatoes: red, white & yellow skin. When I don't grow them, I usually buy them at the traditional market.

Moderator said: what about you participant three? Participant three said: The type of sweet potato doesn't really matter to me. When I feel like eating sweet, I eat any kind. Alright!

Note: While participant three was answering the question, participant four had her head down and at the end of participant three's answer, moderator said to participant four: Are you alright? Participant four looked up and said: I am fine. Moderator asked participant four: Do

you need anything? Participant four said: no! I am fine. Then the moderator asked participant four: Can you tell us what kind of sweet potatoes you like to eat and why?

Participant four touched her eyes as a wake up sign and said: I buy whatever sweet potato my money can buy without any discrimination against one kind or the other.

Note. Upon those words, most of the participants who haven't talked yet shook their head backwards and forwards to show their approval the answer that participant four has given and **participant nine said**: Yes. Participant four is right and did not say anything else.

Note: Participant nine turned her eyes around the table but didn't seem to have everyone else's approval maybe because she started to talk before her time had come. That room was quiet at that moment when participant one asked the moderator: May I use the bathroom now please? Moderator said "yes. You may". Moderator continued: You don't need permission to use to bathroom. It you need to go, you can go at any time. On that participant three stepped off the table and headed to the water fountain with a plastic cup to get some water to drink. In the mean time, **Observer one** said: A few moments ago, I heard one of you say that you like the red skin sweet potato because it is sweet and dry. Do you now of any sweet potato that are neither sweet nor dry?
After listening to the observer's question, all the participants answered at the same time as in a coordinated answer: Yes. Then nobody added anything else to that answer.

Moderator looked at participant five who said: Sweet potatoes that are not too soft or moist, they are the ones that are sweet and dry. I like these types of sweet potatoes.

Participant six said in connection with participant five**:** The type of land you raise your sweet potato determines whether your sweet potatoes will be sweet and dry.

(**Note:** As participant six was talking, participant one came from the bathroom break and participant three came back from the water break and was whispering at participant four's ears for just a few seconds and quickly grabbed her seat around the table).

Moderator to participant seven: What is your opinion in all of this?

Participant seven said: Any sweet potato that is grown in a cold soil will eventually be too soft and moist. Dry soil gives you better sweet potatoes.

Participant eight said: A sweet potato that is neither sweet nor dry is no good.

Note: Most of the participants were shaking their head backwards and forward to show their agreement with what participant eight has just said.

Moderator asked the participants: What kind of sweet do you like less?

Moderator asked **participant one: would you like to answer first?**

Then **participant one said**: To me, if a sweet potato is not sweet, I don't like that much even when I have to eat it. (Participants were laughing on background after that answer)

Moderator turning to participant two asked: can you tell us the name of some of those sweet potatoes that are not sweet in your view?

Participant two said: I don't know their names but I will recognize them when I see them name.
Note: Participant three shook her head in disagreement with participant two [who turned her head away] as to imply if you can identify them why can't you name them?

Then**, participant three** said**:** I know their names. The white skin is called 'Ti Micho' and there are two types of it. There is one that is too soft and there is one that is dry and sweet. I like the one that is dry and sweet for myself; but my child likes the one that is soft more than the other one.

Moderator: What do you say, participant four?

Participant four answered: In my region, people like to call it 'Ti Pestel or little Pestel' [Pestel is the name of a community like Camp-Perrin]. It is the yellow skin one.

Participant five said: 'Ti Savyen' is a very good kind of sweet potato that I like to eat because it is dry and sweet. Its skin is red. (**Note:** Ti Savyen is a Haitian proverb inferring that something will come to you. People use proverbs to name almost anything).

Moderator: As you said earlier, there are three kinds of sweet potatoes: red, white & yellow skins. Which one according to you is the best and why? (Note: As moderator was asking the question, observer two who was at the ORE's office walked very discretely on the extreme left of the room for a quick observation and took the opportunity to take a few pictures and then disappeared).

Note: All of the sudden, every body started to name their favorite types of sweet potatoes at the same time. Moderator intervened and said: Please let's give everybody a chance. I am certain that you will have your chance as well. Please let's listen carefully to one person at a time. On that, the room became quiet and moderator asked participant one to bring about her answer.

Then, **participant one** started to talk: I like 'Ti Micho' the most. It is the white skin sweet potato. Its flesh is white and it is sweet. I used to make sweet potato bread with it as well as other dishes I would want to. It is my favorite.

Participant two said: I like the red skin because it is very sweet. That doesn't mean I do not eat the other types as well.

Participant three followed up by saying: I like the 'Ti Pestèl', the yellow skin sweet potato. It is very sweet and very dry.

Note: There were lots of little talks on the back ground as of which kind of sweet potato was the best among the participants. Because the participants could not reach consensus toward what type of sweet potato they like.

Moderator said: Let's have a vote. The rule is simple. I will name the different types of sweet potatoes. For the one you like, please raise your hand and your hand will be counted. You will not be allowed to raise your hand twice. If you do not understand anything I say, please ask me to repeat for you otherwise, your vote will be final. Ready? All the participants answered together: READY!

Moderator said: Please raise your hands if red skin sweet potato is the kind of sweet potato you like the most. As a result, ten out of the 12 participants raised their hand in favor of red skin sweet potatoes.

Moderator continued: Please raise your hands if white skin sweet potato is the kind of sweet potato you like the most. As a result, the remaining two participants raised their hands in favor of the white skin sweet potato.

Note: When **Moderator** cited yellow skin sweet potato, nobody was able to vote because the twelve participants had already voted. Participants forming the group that voted the most for the red skin sweet potato were talking out telling each other: 'We are the best' while the participants of the other group were laughing without saying anything.

Moderator continued: Do you typically consume sweet potatoes that come from your garden or from the market?

Note: All the participants started to talk at the same time in response to the above question.

Note: Moderator couldn't hear clearly what they were saying. Then Moderator could not say anything but was looking at the participants who were trying their best to talk louder so that people could hear them better. After a few moments, the participants stopped talking by themselves. When complete silence reconvened by itself this time, Moderator addressed the same question to participant seven who did not participate that much in the discussion.

Participant seven said: I consume sweet potato that come from my own garden and when I don't have them ready for consumption, I do not buy due to money shortage.

Participant ten continued: I eat sweet potatoes mostly from my garden. When I don't have it from my garden, I don't usually buy it because they are very expensive at the traditional market.

Participant two followed up by saying: I always buy sweet potatoes from the traditional markets because I don't grow them.

Participant five added: The only place where I get the sweet potatoes that are consumed in my house is at the market where I use to buy them.

Participant eleven said: I mostly eat sweet potatoes that are from my garden. When I don't have them from my garden, I use to buy some at the traditional market for about $4.00 Haitian or 0.6 cents each time.

Participant four said: When sweet potatoes are harvested, the farmers sell them to the traders who sell them in retail by small piles of 4, 6, 7 sweet potatoes called 'Lot'. Street restaurant owners buy them from the traders at the market. They are either boiled or fried before they sell them on the street. This is where most people eat sweet potatoes.

Moderator asked: How about you participant eight?

Participant eight answered: I always have sweet potatoes at home because I grow them year round. I do not buy them at all. I consume what come from my garden.

Participant six said: Because sweet potatoes are grown in our several lands, I always have sweet potatoes available to eat. Therefore, I do not buy them at all.

Moderator asked all the participants: Please raise your hands if you grow sweet potato always year round in your gardens.

As a result, half of the participants raised their hands in support of raising sweet potatoes in their garden year round.

Participants one said: I do the same as participant eight. However, when I say that I grow sweet potato year round, it means that I have several land plots. I plant sweet potatoes in all of them at different times of the year. Sometimes, when I am harvesting sweet potatoes in one garden, I am planting it as well in another garden. As a result, sweet potatoes are always available to me for consumption all the months of the year.

Participant two started to talk while reaching for something from underneath of the table. Moderator said to participant two: Can you start your answer again because we could not hear what you were saying. On that note,

Participant two started over again by saying: Beans and sweet potatoes have the same seasons. What I usually do is to plant sweet potatoes under the beans so that when the beans are harvested, the sweet potato harvest will follow.

Moderator asked the following question to the whole group: How many times in a year do you typically plant sweet potatoes in your garden?

Participant one said: I plant sweet potatoes in my garden every three or four months, all the time of the year.

Moderator asked: What time of the year to you think it is most appropriate to plant sweet potatoes.

Participant two said: I plant sweet potatoes in February and harvest them in July. When I plant in July, they are ready for harvest in December.

Participant three jumped in to say: I, myself use to plant sweet potatoes up to 3 times a year provided I find the appropriate land.

Participant four added: In the locality where I am from (Nazaire: 3rd section), we do things a little differently. I am part of a community based organization that gets involved in the development of soil conservation techniques. We call those plots: family gardens. Wherever we build the ramps for soil conservation for a family, we always plant sweet potatoes within those ramps. As a result, sweet potatoes are always available every two or three months on the community.

Moderator asked: How long does the sweet potato take to be ready for consumption?

Participant seven said: The reason why I Like 'Ti Micho' is because it it ready for consumption three months after being put into the ground. Sometimes, you can even start eating your sweet potatoes two months after putting them into the ground.

Participant two said: The type of land where the sweet potatoes are planted will determine how long they will take before they are ready for consumption.

Moderator said: I understand that everyone here has at least a child from 1-5 years old. True?

Note: All the participants answered "True". Moderator continued: Does this youngest child consume sweet potatoes?

All the participants answered together: Yes and no one else said a word.

Moderator asked: How often do you feed that child with sweet potatoes in the past seven days?

Participant one said: My child is one year old and I feed her sweet potatoes at least two times a week.

Participant two added: My child is 2.5 years old. Sometimes, when I am not able to buy sweet potatoes, I used to spend weeks without feeding him with sweet potato. He likes sweet potatoes a lot.

Participant three said: My child is almost 5 years old. I used to feed him with sweet potatoes more than 3 times a week when they are available.

Participant four told us that: I use to feed my child with sweet potatoes only once a week because people say that if you feed your child with sweet potatoes more than once a week, the child may have diarrhea. I used to feed my child with the white skin sweet potatoes ('Ti Micho').

Participant five said: My child is 1 year old. Thus far, I haven't fed him yet with sweet potatoes. While he is still on breast milk, I introduced other food to him but not sweet potato yet because I have to buy sweet potatoes and they are not cheap. I would be glad to feed him with any kind of sweet potatoes should I be able to do so.

Participant six said: My child is 5 years old. I feed him with the red skin sweet potatoes from time to time.

Participant seven said: My child is 2 years of age. I usually make my child eat sweet potatoes at least 3 times a week in the past week. I fed him with sweet potato every morning boiled with cow milk.

Participant eight said: My child is 4 years old. I didn't feed my child with sweet potatoes in the past week. I used to spend up to six months without feeding my child with sweet potatoes because I do not raise it. Whenever I feel like eating it, I used to buy any kind.

Participant nine added: My child is 2 years old. I fed my child with sweet potatoes 2 times in the past week. He likes sweet potato very much.

Participant ten said: My child is two years old. I couldn't feed him with sweet potatoes in the past week because I was unable to buying them.

Participant eleven added: My child is 3.5 years old. In the past week, I fed him with any available sweet potatoes at least 2 times. I bought those sweet potatoes from the traders at the traditional markets. It is very rare to find one particularly pure sweet potatoes in the market. They are always mixed with other types.

Participant twelve added: My child is 4 years old. I fed him with sweet potatoes everyday in the past week and he eats it at the Lord's taste. (All the participants laughed).

Note: At that moment, an ORE employee riding his loud motor-cycle came on premises and parked outside the office lounge where the focus group discussion was taking place.

Moderator: Now, We will talk about the ways you used to prepare the sweet potatoes you used to consume. I will go around the table from right to left.

Moderator asked: How do you prepare the sweet potatoes you usually consume?

Participant one said: I used to prepare sweet potato in different ways: sometimes I use to boil it in water with salt or in milk or fry it or sweet potato tom-tom.

Participant two replied: I used to burn it on fire woods

Note: three participants nodded to show their agreement with what participant two has just said.

Participant three answered: I used to prepare sweet potato to make tom-tom.

Participant four said: I use to make sweet potato tom-tom.

Participant five said: The most common ways that I prepare the sweet potatoes is to boiled in raw milk. I use to fry the sweet potatoes along with plantain and bread nut.

Participant six: At a personal level, I rarely eat sweet potato alone. I always accompany it with yam, amaranth, and other leafy green vegetables. However, my children like to eat the sweet potato by itself because it is sweet.

Participant seven followed up: I used sweet potato as a weaning food for my reference child. Here is how I did it: The day before, I fetched for the sweet potato I know that my child liked and put it in the house for her to see. At sun down, I put the sweet potato on fire wood and let it there until it is cooked. I do not give the sweet potato to her at night. Early in the morning before brushing my teeth and before greeting anyone, I stepped outside the room and left the door half way open. With part of my body hidden behind the door, I called my child's name. She woke up and took the sweet potato from me without seeing my face and ate it. Since that day, her appetite for breast milk started to fade away until the day he did want to touch my breast any more.

Moderator to participant seven: Why did you do it that way?

Participant seven replied: That is the way I was taught by my parents. I proceeded the same way when I was taking all my other children off breast milk.

Participant eight continued: I don't have a particular way of preparing sweet potato to eat. I can boil it in milk or in water. I can also put it in stew (bouillon), or fry it. Just to follow up with what … (participant name was cited. We identified her as participant seven) had said, when I was taking my children off breast milk, I boiled the sweet potato in milk and feed them with it. When they are consuming the milk in the sweet potato, they believed it was the same as the breast milk.

Moderator: What about you, participant nine, how do you prepare the sweet potatoes you usually consume?

Participant nine responded by saying: Besides the ordinary ways of preparing sweet potatoes that are already mentioned, I rarely prepare a dish called 'sweet potato bread'. It is very expensive to prepare. When I don't have money to prepare it, I used to buy it at the traditional markets.

Note: Because participant nine came to a stop in her explanation, moderator asked her: how do you use to prepare that sweet potato bread?

Participant nine replied: I used to dry the sweet potato up for a couple of days and then add water to it along with kernel, sugar, milk and so forth if they are available to me. Then I put the mix in a plate and put it in a stove made with dried dirt for three to four hours. When it is cooked all the way, I share it with my family members as well as with visitors.

Moderator: Would you share some with me should I be around?

Note: All the participants were laughing and one of them (too whom the question was not addressed said: That is not true. You would never eat from us. Then, participant nine replied: You are welcomed to stop by my house anytime to have a taste of my sweet potato bread. Another participant added: Because you don't sweet potato bread all the time, you need to tell Mr. … (the name of the person was cited. The name was identified as the moderator) exactly when to come to your house for that.

Moderator: Participant one, three and four brought up the fact that she used to prepare sweet potato tom-tom. **Can you tell us how you prepare tom-tom sweet potato?**

Note: Those three participants started to talk at the same time by starting with the following words: 'You put…' On that note, the moderator intervened to say: only three on you will talk this time. There will be enough time to listen to all you will need to say. The moderator added: Please remember that whatever you want to say here is very important. This is the reason why each one of you will have her time to talk. OK!

Moderator: Let's start with participant three: **Can you tell us how you prepare tom-tom sweet potato?**

Participant two replied: I used to put together corn flower, wheat flower or France flower with sweet potato, malanga and plantain. I left them to boil together. When I think that everything is well cooked, I put them in a '*pilon'* to mix everything together very well done. Then I take the mixture out of the pilon and put it into plates to serve to family members. The best way to eat the tom-tom is to have either bean sauce or okra sauce and everyone will eat it all the way.

Participant one answered: Here is the way is that I prepared the most recent sweet potato tom-tom I have consumed: I boil the corn flower and the sweet potato separately. I put both of them in the **pilon** and then mix them together. When the mixture is ready, I eat the whole thing with okra sauce.

Participant three said: The way I use to do it is that I buy already made cassava bread and put it in very warm water. Second, I boil the sweet potato. When the sweet potato is ready, I put it in the **pilon** to mix it with the cassava bread. When I am done, I eat my tom-tom with okra sauce.

Moderator: What kind of sweet potato do you usually use to make tom-tom sweet potato?

Participant one said**:** I use any kind of available sweet potato

Participant two responded: No, you can't make it with any kind of sweet potato because some of them are too soft. The soft sweet potato will not be firm enough to hold. I use to do it with sweet potato that is sweet and dry. That's the way is like it.

Note: At that point, the city power went out. Because the power outage didn't prevent us from going forward, we continued with our discussion.

Participant three: The best kind of sweet potato to make the tom-tom is the dry one because you want the sweet potato to stay strong after boiling.

Moderator: What kind of sweet potato do you think is dry enough to do that**?**

Participant three answered: 'Ti Micho', the white skin sweet potato.

Participant one said: There are red skin sweet potatoes that are very sweet and dry. I think that the red skin sweet potatoes are dry enough to prepare tom-tom with.

Participant one replied: I don't usually take into account whether a sweet potato is dry or soft to put is in my tom-tom.

Note: The power was restored.

Referring to participant twelve, the moderator said: My friend over there hasn't said anything for a while now (all the participants laughed). Let me ask you this: have you ever eaten sweet potato tom-tom?

Participant twelve answered: I don't eat sweet potato tom-tom.

Moderator: Do you eat sweet potato at all?

Participant twelve: Yes, I do.

Moderator: Can you please tell us how you used to prepare the sweet potato you consumed in the past?

Participant twelve answered: I use to boil the sweet potato and eat it with either sauce [fish, herring] or eat it with milk.

Moderator: What kinds of sweet potato do you like eating?

Participant twelve answered: The red skin because it is dry and sweet. My partner likes eating tom-tom sweet potato made with malanga. He made me buy them from the market and prepare it for him every Friday.

Moderator: Now let me ask you this: Do you think sweet potato is good for health?

(Believed to be) **Participant seven answered**: Yes. It contains lots of vitamins that are good for our body.

Note: The moderator noticed that participants two and ten don't seem to agree with the above statement by the way the shook their heads. Then, the moderator said: Let us hear what participant two and ten have to say about that.

Participant two said: I would say instead that the sweet potato leaves are the ones that are food for health because they contain lots of vitamins in them, not the sweet potatoes in themselves.

Participant nine said: I know that sweet potato is good for bones growth and development and it contains lots of milk in it.

Moderator: How many of you here have been sick because you ate sweet potato?

Note: Most of the participants nodded in a negative way.

Participant three said: For me and for some people, sweet potato consumption is the main source for heart burn, stomach acid, gas and diarrhea.

Moderator: When you wanted to cook a dish that requires sweet potato and it is not available at the moment, what have you replaced the sweet potato with?

Participant one said: With Malanga & white yam (guinea yam)

Participant five: Besides malanga and taro, I used to put plantain in lieu of sweet potato in those dishes as well.

Moderator: Do you think that sweet potato is more expensive than yam or malanga?

Note: Most of the participants answered at the same time with the same following words: "Yam is more expensive". Malanga is a kind of tuber that is generally softer then sweet potato and yam when cooked.

Participant five said: That is true but in some localities like where I come from, malanga is even more expensive than yam.

Moderator: For the following question, I would like to hear your individual opinion. What do you like about a sweet potato: is it because it is dry, soft, sweet or what else?

Participant one replied: I don't like any particular characteristics in a sweet potato. I just like it even when I eat it gives me heart burn, I still eat it.

Participant two replied: The reason why I like sweet potato is because my father used to grow it a lot when I was young. I grow up in the habit of eating it. that is why I like it.

Participant three said: I like dry sweet potatoes. Most the sweet potatoes that the participants were mentioning a few moments ago is all sweet to me. From my experience, the only sweet potatoes that are not sweet are the ones that spend too much time in the ground without being harvested. At that point, they contain lots of water in them and that washes away their sweetness.

Participant four said: I eat sweet potatoes because they are sweet, good for health and because I like eating them a lot.

Participant five said: I was raised eating all kinds of sweet potato: sweet, dry, soft, any kind with any characteristics. I like them all.

Participant six said: I like the dry sweet potatoes.

Participant seven said: I don't discriminate about sweet potato.

Participant eight said: I don't like sweet potato that much. It is not because it causes harm to me. Mostly, I don't like their colors. This attitude is not only toward sweet potatoes but also towards other vegetables as well. For example, I don't like the color of pumpkin and because of that I don't eat it that much.

Moderator: Between the different kinds of sweet potatoes named already today, what kind do you eat each time you eat sweet potato?

Participant nine replied: The red skin sweet potato is the one that I used to eat because it is not only sweet but also dry as well.

Participant ten said: I like the red skin sweet potato because people in my community raise it a lot.

Participant eleven said: I like the red skin sweet potato because it is dry and sweet. I like eating sweet potatoes because I don't have to buy them. My partner grows them in our gardens. Sweet potatoes contain lots of proteins.

Participant twelve said: I, myself don't hate sweet potato at all because it is readily available. For example, I used to wake up in the morning and didn't have anything else to

feed my youngest child on. When I boiled the red and white skin sweet potatoes, everyone in the household eats a piece and are ready to face the day ahead.

Moderator: Now, I would like to hear your opinion on milk you used to use to prepare sweet potatoes a home.

Moderator: How many of you use to eat sweet potato with bottled milk like carnation or any other kinds?

Note: All the participants nodded in a negative way.

Participant four said: Bottle milk is too expensive.

Note: The rest of the participants seemed to agree with her.

Moderator: Please raise your hands if cow milk is the most common milk you usually use to prepare your sweet potato with?

Note: All the twelve participants raised their hands in support to the above statement.

Moderator: What kind of sweet potato does your youngest child like to eat?

Participant one said: My youngest child eats whatever kind of sweet potato I feed her with.

Participant nine said: Basically, my youngest child doesn't have too much choice in terms of the kinds of sweet potato to like to eat. He always tries to go after the biggest sweet potato he could put his hands on.

Moderator: I think it is time to take a 15-minute break. We have prepared something delicious for you. We hope you will enjoy. By the way, the yard has lots of nice flowers and small trees on it. You are free to walk and contemplate them as passionately as you want but, please do not touch them.

Note: On that, everyone laughed and started to move around.

Moderator: Thank you and welcome back to our discussion. I hope that you enjoyed the break moment. Let's continue with our discussion. Please remember to talk one at a time. You will all have a chance to state your opinion that we think is very important here.

Moderator: How many of you here have literally seen the yellow/orange fleshed sweet potato in the past?

Participant one said: Yes

Participant two said: A very long time ago since I saw it.

Participant three replied: It is not easy to find it both at the market or the field. The vines of the orange fleshed sweet potato are more difficult to find now than it was in the past. In my community, people used to call it 'Madan abitan' (peasant's wife).

Participant five said: It is very rare to find at the markets because their vines have been destroyed over the years.

Moderator: Let's have a vote on how many of you have seen the orange fleshed sweet potato already. Please bear in mind that the same rules apply here as well.

Moderator: How many of you have seen the orange fleshed sweet potato in the past? Please raise your hands.

Note: As a result, seven of the twelve participants raised their hands to say they have seen orange fleshes sweet potatoes in the past.

Moderator: Why do you think that orange fleshed sweet potato is so rare to find?

Participant four: I think because the vines don't exist any more or at least in my community but I don't mean to talk for other communities.

Moderator: If you had to choose between the white, violet (red skin) and orange fleshed sweet potato which one would you prefer over the other?

Participant seven said: On my part, I would prefer the white skin because it is the most common in my community.

Moderator: Who makes the decision in the household of what kind of sweet potato other people should consume.

Participant ten said: At my house, no one really makes a decision as of what to eat except on special occasions. Otherwise, we eat whatever is available to us.

Participant eight said: I am the one who buys sweet potatoes at the traditional markets for my house. Therefore, I decide what the rest of the people in my house would eat.

Participant one said: If I know that someone at my house likes a particular kind of sweet potato and that I have enough money to buy it, I always did. That is the way I make my decisions most of the time as related not only to sweet potatoes but also to food purchases

Moderator: How many of you have never consumed sweet potato leaves in the past? Please raise your hands.

Note: As a result, seven of the twelve participants raised their hands in support of the fact that they have never consumed sweet potato leaves.

Moderator: If you said you have never consumed sweet potato leaves in the past, do you have any reasons for that?

Participant two said: I haven't heard the notion of eating sweet potato leaves before today.

Participant five said: I never consumed sweet potato leaves because my family never did when I was a little. Yet, the sweet potato is consumed a lot in my family.

Participant three said: I have never heard about consuming the sweet potato leaves. The only thing I know the sweet potato leaves are good for is to wash hair. It gives them style and makes them become darker.

Participant twelve said: At home, we use the sweet potato leaves only to feed our animals.

Participant one said: I never consumed sweet potato leaves in my household because we only feed them to animals.

Participant four said: I never consumed sweet potato leaves because I have never heard of anybody who did it before. I think I might try is some day.

Participant eight said: I always consumed the sweet potato and leave the leaves for my pork.

Moderator: Those amongst you, who use to consume sweet potato leaves, can you please tell us what your reasons are?

(Believed to be) Participant six said: I used to consume the sweet potato leaves because it is good for anemia. The way I used to prepare it is that I add it to other leaves that I am consuming.

(Believed to be) Participant nine said: The reason why I started to eat the sweet potato leaves years ago was because I was sick with a hemorrhage. I was told by my family members and encouraged by medical professional from the hospital to consume a lot of sweet potato leaves along with other green leafy vegetable leaves. This blend is very good for blood. I used to eat this mixture with rice, corn meal and it produces great results. This is the reason why I always add sweet potato leaves in every dish made with leaves that I am preparing in my house.

Moderator: Please raise your hands if you used to feed your youngest child with sweet potato leaves.

Note: As a result, five of the twelve participants raised their hands to support the fact that they have fed sweet potato leaves to their youngest child.

Moderator: How did you use to prepare the sweet potato leaves for your youngest child?

Participant ten said: I have not prepared the sweet potato leaves in a special way for anybody in my house. We all eat them according to the ways they have been prepared.

Note: Participants six and nine nodded in a way to support the answer provided by participant ten.

Moderator: Did you use to use sweet potato as a weaning food for you youngest child?

Participant one said: Yes

Participant three said: I weaned my youngest child with a piece of sweet potato burnt on firewood.

Moderator: Can you explain to us how you did that?

Participant three: My mother taught me to burn a piece of sweet potato on firewood on the afternoon. At night, I placed it under my pillow for a while and then covered it with a bed pan for the whole night. Early in the morning, I woke up and left the door half way open and half way closed. With one foot inside and the other outside the room, I handed the sweet potato over to my child while saying: "This is what mom gives to you to forget taking the breast milk".

Remark: Previously, participant seven had offered a somewhat similar description.

Participant four: I also used to give that burnt sweet potato with cow milk in which I couldn't add salt. If I did, what I was looking for would never happen.

Participant five: I did it differently. I prepared sweet potato bread in the afternoon and gave it to my youngest child so that he could forget about asking for breast milk.

Moderator: Please raise you hand if you use to make sweet potato bread in your house.

Note: As a result, two participants raised their hands. The rest of the participants stated that they use to eat sweet potato bread but never had a chance of making it.

Moderator: Can you share with us how you use to prepare the sweet potato bread dish

Participant one said: I slash the sweet potato first, then add cassava flower to it. I add sugar cane syrup or plain sugar if the can syrup is not available. Then I add kernel, mustard and stir them together. I add to the stirred sweet potato and cassava kernel and mustard. I add sugar

or syrup to the whole thing after adding any available seasoning to it. After carefully mixing everything together, I put it on the stove and let it sit there for the appropriate amount of time until it is cooked all the way and ready for consumption. Another way I used to do it is to put the above mixture of sweet potato bread onto plantain leaves and put it on the stove.

Participant eleven added: The only thing you forget to add is milk.

Participant one replied: Not everyone likes milk to be in their sweet potato bread.

Moderator: Please let's give a round of applause to participants one and eleven.

Note: At that point, the room was filled with shout and contentment. When everything has come to a stop, the moderator continued.

Moderator: Participant eleven, you said that participant one had forgotten to add milk, how differently would you prepare it yourself?

Participant eleven replied: Should I have to prepare it myself, I would add milk to dilute the whole thing because I don't like to eat thick sweet potato bread even when I have never prepared it myself.

Moderator: Please raise your hand if you know how to prepare sweet potato 'bullet'.

Note: Only participant three raised her hand as to know how to make bullet sweet potato.

Moderator: Can you please share with the rest of us the way you use to make it?

Participant three replied: First I peel the skin of the sweet potato. Second, I put together: milk and Fromage, France flower, ground meat if it is available. Then, I blend them together. Fourth, I make a whole inside the sweet potato. Finally, I put everything on the stove and wait for it to be ready. I used to make it once a week.

Moderator: Now, I want to switch the subject a little bit. What have you hear people say about vitamin A?

Participant one answered: It is something you get when you eat lots of yellow fruits like eggs, banana, and milk.

Participant two said: It is something you can find when you eat lots of green leafy leaves like water cress, apricot, and banana.

Note: As participant two started to speak, participant twelve stood up with her index up facing everybody else as to ask permission to step out and started to walk to the direction of the bathroom.

Participant three said: It is important for health because it contains iron in it.

Moderator: Can each one of you name tree foods that you think are rich in vitamin A?

Participant said: Banana, egg, liver

Participant two said: Corn meal, black beans, leafy green leaves,

Participant three said: meat (cow, goat) wheat

Participant four said: sorghum, bread fruit and cassava

Participant five said: green leafy leaves (lyann panye), carrots & water cress

Participant six said: sweet potato, potatoes, peanut, white yam (guinea), avocado

Participant seven said: mango, apricot, papaya

Participant eight said: plantain, goat legs

Participant nine said: avocado, green leafy leaves (bonbon kodenn, lalo), malanga, militon

Participant ten said: papaya, egg, cow milk

Participant eleven said: apricot, grenadia and mango

Moderator: Please raise your hand if you think that vitamin A is good for the body.

Note: As a result, all the twelve participants raised their hands in support of the above statement.

Note: Participant twelve came back from the bathroom and took her seat.

Participant eight added: It helps fight diseases like anemia, broken bone, weakness, Kwashiorkor, tuberculosis, worms.

Moderator: How many of you here used to eat raw sweet potato leaves?

Participant six said: I did. I used to eat the terminal buds with water cress.

Participant nine said: I did. I use to eat the terminal but with salt.

Participant seven said: I always use the terminal buds in stew, leafy dishes and for salad as well. I never used the mature or fibrous leaves.

Moderator: Do you think in the past 12 months that sweet potato has become more expensive or less expensive?

Participant one replied: Sweet potato is more expensive according to a certain time of the year. For example, where there is a lot of it, it is not expensive at all. When there is less to harvest in the gardens, it is more expensive.

Participant two said: In the month of July, I think sweet potato is not that expensive because there is a lot of it everywhere. Sweet potato was more expensive in this past February than it is now in July.

Participant three said: regardless of what other people are saying, sweet potato is very expensive for me.

Participant five said: I don't think that what you are saying is true because I can prove to you that sweet potato is not expensive now.

Note: This comment of participant five was addressed to participant three.

Participant seven said: I do think that sweet potato is very expensive even when there seem to have lots of it at the traditional markets.

Moderator: How much on average do you use to buy a '*lot'* (pile) of sweet potato for at the traditional markers?

Participant four said: 10 gourdes or about 0.30 cents

Participant two said: 20 gourdes or about 0.60 cents

Participant one said: 25 gourdes or about 0.80 cents

Participant twelve said: 15 gourdes or about 0.50 cents

Moderator: Would you buy sweet potato leaves should they be available for sell at the traditional market?

Participant one said: I would not buy them because I have them in my gardens

Participant five said: I would have bought them for my pork.

Participant ten said: I would have bought them to cook as I always did for other leafy green vegetables. I also make juice out of sweet potato leaves. Here is how: I first pile it with other leafy green leaves, add water cress. Then I chop carrots, coconuts, add sugar and water to it.

Participant six said: When I am preparing sweet potato leaves for juice, I usually add cow milk to it.

Moderator: What kind of leafy green leaves do you use to consume?

Participant one said: *Bonbon kodenn, je zegwouy, lyann panye, militon bud, grenadia bud, trumpet & malanga* leaves.

Moderator: How do you use to prepare the sweet potato leaves?

Participant seven replied: I make salad with them, in legume, in boullion and fruit kase,

Moderator: How do you prepare the fruit Kase dish?

Participant nine said: I boil the leafy green leaves and I take it out of the water and then fry it. When it fried to my taste, I use to eat it with plantain, sweet potato, yam, rice and beans etc…

Participant two said: In the case of Kwi Kase, I don't let the leafy greens boil for a long time because I believe I could lose the vitamins that they contain.

Moderator: Because not all of you here consume sweet potato leaves, can you tell me what makes you think of sweet potato leaves differently from the other leaves?

Participant one replied: To me, sweet potato leaves is different than the other leaves I have never consumed them except to give them to the pork.

Participant two said: Sweet potato leaves are different because I have never seen anybody eaten them.

Participant three said: Because I have never seen my mother eaten them when I was growing up and I do the same when I became an adult. We consume only the sweet potato tubers.

Participant twelve said: They are different to me because I have never eaten them and I have never known anybody who consumed it.

Participant four said: I knew that the other leafy green leaves were the only ones that are good for health and blood. I would have never thought of sweet potato leaves as such.

Participant eight said: I have never consumed sweet potato leaves any time in the past. So, I don't know whether they are different from the other leafy green leaves that I used to consume or not.

Moderator: Please raise your hand if you would be willing to taste a dish of sweet potato leaves should it be prepared the same you used to consume other green leaves?

Note: As a result, seven out of the 12 participants (participants who never consumed sweet potato leaves in the past) raised their hands in agreement that they would be glad to taste a sweet potato leave dish.

Moderator: Do you use to prepare the sweet potato leave dishes differently for your youngest child?

Participant six replied: Not really. The child eats whatever I eat or give him to eat. When he grows up, he will make his own choice.

Note: Participants nodded but can't identify whether the ones who used to consume sweet potato leaves or those who stayed open to taste one. The nodding was done in agreement with participant six's reply.

Moderator: Please raise your hand if you have fed your reference child with breast milk only for sometime in the past.

Note: As a result, all the participants raised their hands in agreement that they have breast feed their reference child with breast milk only for sometime in the past.

Moderator: Please raise your hands if you have fed your reference child with breast milk only for:

Less than four months.	Result: two mothers out of twelve raised hands.
Only four months.	Result: Six mothers out of twelve raised hands.
Six months.	Result: Four mothers out of twelve raise hands.

Moderator: Has your youngest child had diarrhea in the past two week?

Participant one answered: Yes. It happens to my child when his teeth were coming out. The diarrhea lasted as long as it took for the teeth to come out. When the teeth come out, the diarrhea stopped.

Moderator: Has your youngest child had malaria in the past two week?

Participant five replied. Yes. I knew she had malaria when I went to the hospital with her. I was prescribed medications for her and instructions of what not to feed feed her, like strong or greasy foods.

Moderator: What seasons do you have more sweet potato in your community?

Participant eight replied: In December, January, June and October

Participant two said: It depends on when the sweet potato was planted because not everybody plants it at the same time.

Moderator: When do you think sweet potato is more expensive in Camp-Perrin?

Participant eight replied: Sweet potato is always expensive in Camp-Perrin

Participant three said: Only in the month of March.

Participant four said: Sweet potato is more expensive in April and May.

Participant six said: The only time of the year when sweet potato is not expensive is in December and January. At that time, many other seasonal foods are ready for consumption.

Participant five said: If you buy a lot (pile) of sweet potato for 10 gourdes (0.33 cents), in December, in April I may pay between 25, 35 gourdes (from 0.80 to $1.00)

Moderator: Have you ever bought orange fleshed sweet potato at the traditional markets?

Participant one replied: No. It is even impossible to find the orange fleshed sweet potato in the traditional markets.

Participant seven said: To me, the orange fleshed sweet potato is almost non existent.

Participant eight said: I use to see just a little bit of orange fleshed sweet potatoes at the markets. My father always grows a small amount of it each time he planted sweet potato in his gardens.

Moderator: Please raise your hand if you would be interested in growing the orange fleshed sweet potato in your gardens?

Note: As a result, eleven of the twelve participants raised hands in support to that and the other participant just said: 'Yes' followed by complete silence.

Moderator: As we are getting close to put an end to that session, do you have anything you would like to add?

(Believed to be) **participant three** said: I wish you conduct those discussions more often so that we can learn from each other. Besides that, I have nothing else to add.

Note: Silence.

Moderator: I thank you very much for participating in our panel today. I thank you for your openness and your willingness to answer my questions. As you are heading back home, I wish you have a safe trip.

Comment: Moderator played the tape so that the participants could hear their voices for a few minutes and then turned it off.

July 20th, 2007

Appendix 15: Transcript for Focus Group 2

This focus group panel took place on July 20th 2007 at the ORE facility in Camp-Perrin. 10 mothers participated in this panel. This session lasted two hours. The moderator asked the questions in Haitian Creole after translation from English to the participants. There were two note takers and two observers.

Introduction by moderator: Good morning, and welcome to our focus group discussion this morning of July 19th, 2008. First, I would like to thank you and welcome you for taking the time to join our discussion about sweet potatoes today. My name is Michael Dessalines. I represent the University of Connecticut and will be the moderator/facilitator of this focus group discussion. Assisting me are Ms. Claudia Constant and Evelyne Sanon. They are two of our three fieldworkers and are taking notes today. We also have Dr. Mousson Finnigan who represents ORE, and Alienne Etienne who is an ORE employee. They will be the panel's observers today. We have invited you here to listen to your views on both the consumption of sweet potatoes itself and its leaves. We basically would like to know what you think about sweet potatoes, especially your knowledge, behaviors, experiences and use.

Note: All the participants sat quietly, listening at the moderator's words of introduction. Patiently, the participants waited until the rules and regulations of the discussion were laid down as clearly as possible. The participants were asked whether they understood the rules or not or if there was a need to go over them once more. Some of the participants said out loud that they clearly understood the rules while others shrug their heads backwards and forward as sign of approval that they understood the rules of the discussion. On that, the moderator said: let us start our discussion today.

M: The first question I would like to ask is: Are sweet potatoes typically consumed in your community?

Note: All the participants answered together: Yes

Note: Complete silence. Nothing else was added by the participants who seemed to focus all their attention on the moderator.

Moderator: Do you (participants) eat sweet potatoes?

Participant one: I want to talk for all of us here: every one here eats sweet potatoes.

Note: There was a discussion going on after the above answer. Almost all the participants mothers started to talk at the same time at a low tone of voice. The transcriber can barely hear what they were saying.

(Believed to be) **Participant two** said: I really like sweet potatoes.

(Believed to be) **Participant five** said: What (participant one) has said is true but I don't like when people are talking in my place.

(Believed to be) **Participant four** said: I think that every one on earth likes sweet potatoes.

Note: Some other participants were shaking their heads as a sign of approval of what has been said by the other participants while looking at each other.

Moderator: Please tell me why do you consume them. Let's go around the table.

Participant one said: I like consuming sweet potato because it contains lots of vitamins in it. I eat it because of its vitamin content.

Probe: *What kinds of vitamins do you think sweet potato contains?*

Participant two said: I like all kinds of sweet potatoes because they all contain lots of vitamins. To tell you the truth, I don't know what vitamin they may have. One thing I know for sure is that the orange fleshed sweet potato has more vitamins in it than the white, red skin sweet potatoes.

Participant three added: I am always happy when I am eating sweet potatoes. The main reason why I eat sweet potato is because they are good for my body.

Participant four said: I eat Sweet potato for the same reason evoked by participant three; because it contains lots of vitamin.

Participant five said: I eat sweet potato because it is a good source of nourishment for the body like all other foods nourish the body.

Participant six said: I eat sweet potato because contains lots of important vitamin that is good for the body. That is why I like eating it.

Participant seven said: I eat sweet potato because it is a good fruit. It is sweet. When I eat sweet potato, my stomach feels good.

Participant eight said: I eat sweet potato because it contains proteins and vitamins. Another reason why I eat sweet potato is because it is sweet and dry. I use to boil the sweet potato with milk. That is the most common way we eat at my house.

Participant nine said: I like to eat sweet potato because it contains more vitamins that any other foods as well as lots of proteins. It is sweet and dry. We eat it almost every day at my house.

Participant ten said: Sweet potatoes are not only good for grown ups but also for children because the body can get the necessary vitamins it needs when I eat them. You can also use

the sweet potato to wean your children as well. Children also like to eat sweet potato because it is sweet. One of the advantages of sweet potato is that you can eat and prepare it in many ways. That means when you have sweet potato at home, you have food that is almost ready for consumption at anytime.

Moderator: How many times do you eat sweet potato in a week? Let's do the other way around the table.

Participant ten said: We don't eat it every day. For example, if the sweet potato we planted is not ready, we don't have enough money to buy on the market the amount we would want to eat. When the sweet potato is ready from the garden, I can eat it three times in a week. When there is a lot of sweet potato, for every body at my house, it is time to eat sweet potato all the time.

Note: Everyone laughs.

Participant nine said: Sometimes, I spent two or three months without consuming sweet potatoes because it is not cheap to get. I may spend four or even five months without consuming sweet potatoes. Because I do not raise them, I have to buy them and money doesn't come across quite easily. When I can, I eat sweet potato twice or three times a week and even more in its season.

Participant eight said: Because we always have sweet potatoes every three months at home, I regularly consume them at least two times a week. We use to have a lot of them.

Participant seven said: When sweet potato season arrives, my household and I eat it (sweet potato) sometimes three times a week. I use to roast or boil it for myself and for my (study) child. We can decide that we want to eat it boiled and then I boil it. if we decide we want to eat it roasted, and I do it. This is why every body enjoys consuming sweet potato at my house

Participant six said: Sometimes when nothing else is available in the household, I use to eat sweet potatoes three times a day. I prepare a certain amount of them in the morning and consume them as the day goes by for breakfast, lunch and dinner.

Participant five said: Friday is the day that I use to buy sweet potato at the market. When I buy on Friday, I decided how much to cook every day until it runs out. Then, I wait for Friday again to buy some more. I usually eat sweet potatoes two times a day: in the morning and at night. I do that the next morning until there is not more.

Participant four said: I can't really count how many times I eat sweet potatoes in a typical day. Where this is all there is, I eat them (sweet potatoes) as I feel hungry during the day whether I am on the field or at home.

Participant three said: I eat sweet potatoes more than two times a day because every body at home likes them a lot.

Participant two said: I can't count how many times I eat sweet potatoes per day. What I can remember is that I eat them several times in the morning, at noon and at night, every day.

Note: Every body laughs.

Participant one said: Because I don't raise sweet potatoes, I have to buy it at the traditional markets. That is why I eat them (sweet potatoes) only once a week but not because we don't like them at home.

Moderator: Can you tell me when the sweet potato season in your community is?

Note: Because almost all the participants raised their hands to answer that question, moderator decided to go again around the table.

Participant one said: I don't raise sweet potatoes. I usually buy them at markets. I think that there are two sweet potato seasons in my community: August and December.

Participant two said: That season begins in September and ends in August; then every starts planting sweet potatoes again.

Participant three said: I don't really know for every one else in my community but at home, we start harvesting sweet potatoes in November through December.

Participant four said: July and August

Participant five said: During the months of October and November, we plant sweet potatoes. The harvest time is April and March. During that time, we eat a lot of sweet potatoes.

Participant six said: The real sweet potato season where I come from starts in August and ends in December.

Participant seven said: I don't really know when the sweet potato season is because with money I can buy if at any moment. If it is the kind I want is not available on this market, I go to another one or to another one if necessary. I find sweet potatoes to be cheapest in the month of November.

Participant eight said: I mostly buy the sweet potatoes we consume at home. I find more if them in the month of December.

Participant nine said: June and July are when we have sweet potatoes in abundance where I come from. If you would like, you can stop at any time by my house and see for yourself.

Note: Some participants find that last statement funny and laugh about it.

Participant ten said: One of the places where I get the kind of sweet potatoes I eat at home is at the market. Sometimes, they are very expensive and sometimes they are not.

Probe: What time during the year do you find them either cheaper or more expensive?

Participant ten answered: It doesn't really matter. I can go to the market today and pay more for a bundle of sweet potatoes; and next week I pay less for the same bundle with the same quantity. To me, the real season of sweet potatoes depends on whether or not the peasants are able to get the sweet potatoes from the high mountains to the markets. Sometimes, some peasants have to walk long distances to carry the sweet potato sacs on their heads down to the markets.

Probe: How about using animals like horses, donkeys or tap-tap to carry the sweet potatoes from the mountains to the markets?

Participant ten answered: Some people can't afford animals or less the tap-tap fees. Depending on the situation, those transportation means are just impracticable because of the mountain slopes and the bad road conditions.

Moderator: Can you tell me what month in the year you plant sweet potatoes?

Note: Everybody started to talk at the same time. The moderator reminded the participant that what they are saying is very important and that everyone who wishes to talk will have equal opportunity to do so. Silence!

Participant one said (looking at the other participants): October is when most people plant their gardens with sweet potatoes. From my personal experience, I harvest more when I plant them in November.

Note: Some participants nodded in agreement.

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Participant three: Where I come from, people plant sweet potatoes in the month of July. This sweet potato will be ready for harvest sometime in December or January.

Note: A small discussion was going on the background between the participants. You could hear the words January, December and January mentioned at a low tone of voices.

Moderator: Can you please tell me now who decides what to grow in the household gardens?

Participant three said: My husband

Participant one said: When I used to grow sweet potatoes, sometimes, when my husband doesn't have money, I hire daily workers myself to help in the planting. However, before planting, we (my partner and I) decided together what kind of sweet potatoes to plant depending on the season. On I used to plant in July when it is very warm like it is right now.

Participant nine said: Because I am the head of my household, I decide what to grow. However, my partner has a say on it if he is present when I make that decision. I like to plant sweet potatoes in the month of July because it is hot. When I plant sweet potato in the month of July, I always harvest more.

Participant four: My husband decides almost everything in the house including what he wants to grow in the household garden.

Participant five said: It is a shared decision between my husband and me. When it is time to plant sweet potatoes, we work together. He digs the holes and I place the vines into them because we do not have enough money to hire people to help us in the planting process.

Participant six said: What would I say? My answer is quite the same with participant five. We make the decision together. When it comes to the sweet potatoes my husband and I dig the holes together. When we are done, I place the vines into the holes and he covers them up with dirt.

Participant seven said: I mostly make the decision and sometimes my husband does.

Participant eight said: My husband makes the decision and I help.

Moderator: How many of you do not buy sweet potatoes but consumed your own? Please raise your hands.

Note: 4 participants out of 10 raised their hands. At this point, the transcriber is not able to identify specifically what participants raised their hands.

Moderator: Is it easy or difficult is it to find or get the kind of sweet potatoes you like to eat?

Note: Participant one raised her hand.

Participant one said: I can find or get sweet potatoes at any time. I may not be able to buy it but I always see it available on the market.

Note: Everyone else agrees that the above statement is true but giving a round of applause to participant one's humorous statement.

Moderator: What kind of sweet potatoes do you like the most?

Participant one said: I like the red skin sweet potato (called Ti Jòji'n or Kè Milèt) because it is driest. Nevertheless, there are two kinds of it. One is dry and the other one of the same red skin is too squashy.

Participant two said: I like the red skin so much because it is sweeter and dryer.

Participant three said: I think that everyone here likes the red skin for the same reasons: it is sweet and not squashy.

Participant four said: My favorite sweet potato in the red skin one for all the reasons evoked above. I like the red skin a lot. That is the one we eat the most at home.

Participant five continued: I don't have any preference for any kinds of sweet potatoes. The red skin is the one that is the most available, that is why I eat it the most. However, I don't have any problem with the orange or white skins neither.

Participant six said: I like the white skin because it is dry and sweet. It also get the vitamins in it too.

Participant seven said: The white skin sweet potato is the kind that most people plant in their gardens where I come from. Therefore, it is the one that I consume the most at home.

Participant eight said: I particularly don't have any problem with either red or white skin. They both are sweet; and as far as dryness goes, I prefer the ones that are dry

Participant nine said: My husband grows all kinds of sweet potatoes. Nevertheless, I like both the red and white skins the most. I particularly like the white skin (ti micho) more because it is the dryer than the red skin. I always have water handy when eating it because I can get choked easily. It is the best. The reason why I like the red skin is because it is sweet and contains more vitamins than the white skin.

Participant ten said: I like the orange and the white skins (both white fleshed). I always suggest to my husband to remember to grow the white skin because it is both sweet and dry. That is why I like it.

Moderator: Now, we are going to have a vote. A person will be able to vote only once. You will raise your hand when I name a sweet potato skin that you like. You will keep hand down if you don't like it.

Note: Silence

Moderator: Now, please raise your hand if you like:

Red skin Sweet potato:	7 participants out of 10 raised their hands.
***Orange fleshed sweet potato*:**	no participant raised hands
White skin sweet potato:	3 participant out of 10 raised hands

Moderator: How many of you have seen or tasted the orange fleshed sweet potatoes in the past? Please raise your hands.

Note: Only 4 participants out of ten raised hand.

Moderator: Please raise your hands if you have raised sweet potatoes in your gardens recently or in the last agronomic cycle.

Note: 4 participants out of ten raised their hands. Only one of them is among those who have seen the orange fleshed sweet potatoes in the past.

Moderator: Do you think that sweet potato is expensive?

Comment: One of the participants said that the room was too cold and asked that we turned the ceiling fan off. Upon that request, three participants volunteered to turn it off. However, an ORE employee who was closer to the switch turned the fan off.

Moderator: Let me ask the question again. Do you think that sweet potato is expensive?

Note: Almost all the participants were saying something at the same time. They were reminded by the moderator that everyone will have a chance to talk and that it is important that only one person speaks at a time.

Comment: Silence!

Participant: one said: Yes. To me, sweet potato is very expensive. I don't mean to speak for every body else.

Note: On that, all the participants started to talk at the same time again. They were reminded that what they have to say is very important, however, it is important to listen to what the other person has to say and that everyone will have equal chance to talk.

Participant two said: When it is sweet potato season, it is not expensive. It is very expensive when it is it not easy to find. I mean when it is out of sweet potato season where I come from.

Note: The participants nodded in agreement with the above answer.

Moderator: In your experience, what month of the year do you find sweet potatoes to be more expensive?

Participant one said: In March

Participant two said: In March and April

Note: The participants nodded in agreement with the last answer.

Moderator: Some of you said you don't buy sweet potatoes but eat only the ones coming from your gardens. What happen when you don't get sweet potatoes from you gardens?

Participant three said: I always have sweet potatoes in my garden. I grow them constantly. Therefore, I have some sweet potatoes ready for consumption year round in my gardens.

Participant four added: I used to grow corn and grow sweet potatoes underneath it. When the corn is ready, the sweet potatoes are on their way a few weeks later. I do that every time I plant my gardens.

Note: The other two participants who said they don't buy sweet potatoes nodded in agreement with the above answers.

Moderator: How do you usually prepare the sweet potatoes you eat? Let's go around the table again.

Participant one said: I used to roast or boil sweet potatoes in raw milk. When the dish is ready, I serve my husband and my children.

Moderator: Do you forget to say that you eat some as well?

Note: Everyone laughs.

Participant one responded: I can't say that. Even when there isn't enough for me to get as much as the other people did, I always find something to put 'under my nose'.

Note: Everyone laughs.

Comment: We use the expression 'under my nose' when not enough of a particular food is available for consumption in adequate amount.

Participant two said: One of the ways that I like to prepare the sweet potatoes is by boiling them in either water with salt or in raw milk. I also prepare (boil) them to be eaten with sauce made up of fresh or salty fish.

Note: There were background noises from ORE employees entering the office.

Participant three said: I think that almost every one here boils their sweet potatoes before they could do anything with them. In my case, I use to boil them in raw milk and eat them like that. Some people at my house like to eat the boiled sweet potatoes with sauce instead. Either way I eat them, down they go.

Note: Every body laughs.

Participant four said: I like to roast the sweet potatoes on fire woods. I also prepare them with raw milk sometimes. My husband likes fried sweet potatoes and eats them with spicy sauce. Sometimes I use to prepare tom-tom with breadnuts, yucca and sweet potatoes.

Participant five said: I never made Tom-tom sweet potatoes but I have to eat it and I like it better when they put sweet potatoes in it. What I do with sweet potatoes most of the time is either boil in raw milk or fried them.

Participant six said: I like eating roasted sweet potatoes. I also use to fry or boil them in raw milk. However, the roasted mean is the best way for me to eat sweet potatoes.

Participant seven said: I use to boil the sweet potato alone with water and salt and eat it with sauce in the morning. In the afternoon, I boil it in waster and eat it with boiled cow milk.

Participant eight: I prepare the sweet potatoes for every body in my house. I boil them in water and then we eat them with sauce; but most of the time I boil them in milk and eat them that way because sometimes it is more economic.

Participant nine said: Everyone in my house likes to eat sweet potatoes boiled in water so that they can eat them with sauce. Sometimes, they decide to eat is roasted or with raw milk. When it is available I always do it the way that the majority of the people in my house want me to prepare them.

Participant ten said: I seldom use to prepare sweet potato bread because it can be very expensive depending what you want to add to it besides the sweet potatoes. The most common way of preparing sweet potatoes in my house is by boiling them in water so that we can eat it with sauce or in raw milk. I occasionally roast or fry the sweet potatoes we eat at home because either one of the two requires more time to skin or to soak in salt. When you are very hungry, that is not the fastest way you go.

Moderator: Please raise your hands if you don't prepare the sweet potatoes differently for your (study) child?

Note: All the participants raised their hands to support the statement that they prepare the sweet potatoes the same way for their (study) children.

Moderator: Do you eat sweet potatoes because of doctor's recommendations or because of tradition?

Participant three said: I used to hear people say that nurses at the hospital or the dispensary encouraged then to eat sweet potatoes for more blood and to combat anemia. That has never been the case for me. I eat sweet potatoes for several reasons. First because I like to eat them a lot, second because it is easy to grow and because it fills me up easily and it is sweet and dry at the same time.

Participant seven said: I think that we eat sweet potatoes only by tradition. I grew up seeing my parents eating sweet potatoes. Now, I do not only eat them but also every body at my house eats them too.

Note: On that answer, the other participants shook their heads and nodded in agreement with the above answer.

Moderator: How often do you feed your (study) child with sweet potatoes on a weekly basis?

(Believed to be) **Participant five** said: It all depends on the season. I use to feed my child with more sweet potatoes in November and December when more sweet potatoes are around. During those months, I used to feed him with sweet potatoes at least three times a week.

Moderator: How many of you have used sweet potatoes to wean your (study) child? Please raise your hands.

Note: 3 participants out of 10 raised their hands; then,

(Believed to be) **Participant two** said: When I planned to stop breastfeeding my (study) child, I boiled the sweet potatoes in raw milk and fed it to the child. I do that over and over again until the child refuses to take the breast milk.

Participant six said: I never had a problem in the past to wean my children. What I used to do is that I boil the sweet potato that is sweet and fed the child with it as the child is still taking breast milk. As time goes by, I used more sweet potatoes with raw milk and less breast milk until the child has lost all the appetite for the breast milk.

Participant ten said: When I am weaning my children, I have to have more sweet potatoes available at home. The only time I breastfeed the child is around noon. In the morning and the afternoon, I feed the child with sweet potatoes and milk.

Moderator: Do you think that sweet potatoes are good or bad for your health?

Participant one said: I think that sweet potatoes are good for my health. The buds for example are good medicine against anemia.

Probe: How do you prepare it?

Participant one continued: I put the sweet potato leaves together with carrots and crush them together. Then I add water or milk and sugar to make a delicious juice out of it.

Participant two said: We have so many things wrong in our bodies that when we eat sweet potatoes they will find some sickness to heal somehow. No I don't think it is bad for health.

Participant three said: Sweet potatoes are very good for our chest and stomach. They give strength and energy.

Participant four said: Sweet potatoes are among the good foods that release great amount of vitamins into our body.

Participant five said: sweet potatoes are good for health because they contain vitamins.

Participant six said: I like sweet potatoes a lot because they help me to stay in good shape.

Participant seven said: Because of its vitamin content, sweet potatoes are good for my body.

Participant eight said: The first time I knew that sweet potatoes are good for health was when my daughter became anemic. Nurses at the dispensary told me to food her with sweet potato leaves which I did. She recovered in relatively short period of time. As a matter of fact, sweet potatoes are good for the chest and for strength.

Participant eight said: Because sweet potatoes are rich with many vitamins, I assume that they are good for health. I eat sweet potatoes every time that I can get it. However, most of the time, they give me heart burn when I eat them too much

Participant nine said: From time to time, I cook sweet potato leaves along with other green leafy vegetables because of their great health values. I think that sweet potato is good for you. If they make you sick because you eat too much at one time, you need to eat it less. It is that sample.

Note: Participant eight seemed a little bit embarrassed and was looking at her fingers after hearing the rebuttal of her answer from participant nine.

Participant ten said: I like sweet potatoes so much for its health benefits than if I come to your house and see that you are eating sweet potatoes and you don't share with me, I can be very unhappy with you.

Note: Everyone laughs.

Moderator: How many of you have gotten sick for eating sweet potatoes? Please raise your hands.

Note: 2 of the 10 participants raised their hand; then,

(Believe to be) **Participant**: **three** said: In some rare cases, sweet potatoes can cause heart burn but I was taught by my parents to put a little bit of sweet potatoes on my throat before and after I eat them to avoid the heart burnt to come. That keeps the heart burn away indeed. Some people also use to drink milk to avoid the heart burn from coming.

(Believed to be) **Participant eight** said: When I boiled the sweet potatoes in raw milk, they never give heart burn to me. I usually have heart burn when I eat the roasted sweet potatoes. I was told by my grand parents that after eating the roasted sweet potatoes, I should apply a small portion of the ashes that came from the woods used to roast the sweet potatoes on my throat and that would keep the heart burn to come. When I forgot to do that after eating the sweet roasted sweet potatoes is when I got the heart burn.

-Break-

-After brake discussion-

Moderator: If you were to prepare a dish with sweet potatoes and there were not available, what do you replace them with?

Participant one said: In case sweet potato is not available for me to use, I use to replace it with pumpkin. I believe that pumpkin is second to sweet potato in terms of vitamins and proteins.

Participant two said: My first choice is always sweet potato. When it is not available, my second choice is yucca in most cases.

Moderator: How many of you have eaten eat sweet potato leaves? Please raise your hands.

Note: 3 participants out of 10 raised their hands. (Participants: one, eight and nine)

Moderator: Those of you who have never consumed sweet potato leaves, what are your reasons for not doing so?

Participant three said: The idea of people eating sweet potato leaves is totally new to me. Neither one of my family members including me have eaten them.

Participant four said: I did not know that people could eat sweet potato leaves. As a matter of fact, I have never seen people selling them at the market.

Participant five said: I have never thought of it that way. I thought only animals consumed sweet potato leaves. The old adage says: we learn something every day. Who would have thought that people could eat sweet potato leaves? I am glad to learn that today. I will start preparing dishes with sweet potato leaves soon and see how they taste.

Participant six said: I did not know. It comes as good news for me. I have known people who suffer from anemia. I think that eating sweet potato leaves could help them as I just learnt a few moments ago. I personally will try sweet potato leave dishes at home. However, I don't know how much I will like them.

Moderator: Those of you who used to eat sweet potato leaves, what are your reasons for doing so?

Participant one said: When there is a case of anemia in the household, I used to take the buds of the sweet potatoes and prepare them for the sick person. Also, the sweet potato buds are helpful in combating weaknesses especially in the months of June and July.

Participant nine said: When there is a case of anemia in the household, I used to take the buds of the sweet potatoes and prepare them for the sick individual. I find out that sweet potato leaves are very effective in fighting anemia, especially among children in soup, bouillon (stew)

.

Participant eight said: Sweet potato leaves are good for pregnant women. They cause the early release of breast milk after delivery and keep the breast milk flowing without interruptions. Also, sweet potato leaves consumption as well as with other leafy green vegetables is mostly known as good practice especially for anemic people.

Moderator: How many of you have consumed any kind of green leafy vegetables? Please raise your hands.

Note: All the participants raised their hands.

Moderator: Can you please name some of the green leafy vegetables you used to prepare at home?

Participant one said: Kout Bari (leafy vegetables)

Participant two said: Lyann panye (leafy vegetables)

Participant seven said: So every body knows: Kout Bari and Lyann panye are the same green leafy vegetable. It is know under different names depending on where you are in the area.

Participant three said: Bonbon Kodenn

Participant four said: Lanman (amaranth)

Moderator: For those of you who eat the above green leafy vegetables but have never eaten sweet potato leaves, how different do you think they are from sweet potato leaves?

Participant two said: I do not know about the difference because I have never tasted sweet potato leaves in my life. If you come next year and ask me the same question, I think I may have a different answer for you.

Participant five said: Because I have never eaten sweet potato leaves, I can't say what the difference may be. However, I am sure that there will be some kinds of difference somehow.

Moderator: How many of you would be willing to try a dish of sweet potato leaves prepared the same way you used to prepare other green leafy vegetables you used to consume? Please raise your hands.

Note: All the participants raised their hands. Then,

Participant 10 asked the moderator publicly: will you feed them to us today before we leave the room?

Note: All the participants were laughing and then gave a loud round of applause to participant 10 for her answer.

Moderator: Those amongst you who used to eat sweet potato leaves, have you ever fed your (study) child with them?

Participant one said: Yes. But I never prepare them differently for my child.

Participant eight said: Yes. I prepare the sweet potato leaves the same for myself and for the child. I used to give sweet potato leaves to my child when I serve tea to the child. I use to use sweet potato leaves as part of the herb tea.

Participant nine said: When I am nursing, I do not feed the child with sweet potato leaves. I eat them and the child eats them from me in the form of the breast milk. It is not a good idea to feed young children with either sweet potato tubers or sweet potato leaves or any kinds of leaves. When the child is old enough then it is good to do so.

Moderator: What have you heard people say about vitamin A?

Participant seven said: I heard it can be found in yellow foods that we are eating. Those foods are good for both adults and children.

Note: Participant 10 has left for the bath room.

Moderator: What foods do you think are the sources of vitamin A? Let's go around the table once more

Participant one said: Vitamin A can be found in fruits like mangoes, papaya and apricot.

Participant two said: Foods like sweet potato, eggs, plantain, banana, are good sources of vitamin A.

Participant three said: It is my opinion that pumpkin contains more vitamin A than any other fruits on earth. This is what I think. I do not speak for any body else.

Participant four said: Avocados, corn and other yellow fruits are rich in vitamin A.

Note: Participant 10 has come back from the bathroom.

Participant five said: we find vitamin A in great quantity in fruit juice and juices made out of green leafy vegetables.

Participant six said: If we are looking for good sources of vitamin A and forget black beans and plantain, I can say that we don't know what is really good.

Participant seven said: adding to all that has been said previously, I think that beet contains a lot of vitamins and protein in it too.

Note: Participant one leaves the table and grasps a steel cup and heads to the water fountain for a drink. Participant three asked her to bring some water to the table to her. Participant one refused and called participant three to keep silence. During that time, all the participants were looking at the two participants conversing back and forth. Then,

(Believed to be) **Participant four** said to participant one addressing her by name: I think you should get your water and should come and sit down in order to allow our conversation to continue.

Note: Participant one headed to the water fountain with only one cup. For about half a minute, participant one came back and the conversation continued.

Moderator: Please raise your hand if your (study) child has received vitamin A supplements since birth.

Note: All the participants raised their hands

Moderator: Can you say how old is you (study) child now and how many times the child has received vitamin A supplements since birth?

Participant one said: My (study) child is 2 years old and received vitamin A capsules 5 times so far since birth.

Participant two said: My (study) child is 2 years old and received vitamin A capsules 4 since birth.

Participant three said: My (study) child is 4 years 8 months old and received vitamin A capsules 5 times since birth.

Participant four said: My (study) child is 2 years 6 months old and received vitamin A capsules 1 time since birth.

Participant five said: My (study) child is 1 year old and received vitamin A capsules 1 time since birth.

Participant six said: My (study) child is 2 years 10 months old and received vitamin A capsules 5 times since birth.

Participant seven said: My (study) child is 2 years old and received vitamin A capsules 3 times since birth.

Participant eight said: My (study) child is 1 year old and received vitamin A capsule 1 time since birth.

Participant nine said: My (study) child is 4 years old. I can't remember how many times he has received vitamin A capsules.

Participant ten said: My (study) child is 3 years and received vitamin A capsules 3 times since birth.

Moderator: Where did you deliver your reference child? Please raise your hand of you delivered your (study) child at home or at the hospital (Sainte Anne)

Note: For home: 9 participants out of 10 raised their hands and one participant raise her hand for hospital.

Moderator: Please raise your hand if you have fed your (study) child with vitamin A rich foods.

Note: All the participants raised their hands.

Moderator: Can you estimate how often have you fed your (study) child with foods that are rich in vitamin A?

Participant one: Yes, everyday of the week.

Participant two: Yes three times a week

Participant three: Yes, two times a week

Participant four: Yes, three times a week

Participant five: Yes, two times a week

Participant six: Yes, two times a week

Participant seven: Yes, three times a week

Participant eight: Yes, four times a week

Participant nine: Yes, three times a week

Participant ten: Yes, all days of the week

Moderator: How many of you are in Métayage (share cropping)? Please raise your hands.

Note: 7 participants out of 10 raised their hands.

Appendix 16: Information Sheet

University of Connecticut

SENSORY ANALYSIS

Principal Investigator: Dr. Rafael Pérez-Escamilla
Student Researcher: Michael Dessalines
Study Title: Understanding the Sensory Acceptability and Potential Nutrient Contribution of Orange Fleshed Sweet Potatoes (OFSP) in Haiti: Formative Research

1. Invitation to Participate
   You are invited to participate in the study because you are a member of any of the following three communal sections: 1st, 2nd, and 3rd of Camperrin.

2. Purpose
   The purpose of this study is to evaluate the overall appeal of the Orange Fleshed Sweet Potatoes in Haiti in terms of taste, texture, aroma, smell etc.

3. Description of Procedures
   Should you agree to participate in this study, you will be asked to evaluate the overall appeal of a sweet potato dish by a University of Connecticut (University of Connecticut) student with the help of his research assistant in Haiti. You will also be asked to tell us what you think about the color, odor, texture, taste, and overall appreciation the sweet potato leaves dishes. Information about your household's structure, social economic status and other family demographics will be collected. You will also be asked to give your name and date of birth. This Sensory analysis session will take no longer than 60 minutes to complete. You will they be given two dishes of sweet potato leaves: one raw and one cooked to evaluate. This session will not be tape recorded.

4. Risks and Inconveniences
   There are no known risks associated with this Project. Your time spent in this study will be compensated with a financial incentive at the end of the sensory tests.

5. Benefits
   The benefits of this Project can be substantial for the communities where it is conducted and beyond as vitamin A deficiency and food insecurity affect hundreds of millions of people worldwide.

6. Economic Considerations
   Should you choose to participate in this study, we will plan to meet with you at a dining hall located either at Lamatiniere, Levy or Gerard to conduct the sensory analysis study. You will be compensated by a financial incentive of US$3.00 for your time.

7. Confidentiality

All information collected from this interview will be confidential. It will be kept locked in file cabinets in Haiti and then transferred to a safe location at University of Connecticut at the end of the data collection process. Your name and personal identifiers will not be used in any written or oral report resulting from this study.

You should also know that the University of Connecticut's Institutional Review Board (IRB) and the Office of Project Compliance may inspect study records as part of its auditing program, but these reviews will only focus on the Project and neither on your response nor involvement. The IRB is a group of people who review Project studies to protect the rights and welfare of Project participants like you.

8. Voluntary Participation

You do not have to be in this study if you do not want to. If you agree to be in the study, but later change your mind, you may drop out at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate.

9. Do You Have Any Questions?

Take as long as you like before you make a decision. We will be happy to answer any questions you have about this study. If you have further questions about this project or if you have a Project-related problem, you may contact the principal investigator: Dr. Rafael Perez-Escamilla at Rafael.perez-escamilla@uconn.edu or the student Project coordinator : Michael Dessalines at 693 8958 or at agrmike2@yahoo.com or the collaborating organization in Haiti ORE [Organization for the Rehabilitation of the Environment]: Dr. Mousson Finnigan at 758 7565or or at mail@oreworld.org. If you have any questions concerning your rights as a Project participant, you may contact the University of Connecticut Institutional Review Board (IRB) in the United States of America at 860-486-8802.

Appendix 17: Sensory Analysis Panel Identification Sheet

1. Today's date: _____/_____/_____
Month day year

3. Name of the respondent mother: _____

4. DOB of the respondent mother: _____/___/_____
Month day year

5. How old is the respondent mother? _____

6. What is (your reference: between 1-5 years old) child's name?
_____

7. How old is that child_____

8. DOB of that child? _____/_____/_____
month day year

9. Where the respondent mother lives?
Habitation: _____
Communal Section:_____

SENSORY ANALYSIS PANEL

1. How many children did you give birth to?
_____

2. How many of them were born alive? _____

3. How many of them were born dead? _____

4. How many of them were born alive but died before reaching the age of one?_____

5. What is your reference child's (between 1-5 years old) name?
_____

6. What is your last grade in school?
❒ No formal schooling
❒ Elementary school incomplete (Please specify last grade completed: _____)
❒ Elementary school complete
❒ High school graduate
❒ More than high school
❒ Professional school attended
❒ Professional school graduate
❒ Other: _____

7. What is your current marital status?
❒ Single/never married
❒ Married
❒ Living together but not married

❒ Separated/divorced/widowed

8.. Which of the following best describes your current employment status?
❒ Working full-time
❒ Working part-time
❒ Unemployed (Who supports the family monetarily? _____)

9. How much money does your family receive in the past month (from all sources of income?)

US currency (Dollars)		**Haitian currency (Gourdes)**
❒ US$0-US$30.00	or	HG0-1170.00
❒ US$31.00-US$60.00		HG1209.00- 2340.00
❒ US$61.00-US$90.00		HG2379.00-3510.00
❒ US$91.00-US$120.00		HG3549.00-4680.00
❒ US$121.00-US$150.00		HG4719.00-5850.00
❒ >US$151.00		>HG5880.00

Appendix 18: Instructions to participants

1. Look at the dish, what do you think of the color?
2. Smell the dish, what do you think of the smell?
3. Put some of the dish on your tongue, what do you think of the texture?
4. Taste some of the dish, what do you think of the taste?

Appendix 19: Sensory panel dish evaluation sheet

Dish #1

Name of Respondent Mother: _____
Name of Dish: _____

1. Please tell me what you think about the color of these sweet potato leave dishes by circling only one of the choices below

Don't like it **neither like it nor dislike it** **like it**

2. Please tell me what you think about the odor of these sweet potato leave dishes by circling only one of the choices below

Don't like it **neither like it nor dislike it** **like it**

3. Please tell me what you think about the texture of these sweet potato leave dishes by circling only one of the choices below

Don't like it **neither like it nor dislike it** **like it**

4. Please tell me what you think about the taste of these sweet potato leave dishes by circling only one of the choices below

Don't like it **neither like it nor dislike it** **like it**

5. Please tell me what you think about the overall appeal of these sweet potato leave dishes by circling only one of the choices below

Don't like it **neither like it nor dislike it** **like it**

6. Would you prepare this dish at home?
❒ Yes
❒ No

7. Would you give this dish to your family to eat?
❒ Yes
❒ No

Sensory panel dish evaluation sheet

DISH #2

Name of Respondent Mother: _____
Name of Dish: _____

1. Please tell me what you think about the color of these sweet potato leave dishes by circling only one of the choices below

Don't like it **neither like it nor dislike it** **like it**

2. Please tell me what you think about the odor of these sweet potato leave dishes by circling only one of the choices below

Don't like it **neither like it nor dislike it** **like it**

3. Please tell me what you think about the texture of these sweet potato leave dishes by circling only one of the choices below

Don't like it **neither like it nor dislike it** **like it**

4. Please tell me what you think about the taste of these sweet potato leave dishes by circling only one of the choices below

Don't like it **neither like it nor dislike it** **like it**

5. Please tell me what you think about the overall appeal of these sweet potato leave dishes by circling only one of the choices below

Don't like it **neither like it nor dislike it** **like it**

6. Would you prepare this dish at home?
❒ Yes
❒ No

7. Would you give this dish to your family to eat?
❒ Yes
❒ No

8. Which of the two dishes do you like the most?
❒ Dish #1
❒ Dish #2
❒ Both dishes