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Food Security and Livelihoods Survey in the Autonomous Atlantic Regions
conducted in February-March 2005

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Executive Summary

The primary aim of the household food security and livelihoods survey was to obtain a better understanding of the food security, nutrition and livelihoods situation of the population in the two Autonomous Atlantic Regions of Nicaragua. The report serves as key input into WFP's decision-making process to assess the need for and possible scope of WFP assistance after mid-2005. Nevertheless, it is perceived that the findings can also serve as a knowledge base on food security related issues for the Government and other agencies.

The objectives of the study are to:

- Identify and characterise the socio-economic groups and individuals most vulnerable to food and nutrition insecurity in terms of livelihood strategies and risk management.
- Assess levels of food insecurity as well as malnutrition and health status of women (15-49 years) and young children (0-59 months) in the two Atlantic Autonomous Regions of Nicaragua.
- Improve understanding of the causes of food insecurity among communities and households in the region.
- Provide recommendations to decision-makers on the possible role for food aid, beyond mid-2005 to address household food insecurity.

The survey covered 1,029 households in 103 rural communities in the Northern Autonomous Atlantic Region (RAAN) and the Southern Autonomous Atlantic Region (RAAS) of Nicaragua. Each region was subdivided into an interior and coastal zone, creating four zones: North Coast, North Interior, South Coast and South Interior. During the analysis it was decided to create a separate stratum of the communities close to the Atlantic coast due to the fact that these populations exhibited very distinct livelihoods compared to the rest of the sample. This fifth zone is referred to as the Littoral.

The household survey was designed to collect data on household demography, education, health, migration, housing, income activities, household expenditures, household asset ownership, risk exposure and response, agricultural activities, livestock ownership, and food consumption as well as information on women and child health and nutrition (including child anthropometry). Additionally 103 community interviews and 65 focus group discussions were carried out to capture information on community infrastructure and services; shocks, immediate response and mitigation strategies; problems and solutions; and trends with regard to income activities at the community level.

Socio-economic analysis

Demography – In the North Coast sample, 90% of the households were Miskito and the rest were multi-ethnic while in North Interior, only 29% of the households were Miskito while the rest were Mestizo. Most of the households in the Southern zones were Mestizo with a few being of the Rama ethnic group. The households in the Littoral sample were a mixture of Miskito, multi-ethnic, Mestizo, Garifona and Creole.

In the entire sample, 13% of the households were headed by women, ranging from 9% in the Littoral sample to 17% in South Interior households. In general, there were fewer households headed by women in the RAAN sample when compared to the RAAS sample. The average age of the head of household was 42 years but 12% of the households were headed by a person aged 60 years or older. The percentage of elderly headed households was highest in the North Coast and South Coast samples (14%) and lowest in the North Interior sample (11%).

The average household size for the sample was nearly 7 persons but varied from region to region with highs of nearly 8 persons in North Coast and 7 persons in Littoral which were significantly *($p < 0.01$)* higher than the average size of 6 persons found in South Interior. Consequently, more than 40% of the households in the North Coast sample had 9 or more members, followed by 37% of the households in the Littoral sample and between 20-25% of the households in the other sampled strata.

Migration does not play a major role in the survey area as only 6% of male members and 4% of female members had migrated. Of those, 59% of the males and 32% of the females had sent money home. Nearly all the females had migrated within Nicaragua while 17% of the males had gone to Costa Rica, presumably due to better income earning

opportunities there. Migration was more common in the Littoral communities (7% of household members) and least common in the South Coast communities.

Housing and amenities – For the entire sample, more than half the houses had a floor made of wood. However, there were distinct differences between strata with the majority of homes in the Coastal and Littoral strata having wooden floors as compared to only half in North Interior and 19% in South Interior with wooden floors. Two-thirds of the homes in South Interior had earth/mud floors. Most homes had a roof of zinc sheets with the remainder having a thatch roof. More than one-quarter of the sample homes in North Interior and South Coast had a roof of thatch.

When considering only the rooms used for sleeping, the median number of people per room was 4, for the entire sample. The median number of people per sleeping room (crowding) was 6 for the North Coast sample, 5 for the South Coast, 4.5 for North Interior and 4 persons per room for South Interior and Littoral samples. The highest levels of crowding by any definition are found in homes in the North Coast sample.

More than half the households in the North Coast and Littoral samples were using water from improved sources (UNICEF definition) as compared to 44% in the North Interior and 43% in the South Interior. Only 27% of the households in the South Coast were using water from improved sources. Households in the North Interior sample were most likely to use an improved latrine (31%) while more than half the households in the Southern region were using basic latrines. Half the households in the North Coast were not using latrines while in the Littoral sample, about 40% were using basic latrines and another 40% had no latrine.

Infrastructure and access to community services - Physical access and isolation is a major issue in the autonomous Atlantic Regions of Nicaragua. The road infrastructure is extremely limited, especially during the rainy season. Large sections of the regions are characterized by an enormous river and lagoon system, which makes travelling by boat the most convenient means of transport. In many communities the main mean of transport is walking on food or riding horses or bicycles.

The existence of primary schools is high across strata, whereas 68% have a preschool and only 27% have a secondary school. Nearly all pre- and primary schools in North Coast and North Interior offer school feeding compared to about half of the schools in South Interior and the Littoral samples.

Overall around 40% of the sample communities have access to a basic health centre, although according to key informants, they are often not operational. In communities where no health post exists, community members have to travel on average more than 3 hours to reach the nearest health service point.

Hardly any of the sample communities reported to have direct access to a market within their community. On average, community members have to travel more than 6 hours to reach the next market for purchasing and commercializing goods. Overall, only about 20% of the sample communities have access to electricity.

Education – An important element in livelihood strategies for the populations in the study is investment in human capital through education. The enrolment rates in primary and pre-schools are higher in the samples from the two Northern strata compared to the other strata. Across strata no gender gaps in enrolment were observed. The proportion of children receiving food at school is much higher in the two Northern strata than in the rest of the sample.

Across strata the results of the survey point out that the lack of pre-schools might be a larger limitation for pre-school enrolment in the two Southern strata and in the Littoral than in the Northern strata. A lack of resources is the main constraint to attendance for children in the North Interior. The main reason for not enrolling children in primary school is the lack of financial means, the distance or time required to reach primary schools and the lack of teachers.

In the overall sample, almost one out of five of the children did not finish the school year. The two Northern strata present better retention rates than the Southern strata. The most common reasons for primary school children dropping out as indicated by community key informants are financial constraints of the parents, distance and time, illnesses or disabilities or because they must work.

Household and animal assets and credit – Sampled households in the Southern strata and the Littoral own more household assets than those in the Northern strata sample. However, when differentiating between productive and non-productive assets households in the Northern strata and the Littoral have more productive assets on average than the Southern strata. Households in the Littoral, North Coast and South Coast are more likely to own a means of transport, in particular boats and kayaks, which are extremely important in the context of difficult physical accessibility.

In the overall sample, most of the households own poultry with fewer owning pigs, cattle, horses or donkeys. Households in the South Coast sample generally have the highest percentage of households owning livestock. Households with livestock have greater access to animal products such as milk, eggs and dairy products that contribute to a diversification of their diet and the also have greater resilience to shocks.

On average, 38% of the sample households have access to credit. The highest rate of access can be found in the Southern strata and the lowest in the North Coast. Informal sources such as relatives/friends make up the main sources of credit across strata.

Land use and agricultural production – The livelihood of households in this region are largely determined by access to assets such as land. More than 80% of all sample households have access to cultivable land, although only 22% of these have legal ownership of this land. Access to land is more limited in the Southern strata, however, a larger percentage of households have legal ownership to the land than in the Northern strata.

Most households cultivate beans, maize and tubers. Rice and plantains are more commonly produced in the coastal strata. Cash crops such as sugar and coffee are not commonly grown by the sample households.

Overall the majority of the main crops are produced partly for consumption and partly for selling. Households with a higher crop diversification usually have a higher resilience to shocks, but this can also be interpreted as a mitigation strategy by households frequently exposed to hazards. The results from the survey indicate that the Coastal strata are characterized by higher agricultural diversity than the Interior strata.

Income sources and livelihood activities - Using principal component analysis (PCA) and cluster analysis, 14 homogeneous livelihood profiles were created based on the contribution of each individual activity to the total household income. The information was then cross-tabulated by strata.

The majority of sample households in North Coast are just farmers, while a small percentage engages in farming complemented by selling of wood and/or other activities. In the North Interior sample many households depend on agricultural production, while the second most important group are daily wage labourers who complement their income with sales of agriculture products. In the South Coast sample most households either engage in daily wage labour, daily wage labour complemented by agricultural production or livestock keeping, while in the South Interior sample most households are farmers, closely followed by daily wage labourers and livestock keepers. Finally, in the Littoral sample the most households rely primarily on fishing or fishing complemented with agricultural production and small-scale businesses.

The livelihood profiles were also analysed with expenditure percentiles. Generally those households that only engage in daily wage labour or farming are more likely to fall into the lower expenditure groups. Those households that complement these with other activities are slightly better of. Best-off are those households that have their own businesses or engage in fishing.

Household expenditures - Data on expenditure for food and non-food items, such as education, health transport, etc. are collected to understand how household decision-makers prioritize expenditures, especially when funds are limited. Monthly food and non-food expenditures can also serve as proxy indicators of household foods access, however care must be taken in interpreting outputs from food expenditures analyses due to the fact that some households may have lower share food expenditures simply because they rely on their own production.

On average the sample of households allocated 60% of their monthly expenditure on food, mainly on staple foods such as cereals, sugar, oil/fats, and beans. Relatively small proportions are spent on fresh foods, such as meat/fish, dairies, fruits and vegetables.

The highest share of non-food expenditures are for basic needs such as health (7%), education (7%), clothes (7%) and transport (5%). In North Coast none of the household reported to have used credit. Generally more households in the South used this strategy, particularly in South Interior, where 25% of all foods were purchased on credit.

Analysis of absolute expenditures provides an indication of household cash availability. The constraint is that households often over- or underestimate their expenses, hence values are only relative and illustrate trends. Households in the Littoral had far higher food, non-food and total expenditures per capita than all other zones. These differences are statistically significant *(p<0.001)*. Differences between the other strata are not as apparent; however, households in the North Interior and South Interior samples spent the least, particularly on food.

Households relying on daily wage labour or farming as their only income source have the lowest expenditures in absolute per capita terms, both with regard to food and non-food expenditures. Both groups allocate a higher share of total expenditures on food and, within the food class, on staple foods.

Shocks and coping strategies – The survey included a section on shocks and coping strategies in order to better understand households' exposure to shocks and their ability to manage them. A larger proportion of the households in the two Northern strata had experienced at least one shock during the past 12 months (North Coast 94%, North Interior 83%) compared to around 60% in the Southern strata and nearly 70% in the Littoral. In the overall sample, **covariate** shocks were experienced more often than **idiosyncratic** shocks.

Covariate shocks are those such as natural hazards or epidemics that can possibly affect an entire community. The most frequently reported covariate shock was **crop pests**/**loss of harvest**, particular in the two northern strata (64% and 57% respectively). In the Littoral fewer households were affected by these shocks, mostly because there are fewer farmers. **Floods, strong rainfall** and **hurricanes** were reported by about 20% of the sample households but in the North Coast sample, an area prone to flooding and strong rainfalls during the hurricane season was particularly affected (48%). The Northern strata also seem to be more prone to recurrent **droughts** (36% and 30%) compared to the South (9% only).

Almost 40% of the sampled households reported at least one **idiosyncratic shock**, ranging from 25% in the South Coast to 57% in the North Coast. In total 15% of households were affected by **theft of harvest** (15%) with the highest reported in North Coast (35%), followed by **theft of animals** (12%) and **illnesses/accident of household members** (12%).

Across most strata the majority of households reported that the shocks had an impact on their household food security, however in the Littoral only three out of four households reported that the shock had an impact on their household food security.

More than 50% of the households in the sample reported that they did not apply a coping strategy to manage the shocks.

The most common reported coping strategies in the overall sample were the **reduction of quantity of diet** (17%) and **finding temporary work** (17%). Both strategies were more commonly used among households in the Northern strata, temporary work particularly in North Interior. Households in North Coast are more likely to have **modified their diet** with less preferred foods and **reducing the numbers of meals** consumed. This area is also characterized by a large number of households **relying on help from others**. **Livestock sales** were more often reported in the Southern strata, particularly in South Coast. South Coast is also characterized by a higher amount of households using their **savings** to mitigate shocks.

In general the households in South Interior had more difficulties in recovering from the shocks than households in the remaining strata. Most successful in terms of recovery were households in the Littoral.

There was a stronger likelihood of households in the Coastal areas to adopt prevention strategies to avoid future shocks compared to the Interior strata. The most frequently reported prevention strategy mentioned by the households in the overall sample was to diversify livelihoods, followed by crop diversification and increasing the agricultural area used for cultivation.

Women and child nutrition and health

Use of antenatal care – For the analysis, 'skilled' antenatal care was defined as at least one visit to a doctor, nurse or midwife. Friends or relatives were not regarded as 'skilled' professionals with regards to antenatal care. More than 70% of the children in the sample had received skilled antenatal care while in the womb. However, there were significant differences between regions – 84% of the recent pregnancies in the North Coast sample had received skilled antenatal care, which is significantly higher than the 72% in the South Coast sample *($p < 0.05$)* and the 64% in South Interior *($p < 0.001$)*. Nearly 80% of the pregnancies in the North Interior sample had received skilled antenatal care, which was significantly higher *($p < 0.001$)* than the South Interior sample.

Pregnancies & birth outcome**s -** The women reported a median number of 4 pregnancies. Sixteen percent of the women had at least one miscarriage or abortion, ranging from 9% in women 20 to 24 years of age, to 23% of the women in the 30-39 year age group. By region, the percentage of women experiencing a miscarriage or abortion was lowest in the *North Interior* (11%) and 17-18% in the other areas.

The average age of the mothers at the birth of the first child was 19 years. More than half of the women had their first child before they turned 18 years and nearly 90% have given birth by their 21st birthday. The average age at the first child increases with education level.

About 19% of the children were described by their mothers to be 'smaller than normal' (9%) or 'very small' (10%) at birth, a proxy indicator for low birth weight. By region, there were generally more children in RAAS who were described as being 'smaller than normal' or 'very small' at birth: 21% in *South Coast* and 23% in *South Interior*. Around 15% of the children born in *North Coast* and *North Interior* were low birth weight.

With the sample data, several analyses were conducted to see the relationships between potential causes of low birth weight (maternal health and use of skilled antenatal care) and some of the negative effects of being born malnourished. Results of the ***causal*** analysis show that:

- Mothers of low birth weight babies were significantly ($p < 0.05$) less likely to have received skilled antenatal care during their pregnancies.
- Mothers of low birth weight babies were more likely to have very low or no levels of education.

Analysis of some ***outcome*** indicators shows that:

- Children who were described as being very small or smaller than normal at birth are significantly *($p < 0.001$)* more likely to be underweight and/or stunted at the time of the survey but not more likely to be wasted.
- Low birth weight children are more likely to suffer from fever, cough and ARI but not significantly.
- Low birth weight children are significantly more likely *($p < 0.05$)* to suffer from diarrhoea than those children of normal birth weight.

Women's health - Overall, 10% of the women had at least one episode of diarrhoea, ranging from lows of 4% in the South Interior and 7% in the South Coast samples, to highs in the North Interior (12%) and North Coast samples (16%). The difference between the North Coast sample and the two southern samples was statistically significant.

Recent fever (non-specific) was reported by 21% of the women in the sample with the highest being 26% in the North Coast, followed by North Interior (24%), South Interior (19%) and South Coast (14%). The difference between North Coast and South Coast was statistically significant *($p < 0.01$)*.

Overall, only 7% of the women had experienced both illnesses in the two weeks prior to the survey. Again the highest prevalence of both illness was found in women from the North Coast sample (15%), followed by North Interior (8%), South Coast (3%) and South Interior (2%). The difference between North Coast and the two southern samples was statistically significant.

Child malnutrition - There was some variation in child malnutrition (6-59 months) by strata – especially for underweight and stunting. The prevalence of **acute malnutrition** or wasting (*whz < -2.00 SD*) was 1.6% *(95% CI: 0.8, 2.4)* for the sample and was higher in the Coastal samples (2.9% for North Coast and 2.4% for South Coast). The prevalence of **underweight** (*waz < -2.00 SD*) was 9.9% *(95% CI: 7.9, 11.9)* for the sample with the highest found in North Coast (12.8%) and North Interior (12.3%). About one-quarter of children 6-59 months in the sample were stunted. The prevalence of **chronic malnutrition** or stunting was highest in the North Interior sample (35.9%). From the data, it appears that malnutrition is worse for the children in this region while the South Coast sample of children appears to be better off than the others, despite the lowest access to drinking water from improved sources.

Child health - Overall, 29% of the children had experienced an episode of diarrhoea, 51% had been coughing and 39% had a non-specific fever in the past two weeks. Coughing with fast breathing is a sign of acute respiratory infection (ARI), which is one of the major childhood illnesses in the developing world. In the sample there was a 33% 2-week period prevalence of ARI in children less than five years of age. For those children suffering from diarrhoea, 55% had received treatment at a health facility.

By strata, the prevalence of all illnesses was highest in the North Coast sample. The two-week period prevalence of **diarrhoea** was 42% in North Coast, 31% in North Interior and 23-24% in both southern strata. In the North Coast the prevalence of **fever** was the highest (49%), followed by North Interior (42%), South Interior (33%), and South Coast (32%). The prevalence of **cough** in young children in the *North Coastal* sample was 58%, followed by 55% in North Interior, 47% in South Coast and 45% in South Interior. Children who had experienced fever, coughing, acute respiratory infection or diarrhoea in the 2 weeks prior to the survey were more likely to be malnourished.

Household food consumption typologies

Dietary diversity and frequency of food consumption are recognized as good proxy indicators for household access to food. Using data on dietary diversity, defined as the number of different foods consumed during 7 days prior to the survey, and the frequency by which these foods are consumed, the sample of households were analysed to identify homogeneous groups of households based on their food consumption patterns. Using multivariate analysis techniques, nine homogeneous clusters of households with distinct food consumption patterns were identified. These clusters were then summarized into four food consumption groups with the following characteristics:

1. **Very poor food consumption group (17%)**: Very low and inadequate food intake. Besides sugar and oil, households consume only one additional food item on a daily basis.
2. **Poor food consumption group (19%)**: Households diet is mainly based on staple foods (cereals, beans, tubers). Their diet shows very little diversification and lacks animal proteins.
3. **Adequate food consumption group (42%):** Diet is more diversified; households complement their food intake with a regular consumption of dairy products and eggs. Meat, fish, fresh vegetables are never or very rarely consumed.
4. **Better off food consumption group (24%):** Highly diversified food consumption characterized by a high protein intake animal protein (fish and/or meat).

The main **source of food** for all food consumption groups is purchase. On average 68% of all food that was consumed was purchased, with little variation between the four food consumption groups thus illustrating the high dependence on cash and purchasing power to meet food needs. On average 24% of the food consumed was from own production, 4% from fishing/hunting and 3% from gifts. Households with adequate food consumption have a slightly higher reliance on own production compared to the other groups. Households with a good consumption have the greatest share from fishing and hunting while those with very poor consumption receive the most from gifts.

Households with **very poor food consumption** are food insecure and are very vulnerable to the impacts of shocks. Similar to other groups they have a high reliance on purchases;

however, their cash availability is not sufficient to guarantee adequate access to food in terms of quantity and quality. A high percentage of households relying on daily wage labour belong to this group. Another vulnerable group are farming households with small plots and low crop diversification.

The households with **poor food consumption** are very vulnerable towards food insecurity where the impact of a shock could easily render them food insecure. They have a slightly better purchasing power than the households with very poor food consumption, which ensures a regular intake of staple foods; however, their diet lacks diversification. Again, daily wage labourers and small-scale farmers are more likely to belong to this group.

Households belonging to the group with **adequate food consumption** are less likely to be vulnerable towards food insecurity. They have enough cash available to meet daily food and non-food needs and have a slightly higher reliance on own production than the other consumption groups. A large percentage of livestock keepers and business owners belong to this group.

The households with **good food consumption** have very low vulnerability to food insecurity. Their high cash availability helps this group to cope with the impact of most risks and shocks they may face. The majority of these households engage in fishing and reside close to the Atlantic coastline.

In terms of **geographic distribution** about 25% of the households in the South Interior and South Coast samples, and 20% of the households in the North Interior sample belong to the very poor food consumption group. About 30% of the households in the North Coast sample belongs to the poor food consumption group, which makes them particular vulnerable towards natural hazards (floods, heavy rainfalls, drought) that are frequent in this zone. The majority of households in the Littoral belong to the group with good food consumption.

Part I: Background and socio-economic context

Section 1.1 – Overview of national context

Nicaragua is situated in Central America between Costa Rica and Honduras and bordered by the Caribbean to the east and the Pacific Ocean to the west. The country has 5.5 million inhabitants and covers approximately 60,000 square miles. Years of dictatorships, civil wars, foreign interventions and corruption have severely affected the economic and social development of the country. Natural disasters (many of them recurrent) such as earthquakes, flooding, mudslides, hurricanes, droughts, tsunamis and volcanic eruptions have contributed to undermining the economic base of the country and caused major human losses.

Nicaragua is classified as a low-income food-deficit country (LIFDC), and ranks 121 out of 175 countries on UNDP's Human Development Index (2003). With GNI per capita of US $730 in 2003, it is the second poorest nation in Latin America. The country is characterized by a highly skewed distribution of income: the richest 20% of the population earns 68% of the GNI, and the poorest 20% earns only 0.36 percent. The poverty incidence is more pronounced in the rural areas where 68% of the population lives in poverty and 27% lives in extreme poverty. The average income for the poor covers only 24% of the cost of the basic food basket. According to a Government survey, in 2001 over 20 percent of the population was illiterate, while up to 33% of the rural population could not read and write. According to the 2001 Nicaragua Demographic and Health Survey (NDHS), 20% of the children under 5 years old were chronically malnourished (stunted).

Administratively, Nicaragua is divided into 15 departments and two autonomous regions. The two autonomous regions are Northern Autonomous Atlantic Region and Southern Autonomous Atlantic Region often referred to as RAAN and RAAS respectively. Until they were granted autonomy in 1985 they formed the single department of Zelaya.

Section 1.2 – History

The Pacific Coast of Nicaragua was settled as a Spanish colony from Panama in the early 16th century. Independence from Spain was declared in 1821 and the country became an independent republic in 1838. Britain occupied the Caribbean Coast in the first half of the 19th century, but gradually ceded control of the region in subsequent decades. Violent opposition to governmental manipulation and corruption spread to all classes by 1978 and resulted in a short-lived civil war that brought the Marxist Sandinista guerrillas to power in 1979. Nicaraguan aid to leftist rebels in El Salvador caused the US to sponsor anti-Sandinista contra guerrillas through much of the 1980s. Free elections in 1990 saw the Sandinistas defeated. The country slowly rebuilt its economy during the 1990s, but was severely impacted by Hurricane Mitch in 1998. Free elections have been held in 1996 and 2001.

Of particular interest to this study is the history of the two Autonomous Atlantic regions of Nicaragua. The eastern part of these regions is also known as the Mosquito Coast. The name is derived from the Miskito, the indigenous inhabitants. Never exactly delimited, the region is a belt about 40 miles (60 km) wide extending from the San Juan River in Nicaragua north into Northeastern Honduras. The region is humid and swampy, rising to low hills in the west.

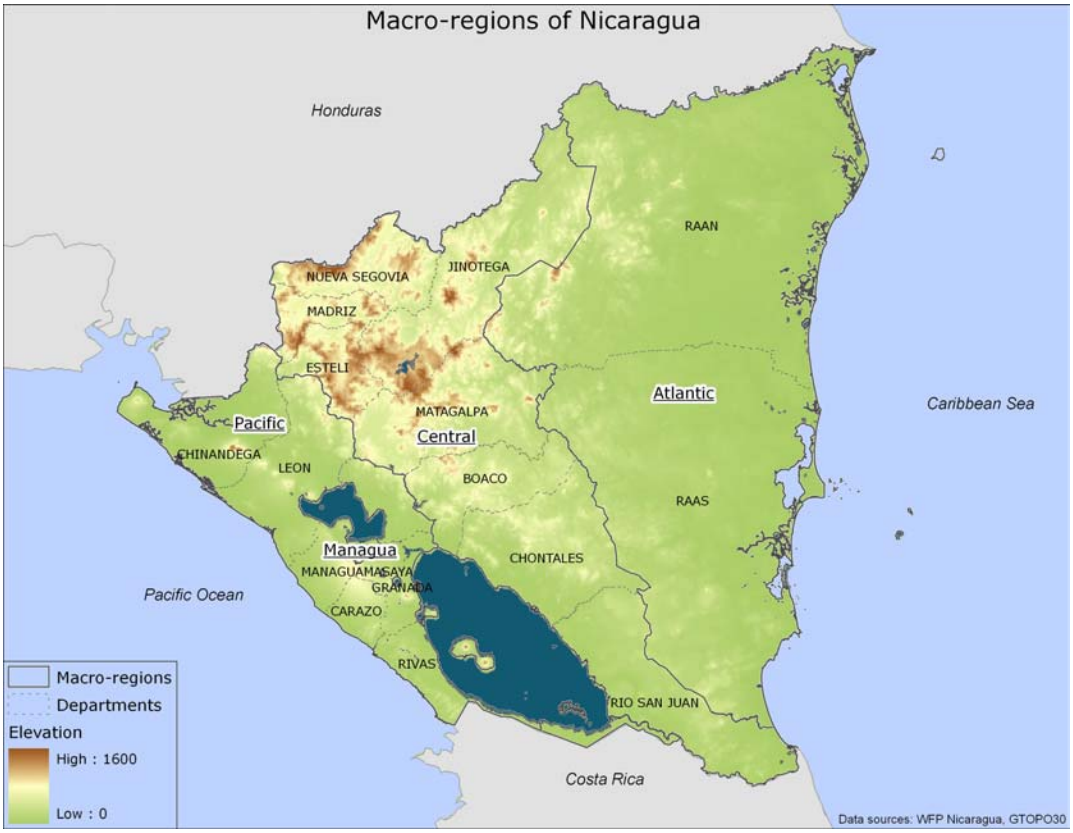
The region was a British protectorate from 1655 to 1860. During that period English loggers exploited the forest, English pirates attacked Spanish shipping from the coast, and slaves from Jamaica were brought in to increase the labor supply. In 1860 it became an autonomous state known as the Mosquito Kingdom. In 1894, Jose Santos Zelaya appropriated the territory and forcibly incorporated it into Nicaragua. In 1960 the northern part was awarded to Honduras by the International Court of Justice, thus ending a long-standing dispute. In 1987, the government divided the Nicaragua part of the region - the former department of Zelaya - into two autonomous regions and granted a partial autonomy, including control over local natural resources, but little real change has resulted and the area remains impoverished.

Section 1.3 – Geography

Nicaragua has three distinct geographical regions: the Pacific Lowlands, the North-Central Mountains and the Atlantic Coast. The Pacific Lowlands are in the west of the country, and

consist of a broad, hot, fertile plain which supports most of Nicaragua's population. The capital, Managua, and the two main provincial cities, Leon and Granada all lie in this region. Punctuating this plain are several large volcanoes, many of which are active. Volcanic eruptions and earthquakes are common in this part of the country: much of central Managua was destroyed by an earthquake in 1972.

The North-Central Mountains are an upland region away from the Pacific coast, with a cooler climate than the Pacific Lowlands. About a quarter of the country's agriculture takes place in this region, with coffee grown on the higher slopes. The Atlantic Coast is a large rainforest region (60,366 km^2), with several large rivers running through it. The climate is hot and humid and the region is sparsely populated. Furthermore, lagoons and deltas make it very irregular.



Section 1.4 – Population and ethnic groups

In Nicaragua there are several ethnic groups. Although definitions are imprecise, approximately 76% of the Nicaraguan population is Mestizo, 10% is European and the rest are indigenous or descending from Africa (Miskito, Creole, Mayangna, Garífonas, Rama, Matagalpas, Nahoas and Chorotegas). The majority of the people belonging to the third group live in the two Atlantic regions of RAAN and RAAS. These areas represent 46% of the total territory of the country but about 11% of the population. According to the INECs pre-census, these two Atlantic regions have a total population of 626,848 habitants. The Mestizo population in the Atlantic regions has grown steadily and at present the constitute 76 percent of the population (more than 0.5 million habitants).

The Miskito, Suma/Mayangnas and Rama are recognized as Indigenous people by the Nicaraguan Constitution because of their original character and presence in the area before contact with Europeans in 1492, while the Creole, Garifunda and Mestizos are recognized as ethnic communities, because they are considered a product of etnogenesis provoked by the conquer and colonization. The Creole population is concentrated on the South Atlantic coast and is of mostly of West Indian origin, the descendents of laborers brought mostly from Jamaica. The Creole culture is more similar to that of Caribbean nations. There is

also a smaller number of Garífona, a people of mixed African, Caribbean and Arawak descent.

Spanish is spoken by about 90% of Nicaraguans. The Creole and Garífona population of the east coast region has English as its first language. Several of the indigenous peoples such as the Sumo, Rama and Miskito still use their original languages.

The indigenous people have traditionally different livelihoods than the ethnic communities, being mostly engaged in gathering of wild plants and plant products, fishing, hunting and some agro-forestry activities, while the ethnic communities are more engage in productive and commercial activities (IDH, 2005).

Roman Catholicism is the major religion, but evangelical Protestant groups have grown recently, and there are strong Anglican and Moravian communities on the Caribbean coast.

Section 1.5 – Poverty

With an estimated per capita GDP of US $752 in 2003, Nicaragua is one of the poorest countries in Latin America. In spite of some progress in poverty reduction assessed by the national Living Standards Measurement Surveys (LSMS), 46% of the population lived below the national poverty line in 2001, while 15 percent lived in extreme poverty. On the Atlantic Coast, 61% of the population lives below the national poverty line, while 20% lives in extreme poverty (LSMS 2001), making the two Atlantic regions the poorest in Nicaragua. According to the national poverty map, 12 of the 19 municipalities in the Atlantic regions are classified as extremely poor. Furthermore, the regions present the highest poverty gap with 37 percent.

	Poverty	Extreme poverty
National	46%	15%
Autonomous regions	61%	20%

The incidence of poverty is more than twice as high in rural areas (68 percent) as in urban areas (31 percent). Furthermore, between 1993 and 2001, the absolute number of people in poverty increased.

According to the regional IDH, the principal problems identified by the population in the region with regard to their economic situation are:

- Lack of market promotion opportunities for the producers
- High dependence on products from the Pacific region and imported externally
- Reduced presence of financial systems in support of the local production
- Insecurity in use and tenancy of the land
- High cost of living (15 to 20 percent higher than the rest of the country)

Section 1.6 – Education

The retention rates of both pre-school and primary school are lower in both the RAAN and the RAAS than the national retention rate. Nationally, the primary school retention rate is 93.8%, while it is only 89.9% in the RAAN and 86.4% in the RAAS.

Between 1992 and 2003 the percentage of pre-schools in relation to the total number of schools has risen from 7 to 9 percent. The percentage of primary schools has increased from 10 to 21 percent, while the number of secondary schools has risen from 7 to 10 percent of the total number of schools.

According to the 2001 LSMS the average distance to a primary school is 1.4 km or 24 minutes in the Atlantic regions, while it is 0.9 km or 18 minutes nationally.

Section 1.7 – Infrastructure

The access to basic infrastructure is lower in the Atlantic regions than in the rest of the country. On a national level more than half of the households have electricity, as compared to only about one-quarter of the households in RAAN and RAAS. Access to water from improved sources is low – only 48% of rural households nationally. This access is even lower in RAAN and RAAS, where only 11% of rural households in RAAN and 21% in RAAS are using drinking water from improved sources. Virtually no households in the Atlantic regions are using sanitary means of excreta disposal, as compared to 40% nationally.

The poor access to sanitary infrastructure influences negatively on the health indicators for the population in the Atlantic region.

Section 1.8 – Health

According to statistics from the health centres the incidence of low birth weight (< 2500 grams) in the autonomous regions is 6.5% compared to a national incidence of 4.9% (MINSA 2004). Furthermore, the percentage of births attended by trained professionals is 36.7% in RAAN and 25.3% in RAAS, as compared to 50% of the births nationally.

According to the 2001 Demographic and Health Survey in Nicaragua, 1 in every 5 children less than 5 years old is chronically malnourished (stunted), while 6% are severely stunted (ENDESA 2001). The prevalence of chronic malnutrition is somewhat higher in the Atlantic regions, especially in the RAAN, where 34.8% of the children less than 5 years old are stunted. The same pattern can be observed for the prevalence of underweight in the region. The prevalence of acute malnutrition in the Atlantic regions is somewhat similar to the national level (ENDESA 2001).

The number of cases of acute diarrhoeal diseases and acute respiratory infections per 100,000 habitants are higher in the Atlantic regions than on a national level. The percentage is considerable higher in the RAAN. On a national level 73.7% of the deaths received specialized medical attention in 2004, while only 55.7% of the deaths in RAAN and 61.4% in RAAS received the same attention.

The maternal mortality rate is higher in the two Atlantic regions than the national maternal mortality rate (MINSA 2004). The average distance to a health centre is 6.2 km or 1 hour in the Atlantic regions, compared to 3.0 km or a little over half an hour on a national level.

Section 1.9 – Agriculture and land reform

Since the early 1970s, Nicaragua has experienced three waves of land reform. The first wave of land reforms took place under the *Anastasio Somoza* regime. This so called 'land reform' consisted mainly of extending the agricultural frontier, which was achieved by giving out frontier land to agricultural labourers.

The second wave of land reform took place under the *Sandinista* regime and saw the expropriation and re-distribution of large areas of land to former agricultural workers, organizing many of them into collectivist cooperatives or state farms although subsequently, the land reform started granting land to individuals. Some 200,000 families benefited of the distribution of more than 1 million hectares, including over a third of Nicaragua's arable land.

The third wave of land reform was initiated by the *Chamora* government, who continued the redistribution of land on the basis of peace accords after winning the election in 1990. This time the beneficiaries of the redistributions were ex-combatants (both ex-contras and ex-members of the *Sandinista* army and security forces), largely under cooperative arrangements. Furthermore, the change of government opened the door to a flood of claims for restitution of land which had been expropriated during the *Sandinista* regime much of which has not yet been resolved. In this context, Nicaragua has undertaken a large titling program to regularize the situation of beneficiaries of the successive waves of land reform.

According to the IDH regional, a massive migration of extremely poor Mestizo peasants to apparently "national" or "without owner" land on the agricultural border has occupied land that were traditionally under community use and ownership by Sumo/Mayangnas and Miskitos.

According to the yearly statistics from the Ministry of Agriculture and Forestry, both the area harvested and the production of white maize has increased from the 2001/2002 to the 2003/2004 season both nationally and in the Atlantic regions. Nevertheless, the yields decreased in both RAAN and RAAS while in the Pacific and Central regions the yields increased during the same period.

The two Atlantic regions hold 64% of the national forested area, while they only generate 29% of the income from forestry-activities. The income from forestry is the highest in the Central region where 4.9 COR are generated per hectare of forest. In comparison 3.9 COR/ha is generated in the Pacific region and only 1.0 COR/ha in the Atlantic regions.

Section 1.10 – WFP assistance

Regional Protracted Relief and Recovery Operation 10212.0
The PRRO aims at assisting some 150,000 persons with the purpose of providing nutritional support to vulnerable families affected by recurrent shocks, facilitating the creation of family assets to be able to mitigate the effects of these shocks and contributing to the stabilization of the school attendance rates.

WFP assists through the regional PRRO six municipalities of the North Atlantic Autonomous (RAAN), inhabited by indigenous communities characterized by high levels of poverty and chronic food insecurity. The execution of this program represents a great challenge for WFP due to distance and the poor road conditions roads that make access to this area very difficult.

The assisted municipalities include the dry and humid areas of the Department of Matagalpa and the humid zones of the Departments of Jinotega and Madriz, as well as selected municipalities the Northern Atlantic Region (RAAN). WFP assists 55,264 indigenous people in 262 different communities across the country: 50,262 in the North Atlantic Autonomous Region (232 communities) through PRRO school feeding and 5,002 in the Northern area of the country (30 communities), through PRRO Vulnerable Groups, food-for-work and school feeding activities.

To guarantee the implementation of this operation, WFP opened in 2002 field offices in the Matagalpa in the department of Matagalpa and in Puerto Cabezas in the Northern Atlantic Autonomous Region. Their main partners are UNICEF, Ministry of Agriculture (Implementing Unit), Ministry of Health and some local NGOs.

WFP Nicaragua plans to distribute a total of 28,395 metric tones during the three years (March 2003-February 2006), resources permitting, for a total cost of US$ 13,722,258. The government's contribution will be of US$ 1,781,291.

At the time of the preparation of this report, WFP operations under the PRRO in Nicaragua face the following shortfalls for the next six months:

- May – 410 MT of rice and 555 MT of beans
- June – 312 MT of vegetable oil
- August – 453 MT of CSB
- September – 616 MT of maize

If no commodities are announced in the coming months or those that are announced arrive late, the PRRO will face serious pipeline breaks and beneficiary numbers will have to be reduced. Shortfalls could also reduce WFP's capacity to respond to crises which is a critical component of the PRRO in this disaster-prone region.

Nicaragua Country Programme 10044.0
The Country Programme (2002-2006) aims to improve the nutritional status of vulnerable women and children; to relieve short-term hunger and to increase school enrolment and attendance of pre- and primary school children; and to enable poor rural households to invest in development activities aimed at reducing vulnerability to recurrent disasters and decreasing migration.

The County Programme represents a U$23.4 million budget and plans to distribute some 45,730 metric tonnes for the period. Food for Education represents the largest activity within the Country Programme. The Integrated School Nutritional Program (PINE) ascribed to the Ministry of Education implements and coordinates all Food for Education activities. Other activities are being implemented in coordination with the Ministry of Health (assistance to vulnerable women and children) and the Ministry of Agriculture (assistance to poor rural families).

With the Country Programme, WFP is assisting 60 municipalities in the country classified as very highly vulnerable and highly vulnerable to food insecurity according to a 2001 WFP study on Vulnerability to Food Insecurity. In the Northern Atlantic Autonomous Region, the municipality of Waslala is assisted and in the Southern Atlantic Autonomous Region the municipalities of Paiwas, Rama and Muelle los Buyes are assisted under the food for education component.

At the time of the preparations of this report, accumulated shortfalls for the Country Programme activities will amount to a total of 140 MT of vegetable oil, 5,391 MT of

cereals, 922 MT of CSB and 1,091 MT of beans by October 2005 as a result of a lack of resources. This is especially problematic for Activity 3 that doesn't have any announcements yet for 2005. Overall beneficiary numbers will be reduced by half if the current funding problems prevail.

Part II: Objectives and methodology

The primary aim of the household food security and livelihoods survey was to obtain a better understanding of the food security, nutrition and livelihoods situation of the population in the two Autonomous Atlantic Regions of Nicaragua. The report serves as key input into WFP's decision-making process to assess the need for and possible scope of WFP assistance after mid-2005. Nevertheless, it is perceived that the findings can also serve as a knowledge base on food security related issues for the Government and other agencies.

In designing the study, a framework that combines household food security and livelihoods analyses was used. With respect to food security, htreeinter0related dimensions were identified as being paramount:

- *Food availability*: the amount of food physically available to households;
- *Food access*: the manner in which households acquire adequate amounts of food through their own production, purchase, barter, gifts or food assistance;
- *Food utilization*: the household's use of the food to which they have access and an individual's ability to absorb and utilize nutrients.

In terms of livelihood security, the study built upon concepts and practice associated with *sustainable livelihoods* and *risk management*. Given that food security is closely related to livelihood security, the study aimed to understand this linkage in the following manner:

- Identifying the range of assets (productive and non-productive) accessible to households and distribution of these assets among households;
- Delineating the livelihood, or income-earning strategies pursued by different households based on asset endowments;
- Identifying the social, economic, natural, political, environmental, and health risks faced by households;
- Determining the frequency of and exposure to (vulnerability) these risks for different types of households; and
- Understanding the outcome of these risks/shocks in terms of their effects on a household's ability to meet food and non-food priorities.

Section 2.1 – Objectives

The objectives of the study are to:

- Identify and characterise the socio-economic groups and individuals most vulnerable to food and nutrition insecurity in terms of livelihood strategies and risk management.
- Assess levels of food insecurity as well as malnutrition and health status of women (15-49 years) and young children (0-59 months) in the two Atlantic Autonomous Regions of Nicaragua.
- Improve understanding of the causes of food insecurity among communities and households in the region.
- Provide recommendations to decision-makers on the possible role for food aid, beyond mid-2005 to address household food insecurity.

Section 2.2 – Data collection tools

The survey was designed to collect quantitative information at the household and individual level and qualitative data at the community level. Three different instruments were designed: a household questionnaire with an anthropometric module, a community questionnaire and a focus group guide. All instruments were prepared in Spanish but were also translated into Miskito and Creole for the use in ethnic and indigenous communities.

The **household questionnaire** included modules on household demography, education, health, migration, housing, income activities, household expenditures, household asset ownership, risk exposure and response, agricultural activities, livestock ownership, and food consumption (7-day food frequency). Furthermore, it collected information on woman and child health and nutrition.

For child anthropometry, height and weight/length were measured of children from 6-59 month of age. This information was used to calculate nutritional indices (z-scores) and then to classify children as being stunted, wasted and/or underweight. The questionnaire also contained questions on antenatal health care, recent morbidity recent vitamin A supplementation.

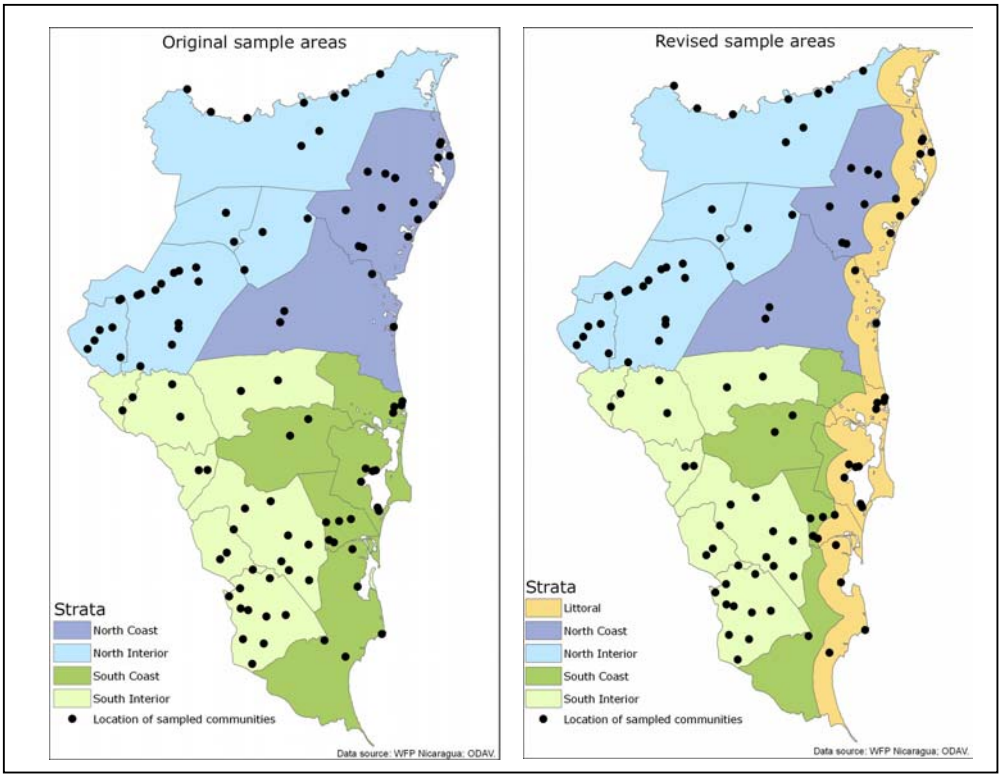
The **community questionnaire** was used to collect information from key informants, such as local community leaders, teachers, nurses, religious leaders, etc. Usually three knowledgeable community members were gathered for one interview, at least one of them was supposed to be female. The key informant interviews provided an overview of the community access to schools, markets and health facilities, along with main sources of income in the community, self organization and any external assistance provided to the community.

Focus group discussions provided information on shocks, immediate responses and mitigation strategies, problems and solutions, and trends with regard to income activities at the community level. Men and women were interviewed in separate focus groups in order to obtain views and opinions by gender. Both groups followed the same discussion guide.

Section 2.3 – Sampling

The main focus of the survey was to assess the food security, nutrition and livelihoods situation of populations in rural areas of the two Autonomous Atlantic Regions of Nicaragua, RAAN and RAAS which constitute the scope of the study.

Both regions were sub-divided into *municipios* that either belonged to the coastal or to the interior areas creating **four zones (strata)**, namely North Coast, North Interior, South Coast and South Interior (see map below: original sample areas). The source for the stratification was the MFEWS "Livelihood Zone Map", which was slightly modified as population data were only available by administrative boundaries. A list of all rural communities and their populations were provided by the Nicaraguan National Institute for Census and Statistics.



A **two-stage cluster sampling** was applied; the first stage was to draw a sample of 20 clusters (communities) in the coastal strata and 30 clusters in the interior strata for a total of 100 communities. Three additional communities were randomly sampled proportional to their size, meaning that larger communities had a higher chance to be selected than smaller communities. The second stage was to randomly select 10 households in each community using the "spin the bottle" probability technique. A total of 1,029 households were interviewed. The sample is representative for the rural population within each stratum.

During the analysis it was decided to separate those communities located close to the Atlantic coast (in a buffer zone of 12 km from the shoreline) due to the fact that the populations exhibited very distinct livelihoods compared to the rest of the coastal samples. They formed a fifth zone referred to as the "Littoral" (see map above: revised sample areas).

It is acknowledged that this may have an impact on the representativeness of some of the findings as the case numbers in two of the original coastal strata were reduced. However, the five strata are each more homogeneous than the original four, which led to the assumption that this constraint

Section 2.4 – Data collection

The design of the data collection methodology, data analysis and final reporting was carried out by the Vulnerability Analysis and Mapping (VAM) units of WFP Rome and WFP Nicaragua. The data collection was organized and carried by WFP Nicaragua with Government counterparts. Two 5-day training sessions of enumerators and team leaders were undertaken. Of the total 40 enumerators that were trained, 16 men and 16 women were selected to participate in the data collection process. The enumerators and facilitators, graduates from two local universities (URRACAN and BICU), were recruited through the UN Volunteers Programme. The WFP national VAM officer coordinated and supervised the field work with the assistance from three regional supervisors from WFP and MAGFOR.

After the training and field-testing, enumerators were divided into 8 teams each with 1 team leader and 3 enumerators. Within each group two of the enumerators were also responsible for anthropometric measurements. Basically four teams covered the Northern Atlantic Region (RAAN) and another four teams covered the Southern Atlantic Region (RAAS). The data collection process which took place from 6 of February to 7 of March 2005 was regularly monitored by WFP Nicaragua and the Government counterpart, the Ministry of Agriculture and Forestry (MAGFOR).

On a regular basis, all teams met with the Regional Supervisor and the VAM coordinator for a final screening of the questionnaires prior to sending them off to Managua for data entry. A debriefing session took place in the end process to identify possible problems/constraints that occurred during data collection process that could hamper data quality or help with the interpretation of results.

Section 2.5 – Data entry and analysis

The questionnaires were sent to Managua on a rolling basis and were entered by a team of people employed by WFP Nicaragua using an ACCESS data entry sheet. The data cleaning, processing and analysis was carried out by VAM staff from Rome and Nicaragua. The calculation of child anthropometric indices was conducted in Nutrisurvey. All data were analyzed using SPSS software, versions 11.5, except for the multivariate analysis which was done using ADATTI software. Final reporting was done by VAM staff from Nicaragua and Rome.

Section 2.6 – Data constraints and limitations

There are several constraints and limitations to the data that must be taken into account when interpreting the results. These limitations may also serve as a guide for improving future assessments.

During the analysis the team realized that the variations within the two coastal zones (see Map A) were very distinct. Food security and poverty levels were highly influenced by the distance of sample communities to the Caribbean Coast which influenced their access to different livelihood activities. Indeed a community with direct sea access in the North has

more in common with a similar community in the South than with a community that lies further inland even though if it belongs to the same strata. The analysis team therefore decided to introduce a fifth stratum which is comprised of those villages that are located within a 12 km buffer zone from the shoreline and bays of the Caribbean Sea.

Findings and results are not presented by ethnic group as this was not the scope of the survey. However, all ethnic groups are presented in this survey as all communities had the equal chance to be selected based on their proportional presence in the overall sampling frame.

Access to land and land productivity was difficult to assess as some households have access to communal land, others own private plots. The questionnaire did not differentiate between the two land tenure systems. It was therefore decided to use the actual area cultivated as proxy indicator for access to land, while it was impossible to assess actual productivity.

Part III: Household survey results

This section presents the findings from the individual household member section of the questionnaire, including household headship, composition by age and sex, education, migration and employment.

Section 3.1 – Household demography and migration

For all people included in the sample, 49% were male and 51% were females. The gender ratio was fairly even in the younger age groups but for those aged 18-59 years, there were slightly more women (52%) than men while in the elderly age group (60+ years), there were slightly more men (52%) than women.

In the North Coast sample, 90% of the households were Miskito and the rest were multi-ethnic while in North Interior, only 29% of the households were Miskito while the rest were Mestizo. All of the households in the RAAS samples were Mestizo. The households in the Littoral sample were a mixture of Miskito, multi-ethnic, Mestizo and Creole.

In the entire sample, 13% of the households were headed by women, ranging from 9% in the Littoral sample to 17% in South Interior households. In general, there were fewer households headed by women in the RAAN sample when compared to the RAAS sample. The average age of the head of household was 42 years but 12% of the households were headed by a person aged 60 years or older. The percentage of elderly headed households was highest in the North Coast and South Coast samples (14%) and lowest in the North Interior sample (11%).

The average household size for the sample was nearly 7 persons but varied from region to region with highs of nearly 8 persons in North Coast and 7 persons in Littoral which were significantly *($p < 0.01$)* higher than the average size of 6 persons found in South Interior. Consequently, more than 40% of the households in the North Coast sample had 9 or more members, followed by 37% of the households in the Littoral sample and between 20-25% of the households in the other sampled strata.

The average percentage of dependents[1] per household for the entire sample was 51.4% with a high of 52.5% in the North Coast sample and a low of 50.6% in the Littoral sample, indicating that households in the Littoral were more likely to have members who were capable of earning income. However, there were no statistically significant differences between regions.

Households were asked if individual members had migrated recently, why they migrated and to where most people had gone. Overall, 6% of male members and 4% of female members had migrated. Of those, 59% of the males and 32% of the females had sent money from where they had migrated. Nearly all the females had migrated within Nicaragua while 17% of the males had gone to Costa Rica, presumably due to better income earning opportunities there. Reasons for migration for males were mostly to look for work (42%), because of secured employment (19%) or education (19%). Most of the females who migrated left for educational opportunities (36%), to look for work (28%) or due to secured employment (12%). Most people who migrated were between the ages of 14 and 59 years (8% each). Those between the ages of 14-17 years mostly migrated for school (74%) while those 18 and older migrated because of secured employment or to look for work.

Migration was more common in the Littoral communities (7% of household members) and least common in the South Coast communities (1%). Most migrants in the North and Littoral strata moved within Nicaragua while in the Southern strata, nearly half had gone to Costa Rica. The reasons for migration were also different by strata. Education was the main reason for migration in North Coastal (42%), North Interior (30%) and Littoral (30%) strata while in the South Interior (76%) and South Coast (57%) people went in search of employment.

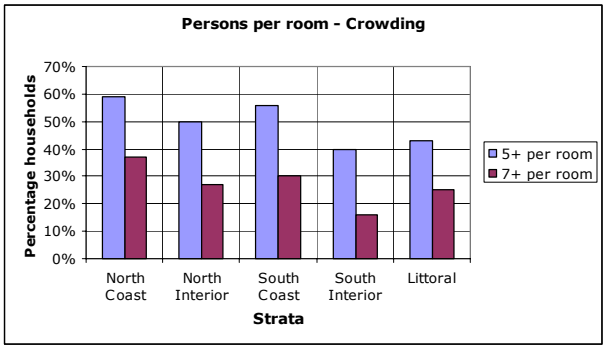
Section 3.2 – Housing and amenities

For the entire sample, more than half the houses had a floor made of wood. However, there were distinct differences between strata with the majority of homes in the Coastal

[1] Members younger than 15 and 60 years or older.

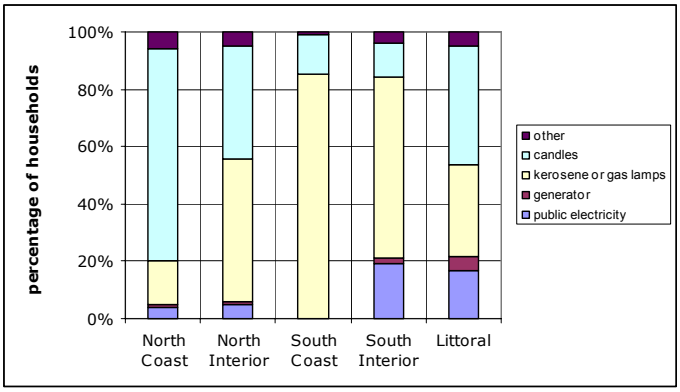
and Littoral strata having wooden floors as compared to only half in North Interior and 19% in South Interior with wooden floors. Two-thirds of the homes in South Interior had earth/mud floors. Most homes had a roof of zinc sheets with the remainder having a thatch roof. More than one-quarter of the sample homes in North Interior and South Coast had a roof of thatch.

In general, most homes had 2 rooms for living but in 13%, they had a room used both for cooking and sleeping. This was most commonly found in homes in the North Coast sample (28%) and least common in South Interior (5%). Therefore, when considering only the number of rooms used for sleeping, the median number was only one room in all but the Littoral sample where most homes had 2 rooms for sleeping.



When considering only the rooms used for sleeping, the median number of people per room was 4, for the entire sample. The number of people per sleeping room (crowding) was 6 for the North Coast sample, 5 for the South Coast, 4.5 for North Interior and 4 persons/room for South Interior and Littoral samples. The local definition of crowding was 5 o more persons per room while a functional definition based upon the sample distribution was 7 or more persons per room. The above chart compares the definitions of crowding by strata, showing that the greatest crowding by any definition is found in homes in the North Coast sample, followed by the South Coast sample and North Interior. Homes in the South Interior sample are the least crowded.

Nearly all of the sample households used wood for cooking, with the few exceptions being concentrated in the Littoral households – 8% were using propane gas and 7% were using charcoal for cooking.



The sources for lighting varied widely across the sample with three-quarters of the households in the North Coast sample relying on candles while in the North Interior, about half were using lamps. The majority of households in the South Coast were using lamps. The highest percentage of households using electricity for lighting were found in the South Interior and Littoral samples where more than 20% were lighting their homes from public or private sources.

More than half the households in the North Coast and Littoral samples were using water from improved sources (UNICEF definition) as compared to 44% in the North Interior and 43% in the South Interior. Only 27% of the households in the South Coast were using water from improved sources. On average, households required 13 minutes to collect water, ranging from 18 minutes in the North Interior sample to only 8 minutes in the Littoral. Households in the North Interior sample were most likely to use an improved latrine (31%) while more than half the households in the Southern region were using basic latrines. Half the households in the North Coast were not using latrines while in the Littoral sample, about 40% were using basic latrines and another 40% had no latrine.

Section 3.3 – Infrastructure and access to community services

In total 103 key informant interviews, comprised of 216 men and 83 women, were carried out to assess physical access and access to social infrastructure and services at the community level. The average female participation was of around 30% across

communities. Key informants included community leaders, judges, teachers, health personnel, religious leaders and elderly community members. Figures provided in this section are not statistically representative and only serve to depict trends. As a second step some important results were cross tabulated with the food consumption profiles to assess possible impacts on the food security situation (see Part V).

3.3.1 - Access to schools

Key informants were requested to indicate if the community has a pre-school, primary school and secondary school. Overall nearly all communities have a primary school located within their community boundaries, 68% have a preschool but only 27% have a secondary school. However, the existence of the primary school does not necessarily mean that that it has an adequate building or that all grades for primary school are offered. Often schools are incomplete; sometimes even closing down for periods of time due to weather conditions or lack of teachers (see also Section 3.4). Across strata the existence of primary schools is high (see table above), however the existence of preschools ranges from zero in the South Coast sample to the majority of communities in North Interior and North Coast. This could explain the varying degrees of children 3-5 of age enrolled in preschools (see Section 3.4.1). Access to secondary schools is the highest in South Interior and the Littoral strata. Again none of the sampled communities in South Coast reported to have a secondary school.

	Preschool	Primary	Secondary
North Coast	78%	100%	11%
North Interior	84%	100%	23%
South Coast	0%	88%	0%
South Interior	60%	100%	40%
Littoral	76%	88%	32%
Total	***68%***	***96%***	***27%***

Key informants were also asked if schools provide school-feeding. Nearly all pre- and primary schools in North Coast and North Interior offer school feeding compared to about every second school in South Interior and the Littoral. Very few of the primary schools in the South Coast offer school meals, and across strata hardly any of the secondary schools offers school feeding.

Another important factor is the access to adequate sanitation services in schools. Nearly half of the primary schools in North Coast do not have any type of sanitation. Only in the Littoral there are some primary schools equipped with flush toilets while the rest in the sample have an improved or basic latrine. Nearly 70% of the primary schools in the North Interior sample have access to improved latrines while in the South Coast, most are only equipped with a basic latrine.

	No sanitation	Flush toilet	Improved latrine	Basic latrine
North Coast	44%	0%	22%	33%
North Interior	16%	0%	68%	16%
South Coast	14%	0%	14%	71%
South Interior	10%	0%	43%	47%
Littoral	13%	9%	43%	35%
Total	***16%***	***2%***	***47%***	***35%***

3.3.2 - Access to MINSA health posts

Overall around 40% of the sample communities have access to a basic health centre. However, according to key informants, they are often not operational because they lack personnel and/or medicine forcing community members to travel far distances to reach well equipped health centres with skilled staff. The highest number of basic health posts can be found in the Littoral (60%) and North Coast (45%) strata but only in every third community in the two Interior strata. In the South Coast sample only around 15% of the communities had access to a basic health centre. In communities where no health post exists, community members have to travel on average more than 3 hours (or 18 km) to reach the nearest health service point.

3.3.3 - Access to markets

Almost none of the communities reported to have direct access to a market within the boundaries of their community. Only in South Interior 1 in 10 communities reported to have a market. Small shops with basic commodities, however, can be found in the majority of the villages. On average community members have to travel more than 6 hours and cover a distance of 30 km to reach the next market for purchasing and commercializing goods.

3.3.4 - Access to electricity and communication

Overall every fifth community has access to electricity, slightly more in South Interior and the Littoral (every third community). None of the communities in South Coast and very few in the North Coast samples reported to have access to electricity. Access to telephone is extremely rare across the strata, only some communities in South Interior and the Littoral reported to have access. Access to radio is higher, especially in North Coast with more than 40% and the Littoral with more than 30% of the sampled communities. In the Southern strata and North Interior very few communities reported to have access to radio stations.

3.3.5 - Physical access and main means of transport

Physical access and isolation are major issues in the autonomous Atlantic Regions of Nicaragua. The **road infrastructure** is extremely limited. The only paved road leads from Rama (RAAS) to Managua with all other roads being unpaved. For example all connections between Puerto Cabezas, Waspam, Rosita and Waslala are unpaved. Conditions of these roads are especially bad during the rainy season which increases travel times immensely.

Both RAAN and RAAS are characterized by an enormous **river and lagoon system**, which makes travelling by boat the most convenient means of transport especially in the Littoral and the coastal areas.

Key informants were requested to indicate if their main physical access to their communities was by water or road (including walking trails). The table on the left illustrates that 60% of the communities indicated that their main physical access was by road or walking tracks. Often communities have to walk for long distances to reach the closest road or water system. The rest of the communities are accessed by water, which makes travelling more convenient. However water travel is also very time-consuming when kayaks are used or costly when speed or motor boats are available.

	Main physical access	
	by road/ walking trails	by water
North Coast	78%	22%
North Interior	77%	23%
South Coast	13%	88%
South Interior	87%	13%
Littoral	16%	84%
Total	***60%***	***40%***

Access by water varies greatly between the 5 strata. It is particularly high in the South Coast and Littoral with more than 80% of communities reporting to have direct access to waterways throughout the year. Half of the communities in North Interior and some communities in North Coast and South Interior reported that during the rainy season – mainly from July/August to October – road access is constrained.

Also walking on foot can be constrained in this time period if locals have to cross rivers, for example, to reach schools or agricultural plots that are located on the other sides of the river beds. Crossing can be impossible due to high water levels and strong currents.

Another important indicator to assess physical accessibility is the main means of transport used by community members to reach the markets, health centres, etc. (see table). The main means of transport are boats and/or kayaks (mainly in South Coast and the Littoral) followed by animals which are particularly important in the interior regions. Every second community in South Interior and every third community in North Interior reported that animals are their principal means of transport. These are also the areas where some communities indicated that they solely rely on walking on foot or riding bicycles. Overall every fifth community reported to have access by public transport, the majority residing in North Coast, mainly those located along the Waspam - Puerta

	Main mode of transport			
	Private vehicles	Public transport	Boats/ Kayaks	Animals
North Coast	11%	67%	22%	0%
North Interior	16%	26%	23%	32%
South Coast	0%	13%	75%	13%
South Interior	20%	17%	13%	47%
Littoral	12%	4%	80%	4%
Total	***15%***	***20%***	***38%***	***25%***

Cabeza connection. The use of private vehicles (including taking a lift) is less important because very few households can afford a car or truck (see Section 3.5.1).

Section 3.4 – Education

Caretakers of children aged 3 to 14 were asked whether the children had been enrolled in pre-school or primary school. The official age for pre-school is 3 to 5 years old and for primary school, ages 6 to 12 years. Nevertheless, for purposes of the current study, children with "extra-age" are considered as enrolled even if they are not enrolled in the correct educational institution; e.g. a child 7 years old enrolled in pre-school would be considered enrolled.

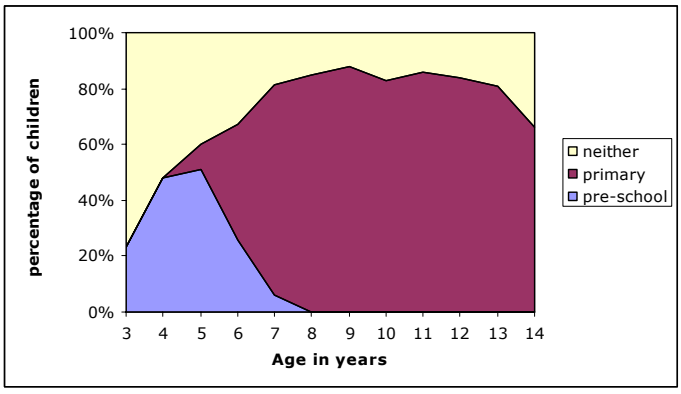
3.4.1 - Enrolment

The table below presents the enrolment rates by age group. The results indicate that in the enrolment rates are significantly higher for the primary school aged children than for the pre-school aged children. The findings also suggest that the enrolment rates are higher in the two Northern strata, particularly in North Coast (72%), than in South Interior (27%) or South Coast (9%) households. Overall the enrolment rates for the children in the primary school age group (6-13 years) are more even but also here, the North-South differences are apparent. The Littoral sample shows relatively high figures of enrolment that are closer oriented towards North/Coast.

The percentage of children from sampled households receiving food at school is also much higher in the two Northern strata than in the rest of the sample. In North Coast 97% of the children received a meal at school compared to 79% in North Interior. In the Littoral and South Interior strata between 39% and 42% of the children were receiving a meal, whereas none of the children in the South Coast were recipients.

Enrolment	North Coast	North Interior	South Coast	South Interior	Littoral
% of the 3-5 years old children enrolled in Preschool	72%	46%	9%	27%	60%
% of the 6 to 13 years old children enrolled in Primary	91%	82%	74%	78%	85%
% of children receiving School Feeding	97%	79%	0%	42%	39%

The chart on the right shows the percentage of children enrolled in school by type and illustrates the change in enrolment by one year age increments. The blue section represents the pre-school enrolment indicating that it peaks at around 50% for children aged 4-5 years and decreases sharply with virtually no children older than 7 years in pre-school. Enrolment in primary school begins around five years of age and peaks around ages 7-8 years and tapers off after the age of 13 years. From there, children either leave school or move on to secondary schooling.



Enrolment was also assessed by sex, however, no gender gap could be observed. Boys and girls have equal opportunities of being enrolled in pre- and primary school. However, differences can be expected for the enrolment in secondary schools as they are usually located in far distances from the communities.

3.4.2 - Reasons for not being enrolled

If the child was enrolled neither in pre-school nor in primary school, the caretaker of the child was asked the reasons why the child was not currently enrolled. The reasons for not enrolling differ significantly between age groups and strata.

	Main reasons for children not being enrolled	
	Pre-school (3-5)	Primary (6-13)
No Pre-school/Primary	59%	20%
Distance/time	18%	23%
Security	18%	13%
Mistreatment of children	1%	3%
Children have to work	1%	7%
Not enough money	21%	48%
Illnesses/disabilities	2%	6%
No teachers	2%	13%

The main reason for not enrolling children in **pre-schools** is that this type of service is not offered in many communities (59%). Other important reasons are lack of financial means (21%), the distance or travel time to reach pre-schools (18%) and the security situation (18%). Maltreatment of children, the fact that children have to work, illnesses/disabilities, or absence/lack of teachers have hardly any importance at all (see table above).

Across strata the results of the survey point out that the lack of **pre-schools** might be a larger limitation for school enrolment in the two Southern strata and in the Littoral than in the Northern strata (see table below). The lack of resources is main constraint for children in the North Interior. Security restrictions seem to be of less importance in the South Interior and in the Littoral while they seem to be a main issue in North Coast. However, 72% of children are enrolled, which is very high compared to all other strata. It is also worth mentioning that none of the households in the North Coast perceived the distance or time as a limitation, whereas in the South Coast, for one in every three children these are limiting factors.

	Reasons for children not being not enrolled in pre-school				
	North Coast	North Interior	South Coast	South Interior	Littoral
No Pre-school/Primary	25%	27%	83%	66%	71%
Distance/time	0%	17%	33%	21%	4%
Security	50%	25%	33%	5%	13%
Mistreatment of children	0%	2%	0%	1%	0%
Children have to work	0%	2%	0%	1%	3%
Not enough money	13%	38%	9%	15%	24%
Illnesses/disabilities	0%	0%	2%	4%	0%
No teachers	13%	2%	2%	0%	4%

The main reason for not enrolling children in **primary school** is the lack of financial means (48%). The second reason is the distance or time required to reach primary schools (23%), whereas the lack of primary schools is only reported for 20% of the children not attending school. Security as a hindering factor is less important among parents of primary school aged children (13%), however lack of teachers (13%), need to work (7%) and illnesses and incapacities are relatively more frequently reported for this age group.

Across strata economic constraints seem to be the main limitation in North Interior, South Interior and South Coast, while the lack of teachers was reported as the main reason in the North Coast and in the Littoral. It is discouraging to see that some of the children in South Coast and Interior do not attend school because they have to work.

	Reasons for children not being not enrolled in primary				
	North Coast	North Interior	South Coast	South Interior	Littoral
No Pre-school/Primary	0%	5%	22%	8%	64%
Distance/time	0%	25%	22%	21%	27%
Security	0%	8%	28%	12%	17%
Mistreatment of children	0%	3%	0%	7%	0%
Children have to work	0%	3%	14%	10%	3%
Not enough money	18%	64%	47%	58%	15%
Illnesses/disabilities	18%	5%	8%	9%	0%
No teachers	64%	0%	17%	0%	42%

3.4.3 - Attendance and drop outs

The caretakers of the children were also asked about school drop-outs. In the overall sample, 18% of the children did not finish the school year. The two Northern strata appear to have better retention rates than the Southern strata. In the North Coast, only 3% did not finalize the school year, whereas in the North Interior 13% dropped out. In the Littoral, 16 % of the children did not finish the school year. South Coast has the highest drop-our rates as more than half of the children (51%) did not finish the school year, whereas in the South Interior, 1 in every 4 child dropped out.

The results from the study reveal that the drop out rates for the children decreases with age. Hence, the children between 4 and 8 years old have drop out rates between 20 and 32%, while only 12% to 15 % of the children between 9 and 13 years old had dropped out.

Reasons for dropping out	Pre-school (3-5)	Primary (6-13)
Closing of schools	11%	15%
Distance/time	40%	24%
Security	20%	14%
Mistreatment of children	0%	1%
Children have to work	3%	14%
Not enough money	31%	37%
Illnesses/Disabilities	20%	17%

The main reason for dropping out of pre-school are the distance and time required to reach schools (40%), financial constraints (31%), security issues (20%) and illnesses or disabilities (20%). The most limiting factor for primary school children dropping out are financial constraints of their parents (37%). Also here distance and time play a major role (24%). The third most common reason is illnesses or disabilities (17%) but also a large number of the children dropped out because they have to work (14%).

Some differences can be observed between the strata with regard to the reasons for dropping out. In the North Coast the only reason reported is illness (100%) while in the North Interior the main reason is illness (31%), followed by the need to work (22%) and economic constraints (21%). In the South Coast, closing down of schools (39%), economic constraints (32%) and security problems (28%) were mentioned, while in the South Interior economic constraints are mentioned by more than half of the households (54%). In the Littoral the main reason for drop out was the distance/time (41%).

Reasons for dropping out	North Coast	North Interior	South Coast	South Interior	Littoral
Closing pre-school	0%	8%	39%	3%	14%
Distance/time	0%	16%	15%	24%	41%
Security	0%	6%	28%	8%	18%
Mistreatment of children	0%	3%	0%	1%	0%
Children have to work	0%	22%	11%	14%	14%
Not enough money	0%	21%	32%	54%	27%
Illnesses/disabilities	100%	31%	8%	14%	17%

Caretakers were also requested to estimate the missed schools days during the last school year, a proxy indicator for school attendance. The attendance rate is considerably higher in the two Northern strata and the Littoral than in the two Southern strata. In the South Coast children missed on average 20 school days. In the South Coast, the children missed 13 school days, whereas in the two Northern and the Littoral strata, the children only missed between 4 and 7 school days.

The respondents were then asked if they expect school attendance to increase if school feeding was introduced. An overwhelming 77% of the respondents agreed to this, 18% declined and 5% were unsure about the answer.

Section 3.5 – Household and animal assets and credit

3.5.1 - Household asset ownership

The number of different assets owned by a household is a good proxy indicator for households' wealth and is related to household food security. A greater variety of assets

usually indicates that a household has more purchasing power, that it was not forced to sell assets in the past to meet food or other basic needs, or that it has a greater resilience in case shocks occur in the future.

During the interview, respondents were asked if any member of the household owned one or more of 11 household assets, ranging from basic assets such as lamps or radios to productive assets such as sewing machine or farm implements. During the analysis assets were separated into two groups, productive assets that can be used to generate income (boat, kayak, sewing machine, motorbike, car, barrel and farming tools) and non-productive assets (lamps, bicycle[2], radio, television and hand mill).

Overall households in the Southern strata and the Littoral own more assets than the Northern strata. On average they own 3.4 assets compared to 2.7 in the North Coast and 3.1 in North Interior. However, when differentiating into productive and non-productive assets it is interesting to note that the Northern strata and the Littoral have more productive assets on average than the Southern strata. Households in the Littoral, North Coast and South Coast are also more likely to own a means of transport, in particular boats and kayaks, which are extremely important in the context of difficult physical accessibility.

Regarding the **non-productive** category the most commonly owned assets were radios (74% of all households own one), lamps/lanterns (68%), and hand mills (53%), bicycles (15%) and televisions (8%). Households in the Northern areas were less likely to own these types of assets, except for bicycles that are owned by every third household in the North Coast sample.

In terms of **productive assets**, more than 70% of sample households own agricultural tools - in North Interior even 80 percent. Kayaks are owned by 22% of the sample, followed by barrels to store grains (12%), sewing machines (7%).

In terms of **means of transport** very few households own cars, motorcycles and boats, but households in the Littoral are more likely to own a boat which is not surprising given the fact that the zone is characterized by fishing as one of the main livelihood activities; kayaks are mainly owned in the costal strata and the Littoral.

		North Coast	North Interior	South Coast	South Interior	Littoral
Non-productive assets	Radio	69%	68%	80%	83%	71%
	Lamp/lantern	24%	60%	90%	87%	67%
	Hand mill	36%	57%	69%	72%	26%
	Bicycle	33%	15%	1%	10%	18%
	Television	1%	1%	4%	15%	12%
Productive assets	Agricultural tools	70%	80%	74%	69%	69%
	Kayak	22%	11%	35%	2%	58%
	Barrels to store grains	8%	12%	3%	11%	19%
	Sewing machine	7%	6%	5%	9%	8%
	Boat	2%	1%	1%	0%	6%
	Motorbike	0%	0%	0%	1%	2%
	Car/truck	1%	0%	0%	1%	0%

3.5.2 - Livestock assets ownership

Also number of livestock can be considered to be a good indicator for relative wealth and food security, as these households have a greater access to animal products such as milk, eggs and dairy products that contribute to a diversification of their diet. These households can also sell parts of their livestock in times when they are facing shocks or as regular income generating activities.

A large percentage of sample households own poultry (74%) and pigs (51%). Cattle were owned by 42% of the households while 38% owned horses or donkeys. Few households own sheep (5%) and goats (1%). By strata, 66% of household in North Coast own pigs as

[2] Bicycles were considered to be non-productive due to the limited road infrastructure and distances that make it unlikely that they are used in a productive manner.

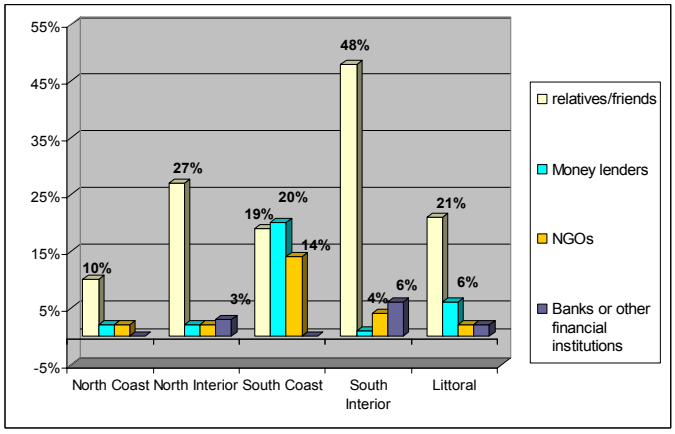
compared to 57% in North Interior and 58% in the South Coast sample. South Coast has generally the highest percentage of households owning livestock and hence the majority of livestock rearing households reside that strata (see section 3.7.2). In all, 58% of those households own horses or donkeys and nearly all households own poultry.

	North Coast		North Interior		South Coast		South Interior		Littoral	
	%	Median	%	Median	%	Median	%	Median	%	Median
Cattle	42%	3	44%	3	55%	6	44%	5	31%	2
Pigs	**66%**	3	**57%**	2	**58%**	3	47%	2	38%	3
Goats	1%	6	1%	3	4%	2	0%	-	3%	4
Sheep	1%	2	4%	5	15%	2	6%	4	3%	4
Horses/ donkeys	32%	2	35%	2	**58%**	3	**53%**	2	19%	2
Poultry	75%	7	77%	7	**89%**	10	71%	8	69%	8

In terms of numbers of animals owned, households in the South Coast tend to have higher average numbers compared to the other strata. For example, of those households that own cattle the median herd size is 6 animals compared to 5 animals in the South Interior, and 2-3 in the other strata. In terms of livelihoods, households that rely on sales of livestock and animal products are characterized by high median numbers of cattle (15) and poultry (10). All other income groups have much lower percentages and herd size.

3.5.3 - Access to loan and credit

On average, 38% of the sample households have access to loans or credit. In North Coast only 14% of households have access, compared to 29% in the Littoral and 32% in North Interior. The highest levels of access can be found among households in South Coast (56%) and South Interior (44%). Informal sources such as relatives or friends are the main sources of credit across strata (see chart on the left). As nearly every second household South Interior regularly relies on family and friends for loans, it can be assumed that a high share of this is spent on food as the expenditure data indicates (see Section 3.8.2). The access to credit through friends and family is an indicator that the communities in the South Interior have kept their social capital more intact. South Coast households are characterized by a higher number of households having access to credit through money lenders and NGOs. Across the strata formal lending institutions hardly have any role.



Section 3.6 – Land use and agricultural production

As agricultural production plays a major role in the livelihoods of rural Nicaraguans, a module was incorporated into the questionnaire to collect more detailed information on land access and use, crop production and use and horticulture in order to better understand this role of agriculture for the sampled households.

3.6.1 - Access to and use of agricultural land

More than 80% of all households in the sample stated that they had access to agricultural land, although only 22% stated that they had legal ownership of this land. Generally fewer households in the Southern strata (65% and 78%) have access to agricultural land but they are more likely to have legal ownership of this land (40%). In the Northern strata most households have access to land; however, relatively few have ownership rights which can be explained by the fact that communal land is more predominant. In the Littoral stratum land access is quite high but only 5% of households own their plots.

In the survey the households were asked how many hectares they cultivated in the last agricultural season (2003/04). Households in the Littoral sample cultivated the smallest plots of land with an average size of 1.6 hectares. Households in the South Interior present a unique situation in that the sample had the fewest households with access to agricultural land (65%) and then the average size cultivated was only 2.0 hectares, indicating that this stratum had the least amount of land under cultivation. Area cultivated for the other 3 strata averaged around 2.3 hectares.

	Access to land	Average size cultivated *manzanas* (ha)	Title to the land	Irrigated land	Soil Conservation
North Coast	97%	3.1 (2.2)	16%	-	1%
North Interior	89%	3.3 (2.3)	21%	1%	15%
South Coast	78%	3.3 (2.3)	40%	-	37%
South Interior	65%	2.9 (2.0)	39%	-	16%
Littoral	86%	2.3 (1.6)	5%	3%	17%
Total	***81%***	***3.0 (2.1)***	***22%***	***1%***	***15%***

Very few of the households reported to use irrigation schemes for their agricultural production. The highest percentage of household with irrigation can be found in the Littoral (3%). The highest percentage of households with soil conservation works were found in the South Coast (37%) followed by the Littoral (17%), South Interior (16%), and North Interior (15%). In the North Coast very few households engage in soil conservation activities.

3.6.2 - Main crops

Households in the sample that have access to land were asked to list all crops that they cultivate; subsequently they were requested to name the four main ones in order of importance and the main use. Most households cultivate beans (79%), maize (72%), tubers (69%), plantains (59%) and rice (53%). Cash crops, such as sugar and coffee, have very little importance for the sample households. Considerable differences can be observed within the different strata (see table below).

	North Coast	North Interior	South Coast	South Interior	Littoral	Total
Maize	72%	74%	**92%**	**92%**	**44%**	72%
Rice	**89%**	60%	68%	**15%**	56%	53%
Beans	88%	**95%**	87%	86%	**43%**	79%
Sugar	0%	1%	0%	1%	**8%**	2%
Vegetables	0%	2%	0%	2%	1%	1%
Fruits	10%	3%	8%	6%	**18%**	8%
Tubers	**100%**	55%	85%	52%	86%	69%
Fodder	2%	4%	**19%**	12%	2%	6%
Plantains	**92%**	55%	55%	**37%**	73%	59%

In the **North Coast**, all of the households with access to land produce tubers (100%), while 92% produce plantains, 89% rice, 88% beans and 72% maize. In terms of importance, for 42% of the households rice is the most important crop followed by tubers (22%) and maize/beans (both 14%).

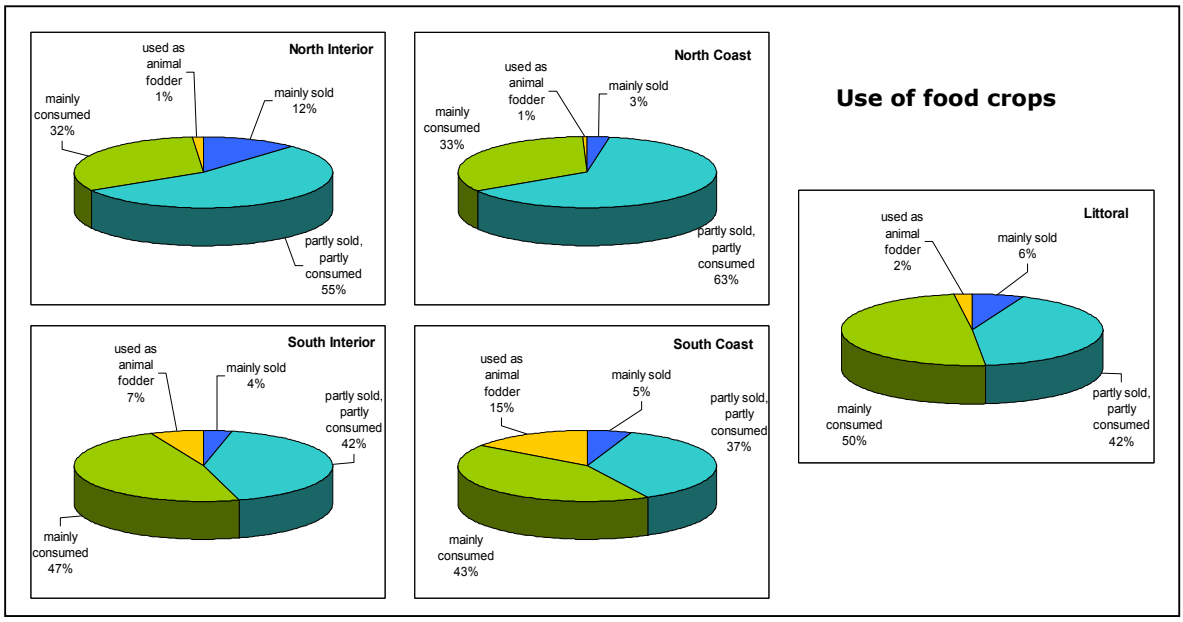
In the **North Interior**, almost all of the households with access to land produce beans (95%), followed by maize (74%). Both are also the most important crops with 44% and 36% respectively. A substantial percentage of households are also engaged in cultivating rice, tubers and plantains.

In the **South Coast**, the most frequently grown crop is maize (92%), followed by beans (87%), tubers (85%), and rice (68%). An important percentage of the households produce animal fodder (19%). The most important crops for these households are maize (32%), beans (27%) and rice (18%).

In the **South Interior**, almost all of the households with access to land produce maize (95%), followed by beans (86%) and tubers (52%). Also here, some of the households

produce fodder (12%). Maize and beans are by far the most important crops with 46% and 35% respectively.

In the **Littoral**, the most frequently grown crop was tubers (86%), followed by plantains (73%) and rice (56%). It is also the only strata where a relatively high number of households participate in the cultivation of fruits and vegetables (18%).

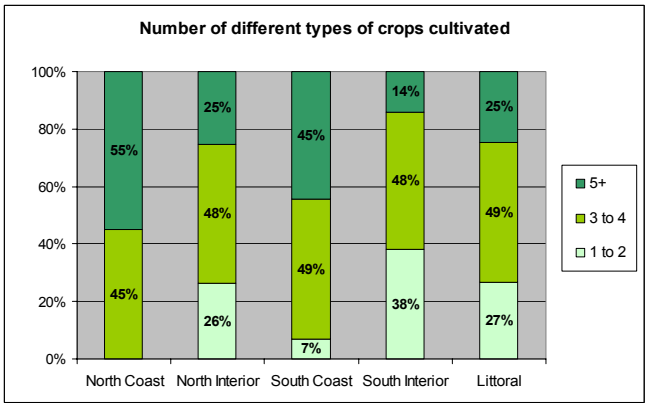


The households were asked if the four main important crops were mainly consumed, mainly sold, partly consumed/partly sold, or used as animal fodder (see charts above). In the Northern strata, where more households rely on agricultural activities, far more products are sold or sold and consumed. In the South and in the Littoral, most crops are used for household consumption. In the South Coast stratum where raising livestock is an important activity, 15% of the crops produced are used as animal fodder. The crops provided to animals are mainly fodder, maize, tubers and plantains.

Beans are the crop that to the greatest extent are used for both selling and consumption as 67% of the households states that the crop is used for both, followed by rice (63%), maize (55%) and plantains (53%). Tubers (45%) and plantains (42%) are the crops most commonly reported as being produced mainly for consumption, followed by maize (39%) and rice (34%). Fruit is the only crop that was reported by a significant percentage of households to be cultivated mainly for sales (23%) while only about 4-5% of all other crops were mainly sold.

3.6.3 - Diversification of the agricultural production

Households that cultivate a variety of crops have usually a higher resilience to risks such as economic shocks as well as natural hazards and plant diseases. In this sense it can be also interpreted as a mitigation strategy of households that are regularly exposed to risks and shocks. With regard to the household food consumption these households are also more likely to have a more diversified diet. The chart on the left indicates that the two coastal areas are characterized by a far higher diversity of agricultural



production than the interior strata. For example, 55% of the households in North Coast and 45% in the South Coast sample cultivate more than five crops. In addition, as found in the previous section, households in the South Coast sample also have the best livestock diversification. However, the lowest diversification of agricultural production is found in the interior where 26% of the households in the North Interior sample and 38% in the South Interior cultivate only one or two products.

3.6.4 - Horticulture

The existence of horticulture is quite an important factor for food security as it provides the household with fresh vegetables and can also serve an additional income generating activities if products are sold. On average, 29% of households in the sample had a vegetable garden, ranging from 44% in the Littoral, 34% in North Coast and around 20% in the remaining three strata.

Section 3.7 – Income sources and livelihood activities

Households were asked to name their four main sources of income and to estimate the contribution of each source to the total annual income. As a second step livelihood profiles were created using multivariate techniques based on the main activities households are involved in and their respective shares to the total household income.

3.7.1 - Income sources

During the interviews, the households were asked to name their four most important sources of income. In the overall sample, sale of crops (59%), daily wage labour (31%), sale of livestock (20%), and fishing (15%) were most frequently reported by households. However, percentages of sampled households engaging in these activities vary greatly across the five strata.

The main source of income for households in the **North Coast** sample is sale of crops (92%), followed by livestock sales (21%), sale of wood (10%) and 'other' activities (10%). In the **North Interior**, 81% of the households received income from sale of crops, 30% from daily wage labour (*jornerlero*), 17% from livestock sales and 12% from the sales of animal products. There were more variations in the main income sources for the southern samples. In **South Coast**, 59% of the households received income from the sales of crops while 48% relied on daily wage labour, 45% on livestock sales and 19% on the sale of animal products. Households in the **South Interior** were more reliant on daily wage labour for income (42%), followed by crop sales (39%), livestock sales (18%), sales of animal products (15%) salaried work (13%) and small business (12%). Fishing was the main source of income for households in the **Littoral**, supplying income to 59% of the sample households. More than 40% relied on crop sales for income, 20% on small businesses, 19% on livestock sales and 18% on daily wage labour.

Remittances overall are not a main source of income for the sample households (4%) with slightly more (6%) in South Interior receiving income from remittances. Findings from the focus group discussions suggest that some of the 'other' activities are charcoal sales, domestic work, hunting and gathering. However, according to local key informants, they might also be activities associated with drug trafficking or related activities, particularly in the Littoral.

3.7.2 - Livelihood profiles using multivariate analysis

Using principal component (PCA) and cluster analysis 14 homogeneous income profiles were created based on how much each individual activity contributed to the annual household income. The information was then cross-tabulated with strata and expenditure percentiles.

Of the 1,028 households 27% are described as **farming households** and depend mainly on the sale of crops while another small share comes from livestock sales. Ten percent of the sample are described as **daily wage labourers** and rely solely on this activity for income. Another 11% of the sample households rely mostly on daily wages but complement their income with crop sales.

Twelve percent of the households can be described as **livestock keepers**, earning nearly 80% of their income from sales of livestock and animal products, with the rest coming from crop sales. The **fisherman** profile was applied to 7% of the households where nearly

90% of their income is from fishing activities. Another 4% of the households earn half their income from fishing activities and the rest from crop sales and small business activities.

Three percent of the households were characterised as **small business owners**, receiving nearly all of their income from this activity. Another 4% relied mostly on small businesses, complementing their income with crop sales and fishing. Only 19 households could be characterised by earning most of the household income through **skilled work**, supplemented by contributions from small businesses and fishing. However, 4% of the households earned most of their income from **regular salaries** and another 3% earned about half their income from salaries with the rest from crop sales and wage labour.

Only a few (2%) of the households earn most of their income (90%) from **remittances** while 7% are faming households that complement their income with wood sales and 'other' activities. Lastly, 4% of the households earned most of their income from **'other'** activities.

Profile	#	%	Contribution to annual income		
			First income	Second income	Third income
Farming households	280	27%	Sales of crops (90%)	Sales of livestock (5%)	
Daily wage labourers	103	10%	Daily wage labour (99%)		
Daily wage labourers complemented by agricultural production	114	11%	Daily wage labour (52%)	Sales of crops (41%)	
Livestock keepers	120	12%	Sales of livestock (39%)	Sales of animal products (38%)	Sales of crops (17%)
Fishermen	67	7%	Fishing (87%)	Sales of crops (8%)	
Fishermen complemented by agricultural production and small-scale business	41	4%	Fishing (51%)	Sales of crops (21%)	Small-scale business (8%)
Small-scale business owners	33	3%	Small-scale business (98%)		
Small-scale business owners complemented by agricultural production	37	4%	Small-scale business (57%)	Sales of crops (18%)	Fishing (5%)
Skilled workers	19	2%	Skilled labour (72%)	Small-scale business (8%)	Fishing (6%)
Employees with regular salaries	43	4%	Regular salary (96%)		
Employees with regular salaries complemented by agricultural production and daily wage labour	27	3%	Regular salary (55%)	Sales of crops (22%)	Daily wage labour (10%)
Remittances	22	2%	Remittances (90%)		
Farming households complemented by selling of wood or other activities	76	7%	Sales of crops (33%)	Sales of wood or firewood (17%)	Other (16%)
Household depending on other activities	46	4%	Other activities (88%)		

The profiles were then cross-tabulated with the five strata (see table below). The majority of households in **North Coast** are farmers (57%), while 11% engage in farming complemented by selling of woods and or other activities. Livestock keepers make up the third most important income profile (8%).

In **North Interior** farming households are the most abundant profile (43%), followed by daily wage earners who complement their income with agricultural production (16%). Again livestock keepers are the third most important group (11%). Focus group discussions in 10 communities of the North Interior tend to confirm quantitative data in terms of the major sources of household income. These discussions showed that there is

very little variation between women's and men's livelihood activities—implying that household labour is deployed equally for a fixed set of activities, mostly crop sales.

However, some nuanced differences emerge in terms of how women and men perceive the threats to their major income-earning strategy - essentially representing two facets of the same issue. In seven of the ten communities, men reported that the major constraint to crop sales was lack of technical assistance to help diversify production. In these same communities, women noted that the major constraint is the cost of crop sales - i.e., transport and transaction costs.

In **South Coast** most households are described as daily wage labourers (19%), daily wage labourers complemented by agricultural production (19%) or livestock keeping (19%) households. Sixteen percent are farming households. In the **South Interior** sample about 20% of the households were either farmers or daily wage labourers while another 15% were livestock keepers and 13% combined daily wage earning with farming. Findings from focus groups in nine selected communities within the South Interior also reported similar strategies, but revealed that these have changed over time.

Both men and women were asked to identify whether current livelihood strategies were similar to those utilised five years ago. In around half of the communities enumerated, women and men indicated that livestock sales and wage labour are gradually replacing crop sales as the most important livelihood activities.[3]

Reasons for this change include exposure to recurring floods and pest infestations in addition to declining soil fertility. Livestock rearing and wage labour, therefore, are more viable options for agriculture-based households. In these same communities, women pointed out that the gradual shifts also meant that food was increasingly being purchased or borrowed on credit rather than accessed through own production.

Finally in the **Littoral,** 28% were fishing households, while another 15% of the households complement fishing with farming and small businesses, and 10% are farmers that also engage in the sales of wood and 'other' activities.

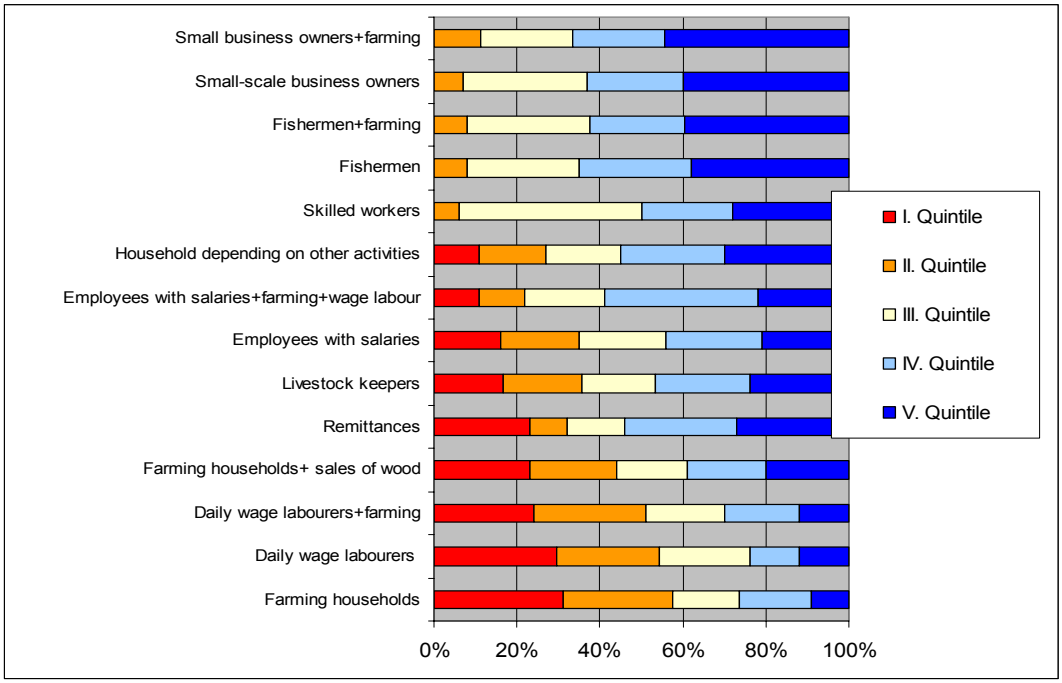
	Income profile by strata					
	North Coast	**North Interior**	**South Coast**	**South Interior**	**Littoral**	***Total***
Farming households	57%	43%	16%	19%	8%	***27%***
Daily wage labourers	0%	7%	19%	18%	5%	***10%***
Daily wage labourers complemented by agricultural production	6%	16%	19%	13%	3%	***11%***
Livestock keepers	8%	11%	19%	15%	7%	***12%***
Fishermen	1%	0%	0%	0%	28%	***7%***
Fishermen complemented by agricultural production and small-scale business	4%	0%	0%	0%	15%	***4%***
Small-scale business owners	1%	2%	4%	5%	3%	***3%***
Small-scale business owners complemented by agricultural production	0%	4%	5%	3%	6%	***4%***
Skilled workers	0%	1%	0%	4%	3%	***2%***
Employees with regular salaries	4%	3%	1%	7%	3%	***4%***
Employees with regular salaries complemented by agricultural production and daily wage labour	3%	4%	1%	3%	1%	***3%***
Remittances	1%	2%	0%	3%	3%	***2%***
Farming households complemented by selling of wood or other activities	11%	7%	11%	3%	10%	***7%***
Household depending on other activities	4%	2%	5%	6%	6%	***4%***

[3] These communities are: Jerusalen, Banderitas, Suba, El Ayote

The chart below illustrates the percentage of household per **expenditure quintile** for the different livelihood profiles. The first quintile refers to the bottom 20% households of the total per-capita expenditures (food and non-food), the second quintile to the following, etc.

According to the analysis, the profiles with the most households in the highest expenditure quintile are those combining small business activities with farming, small business owners, fishing and farming combined and fishermen households. Those with the highest percentage of households in the lowest expenditure quintile are those characterized as farming households, followed by daily wage labour households.

It should be noted that only cash expenditures and expenditures on credit were considered during the analysis, hence low shares of food expenditures can be misleading as they may indicate a high level of reliance on self-produced food crops and animal production. Therefore the same analysis was repeated for non-food expenditures only. The results are similar and confirm that faming and daily wage households have the highest shares in the lowest expenditure quintiles, while around 60% of the households engaged in fishing and small-scale business belong to the highest expenditure quintiles.



3.7.3 - Traditionally vulnerable household groups

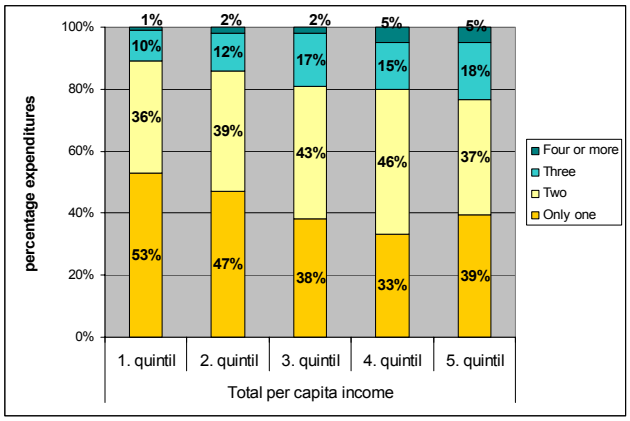
In terms of **sex of household head**, statistically significant differences can be found for

- Small business - Female headed households (10%) are significantly *(p < 0.001)* more likely to have this profile than households headed by men (2%).
- Salary from employer – Female headed households (10%) are significantly *(p < 0.001)* more likely to have this profile as compared to male-headed households (3%).
- Remittances - Female headed households are also significantly *(p < 0.05)* more likely to be described with this profile than those headed by men.

Elderly headed households (60 years and above) do not differ much from the rest of the sample, however, they are more likely to be engaged in livestock keeping *(p < 0.001)* and to rely on remittances *(p<0.01)*.

3.7.4 - Number of income sources

Since the households were able to name up to four source of income it was of interest to see how many households relied on just one source or up to four sources. The analysis shows that South Coast and Littoral sampled have more households with diverse sources of income. Around 30% of these households have at least four income sources. At the same time more than 40% of the households in the Northern strata rely only on one income source, increasing to 54% in the South Interior sample.



The most common income sources for households only naming one source are sales of crops in North Coast and in North Interior, daily wage labour in South Coast and South Interior and fishing in the Littoral. Diversification of income sources should be interpreted in the local context. In the Atlantic Coast of Nicaragua it generally seems that households with fewer sources of income are more vulnerable. There is a nearly linear negative relationship between expenditures and number of income sources as the graph on the left illustrates. The only exception is that 39% of households in the fifth quintile rely on only one activity, an indication that the sources of income for households also matters. Section 3.7.2 already showed that households relying on fishing or a permanent salary, for example, are more likely to belong to the better off groups.

3.7.5 - Income activities differentiated by sex and age

Respondents were asked which household members are involved in the main four income activities. As the contribution of each activity to the total income was known, the percentage of each group contributing to the household income could be estimated. On average, men (only) contribute to 54% of the total income, followed by adults with 22 percent. Women (only) contribute to 11% and all household members to 8% of the total income. Children alone do not contribute, however 4% of the income is generated through one adult that is helped by a child.

	% of income earned by household members					
	North Coast	**North Interior**	**South Coast**	**South Interior**	**Littoral**	**Total**
Only men	28%	54%	55%	60%	60%	***54%***
Only women	10%	8%	13%	15%	11%	***11%***
Adults only	46%	26%	15%	16%	16%	***22%***
Women and children	1%	3%	1%	1%	1%	***2%***
Men and children	5%	1%	0%	2%	5%	***2%***
All together	10%	8%	15%	6%	7%	***8%***

Generally it is more common that women and men work separately. However, in North Coast, 46% of the income is jointly generated by men and women. Children no not contribute much; however, 5% of the income in North Coast and the Littoral is generated by men supported by children. In South Coast 15% of the income is generated by all household members.

In terms of activity, men only are mostly engaged fishing, daily wage labour and skilled work, while women work in small scale businesses. Women also have a high share in sales of livestock and animal products, salaried work and other income activities such as sales of

Male income activities:
1) Sales of crops
2) Sales of livestock and animal products
3) Daily wage labour
4) Fishing

Female income activities:
1) Sales of crops
2) Sales of livestock and fishing
3) Sales of prepared foods
4) Paid domestic work

Source: Focus group discussions

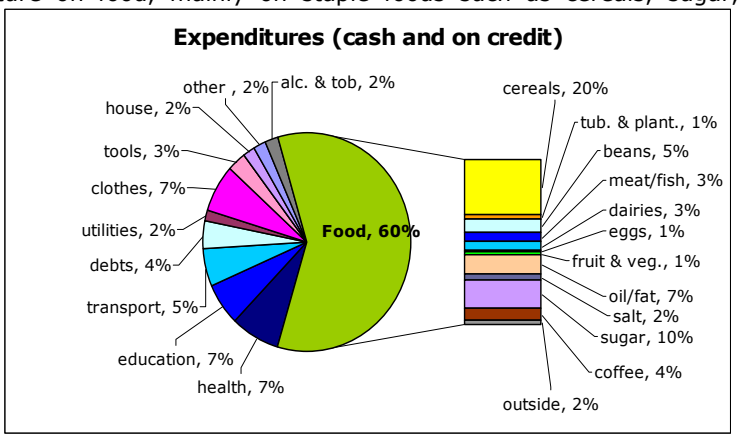
prepared foods and paid domestic labour (see box above which presents findings from the focus group discussions). All household members are mainly involved in crop production and micro-business. Children support men with fishing and women in their micro-businesses.

Section 3.8 – Household expenditures

Data on expenditure for food and non-food items, such as education, health transport, etc. are collected to understand how household decision-makers prioritize expenditures, especially when funds are limited. Monthly food and non-food expenditures can also serve as proxy indicators of household foods access, however care must be taken in interpreting outputs from food expenditures analyses due to the fact that some households may have lower share food expenditures simply because they rely on their own production. Similarly better off households may spend a high proportion on costly food items, which increases the percentage they spend on food. The analysis took into account cash expenditures and in-kind expenditures such as credit and barter. The latter was of were not commonly used by sample households and thus are not included in the analysis.

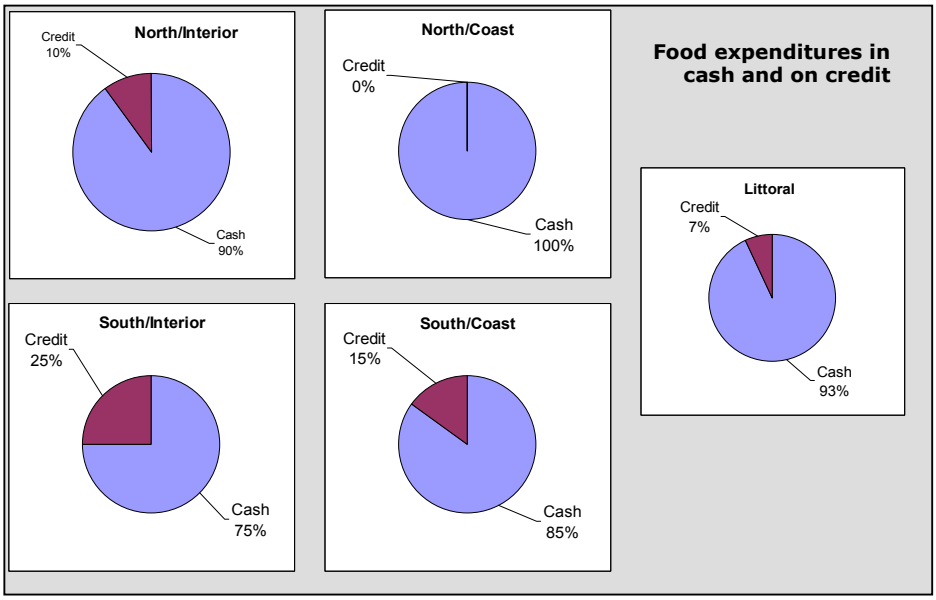
3.8.1 – Food and non-food expenditure shares

The graph on the right illustrates that on average the sample of households allocated 60% of their monthly expenditure on food, mainly on staple foods such as cereals, sugar, oil/fats, and beans. Relatively small proportions are spent on fresh foods, such as meat/fish, dairies, fruits and vegetables. The highest share of non-food expenditures are for basic needs such as health (7%), education (7%), clothes (7%) and transport (5%). There are hardly any variations in terms of expenditure allocation between strata therefore it was decided to differentiate between food expenditures in cash and on credit.



3.8.2 – Food expenditures in cash and on credit

When differentiating between expenditures in cash and on credit, variations between the five strata are remarkable (see charts below). Buying food on credit is often used as a day to day strategy to ensure that immediate basic needs are met. In North Coast none of the household reported to have used credit. Generally more households in the South used this strategy, particularly in South Interior, where 25% of all foods were purchased on credit.

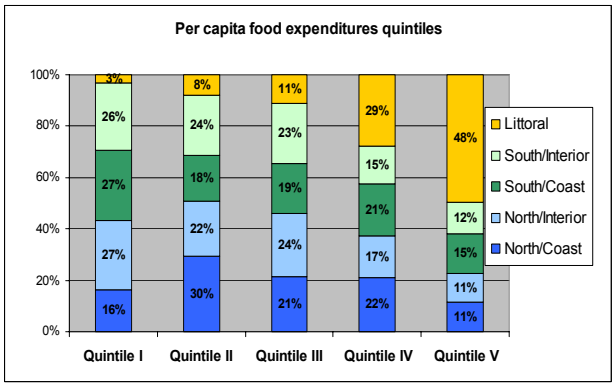


3.8.3 – Absolute expenditures and quintiles

	Per capita food (COR)	Per capita non-food (COR)	Per capita total (COR)
North Coast	135	153	289
North Interior	**125**	116	**241**
South Coast	150	166	317
South Interior	**128**	152	280
Littoral	**271**	**238**	**510**
Total	**163**	**162**	**326**

Absolute expenditures provide an indication of household cash availability. The constraint is that households often over- or underestimate their expenses, hence values are only relative and illustrate trends. Households in the Littoral had far higher food, non-food and total expenditures per capita than all other zones. These differences are statistically significant *($p<0.001$)*. Differences between the other strata are not as apparent; however, households in the North Interior and South Interior samples spent the least, particularly on food.

Given the constraints indicated above with regard to the interpretation of proportions as well as absolute values, figures should be treated in relative rather than in absolute terms. Therefore per capita food and non-food expenditures were aggregated into quintiles. Analysis by quintiles yields a relative measure of the cash availability at the household level that can be compared across households. The first quintile refers to the bottom 20% households in terms of per capita expenditures, the second quintile to the following 20%, etc.



The chart on the left presents the per capita food expenditure quintiles cross-tabulated with the strata. Nearly half of the households in the highest expenditure quintile are from the Littoral sample. The lowest expenditure quintile is mostly comprised of households from South Interior, South Coast and North Interior, while 30% of the second expenditure quintile is made of households from the North Coast sample.

The analysis on per capita non-food expenditures reveals a similar trend. However differences particularly within the highest expenditure quintile are not as evident as within the food expenditure quintiles.

3.8.4 – Expenditures and livelihood profiles

The table below provides an overview on (1) food expenditures versus non-food expenditures (absolute values), (2) food expenditures as percentage in total expenditures, (3) food expenditures on credit as percentage in total food expenditures, and (4) expenditures on staple foods (cereals, tubers, plantains, beans, oil, sugar, salt) as percentage in total food expenditures, all differentiated by livelihood profile.

	Per capita total (COR)	Per capita non-food (COR)	% food/total	% food on credit/total	% staple food/total food
Farming households	**126**	**104**	**64%**	**7%**	**79%**
Daily wage labourers	**125**	**116**	**65%**	**31%**	**81%**
Daily wage labourers complemented by agricultural production	**126**	**138**	57%	**21%**	76%
Employees with regular salaries	201	122	**72%**	12%	**68%**
Farming households complemented by selling of wood and other activities	149	182	**56%**	14%	**79%**
Livestock keepers	133	**234**	**51%**	11%	77%
Employees with regular salaries complemented by agricultural production and daily wage labour	189	186	57%	11%	**69%**
Households depending on other sources	206	177	59%	11%	**79%**
Remittances	208	200	63%	**2%**	73%
Fishermen complemented by agricultural production and small-scale business	**260**	167	**64%**	**7%**	73%
Skilled workers	211	**266**	58%	18%	**69%**
Fishermen	**260**	**234**	61%	**4%**	71%
Small-scale business owners complemented by agricultural production	**267**	**269**	57%	17%	71%
Small-scale business owners	**274**	**286**	**56%**	10%	71%

Households relying on **farming** and **daily wage labour** as their main income source have the lowest expenditures in absolute terms, both with regard to food and non-food expenditures. Both groups spend high proportions of their total expenditures on food and within the food class on staple foods, an indication that their diet is not very diversified. Comparing the two profiles, the daily wage labourers are worse off because they have less opportunity to supplement their diet with self produced food unless they are remunerated in-kind as agricultural workers. They are also the group that purchases food on credit more than any other group (31%). If household engage in both agricultural production and daily wage labour activities, they are slightly better off; however, also this group has high purchases on credit.

Employees with regular salaries are only slightly better off. They spend 72% of their total expenditures on food. Generally food expenditures increase as a percentage of total expenditure until food needs are met before they fall. They spend less on staple foods, an indication that they manage to purchase slightly more quality and costly foods compared to the twp groups above.

Livestock keepers have absolute expenditures at a medium level, however, they also spend the lowest percent on food and here more on staple foods, an indication that they complement their diet with own produced goods (e.g. milk & eggs).

Households that engage in small-scale businesses and fishing in various combinations have the highest expenditure. **Fishermen**, for example have high food and non-food expenditures, allocating over 60% of total expenditure on food. However, within this category they spend a high percentage on non-staples, most likely specialty items or more costly foods. They have the least use of credit, another indicator that demonstrates their higher cash availability. Households that complement this activity with agricultural production and small-scale businesses show a similar pattern, however, have less non-food expenditures.

Best off are the **small-scale business owners** with very high per capita expenditures, more than double compared to the households relying on farming and daily wage labour for income. They have low shares on staple foods and food expenditures in general, however, spend more on credit which could be also related to their work as micro-business owners.

Section 3.9 – Shocks and coping strategies

Shocks are defined as an event that has negative consequences for individuals, households, or communities. They can be of natural, economic, political, or social nature. The present analysis differentiates between **covariate** and **idiosyncratic** shocks. Covariate refers to shocks that affect a number of households, whole communities or geographic defined areas such as natural disasters or insecurity. Idiosyncratic shocks affect individual households, such as loss of employment or illness/death of a household member.

Risk is defined as the likelihood of a particular shock to occur. For example, communities in earthquake-prone areas are at greater risk of experiencing an earthquake.

Coping strategies are defined as the ways a community, household, or individual adjusts their livelihood strategies in response to a shock or risk. Coping strategies may involve changing diet habits by consuming less expensive foods. They may also involve the use of savings, either in the form of money, or in the sale of assets. When normal coping strategies are exhausted, households will use negative crisis strategies, such as selling productive assets (e.g. female livestock) or decreasing the number of meals eaten. Repeated shocks and the use of crisis strategies to manage their effects can lead to increased vulnerability and a decrease in food security at the individual, household, community, and national level.

For the survey households were asked if they had experienced one or more of 8 covariate and 7 idiosyncratic shocks in the past 12 months. They were then requested to rank the four most important shocks according to their level of impact. For each reported shock they were requested to report the impact the shock had on the household in terms of loss of income, loss of assets or a combination of the two. Subsequently, they were asked which coping strategies were employed to manage the shock, and if the household had recovered from the effects of the shock.

It should be noted that reported shocks and impacts are subject to the perception of the respondent; in other words what one household might perceive as a shock might not be reported by the next even though it experienced worse adverse effects. In this sense the household data can depict trends but figures are only indicative.

		North Coast	North Interior	South Coast	South Interior	Littoral	*Total*
No shock		6%	17%	40%	42%	32%	***28%***
Covariate shocks	Crop pests, loss of harvest	64%	57%	28%	26%	18%	***37%***
	Flood, strong rainfalls, hurricanes	48%	27%	18%	12%	16%	***21%***
	Drought	36%	30%	9%	9%	10%	***18%***
	Diseases of animals	22%	13%	13%	12%	9%	***13%***
	Insecurity	8%	7%	3%	4%	7%	***6%***
	Bushfire	12%	2%	1%	0%	2%	***2%***
	Environmental degradation/erosion	1%	2%	1%	1%	0%	***1%***
	Seismic events	4%	1%	0%	0%	1%	***1%***
Idio-syncratic shocks	Theft of harvest	35%	19%	5%	6%	16%	***15%***
	Theft of animals	21%	9%	6%	12%	13%	***12%***
	Illness or accident of household member	4%	10%	9%	15%	14%	***12%***
	Death of a household member	3%	2%	5%	4%	5%	***4%***
	Loss of employment	3%	4%	0%	1%	3%	***3%***
	Domestic violence	7%	1%	0%	1%	1%	***2%***
	Loss of salary/income	1%	0%	1%	1%	0%	***0%***

As outlined in the table above, a larger proportion of the households in the two northern strata had experienced at least one shock during the past 12 months (North Coast 94%, North Interior 83%) compared to around 60% in the Southern strata and nearly 70% in the Littoral. In the overall sample, covariate shocks were experienced more often than idiosyncratic shocks.

In addition to findings from the household survey, exposure to shocks and coping with their effects were also investigated in 65 focus group discussions with men and women in selected communities within the overall sample. Participants were asked three sets of questions related to risk exposure and response. The first set focused on the shocks that had occurred in the last 3 years (2002-2005) and which shocks the participants felt were most significant in terms of their negative effects on their communities. The second round of questions inquired of the effects of these shocks on the community and the final set on how affected households responded to the negative effects.

3.9.1 - Covariate shocks

Covariate shocks are those such as natural hazards or epidemics that can possibly affect an entire community. The most frequently reported covariate shock was **crop pests/loss of harvest**, particular in the two northern strata (64% and 57% respectively) which is interesting because it is the area that is highly characterized by agricultural production as one the main livelihoods activities. In the Littoral fewer households were affected by these shocks, mostly because there are fewer farmers.

Pest infestations were also reported in the focus group discussions within communities belonging to these same strata. However, in the North Interior, household data mask an important issue: men and women reported loss of crops due to pests over the course of *three consecutive years (i.e., 2002-2005)*. Participants in focus groups in the South Interior also reported that pest infestations were the most prominent shock their communities had faced for the same recall period.

Floods, strong rainfall and **hurricanes** were reported by about 20% of the sample households but in the North Coast sample, an area prone to flooding and strong rainfalls during the hurricane season was particularly affected (48%). The Northern strata also seem to be more prone to recurrent **droughts** (36% and 30%) compared to the South (9% only). **Animal diseases** rank fourth in the overall sample but were also reported more often by households in the North Coast. **Insecurity** was reported by 3% to 8% of the households, slightly more in the Littoral and North than the South.

Outbreaks of **bushfires** were reported by 12% of sample households in North Coast, while in the other strata they were hardly reported. Traditionally small fires are lit to clean the ground before the next planting season. On occasion they get out of control and destroy larger areas than originally intended. **Environmental degradation/soil erosion** and **seismic events** were hardly ever reported by households in this region.

3.9.2 - Idiosyncratic shocks

Idiosyncratic shocks are those that do not directly affect all members of a community but rather are likely to affect individual households within a community. These types of shocks were reported less often than covariate shocks however idiosyncratic shocks often have more severe impacts for affected households. Almost 40% of the sampled households reported at least one **idiosyncratic shock**, ranging from 25% in the South Coast to 57% in the North Coast. In total 15% of households were affected by **theft of harvest** (15%) with the highest reported in North Coast (35%), followed by **theft of animals** (12%) and **illnesses/accident of household members** (12%).

According to the survey results, theft of harvest has a greater impact in the Northern strata while illness, accident or death of an active family member was more common in the Southern strata. Again, findings from focus groups help explain some of the contextual information behind household data. Illness among children - especially malaria, cholera and influenza - was reported in around two thirds of all focus groups for the North Interior, South Coast and South Interior combined. Women, in particular, were three times as likely as men to report illness among children as a major shock - albeit an idiosyncratic one.

This being said, for the recall period 2002-2005, reported illnesses coincided with reports of flooding or heavy rainfall. In other word, illnesses among children were reported as resulting from poor sanitary conditions that followed annual flooding.

3.9.3 - Impacts

Households in the interior strata were more likely to report that the shock had an impact on their income levels or asset base. Only 11% in North Interior and 17% in South Interior reported that the shock had no impact compared to 20% in the North Coast, 23% in South Coast and 24% in the Littoral samples. North Coast, North Interior and South Coast reported the loss of income more frequently, while in the South Interior and Littoral the loss of assets was equally important to the loss if income.

Across most strata the majority of households reported that the shocks had an impact on their household food security, however in the Littoral only three out of four households reported that the shock had an impact on their household food security.

Floods, droughts, theft of harvest and illness/accident of household members were more likely to cause a loss of income, while theft of animals and animal diseases were likely to cause a loss of the assets base. In terms of impact on household food security, droughts, floods, the theft of harvest and crop pest were perceived to have the highest negative impact.

3.9.4 - Coping strategies

More than 50% of the households in the sample reported that they did not apply a coping strategy to manage the shocks. This could be due to a couple of reasons: first, the negative impacts were not perceived to be grave enough to make the use of a coping strategy necessary; second, households already depleted most of their reserves and were not able to provide any further response to recurrent risks and shocks.

The greatest percentage of households that did not report the use of any coping strategies was found in the Littoral (61%). As this is the group with the largest asset base and income earning opportunities the assumption could be made that the impacts were not as strong as in the other four strata.

The most common reported coping strategies in the overall sample were the **reduction of quantity of diet** (17%) and **finding temporary work** (17%). Both strategies were more commonly used among households in the Northern strata, temporary work particularly in North Interior (see table below). Households in North Coast are more likely to have **modified their diet** with less preferred foods and **reducing the numbers of meals** consumed, which reflect the facts that this is the group that is mostly affected by recurrent shocks such as flooding and droughts. This area is also characterized by a large number of households **relying on help from others**, an indication that these communities have a stronger social organization and collective identity.

Coping strategies	North Coast	North Interior	South Coast	South Interior	Littoral	*Total*
Modified the diet	**19%**	4%	2%	7%	2%	***6%***
Reduction food quantity	**24%**	**23%**	8%	14%	9%	***17%***
Reduction number of meals	**12%**	7%	8%	2%	4%	***6%***
Reduction of non-food expenditures	0%	1%	6%	0%	1%	***1%***
Use of Savings	1%	1%	**13%**	3%	1%	***2%***
Loan from friends/family	0%	4%	0%	4%	3%	***3%***
Buy food on credit	5%	2%	2%	4%	6%	***4%***
Receive help from others	**15%**	9%	10%	7%	7%	***9%***
Sale of livestock	8%	5%	**27%**	**11%**	3%	***8%***
Temporary work	**18%**	**25%**	10%	12%	10%	***17%***
Small business	3%	0%	4%	3%	4%	***2%***
Begging	0%	0%	0%	1%	6%	***1%***
No strategy	**52%**	**54%**	**40%**	**47%**	**61%**	***53%***

Livestock sales were more often reported in the Southern strata, particularly in South Coast, which makes sense since many of those families rely on livestock raising activities. The South Coast sample is also characterized by a higher amount of households using their **savings** to mitigate shocks, an indication that some of the households have a higher resilience to shocks due to their financial reserves.

3.9.5 - Recovery

The respondents were asked if the households recovered from the shock(s). The results indicate that in general the households in the Northern regions have more difficulties in recovering from the shocks than the households in the Southern regions and the Littoral. The highest number of households which had recovered totally from the shock can be found in the Littoral (22%), followed by the South Coast (27%), and South Interior (17%). In the North Interior and North Coast only 11% had recovered totally from the shocks.

3.9.6 - Prevention strategies

The households were also asked about if and what kind of prevention strategy they had employed to mitigate similar and risks and shocks in the future. More than half did not report having employed any kind of prevention strategy with more found in the Littoral (62%) sample. There is a correlation between those households not applying a coping strategy and those not adopting a prevention strategy - 73% of the household not applying a coping strategy also did not adopt a prevention strategy. There is a stronger likelihood of households in the coastal areas to adopt prevention strategies compared to the interior strata.

The most frequently reported prevention strategy mentioned by the households in the overall sample was to diversify livelihoods/look for work (26%), followed by crop diversification (9%) and increasing the agricultural area used for cultivation (7%). Nevertheless, some of the prevention strategies adopted by households differed across strata.

Diversification of livelihood opportunities was more mentioned by the Northern two strata. They were also more also likely to refer to agricultural related activities such as **expansion of the agricultural area cultivated** and **diversification of crops**, which corresponds with the finding that these households on average cultivate a higher number of various types of crops (see Section 3.6.3). South Coast is characterized by a large number of households **raising small livestock**, while South Interior generally employs less prevention strategies.

Prevention strategies	**North Coast**	**North Interior**	**South Coast**	**South Interior**	**Littoral**	***Total***
Move dwelling	3%	1%	0%	1%	1%	***1%***
Diversify crops	**24%**	9%	6%	6%	6%	***9%***
Raising of small livestock	9%	3%	**13%**	3%	1%	***4%***
Learning new skills	3%	1%	4%	5%	2%	***3%***
Self organization	1%	7%	6%	2%	9%	***5%***
Increase agricultural areas	**16%**	**12%**	4%	1%	1%	***7%***
Save money	4%	5%	4%	3%	3%	***4%***
Look for work	**34%**	**33%**	23%	21%	17%	***26%***
Family planning	0%	4%	8%	5%	5%	***4%***
No prevention strategy	**45%**	**53%**	**48%**	**59%**	**62%**	***55%***

The data from the survey suggest that a greater percentage of households in the two Northern strata (22-34%) utilized two or more prevention strategies as compared to the South Interior and the Littoral (6-7%).

Section 3.10 - Self-organization and external assistance

Key informants in the communities were asked about the existence of community organizations and committees[4] as well as the presence of external organizations and type of programmes offered by them. The existence of formal and informal networks is an important indication of the social capital in the communities. It is also an important element in the capacity of the communities to access other institutions and influence decision-makers.

The most common types of committees in the overall sample are religious (76% of the communities) and school committees (73%), followed by development (65%), women (51%) and health committees (48%). Nevertheless, some differences can be observed across strata. In the Northern strata, the communities in general have a larger number of committees than in the Southern and Littoral strata. The high level of existing community organization and structures should be taking into consideration when planning development, rehabilitation and emergency interventions in the zones. The strengthening of community organizations is a way of increasing the social capital in the communities. It should be noted that a larger percentage of the communities in the North Coast have an emergency committee than in the rest of the strata, which is a positive indication, given the more frequent exposure to natural hazards such as flooding in this zone.

Type of committee	North Coast	North Interior	South Coast	South Interior	Littoral	Total
Development	44%	**71%**	38%	63%	**76%**	**65%**
Women's	**89%**	**58%**	25%	40%	52%	**51%**
Youth	**56%**	19%	13%	27%	**40%**	29%
Food	**56%**	26%	0%	**40%**	4%	25%
Emergency	**44%**	13%	0%	17%	8%	15%
Religious	67%	**81%**	**88%**	73%	72%	**76%**
Health	44%	**55%**	25%	**50%**	44%	**48%**
Water	22%	**29%**	13%	**30%**	0%	20%
School	67%	68%	50%	**93%**	64%	**73%**

The nature of external assistance including government assistance to the communities was also investigated through key informants. In the overall sample, almost half of the communities had programmes relating to education, whereas only one out of five had agricultural programmes and programmes dealing with health.

In the North Coast, education and food programmes are more common than in the other strata, which probably is due to the presence of WFP school feeding programmes in the area. It is worth noting that despite the importance of agriculture in especially the Northern strata, none of the communities in the North Coast and only 25% in the North Interior had benefited from agricultural assistance programmes. Furthermore, less than 10% of the communities in the Southern strata had received assistance related to livestock breeding, although it is one of the most important income generating activities in these areas. Of all the strata, only in the South Coast, a few communities (20%) had benefited from a credit programme. Only very few communities (4%) in the overall sample reported income-generating programmes and none of the communities had received assistance related to fishing.

[4] It should be noted that only the quantifiable side community organizations were investigated and neither their functioning nor their quality.

External assistance	North Coast	North Interior	South Coast	South Interior	Littoral	Total
Agriculture	0%	**25%**	**33%**	8%	**26%**	20%
Livestock	0%	**10%**	7%	8%	**10%**	8%
Education	**71%**	43%	13%	**50%**	39%	44%
Women's	5%	5%	0%	**8%**	0%	4%
Health	**24%**	17%	13%	19%	16%	18%
Nutrition	0%	8%	0%	19%	3%	7%
Food	**62%**	39%	0%	**54%**	16%	36%
Income generation	5%	5%	0%	**8%**	3%	4%
Conservation	**10%**	1%	**13%**	**12%**	**10%**	6%
Credit	0%	1%	**20%**	0%	6%	3%
Fishing	0%	0%	0%	0%	0%	0%

According to the results of the study more women than men are benefiting from the external assistance. With regard to education, health, nutrition, food and income-generating programmes, more women are beneficiaries, whereas more men than women are benefiting from programmes related to agriculture, soil conservation and livestock breeding.

In order to identify possible counterparts for external intervention, the key informants were asked to name the organizations working in the communities. WFP is the organization with the greatest presence in the regions, especially in the RAAN, as they were mentioned in more than half of the communities in the overall sample. Both Painin-Alistar and FISE were present in around one-fifth of the communities in the overall sample, although also especially in the RAAN. Acción Medica Cristiana and FADCANIC were present in only about one-tenth of the communities in the overall sample although the former only in the Northern strata and the Littoral and the latter only in the Southern strata and the Littoral. The rest of the organizations have very limited coverage in the regions.

Part IV: Women and child nutrition and health

Section 4.1 - Women's nutrition and health

Main findings of the household survey for nutrition and health of women of reproductive age (15-49 years) are presented in the following section. The data in this chapter is presented subdivided into the four original strata. For consistency with the other chapters, results of the main indicators are also presented in Section 4.3, integrating the Littoral stratum. Data tables with the complete results of the analysis are found in Annex II of the report.

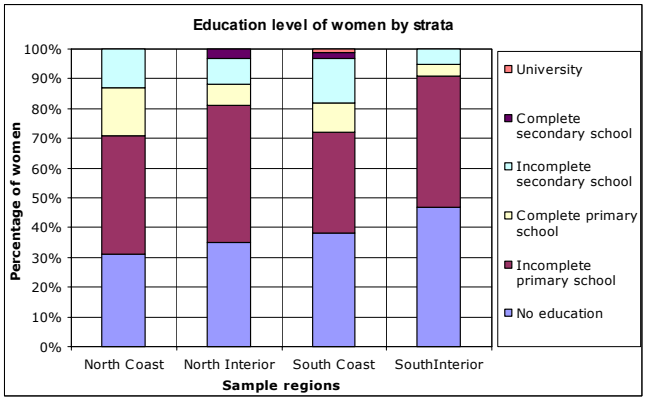
4.1.1 - Methodology and sampling

During the household survey, information on reproductive history, education, health and hygiene were collected from more than 816 women in the two Atlantic regions of Nicaragua. There were 148 women in the North Coastal sample, 254 in North Interior, 184 in South Coastal and 230 in the South Interior samples.

Much of the data are analysed and presented by age group in order to capture trends among the cohorts of women. Women of reproductive age are traditionally grouped into 5 age categories – these categories and the percentage of total sample are: 15-19 years (7.1%), 20-24 years (22.2%), 25-29 years (19.4%), 30-39 years (30.8%) and 40-49 years (20.6%). Additionally, 125 women aged 50 years and older had been questioned.

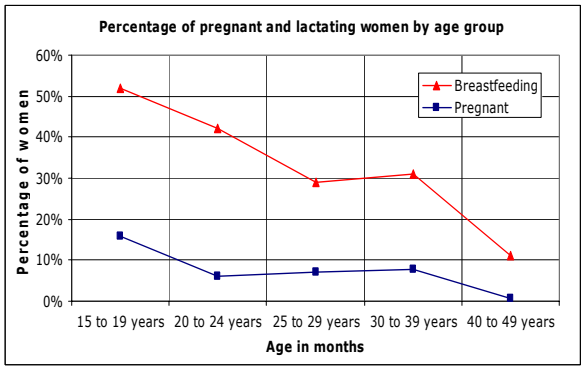
4.1.2 - Education

Of the women in the sample, 38% reported they had no formal education and an additional 42% had attended but not completed primary school. Only 8% had completed primary school, while 10% had attended secondary school but with only 2% completing their secondary education. Three women had gone to university. The chart on the right shows the percentage of women according to education level, by region. Overall, the women in North Coastal region had the highest levels of education with 29% completing primary school and/or attending secondary school. On the low end, nearly half the women from the South Interior had not even attended school.



4.1.3 - Current pregnancy and lactation

At the time of the survey (Jan-Mar 2005), 6% of the women interviewed were pregnant with about one quarter in their first trimester, another quarter in the second trimester and the rest in the third. The graph on the left shows that by age group, 15% of the women 15-19 years old in the sample were pregnant as compared to 1% in the 40-49 years group. Between 6-8% of the women in the other age groups were pregnant at the time of the survey. By region just over 10% of the women in the North Coast sample were pregnant while only about 5% of the women were pregnant in the remaining samples.



A total of 30% of the mothers were breastfeeding at the time of the survey – 37% in the North Interior, 35% in the North Coast, and 24% in the South Interior and South Coast area. According to the above chart, 52% of the women aged 15-19 years were breastfeeding at the time of the survey. This percentage decreases with age group, flattening out at around 30% in women aged 25 to 39 years, after which it drops down to only 11% of the 40-49 year old sample women. Overall, two-thirds of the women in the sample were either pregnant or lactating at the time of the survey.

4.1.4 - Pregnancy history and number of children

For the women in the sample, the average age was 31 years and the median age was 30 years. The women reported a median number of 4 pregnancies and 4 children. Sixteen percent of the women had at least one miscarriage or abortion, ranging from 9% in women 20 to 24 years of age, to 23% of the women in the 30-39 year age group. By region, the percentage of women experiencing a miscarriage or abortion was lowest in the North Interior (11%) and 17-18% in the other areas.

The women were asked to remember how old they were when they had their first child. The average age was 19 years for the sample. More than half of the women had their first child before they turned 18 years and nearly 90% have given birth by the time they turned 21 years. The average age at the first child increases with education level – for women with no education, the average age at first live birth was 17.0 years as compared to 18.7 years for women with incomplete secondary education *($p < 0.001$)* and 20.3 years for those with completed secondary education *($p < 0.01$)*.

4.15 – Antenatal care

For each child less than five years of age, the mothers were asked to provide information on their use of antenatal care prior to delivery. For the analysis, 'skilled' antenatal care was defined as at least one visit to a doctor, nurse or midwife. Friends or relatives were not regarded as 'skilled' professionals with regards to antenatal care. More than 70% of the children in the sample had received skilled antenatal care while in the womb. However, there were significant differences between regions – 84% of the recent pregnancies in the North Coast sample had received skilled antenatal care, which is significantly higher than the 72% in the South Coast sample *($p < 0.05$)* and the 64% in South Interior *($p < 0.001$)*. Nearly 80% of the pregnancies in the North Interior sample had received skilled antenatal care, which was significantly higher *($p < 0.001$)* than the South Interior sample.

The likelihood of receiving skilled antenatal care increased with increased education levels of the women in the sample. All of the pregnancies in women who had completed their secondary education had received skilled antenatal care as compared to more than 85% of those among women who had completed primary school and/or attended secondary school. Around three-quarters of the pregnancies in women with incomplete primary school had received skilled antenatal care as compared to only 68% of those in women with no education. These differences were significantly different between women with no education and those who had completed primary or more.

4.16 – Night blindness and vitamin A supplementation

The survey investigated deficiencies of vitamin A at the individual and household levels. Vitamin A is an essential micronutrient for child growth and development, immune function, epithelial cellular integrity and eyesight. It is a fat-soluble vitamin and adequate stores can satisfy the body's needs for up to six months.

Vitamin A deficiency (VAD) in women can be clinically diagnosed through symptoms of night blindness, spots or scars on the eye. The mothers of children under five in the survey were asked if they had experienced night blindness (difficulty seeing at dusk) during their most recent pregnancy. From the sample, 0.7% *(95% CI: 0.2, 1.2)* had suffered night blindness with a high of 1.3% *(95% CI: 0, 2.7)* in the South Coast sample to a low of 0.4% *(95% CI: 0, 1.1)* in the South Interior sample. The International Vitamin A Consultative Group (IVACG) recommends that a maternal night blindness prevalence of greater than 5% as a cut-off at which vitamin A deficiency may be considered to be a problem of public health significance within the community. Hence, vitamin A deficiency, as indicated by the prevalence of maternal night blindness is not a public health problem in the survey area.

For **vitamin A supplementation**, the women were asked if they had received a high dose capsule of vitamin A after their most recent delivery. These capsules are not only given to boost levels of vitamin A in the mother but also to ensure that she passes on the benefits of vitamin A to her newborn child through her breast milk while the child's immune system is developing. Only 28% of the women in the sample had received this vitamin A supplementation with the highest found in North Coast sample (39%) while only around one-quarter in the other three regional samples had been supplemented. The difference between North Coast and North Interior were statistically significant *($p < 0.05$)*.

4.17 - Birth size & low birth weight

According to the ACC/SCN, Intrauterine Growth Retardation (IUGR) refers to foetal growth that has been constrained by inadequate nutritional environment *in utero* and is a characteristic of a newborn that has not attained its growth potential. There are two main types of IUGR: Group 1 are those born after at least 37 weeks of gestation and weigh less than 2,500 grams; Group 2 are those born prematurely and weigh less than the 10th percentile at birth (2,500 grams).

In most developing countries, it is difficult to determine gestational age so low birth weight (< 2500 grams) is used as a proxy for IUGR. Research shows that in 2000, 11% of newborns in developing countries had low birth weight at term.

Inadequate maternal nutritional status before conception, short maternal stature, and poor maternal nutrition during pregnancy (low gestational weight gain primarily due to inadequate dietary intake), but also diarrhoeal diseases, intestinal parasites, respiratory infections and malaria are causes of IUGR. Low birth weight (< 2500 g) is used as a proxy for IUGR. The underlying and more basic causes relate to the care of women, access to and quality of health services, environmental hygiene and sanitation, household food security, educational status and poverty.

In order to estimate incidence of low birth weight among children in the survey sample, the mothers where asked about the size of their child at birth. The child could be classified as: very large, larger than normal, normal, smaller than normal, or very small, with smaller than normal and very small regarded an indication for low birth weight. Overall, 17% were reported to be larger than normal or very large, 64% normal, 9% smaller than normal and 10% very small.

By region, there were generally more children in RAAS who were described as being smaller than normal or very small at birth: 21% in South Coast and 23% in South Interior. Around 15% of the children born in North Coast and North Interior were low birth weight.

With the sample data, several analyses were conducted to see the relationships between potential causes of low birth weight (maternal health and use of skilled antenatal care) and some of the negative effects of being born malnourished. Results of the ***causal*** analysis show that:

- Mothers of low birth weight babies were significantly ($p < 0.05$) less likely to have received skilled antenatal care during their pregnancies.
- Mothers of low birth weight babies were more likely to have very low or no levels of education.

Analysis of some ***outcome*** indicators shows that:

- Children who were described as being very small or smaller than normal at birth are significantly *($p < 0.001$)* more likely to be underweight and/or stunted at the time of the survey but not more likely to be wasted.
- Low birth weight children are more likely to suffer from fever, cough and ARI but not significantly.
- Low birth weight children are significantly more likely *($p < 0.05$)* to suffer from diarrhoea than those children of normal birth weight.

4.18 – Recent illness in women

The women in the sample were asked if they had experienced an episode of diarrhoea or fever in the two weeks prior to the survey. Overall, 10% of the women had at least one episode of diarrhoea, ranging from lows of 4% in the South Interior and 7% in the South

Coast samples, to highs in the North Interior (12%) and North Coast samples (16%). The difference between the North Coast sample and the two southern samples was statistically significant *(NC/SC: $p < 0.05$; NC/SI: $p < 0.001$)*.

Recent fever (non-specific) was reported by 21% of the women in the sample with the highest being 26% in the North Coast, followed by North Interior (24%), South Interior (19%) and South Coast (14%). The difference between North Coast and South Coast was statistically significant *($p < 0.01$)*.

Overall, only 7% of the women had experienced both illnesses in the two weeks prior to the survey. Again the highest prevalence of both illness was found in women from the North Coast sample (15%), followed by North Interior (8%), South Coast (3%) and South Interior (2%). The difference between North Coast and the two southern samples was statistically significant *(NC/SC: $p < 0.01$; NC/SI: $p < 0.001$)*.

4.19 – Hand washing knowledge

During the household interview, women were asked about appropriate hand washing practices for women who are caring for young children. The situations included:

- Before food preparation
- After using the toilet
- After taking out the garbage
- After changing diapers
- Before eating

More than 70% of the women noted that hands should be washed before food preparation, after using the toilet and before eating. However, only 17% said that hands should be washed after changing diapers or after taking out the garbage.

By region, 84% of the women in the North Coast sample believed that hands should be washed **before food preparation**, followed by North Interior (80%), South Coast (71%) and South Interior (66%). Similarly, more than 77% of the women in the northern samples believed correctly that hands should be washed **before eating**, as compared to only 73% in South Interior and 60% in South Coast samples. Lastly, three-quarters of the women in the South Coast sample believed that women should wash their hands **after defecation**, which was higher than the 65-70% of women in the other samples. Overall, more than three-quarters of the women in the southern samples could correctly name at least two different occasions when hands should be washed and around 90% in the northern samples. By age group, the percentage of women who could correctly name at least 2 different occasions when hands should be washed was 79% in the 15-19 years age group and slightly increases with age to 86% in the women 40 to 49 years of age.

Section 4.2 – Child nutrition and health

Main findings of the household survey for child nutrition and health are presented in the following section. The data in this chapter is presented by the four sampled strata. For consistency with the other chapters, results of the main indicators are also presented in Section 4.3, integrating the Littoral stratum. Data tables with the complete results of the analysis are found in Annex II of the report.

4.2.1 – Methodology and sampling

The planning team decided that households would be randomly sampled since there were great distances between them. The assumption was that almost all would have at least one woman of reproductive age (15 to 49 years) to be included in the women's health section of the household questionnaire. If the household had more than one woman of reproductive age, then the woman with children under five years of age was selected and all of her children (0-59 months) were included in the child health and nutrition section of the questionnaire.

The age of children was determined by asking the mother for the date of birth and when possible, verifying the birth date on the child's vaccination card. If it was not known, the enumerator worked with the mother to estimate the age of the child in months. Each team had a member who had been trained and was responsible for weighing and

measuring the children. The children were weighed using SALTER scales with weights reported up to 100 grams. Their length/height was measured using locally made measuring boards, designed to measure to 1/10th of a centimetre.

In total, more than 1,030 children were weighed and measured in the four regions with the analysis including 197 from North Coast, 321 from North Interior, 238 from South Coast and 273 from the South Interior samples. Although the sample sizes for anthropometry by region vary, the use of random sampling rather than cluster sampling reduces the design effect, allowing relative comparisons to be made between the zones while allowing the final estimates of malnutrition to be representative of the areas included in the four regional samples.

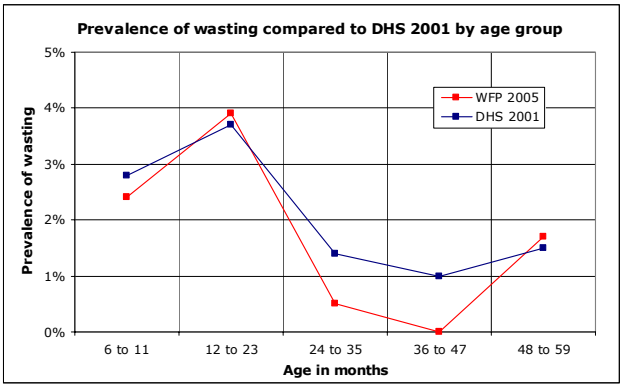
4.2.2 – Comparison to the 2001 Nicaragua Demographic and Health Survey (NDHS)

The results of the nutritional outcomes of the 2005 Food Security and Livelihoods survey are presented below and compared to the findings of the 2001 NDHS. The results of the survey represent only rural communities in RAAN and RAAS.

For the survey areas, the prevalence of the various types of malnutrition in children was lower to those found in rural areas in the 2001 Nicaragua DHS. However, when comparing to the levels found in RAAN and RAAS, the results of the 2005 WFP survey were quite similar to the 2001 NDHS with higher rates of malnutrition found in Northern areas as compared to the southern areas. These results are presented in the table below.

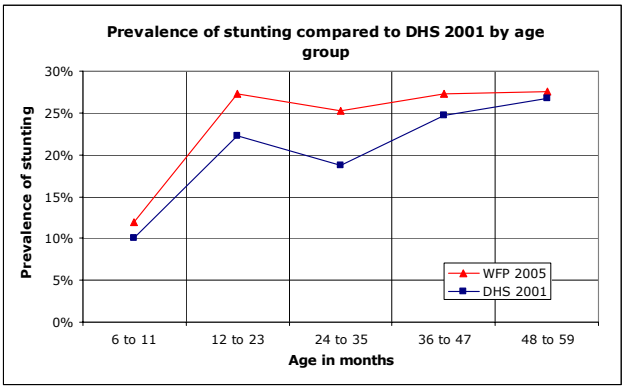
	Location	At least moderate (< -2 SD)		
		Wasting[1]	Underweight[2]	Stunting[3]
2001 NDHS	RAAN	2.0%	13.8%	34.8%
	RAAS	1.7%	7.8%	22.7%
2005 WFP	RAAN	1.8%	12.6%	30.4%
	RAAS	1.4%	7.2%	20.3%

The prevalence of wasting from the 2005 WFP survey in RAAN and RAAS was similar to that found in the 2001 DHS for those regions. The prevalence of underweight was also very similar, with slightly lower prevalence found in the WFP survey. However, the prevalence of stunting was 2-4 percentage points lower in the 2005 WFP survey for both regions. All in all, the anthropometric findings were quite similar, validating the 2005 WFP survey data.

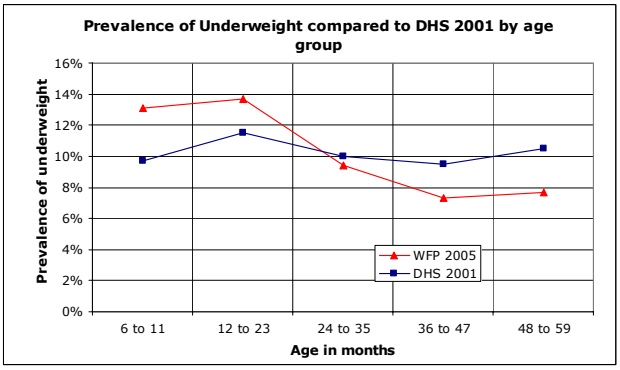


The chart on the left compares the prevalence of **wasting** from the 2005 WFP survey to the 2001 NDHS results by age group. In both surveys the prevalence of wasting peaks in children aged 12 to 23 months and then declines to the lowest levels in the 36-47 months age group. The rising trend in children aged 6 to 23 months is typical, because it shows the difficulties of weaning and giving adequate and timely complementary foods.

[1] A **wasted child** has a weight-for-height Z-score that is below -2 SD based on the NCHS/CDC/WHO reference population. Wasting or **acute** malnutrition is the result of a recent failure to receive adequate nutrition and may be affected by acute illness, especially diarrhoea.
[2] An **underweight child** has a weight-for-age Z-score that is below -2 SD based on the NCHS/CDC/WHO reference population. This condition can result from either chronic or acute malnutrition or a combination of both.
[3] A **stunted child** has a height-for-age Z-score that is below -2 SD based on the NCHS/CDC/WHO reference population. Stunting or **chronic** malnutrition is the result of an inadequate intake of food over a long period and may be exacerbated by chronic illness.



The chart on the right compares the prevalence of **stunting** between the 2005 WFP and 2001 NDHS surveys. In both surveys the prevalence of stunting is lowest in the youngest age groups and increases sharply to the 12-23 month group and then levels off in the older groups. The prevalence of stunting in the 2005 survey is higher in all age groups compared to the 2001 NDHS findings. The NDHS shows a slightly steeper rising trend in the 24 to 59 months old children, whereby the observed stunting rates of both surveys converge in the older age groups. The rising trend in the prevalence of stunting is typical, because the long-term impact of malnutrition is reflected more clearly with increasing age.



The chart on the left compares the 2005 WFP survey prevalence of **underweight** to the 2001 NDHS by age group. In both groups, the prevalence of underweight increases slightly from 6-11 months to peak at 12-23 months age groups. For the NDHS, the prevalence then drops slightly, levels out and then increases a bit in the oldest age groups. For the 2005 WFP survey, the prevalence of underweight decreases by several percentage points, levelling out at the three years old age group. In both surveys an increase in the prevalence of underweight is observed in the age group 12 to 23 months, which is typically indicating nutritional problems in the weaning period.

4.2.3 – Malnutrition by strata

There was some variation in child malnutrition (6-59 months) by strata – especially for underweight and stunting. As indicated in the below table, **acute malnutrition** or wasting (*whz < -2.00 SD*) was higher in the Coastal samples while prevalence of **underweight** (*waz < -2.00 SD*) was highest in children from RAAN.

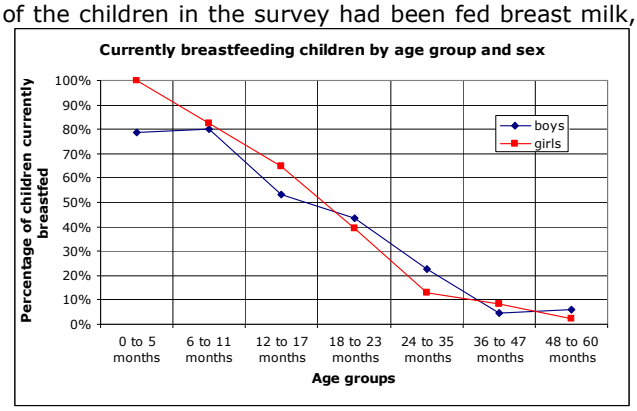
	Wasting		**Underweight**		**Stunting**	
	%	***95% CI***	***%***	***95% CI***	***%***	***95% CI***
North Coast	2.9%	*(0.4, 5.5)*	12.3%	*(7.3, 17.2)*	21.6%	*(15.6, 27.9)*
North Interior	1.1%	*(0.0, 2.3)*	12.8%	*(8.8, 16.8)*	35.9%	*(30.2, 41.6)*
South Coast	2.4%	*(0.3, 4.5)*	7.3%	*(3.7, 10.9)*	18.0%	*(12.7, 23.2)*
South Interior	0.4%	*(0.0, 1.3)*	7.0%	*(3.7, 10.4)*	22.5%	*(17.0, 27.9)*
Total	***1.6%***	***(0.8, 2.4)***	***9.9%***	***(7.9 – 11.9)***	***25.4%***	***(22.5 – 28.3)***

About one-quarter of children 6-59 months in the sample were stunted. The prevalence of **chronic malnutrition** or stunting was highest in the North Interior sample. From the data, it appears that malnutrition is worse for the children in this region while the South Coast sample of children appears to be better off than the others, despite the lowest access to drinking water from improved sources.

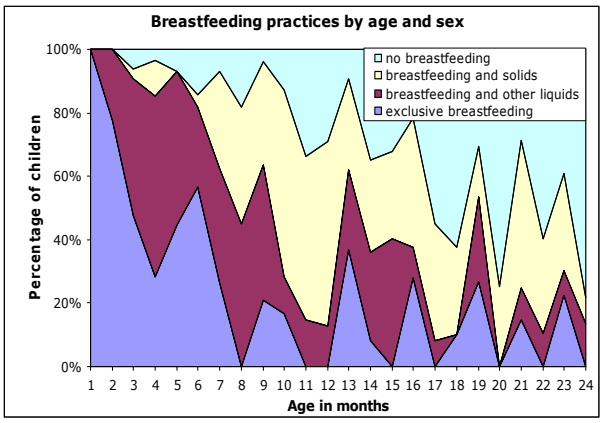
The prevalence of **severe stunting** (*haz < -3.00 SD*) was highest (7.7%) in North Interior *(95% CI: 4.5, 10.9)* sample, followed by 7.5% in South Interior *(95% CI, 4.0, 10.9)*, 5.3% in North Coast *(95% CI: 1.9, 8.6)* and lowest (4.4%) in the South Coast *(95% CI: 1.6, 7.2)* sample.

4.2.4 - Breastfeeding practices

For each child in the survey, information was collected on breastfeeding initiation, duration and weaning practices. Over 90% of the children in the survey had been fed breast milk, ranging from 95% in North Interior to 92% in the South Interior. The chart on the left shows the percentage of boys and girls who were still breastfeeding by the time of the survey. Most children 0-5 months are breastfeeding. This percentage decreases gradually with increasing age. Virtually no children over the age of 3 years were being breastfed. There are few differences by gender, except that in the 0 to 5 months age group where all of the girls and only 79% of the boys were being breastfed. In addition slightly more girls than boys in the 12 to 17 months and slightly more boys than girls aged 24 to 35 months were receiving breast milk.

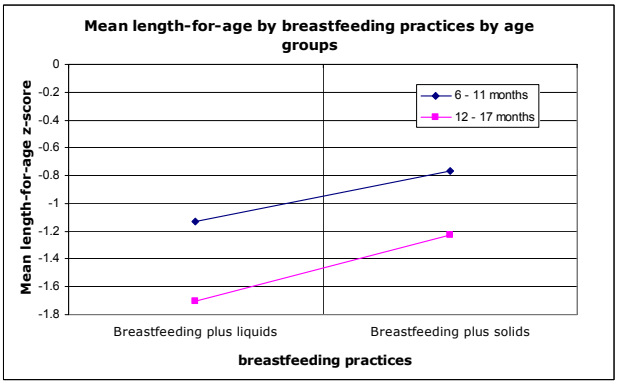


The results of this survey show than 13% of children below 24 months of age are being fed only breast milk (no water). Only the children aged one month or less were all exclusively breastfed. Liquids are already introduced to the diet in the second month and solids are being introduced to more than one-third of the children after 6 months of age. By 2 years of age, nearly 80% of the children are not breastfed anymore.

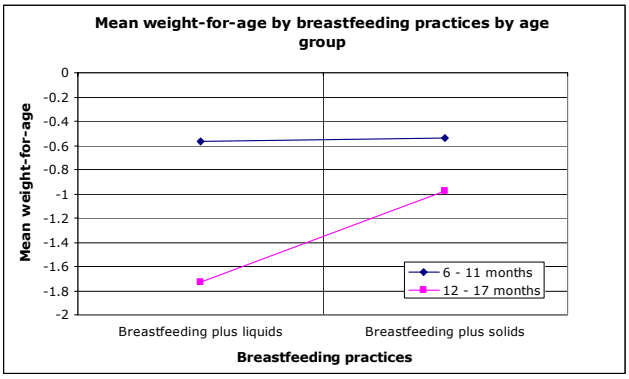


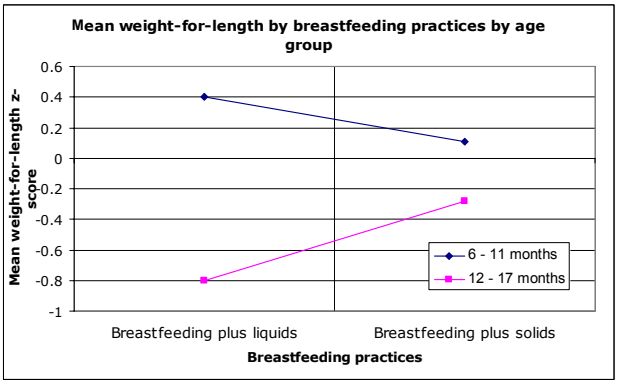
In all the survey area more than 90% of the children have been breastfed. Differences in the breastfeeding practices of mothers with children below 24 months between the strata are noticed. A higher percentage of mothers in the northern strata give solid complementary foods to their children, whereas a higher percentage of mothers from the southern strata fully replace breast milk with complementary foods. More mothers in the South Interior fully replaced breast milk with solid food in children under 24 months than in the North Coast, where significantly more mothers gave breast milk and solids to their children than in the South Coast sample.

The types of feeding practices have an effect on child growth, as indicated in the three graphs below. For the sample of children between 6 and 17 months, the mean **height-for-age** z-score is higher for children having breast milk plus solids than those receiving breast milk and liquids, as shown in the graph on the left. This is true for both the 6 to 11 months and 12 to 17 months age groups, indicating that solid or semi-solid foods added to breast milk enable better growth than adding only liquids to breast milk. The curve is slightly steeper for the older children, who have higher need for additional nutrients than the younger age group, thus the change in breastfeeding practices shows a slightly higher impact.



The graph on the right compares the mean **weight-for-age** z-scores of young children by feeding practices. For children 6-11 months of age, there is no difference in mean waz score for children being fed breast milk plus liquids or those consuming solids. However, for the children 12-17 months of age, the inclusion of solids in the diet of breast milk shows a substantial increase in mean waz score, again underscoring the importance of introducing timely and appropriate complementary foods for children by the age of one year.



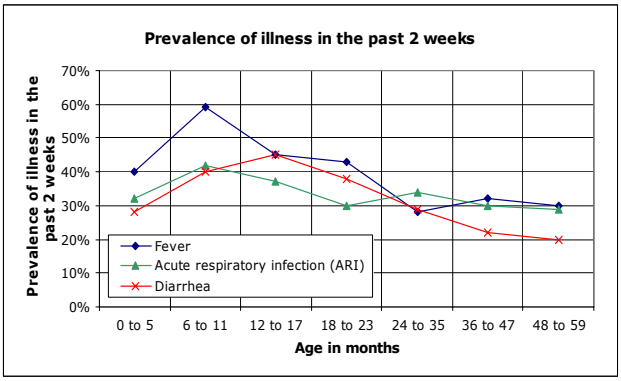


The graph on the left compares the mean **weight-for-length** z-score (wlz) for children 6-17 months feeding practices. For children 6-11 months of age, children receiving breast milk plus solid foods have a lower mean wlz score than those receiving breast milk plus liquids. This may indicate that the added nutrition from solids help with linear growth (see above graph) resulting in longer but thinner children. For children 12-17 months of age, children being fed only breast milk and liquids have a much lower wlz score than those consuming solids. The progression of the curves clearly show that receiving additional solid foods instead of liquids has a positive impact on the weight-for-length z-score in children aged 12 to 17 months, but not on the age group 6 to 11 months. The graph illustrates the problems of introducing solid or "adult" foods too early for younger children or too late for the older age group.

4.2.5 - Recent child morbidity

In the survey, the mothers were asked if their children had experienced an episode of diarrhoea, coughing (if yes, with fast breathing), or fever in the past two weeks. Overall, 29% of the children had experienced an episode of diarrhoea, 51% had been coughing and 39% had a non-specific fever in the past two weeks. Coughing with fast breathing is a sign of acute respiratory infection (ARI), which is one of the major childhood illnesses in the developing world. In the sample there was a 33% 2-week period prevalence of ARI in children less than five years of age. For those children suffering from diarrhoea, 55% had received treatment at a health facility.

The prevalence of diarrhoea was highest in the 12-17 month age group and reduces steadily with increasing age. The prevalence of fever and ARI was highest in the 6-11 month age group. However, the prevalence of fever peaks drastically to 60% in children 6-11 months of age before decreasing and flattening out at 30% for those 2 years and older. The prevalence of ARI steadies at around 30% by 18 months of age. There are absolutely no differences in prevalence of recent morbidity by sex of child.



By strata, the prevalence of all illnesses was highest in the North Coast sample. The two week period prevalence of **diarrhoea** was 42% in North Coast, 31% in North Interior and 23-24% in both southern strata. The difference between North Coast and the southern strata were statistically significant *($p < 0.01$)*. In the North Coast the prevalence of **fever** was the highest (49%), followed by North Interior (42%), South Interior (33%), and South Coast (32%). The differences between North Coast and South Coast as well as Interior were also statistically significant *($p < 0.01$)*.

The prevalence of **cough** in young children in the *North Coastal* sample was 58%, followed by 55% in North Interior, 47% in South Coast and 45% in South Interior. The difference between North Coast and South Interior was statistically significant *($p < 0.05$)*. Although there were some differences in the prevalence of **acute respiratory infection** (ARI) between the strata, none were statistically significant. The prevalence was 26% for South Coast and over 30% in the other three strata.

For those children in the survey area suffering from diarrhoea, 55% were treated at a health facility. Compared to the 2001 NDHS, the prevalence of fever and diarrhoea is higher in the whole survey area (39%; 29%). The percentage of children suffering from diarrhoea being treated in health facilities is higher in the coastal survey areas and lower in the interior areas compared to the 2001 NDHS.

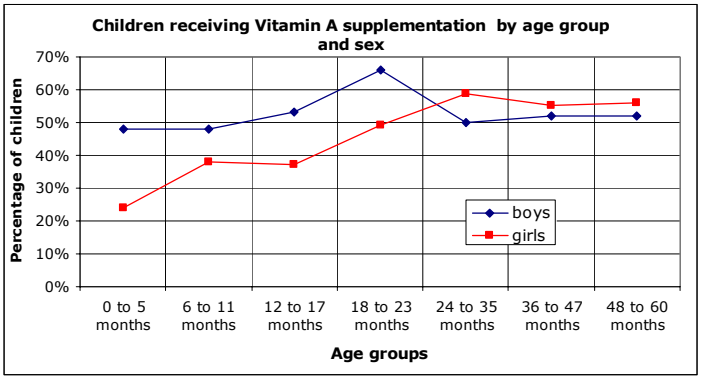
Mothers were asked what they do to stop the sickness if their child has diarrhoea. Forty five percent of the mothers answered they would give medicine to the child, 40% said they would take the child to a health centre, 32% would treat it with a traditional remedy and 24% said they give the child oral re-hydration solution (ORS). More mothers would treat their child with ORS in the Coastal areas than in the Interior areas - the percentage was twice as high and significantly higher in the Coast areas than in the South Interior and a third lower in the North Interior than in the South Coast sample. A significantly lower percentage of mothers would treat their child with a traditional remedy in the South Interior than in the other strata.

The presence of illness has an impact on child nutrition for the overall sample. Children with recent **fever** had significantly ($p < 0.01$) lower mean weight-for-height and weight-for-age z-scores than those without fever. As a result, they were also significantly ($p < 0.05$) more likely to be at least moderately wasted. Children who had suffered recent **coughing** or **acute respiratory infection** had significantly *($p < 0.05$)* lower mean weight-for-height and weight-for-age z-scores. Those with recent **diarrhoea** had significantly ($p < 0.001$) lower weight-for-height z-scores and were significantly ($p < 0.01$) more likely to be suffering from acute malnutrition. These children also had significantly *($p < 0.01$)* lower mean weight-for-age z-scores and were significantly *($p < 0.001$)* more likely to be underweight.

4.2.6 - Vitamin A supplementation

When asked about vitamin A supplementation, just over half of the children in the sample had received at least one supplement in the 12 months prior to the survey, according to the mothers. Supplementation was highest in children from South Coast (64%), followed by North Coast (52%), South Interior (48%) and North Interior (44%). The differences between South Coast and the interior strata are statistically *($p < 0.001$)* significant.

In addition, there are some differences in supplementation by age group and also by gender. The graph on the right shows that in younger children, boys are more likely to have received supplements than girls. However, those differences are reversed in older children so overall, 52% of boys and 50% of girls had received vitamin A supplements. For boys, the level of supplementation remains around 50% with the exception of the 18-23



months age group. However, for girls, the likelihood of receiving a vitamin A supplement increases with age, until the 24-35 month age group.

Section 4.3 - Malnutrition and morbidity in five strata

Since the coast line has unique characteristics the coastal areas were further subdivided creating the Littoral stratum. This section presents health and nutrition findings for the five strata. According to the table below, the prevalence of **acute malnutrition** or wasting in children (6-59 months) was highest in the Littoral and the North Coast samples and lowest in the South Interior sample. The prevalence of **underweight** was also highest in children in the North Coast and Littoral samples but lowest in the South Coast sample. However, the prevalence of chronic malnutrition or stunting was highest in the North Interior sample

	Wasting		Underweight		Stunting	
	%	*95% CI*	*%*	*95% CI*	*%*	*95% CI*
North Coast	2.9%	*(0.4, 5.5)*	10.0%	*(5.0, 15.0)*	22.1%	*(15.2, 29.1)*
North Interior	1.1%	*(0.0, 2.3)*	12.8%	*(8.8, 16.8)*	35.9%	*(30.2, 41.6)*
South Coast	1.3%	*(0.3, 4.5)*	4.0%	*(0.0, 8.5)*	18.0%	*(12.7, 23.2)*
South Interior	0.4%	*(0.0, 1.3)*	7.0%	*(3.7, 10.4)*	22.5%	*(17.0, 27.9)*
Littoral	3.1%	*(0.4, 5.8)*	11.7%	*(6.7, 16.7)*	20.4%	*(14.1, 26.6)*
Total	***1.6%***	***(0.8, 2.4)***	***9.9%***	***(7.9 – 11.9)***	***25.4%***	***(22.5 – 28.3)***

The prevalence of **severe stunting** (*haz < -3.00 SD*) was 7.7% in North Interior *(95% CI: 4.5, 10.9)*, 7.5% in South Interior *(95% CI, 4.0, 10.9)*, 5.7% in North Coast *(95% CI: 1.8, 9.6)*, 5.6% in Littoral *(95% CI: 2.0, 9.1)* and 1.3% in South Coast *(95% CI: 0.0, 4.0)* samples. Overall the greatest problems of child malnutrition are found in the North Interior while the South Coast children have the best nutritional status in the survey sample, despite the lowest access to drinking water from improved sources.

By five strata, the prevalence of all illnesses was highest in the North Coast sample. The two-week period prevalence of **diarrhoea** was 39% in North Coast, 32% in North Interior, 28% in South Coast and Littoral strata, and 23% in the South Interior. The difference between North Coast and the South Interior is statistically significant *(p < 0.05)*. In the North Coast the prevalence of **fever** was the highest (52%), followed by North Interior (42%), South Coast (37%), South Interior (34%), and Littoral (33%). There is a statistically significant difference between North Coast and South Interior *(p < 0.01) as* well *as* Littoral *(p < 0.05)*.

The prevalence of **cough** in young children in the South Coast sample was 61%, followed by 57% in North Coast, 55% in North Interior, 46% in Littoral and 45% in South Interior. The prevalence of **acute respiratory infection** (ARI) was 35% in North Interior, 34% in South and North Coast, 32% in South Interior and 29% in Littoral. For those children in the survey area suffering from diarrhoea, 63% in North Coast were treated at a health facility, 60% in Littoral, 59% in South Coastal, 53% in South Interior and 48% in North Interior.

More than 70% of the children in the sample had received skilled **antenatal care** while in the womb. However, there were differences between regions – 54% of the recent pregnancies in the South Coast sample and 65% in South Interior had received skilled antenatal care, which is lower than 72% in the North Coast, 81% in Littoral, and 79% in South Interior.

The two-week prevalence of **diarrhoea in women** ranges from lows of 2% in the South Coast, 6% in the South Interior samples, 10% in Littoral, and 14% in North Interior to highs in the North Coast sample of 25 percent. The difference between the North Coast sample and the South Interior as well as coastal and Littoral samples was statistically significant *(NC/SC: p < 0.01; NC/SI: p < 0.001; NC/L: p < 0.05)*.

Recent **fever** (non-specific) was reported by 33% of the women in the North Coast, followed by North Interior (24%), South Interior (19%), Littoral (18%), and South Coast (7%). The difference between North Coast and South Coast was statistically significant *(p < 0.05)*.

The highest prevalence of **both illness** was found again in women from the North Coast sample (19%), followed by North Interior (8%), Littoral (4%) and South Interior (2%). No women in the South Coast sample had suffered from both illnesses. The difference between North Coast and the other samples was statistically significant *(NC/NI: $p < 0.05$; NC/SC: $p < 0.001$; NC/SI: $p < 0.001$; NC/L: $p < 0.001$)*.

Section 4.4 - Health and nutrition and household characteristics

With the sample data, several analyses were conducted to see the relationships between specific household characteristics and child health and nutrition. Results of the analysis show that:

- Children under 5 years who live in **overcrowded** households (more than 5 people sleeping in one room) more likely to be stunted *($p < 0.001$)* or underweight *($p < 0.05$)* and are more likely to have had diarrhoea *($p < 0.01$)* and fever *($p < 0.05$)* in the past two weeks.
- In households with a **high dependency ratio**, children are significantly more likely to be stunted *($p < 0.01$)* or to have suffered from ARI *($p < 0.01$)* or fever *($p < 0.01$)* in the past two weeks.
- The children from households with **no sanitation** have a significantly higher chance of being stunted *($p < 0.01$),* wasted *($p < 0.01$)* or underweight *($p < 0.001$)*. These children are also more likely to have had diarrhoea *($p < 0.01$),* fever *($p < 0.01$),* or ARI *($p < 0.05$)* in the past 2 weeks.
- The types of water sources show no significant relationship on the nutritional status of children less than five years of age, but children from households not using water from improved sources are more likely to have suffered from diarrhoea *($p < 0.05$)* in the past two weeks.

Part V: Household food consumption typologies

Section 5.1 – Creation of household food consumption groups

Dietary diversity and frequency of food consumption are good proxy indicators for household access to food and quality of diet. Using data on dietary diversity, defined as the number of different foods consumed during 7 days prior to the survey, and the frequency by which these foods are consumed, a sample of 1022[1] households from RAAN and RAAS were analysed to identify homogeneous groups of households based on their food consumption patterns. Because of the need to analyse several variables simultaneously, two multivariate statistical techniques were applied: principal component analysis (PCA) followed by non-hierarchical clustering using the statistical software ADDATI 5.3.c[2].

Practically every household in RAAN and RAAS consumes oil/fat, coffee, sugar and salt on a daily basis while meat (including turtle) is hardly ever consumed. Since this was consistent across almost all households, these food items were not taken into consideration during the household food consumption profiling.

The analysis is based on the frequency of consumption (0 to 7 days) for the following nine food items or food groups:

1. **Cereals (maize, rice and sorghum)**
2. **Tubers (including potatoes and yucca)**
3. **Plantain**
4. **Beans**
5. **Meat (chicken, beef, pork and wild)**
6. **Fish**
7. **Diary Products (dairy products, yoghurt and cheese)**
8. **Eggs**
9. **Vegetables and fruit**

The results were then cross-tabulated with two other relevant indicators to determine food access, food source and per capita expenditures (Section 5.3). As a large number of factors contribute to household successful in attaining food security, the results were then cross-tabulated with range of other indicators such as demography, livelihood activities, child nutrition and health, etc. (Section 5.4).

Section 5.2 – Household food consumption groups and profiles

Based on the analysis outlined above, the following nine food consumption profiles were created:

Food consumption group	Profiles	%	DESCRIPTION
Very poor	1a	10%	Very poor diet
	1b	7%	Only cereals
Poor	2	18%	Staple food diet
Adequate	3a	23%	Quite diversified diet
	3b	18%	More diversified diet
Good	4a	4%	High protein intake
	4b	8%	High fish intake
	4c	12%	Very Good diet

[1] The original dataset consisted of 1029 households but 8 cases were not considered because data was missing or they contained unrealistic values.

[2] The software used for multivariate analyses is ADDATI 5.3c, developed by Silvio Griguolo, IUAV Venice, Italy, freely available at http://cidoc.iuav.it/~silvio/addati_en.html

They were then summarized into four distinct food consumption groups following the characteristics described below:

1. **Very poor food consumption group (17%)**: Very low and inadequate food intake. Besides sugar and oil, households consume only one additional food item on a daily basis.
2. **Poor food consumption group (19%)**: Households diet is mainly based on staple foods (cereals, beans, tubers). Their diet shows very little diversification and lacks animal proteins.
3. **Adequate food consumption group (42%):** Diet is more diversified; households complement their food intake with a regular consumption of dairy products and eggs. Meat, fish, fresh vegetables are never or very rarely consumed.
4. **Better off food consumption group (24%):** Highly diversified food consumption characterized by a high protein intake animal protein (fish and/or meat).

5.2.1 – Very poor food consumption

This group consists of two food consumption profiles. One profile can consist of several sub-groups and in this case percentages are provided indicating the shares of households falling into one or the other sub-groups.

Profile 1a - Very Poor Diet (10%)	**0-1 days**	**2-3 days**	**4-5 days**	**6-7 days**
Cereals				
Tubers		60%	40%	
Plantain				
Beans	40%			60%
Meat				
Fish				
Dairy products				
Eggs	40%	60%		
Fruit and Vegetables				

Households belonging to this profile in general have inadequate food intake. They are the only group that does not consume cereals on a daily basis. Approximately 40% of the households complement their energy requirements with a regular consumption of tubers, while 60% consume beans on a daily basis. Additionally, households in this group sometimes consume eggs and dairy products.

The second profile is very similar to the first except that these households consume **cereals** on a daily basis while pulses are never consumed, indicating a possible lack of protein in the diet. Again all other foods are never or rarely consumed.

Profile 1b – Diet based on cereals (7%)	**0-1 days**	**2-3 days**	**4-5 days**	**6-7 days**
Cereals				
Tubers				
Plantain				
Beans				
Meat				
Fish				
Dairy products				
Eggs				
Fruit and Vegetables				

5.2.2 – Poor food consumption

Profile 2 - Staple Food Diet (18%)	0-1 days	2-3 days	4-5 days	6-7 days
Cereals				
Tubers		53%		47%
Plantain				
Beans				
Meat				
Fish				
Dairy products				
Eggs				
Fruit and Vegetables				

There is only one profile of households in the poor food consumption group. Their diet is mainly based on **daily intake of basic staple foods** such as cereals, beans, oil, and sugar. Other food items are not consumed at all. This consumption pattern clearly lacks diversification.

5.2.3 – Adequate food consumption

The adequate food consumption group consists of three profiles.

The first profile is characterized by a daily intake of staple foods (cereals and for some households also tuber) and **eggs or/and dairy products**. They rarely consume animal protein from meat and fish nor fruits or vegetables.

Profile 3a - (23%)	0-1 days	2-3 days	4-5 days	6-7 days
Cereals				
Tubers	38%	26%		36%
Plantain				
Beans				
Meat				
Fish				
Dairy products			62%	38%
Eggs	38%	36%		26%
Fruit and Vegetables				

Profile 3b – (8%)	0-1 days	2-3 days	4-5 days	6-7 days
Cereals				
Tubers				
Plantain				
Beans				
Meat				
Fish				
Dairy products				
Eggs				
Fruit and Vegetables				

The second profile has a more diversified diet. It is principally composed of cereals, tubers, plantains and beans. **Dairy products and eggs** are consumed 3-5 times per week and **fruits and vegetables** on a daily basis. Meat and fish consumption is rare.

Households in the third profile have daily consumption of staple foods and regular consumption of beans. **Fish, dairy products and eggs** are consumed 2-3 times per week while meat, fruits and vegetables are rarely consumed.

Profile 3c – (10%)	0-1 days	2-3 days	4-5 days	6-7 days
Cereals				
Tubers				
Plantain				
Beans				
Meat				
Fish				
Dairy products				
Eggs				
Fruit and Vegetables				

5.2.4 – Good food consumption

The group that is characterized to have good food consumption consists of three profiles:

Profile 4a – greater protein intake (4%)	**0-1 days**	**2-3 days**	**4-5 days**	**6-7 days**
Cereals				
Tubers				
Plantain				
Beans				
Meat				
Fish				
Dairy products				
Eggs				
Fruit and Vegetables				

Households belonging to the first profile are characterized by a well **diversified diet**, the only food items that are never or hardly ever consumed are dairy products and fruits and vegetables. They do not consume cereals on a daily basis but their carbohydrate intake is covered by a daily consumption of tubers and plantains. They regularly consume **fish and meat**.

Households in the second profile belonging to the good food consumption group are characterized by a **high fish intake**. They consume cereals and fish on a daily basis while tubers and beans are eaten 4-5 times per week. They complement their diet with dairy products and eggs twice per week but lack fruit, vegetables, plantains and meat.

Profile 4b - High fish intake (8%)	**0-1 days**	**2-3 days**	**4-5 days**	**6-7 days**
Cereals				
Tubers				
Plantain				
Beans				
Meat				
Fish				
Dairy products				
Eggs				
Fruit and Vegetables				

Profile 4c - Very good diet (12%)	**0-1 days**	**2-3 days**	**4-5 days**	**6-7 days**
Cereals				
Tubers			33%	67%
Plantain				
Beans			33%	67%
Meat			67%	33%
Fish	38%			62%
dairy products			62%	38%
Eggs		31%	29%	
Fruit and Vegetables	33%		38%	29%

This third profile considered to have good food consumption is characterized by a **highly diversified diet**. Households consume all food items from all food groups on a daily or regular basis. Households belonging in this group have a **high intake of both animal and vegetal proteins** and about 67% have an adequate intake of **fruit and vegetable**.

Section 5.3 – Household access to food

Access to food is determined by a household's ability to obtain food from own production, stocks, purchase, gathering, or through transfers (gifts from relatives, members of the community, the government, or external assistance). If a household primarily relies on purchases, expenditures on food and non-food items indicate how well a household is able to meet food and other needs.

5.3.1 – Food sources

The sources of the different foods consumed (purchase, own production, gathering/fishing, gift, borrowing, or received as gift, food aid) were analysed as an attempt to understand how reliance on particular sources of food impact household food security. In the analysis, very few households mentioned food aid and borrowing as main sources of food consumed.

The main source of food for all food consumption groups is purchase (see table below). On average 68% of all food that was consumed was purchased, with little variation between the four food consumption groups thus illustrating the high dependence on cash and

purchasing power to meet food needs. On average 24% of the food consumed was from own production, 4% from fishing/hunting and 3% from gifts. Households with adequate food consumption have a slightly higher reliance on own production compared to the other groups. Households with a good consumption have the greatest share from fishing and hunting while those with very poor consumption receive the most from gifts.

Food consumption group	% HH	Share from purchase	Share from production	Share from fishing/ hunting	Share from gifts	Share from other
Very poor	17%	69%	22%	2%	5%	1%
Poor	19%	72%	21%	3%	3%	2%
Adequate	41%	67%	27%	3%	3%	1%
Good	24%	67%	23%	8%	2%	0%
Total	***100%***	***68%***	***24%***	***4%***	***3%***	***1%***

When investigating reliance across profiles, households in Profiles 1b (76%) and 2 (72%) have the highest reliance on purchase for foods consumed by family members. Households in Profile 1b and 4b have the lowest share of food consumption coming from own production (18%). The greatest reliance on food from fishing or hunting is found in two profiles in the good consumption group – 4a and 4b while the households in profile 1a receive 6% of the food they consume as gifts or donations.

Profile	Share from purchase	Share from own production	Share from fishing/ hunting	Share from gifts	Share from other sources
1a	65%	26%	3%	**6%**	1%
1b	**76%**	**18%**	2%	4%	1%
2	72%	21%	3%	3%	2%
3a	67%	27%	1%	3%	1%
3b	68%	26%	3%	3%	1%
3c	65%	27%	7%	1%	0%
4a	62%	27%	**9%**	2%	0%
4b	69%	**18%**	**11%**	2%	0%
4c	68%	24%	6%	2%	1%

When investigating the main sources of individual food items for the entire sample the following was discovered:

- Practically all sugar, coffee and oils are purchased.
- More than 80% of the cereals and fruits/vegetables are purchased and around 15% are from own production.
- More than 70% of meat consumed is purchased, with 17% from own production and 8% from hunting.
- Two-thirds of the fish consumed is from fishing while the rest is from purchase.
- Just over half the dairy products and beans consumed are purchased with about one-third each from own production and 6% of dairy products are received as gifts.
- About two-thirds of the eggs, tubers and plantains consumed are from own production with about 30% from purchase and 7% of tubers and plantains received as gifts.

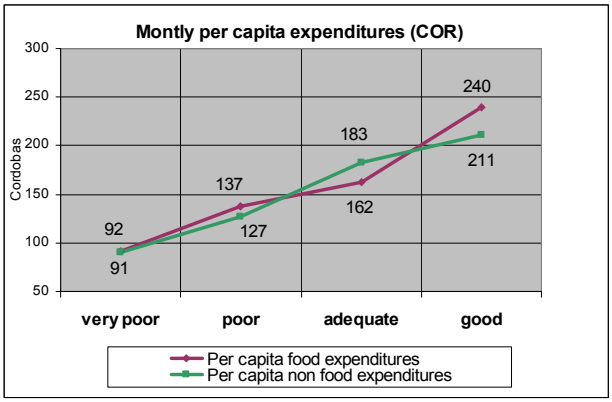
Across food consumption groups the following observations are worth noting:

- For all consumption groups, more than 80% of **cereals** consumed are purchased with the rest from own production.
- More than 60% of the **tubers** consumed are from own production with the rest from purchase. The exception is that 12% of tubers consumed by the very poor consumption group are received as gifts. The same trend is found for **plantains**.

- For the very poor consumption groups, half of the **beans** consumed are from production, 40% from purchase and 9% received as gifts. For the other consumption groups, a slightly greater share of beans consumed are from purchase with the rest coming from own production.
- For households eating **meat**, around 70% is from purchase in all groups with the ret coming from own production with the exception being ht every poor groups where 14% of the meat is received as a gift. Another important source is hunting, especially among the poor consumption households (12%) and those with good consumption (10%).
- Most of the **fish** consumed by all groups is obtained by fishing but with about one-quarter coming from purchase in the poor and adequate consumption groups.
- For those households consuming **dairy** products, for the very poor and adequate consumption households, about half comes from purchase and the rest from own production with 13% received as gifts for the very poor consumption households. For the poor consumption group, dairy products are mostly purchased and households with good consumption rely mostly on purchase (69%) with some from own production (27%). The same pattern is true for households consuming **eggs** with greater shares coming from own production for the households with very poor and adequate consumption.
- For households with adequate and good consumption, nearly all of the **fruits** and **vegetables** consumed are form purchase. However, for the very poor consumption group, about two thirds are purchased and the rest are from own production. The same pattern applies for households with poor food consumption except that 12% of the fruits and vegetables consumed are received as gifts.

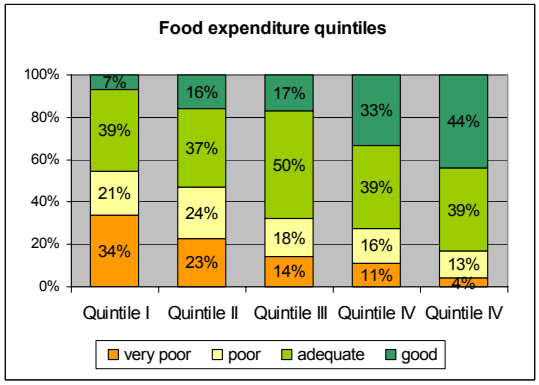
5.3.2 – Monthly expenditure by food consumption group

Per capita monthly expenditure is a very useful proxy indicator for household cash availability. In terms of shares of expenditure for food and non-food items no significant differences exist between the four food consumption groups.

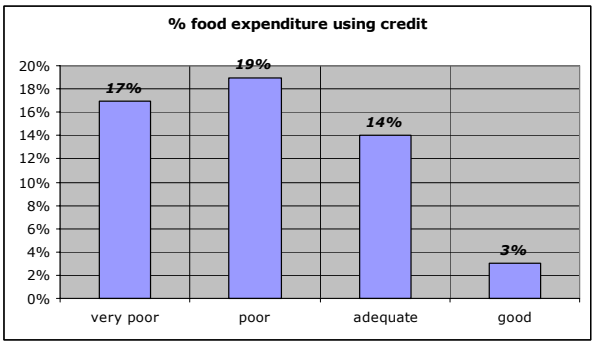


The absolute **monthly per capita expenditures** on food are directly related to the food consumption levels. The very poor food consumption group has the lowest, while the good food consumption group has the highest per capita monthly expenditures on food. The non–food expenditures show a similar trend.

Per capita food and non-food expenditures were aggregated into per capita monthly **food and non-food expenditure quintiles**. Quintiles yield a relative measure of cash availability at household level in a format that is comparable across households. The food consumption groups were cross-tabulated with the food and non-food expenditure quintiles in order to identify the percentage of households in each expenditure quintile, by food consumption group. As the chart on the left indicates, a higher proportion of households in the lowest per capita food expenditure quintile are from the very poor food consumption group (34%). The graph illustrates the linear relationship between per capita food expenditure and improvements in household food consumption. A similar



trend is seen for per capita non-food expenditure quintiles but it is not as strong.



The chart on the left illustrates that the percentage of food expenditures using credit varies greatly by food consumption group. Households with poor food consumption used slightly more on credit than the very poor groups (19% and 17% respectively), while the adequate group spend 14% and the households with good food consumption only 3 percent.

A similar trend can be observed when comparing percentage of food expenditure for staple foods. Poor households spent slightly more than very poor groups (81% and 79%), while the adequate and good food consumption groups have relatively higher share of total food expenditures on non staple foods, which obviously correlates with the fact that they have a more diversified diet.

Section 5.4 – Characteristics of the food consumption groups

The concept of food security is based on a multidimensional approach that tries to integrate information on food availability, access to food, and food utilization. Vulnerability to food security is also determined by exposure to risks and shocks and the ability of households or communities to cope with them.

The four food consumption groups were cross-tabulated with other food security relevant indicators in order to identify possible causes and consequences of food insecurity in the context of RAAN and RAAS.

5.4.1 – Livelihood profiles

Livelihood activities play a role in the ability for a household to access food. In the analysis the **very poor food consumption** households are described by four main livelihood profiles: farmers (23% - highest), daily wage labourers (20% - highest), daily wage labourers + farming (18%) and livestock keepers (10%).

One-third of the households characterized as having **poor food consumption** are in the farmer livelihood profile (highest), while 16% are described as daily wage labourers + farming, 13% as daily wage labourers and 9% as farming households that also sell wood.

Households with **adequate food consumption** are characterized mainly as farmers (30% - high), livestock keepers (17% - highest) with 8-9% earning income from daily wage labour alone or in combination with farming.

Those households with **good food consumption** fall into four main livelihood profiles: farmers (21% - lowest), fishermen (18% - highest), fishermen + farming (12%) or livestock keepers (10%).

When further investigating the food consumption profiles by livelihood profile, the most disadvantaged in terms of food consumption are **daily wage labourers** with 60% belong to the very poor or poor food consumption group. In addition 55% of the households in the **daily wage labourer + farming** profile are in the very poor and poor food consumption group. Conversely, more than 70% of the households characterized as **fishermen + farming** are in the good food consumption group as are 66% of the **fishermen** households. Nearly 80% of the households described as **livestock keepers** or **small business owners + farming** have adequate or good food consumption.

Depending on the type of activity but households with adequate and good food consumption often pursue more than one activity, while about half of all households with very poor and poor food consumption only pursue one activity.

5.4.2 – Access to land and agricultural production

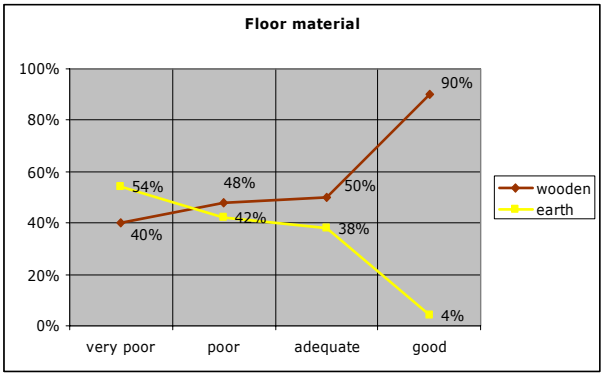
On average more than 80% of the sample household have access to land and there are no significant differences between the food consumption groups, only the good food consumption group has a slightly higher access (86%). Households with adequate food

consumption are more likely to own their land than the other groups. They also cultivate larger plots (2.4 hectares) compared to the very poor consumption group that only cultivate 1.4 hectares. The other households cultivate an average of 2.0 hectares.

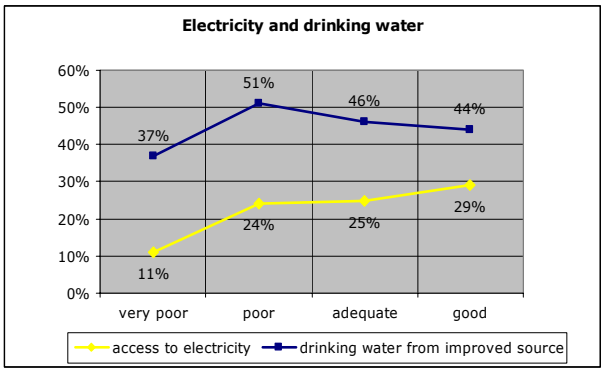
In terms of crop types, households with good food consumption are more likely to cultivate tubers, plantains and rice while all other households are more likely to cultivate maize and beans. One-third of the households in the good food consumption group have a vegetable garden compared to only 22% of the households in the very poor food consumption group. Generally the very poor group have less agricultural diversification, they cultivate on average (median) 3 types of crops compared to 4 in the other groups.

5.4.3 – Housing conditions and amenities

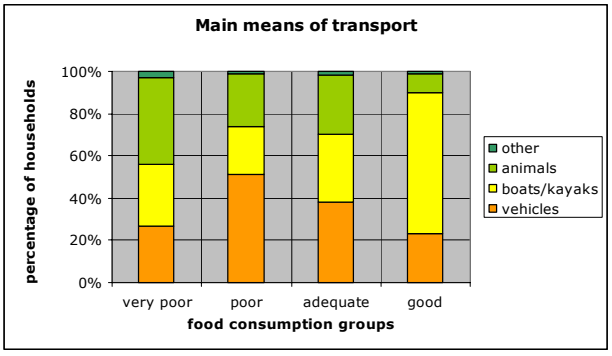
Housing construction materials can indicate well-being and prosperity of households. Houses with improved materials are also more likely to withstand natural hazards such as floods and strong rainfalls. Additionally, a hygienic living environment is prerequisite for improved food utilization. The percent of houses reported to have wooden floors increases slightly between households with very poor consumption and those with adequate consumption. However, 90% of the households with good food consumption had houses with wooden floors. The majority of households with very poor food consumption had homes with an earthen floor. Similarly very poor households are more likely to have roofs made of palm leaves or other plant materials (31%) compared to household with good food consumption (20%).



Interestingly, households with poor food consumption are more likely to use **drinking water from improved sources** than all other groups (see chart below on the right). This is an indication that food consumption and nutrition levels do not necessarily correlate, as access to safe drinking water is one of the key factors for a good nutritional status.



The same chart also illustrates that access to **electricity** at community level increases with improved household food consumption levels. Lack of access to electricity could be a proxy indicator for isolation; hence villages that have access to this type of service are less isolated and hence are more likely to have improved access to livelihood opportunities.



Another indicator illustrating that isolation is a very important factor in the context of the Atlantic regions is the principal means of **transport** used by community members to reach the next town, market, health centre, etc. The chart on the left illustrates that the use of animals to transport people and goods decreases with improved food consumption level. Households with good food consumption are more likely to live in communities that reported the use of boats or kayaks as their main means of transport

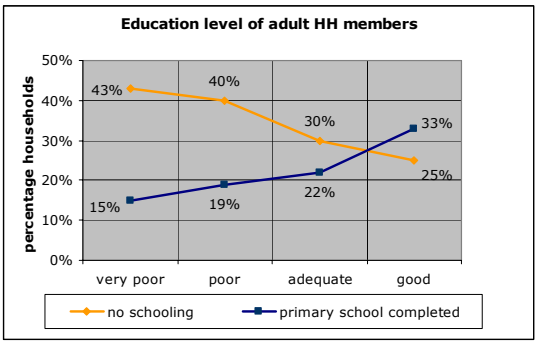
indicating that they are closely located to the coastline or rivers. Interestingly, half of the households in the poor food consumption groups reported the use cars or public buses as their main means of transport.

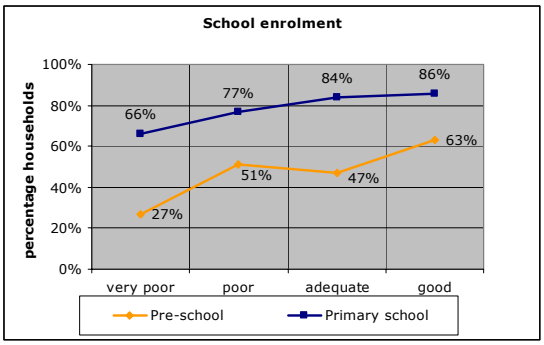
5.4.4 – Demography and education

Around 10% of the households with good food consumption groups are **female headed** compared to 14% in the other consumption groups. This difference is not statistically significant. There is also no indication at all that **elderly headed households** are more vulnerable to food insecurity.

An average household consists of 7 household members – household size does not vary between the four consumption groups. However, the number of dependents varies with around 30% of households with very poor and poor food consumption having a high **dependency ratio** (2 or more dependents per 1 non-dependent) compared to only 23% in the adequate and good food consumption groups.

Food consumption improves with **increased education level** of adult household members in a linear fashion (see chart on right). More than 40% of the household members (18 years and older) belonging to the very poor food consumption group have not ever attended school compared to only 25% in the group with good food consumption. One third of adult household members in the good consumption group have completed at least primary school and, of these 63% continued with secondary schooling. In the poor consumption group only 15% completed primary education.





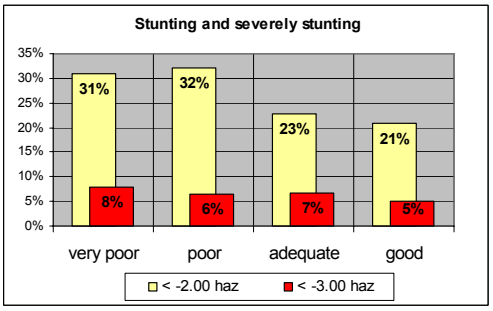
The **current enrolment status** of pre-school and primary school aged children show similar trends. The chart on the left shows that pre-school enrolment rates vary greatly between the food consumption groups. Only 27% of children in the very poor food consumption group were enrolled in pre-school compared to 63% in the group considered to have good food consumption. The trend of enrolment in primary school is similar, though differences are not as evident.

The main reasons provided by caretakers for not enrolling children in pre-school differ between the four consumption groups. Economic reasons – limited financial resources – are much more relevant for the very poor and poor food consumption groups. The fact that nearly every second household with good food consumption also indicated lack of money to be one of the reasons is somewhat misleading because the majority of children in this group are enrolled anyway.

	Pre-school (3-5)				Primary (6-13)			
	very poor	**poor**	**adequate**	**good**	**very poor**	**poor**	**adequate**	**good**
No school	50%	56%	60%	75%	6%	21%	21%	42%
Distance/time	18%	18%	18%	14%	18%	18%	28%	15%
Security	13%	16%	19%	25%	12%	8%	14%	9%
Children have to work	2%	0%	1%	0%	2%	8%	14%	0%
Not enough money	**35%**	**29%**	10%	17%	**67%**	**55%**	27%	***45%***
Illnesses/Disabilities	0%	5%	1%	3%	7%	8%	7%	0%
No teachers	0%	2%	1%	8%	3%	15%	19%	30%

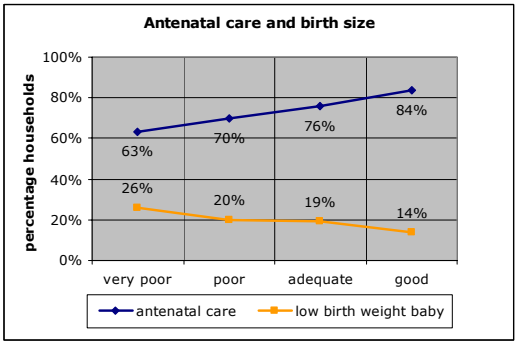
5.4.5 –Chronic malnutrition and food security

The chart on the left illustrates that children from households with very poor and poor consumption are more likely to be moderately stunted (<-2.00 haz) than children from other households. The fact that the differences are not more apparent is an indication that malnutrition is not only related to food intake but to many other factors, such as access to health services, access to safe drinking water and sanitation, diseases, hygiene, education level of mothers, etc. (see Part IV).



Households with very poor and poor food consumption are less likely to have access to health services in their communities (28% and 32% respectively) while more than half of households with good food consumption have access. The chance of children being treated in a health centre after an episode of diarrhoea ranges from 46% of children from households with very poor consumption to 61% of the children from households with good food consumption.

Mothers were asked if they received antenatal care during their pregnancies and delivery and if the child was born "smaller than normal", which is a proxy indicator for low birth weight. The relationship between these two indicators and the food consumption level is linear; the better the food consumption the higher the chance that the mother received antenatal care and the lower the chance that the child was a low birth weight baby (< 2500 grams). These findings illustrate the intergenerational cycle of poverty food insecurity and malnutrition.



5.4.6 – Shocks and coping mechanisms

Repeated exposure to risks and shocks often increase a household's vulnerability to food insecurity – particularly if they are unable to mitigate negative impacts or if they are forced to manage the effects of the shock in a manner that leads them to decrease their asset base. Across food consumption groups around 70% of the households experienced a shock during the 24 months prior to the survey.

	Food consumption level			
	very poor	**poor**	**adequate**	**good**
No shock experienced	29%	26%	28%	30%
Crop pests, loss of harvest	***34%***	***42%***	***41%***	***29%***
Flood, strong rainfalls, hurricanes	19%	20%	22%	***23%***
Drought	13%	19%	20%	19%
Theft of harvest	10%	13%	15%	***20%***
Theft of animals	9%	11%	11%	***17%***
Diseases of animals	9%	9%	***17%***	12%
Illness or accident of household member	***14%***	10%	12%	10%
Insecurity	6%	7%	7%	3%
Death of a household member	***6%***	4%	2%	4%

With regard to **covariate shocks**, 13% of the households with very poor food consumption were affected by drought as compared to 20% of the households in the other consumption groups. Floods were more frequently reported by the adequate and best-off group, which makes sense as a high percentage of the better-off households living near the coastline. Households with poor and adequate food consumption are more likely to have experienced plant pests or diseases - around 40% compared to around 30% in the other two groups.

In terms of **idiosyncratic shocks**, theft of crops was reported by 15% of the households with adequate consumption and 20% of those with good consumption. The households with adequate consumption also experienced effects from animal diseases (17%) and households with good food consumption more often reported theft of animals (17%). The very poor consumption households mentioned more frequently the illness or accident of a household member (14%) more than any other consumption group.

In terms of perceived impacts on income, asset base and food security no clear differences exist between the four consumption groups. They deviate, however, in terms of the types of **coping strategies** applied. The households with poor food consumption were the least likely to have applied any strategy at all - only 38% reported that they have done so. In comparison, 52% of the households with adequate food consumption applied a strategy (see table).

	Very poor	Poor	Adequate	Good
Did nothing	***52%***	***62%***	***48%***	***54%***
Reduce food intake	**22%**	14%	17%	15%
Temporary work	14%	**17%**	**18%**	**17%**
Receive help from others	4%	4%	**10%**	**15%**
Modified the diet	**9%**	6%	6%	4%
Sale of livestock	7%	5%	**10%**	6%
Loan from friends/family	**4%**	2%	3%	2%
Buy food on credit	2%	**6%**	3%	4%

Households with very poor consumption were more likely to reduce their food intake and modify their diet than the other two groups. Take up of temporary work was reported across the four groups but slightly less common among the household with very poor consumption. Ten percent of the affected households with adequate consumption sold livestock to manage the shock. Poor households are more likely to buy food on credit, which could be perceived more as a livelihood strategy rather than a coping strategy to meet basic needs. This group reported the highest share of food expenditures on credit (see Section 5.3.2). The households with very poor food consumption rely more on loans from family and friends than purchases on credit. Interesting is that households with good and adequate food consumption rely more often on help from others.

About half of the households from the two better off groups adopted **prevention strategies** to avoid negative impacts from shocks in the future compared to only around 40% on the very poor and poor groups (see table).

	Very poor	Poor	Adequate	Good
No prevention strategy	***60%***	***61%***	***51%***	***53%***
Look for work	26%	24%	27%	25%
Diversify crops	8%	6%	**10%**	**13%**
Increase agricultural areas	4%	5%	**11%**	4%
Self organization	3%	4%	7%	7%
Raising of small livestock	2%	**4%**	**4%**	**5%**
Save money	1%	**4%**	**6%**	**4%**
Family planning	3%	3%	5%	4%
Learning new skills	2%	1%	**4%**	2%
Move dwelling or migrate	1%	1%	1%	2%

Across groups, households search for additional employment (around 25%). Ten percent of households with adequate and 13% with good food consumption have diversified their crops. Additionally the adequate consumption households increased their land under cultivation (11%). The raising of small livestock and saving money is more likely to be done by the households with poor, adequate or good food consumption, while the very poor group most likely has not enough capital to engage in these types of activities.

Section 5.5 – Vulnerability of households in the four food consumption groups

Households with **very poor food consumption** are food insecure and are very vulnerable to the impacts of shocks. Similar to other groups they have a high reliance on purchases; however, their cash availability is not sufficient to guarantee adequate access to food in terms of quantity and quality. A high percentage of households relying on daily wage labour belong to this group. Another vulnerable group are farming households with small plots and low crop diversification. Every fourth household in South Interior and South Coast, and every fifth household in North Interior belong to this consumption group.

The households with **poor food consumption** are very vulnerable towards food insecurity where the impact of a shock could easily render them food insecure. They have a slightly better purchasing power than the households with very poor food consumption, which ensures a regular intake of staple foods; however, their diet lacks diversification. Every third household in North Coast belongs to this profile, which makes them particular vulnerable towards natural hazards (floods, heavy rainfalls, drought) which are frequent in this zone. Again, daily wage labourers and small-scale farmers are more likely to belong to this group.

Households belonging to the group with **adequate food consumption** are less likely to be vulnerable towards food insecurity. They have enough cash available to meet daily food and non-food needs and have a slightly higher reliance on own production than the other consumption groups. A large percentage of livestock keepers and business owners belong to this group.

The households with **good food consumption** are not vulnerable to food insecurity. Their high cash availability enables this group to cope with all risks and shocks they may face. The majority of households reside in the Littoral zone and engage in fishing.

The geographic distribution of the four groups across the five strata can be observed in the Part VI.

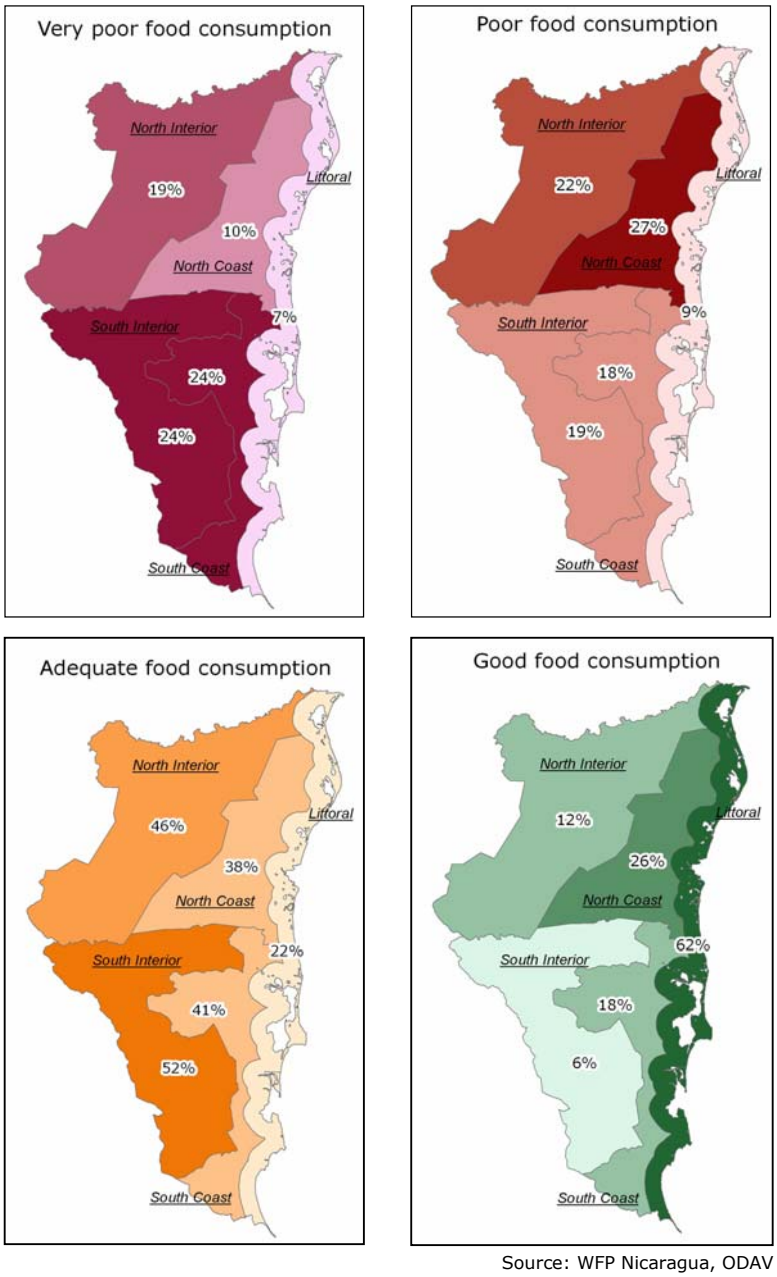
Part VI: Recommendations for programme interventions

This food security and livelihood survey covered five relatively homogeneous zones (strata) in the Autonomous Atlantic Regions of Nicaragua. Based on the findings of the socio-economic analysis (Part III), nutrition and health (Part IV) and household food consumption profiling (Part V), the report concludes with recommendations for food and non-food programme options and targeting to address food insecurity.

Section 6.1 – Geographic distribution of food consumption groups

Based on data on food frequency and dietary diversity, four household food consumption groups were created. In the overall sample 17% of households were classified as having very poor food consumption, 19% with poor consumption, 42% with adequate and 24% with good food consumption. The geographic distribution of each group is illustrated in the four maps below.

Household food consumption profiles in RAAN and RAAS



Source: WFP Nicaragua, ODAV

Section 6.2 - Main causes of food insecurity

The main causes of food insecurity vary from strata to strata, and therefore require different response options:

- **North Coast:** The area is prone to recurrent natural hazards, such as floods, strong rainfall and droughts. As agricultural production is the main livelihood activity for the majority of the households, they are vulnerable to crop pests and theft of harvest. Child morbidity is very high while chronic malnutrition is average and access to drinking water from improved sources is relatively high.

  → Main causes: Recurrent shocks, health problems

- **North Interior:** This zone is characterized by geographical isolation, which results in limited access to basic services, markets and livelihood opportunities. Farming households are additionally vulnerable to crop pests. The zone has the highest prevalence of child malnutrition – the prevalence of stunting is significantly higher than all the strata. The fact that 19% of these households are in the very poor food consumption group but 46% are in the adequate consumption groups indicates that the problem of malnutrition may not be one of food access but rather one of food utilization due to inadequate maternal and child-care practices and poor water and sanitation facilities.

  → Main causes: Food utilization, physical and economic access

- **South Coast:** Though average purchasing power is relatively high, there is also a large group that falls into the very poor food consumption group, indicating that income inequality could exist between different social groups. Daily wage labourers tend to have low food consumption levels, while livestock keepers generally fall into the better off groups. However these households are vulnerable to shocks such as livestock diseases. The prevalence of chronic malnutrition is in children is relatively low, indicating at least adequate access and utilization of food.

  → Main causes: Food access for some households

- **South Interior:** Similarly to the North Interior, the area is characterized by geographical isolation leading to a lack of income earning opportunities. The majority of households only pursue one livelihood activity. Agricultural production is limited combined with a low purchasing power.

  → Main causes: Physical and economic access

- **Littoral:** This zone has the best access to markets and livelihood opportunities, especially fishing. Purchasing power for food and non-food items is very high. Contrarily, the prevalence of malnutrition is not the lowest in the sample, which could be due to poor caring practices but not to elevated levels of child morbidity.

  → No food consumption problem, however, malnutrition could be addressed by improved maternal and child-care practices.

Section 6.3 – Role of food aid

As the causes of food insecurity are complex and related to income poverty and isolation, food aid alone is not the answer to address household food insecurity in the Atlantic regions. However, in the short-term, food based programmes can be a viable solution to improve the asset base of vulnerable rural households and improve their access to food. Complementary non-food interventions from the Government or other agencies are essential.

The findings suggest that nutrition and health problems, especially among children are matters of concern in the region. Here, fortified blended food aid, targeted to expectant and nursing mothers can play a significant role in improving health and nutrition status and to encourage better ante-natal care, care-taking and hygiene.

The fact that in areas with school feeding programmes, enrolment and attendance rates are higher, leads to the conclusion that current activities should be continued and extended into those areas with lower enrolment and attendance rates. In areas where child morbidity is particularly high, school feeding should be complemented with health education and de-worming activities.

Section 6.4 – Recommendations for programme options and targeting

6.4.1 – Overview on food interventions

The problem of access to food could be addressed by poverty-reduction programmes or livelihood enhancement strategies. *Food-for-work (FFW)* and *food-for-asset creation* programs could include activities to improve community infrastructure (health centres, schools, water and sanitation facilities, or tertiary roads). Improved access to safe drinking water and sanitation through food-for-work could be a suitable option to improve food utilization. *Food-for training* (FFT) could include agricultural and livestock training as well as vocational training for better livelihood security.

Maternal and child health (MCH) programmes that provide fortified blended food and health and nutrition education programmes could contribute to improved food consumption, utilization and child care. The provision of fortified food to vulnerable groups (expecting and nursing mothers, pre-school children and adolescent girls) can address current micronutrient deficiencies, as indicated in recent studies. The education component should contain information on caring practices, hygiene, nutrition and sanitation.

Although not specifically designed to directly address household food insecurity or to treat malnutrition, *food-for-education programmes* (FFE) are beneficial in providing an incentive for children to attend school every day. Providing fortified food rations to children in combination with de-worming activities can help to improve food utilization and increase consumption of essential micronutrients.

6.4.2 – Targeting of food aid interventions

Household with ***very poor food consumption*** would benefit from poverty-reduction programmes or livelihood enhancement strategies such as **FFW** and **FFA** with the objective to create community assets, in particular water and sanitation facilities, tertiary roads, school infrastructure and health services. **FFT** programmes could enhance skills-sets of individual household members to improve their access to better and more regular employment opportunities. Households in South Interior, South Coast and North Interior should be targeted for these types of interventions. In terms of social targeting, the following groups are recommended:

- Households relying solely on casual labour with no or little access to land and
- Within this group, households with high dependency ratios.

Disaster mitigation activities, such as erosion gullies, water harvesting, etc. through food-for-work could be especially beneficial to poor households in North Coast, a zone prone to recurrent natural disasters.

North Interior with higher prevalence of chronic malnutrition would benefit greatly from **MCH** programmes. Also communities in North Coast could be targeted because of the high incidence of child morbidity. Within the regions households with high dependency ratios and overcrowding should be prioritized.

FFE activities should be continued in areas where school feeding is already in place and if possible extended to other areas since the findings suggest that school feeding had a positive impact on enrolment and attendance rates. They should be complemented by health related activities, such as de-worming programmes and creation of water and sanitation facilities (possibly through FFW), particularly in North Coast.

6.4.3 – Overview on non-food interventions

Non-food interventions could include *micro-credit schemes, agricultural extension* and *poverty reduction programmes*. Improved availability of micro-credit facilities could help households to gain productive household assets, such as small livestock and agricultural inputs and tools. Agricultural extension programmes could provide improved information on commodity markets, pest control, animal diseases, crop diversification, adjusted agricultural seasonal cycles, etc. General poverty reduction and longer-term development activities could improve the rural road infrastructure, build or renovate schools and medical facilities and provide regular power to rural communities.

6.4.4 – Targeting of non-food interventions

Households with very poor and poor consumption – especially those relying primarily on one income generating activity – would benefit greatly from **micro-credit schemes** aimed at diversifying livelihoods. For example, the rearing of chickens or other small animals would enable households to have an additional source of income which at the same time would benefit household food consumption if these animal products are consumed. A similar range of households should be targeted as for FFW and FFT.

Agricultural extension programmes are of particular importance for households relying on farming. Crop disease was frequently reported by households in the Northern strata, while households in South Interior would greatly benefit from crop diversification.

Livestock extension programmes – including veterinary services – for those relying on animal husbandry. To benefit the households with very poor and poor consumption these programmes could be combined with micro-credit schemes.

All zones would benefit from **horticulture** as the consumption of fresh fruits and vegetables is minimal across all groups except for the households with good food consumption.

As remoteness is one of the main constraints found in both RAAN and RAAS, all strata would benefit from improved **road infrastructure, public transport services and social infrastructure**. Isolated communities not connection to road or water systems should be prioritized.

Natural resource management would be particularly useful for households in the Littoral that engage in fishing to ensure a sustainable use of the natural resource base. The same is valid for households that are involved in selling wood, firewood and charcoal, particularly in North Coast.

6.4.5 – Summary of food and non-food interventions

The table below provides an overview on all recommended programme and targeting options. To maximise benefits and efficiencies, it is often useful to combine different programmes such as example school feeding with de-worming activities, FFW and cash programmes to improve infrastructure, etc.

Type of intervention	Geographic targeting	Social targeting
FFW (Creation of community assets)	South Interior, South Coast, North Interior	Households relying on one income activity, Households with many dependents
FFT	South Interior, South Coast, North Interior	Households relying on one income activity, Households with many dependents
FFW (Disaster mitigation assets)	North Coast prioritizing communities in high risk areas	
FFE in primary and preschools	All zones (if school infrastructure exists)	School children
De-worming	All zones, particular in North Coast	School children
MCH	North Interior, North Coast	Pregnant and lactating mothers from households with many dependents or that are overcrowded
Micro-credit schemes for buying small livestock	North Interior, South Interior, South Coast	Households relying on one income activity, especially daily wage labourers
Agricultural extension programmes	Pest control in North Interior and North Coast, Crop diversification South Interior	Farming households
Livestock extension and veterinary services	South Coast, South Interior	Livestock keepers
Horticulture	All zones, prioritizing South Interior	
Improvement of road and social infrastructure	All zones prioritizing remote communities	
Natural resource management	Littoral, North Coast	Fishing households. Households engaging in the selling of wood

Annex I: Women and child nutrition and health tables

Table 1.1 – Women's education level, by strata

	N	No education	Primary		Secondary	
			Incomplete	*Complete*	*Incomplete*	*Complete*
North Coast	147	31%	40%	16%	13%	0%
North Interior	254	35%	46%	7%	9%	3%
South Coast	184	38%	34%	10%	15%	2%
South Interior	230	47%	44%	4%	5%	0%
Total	***815***	***38%***	***42%***	***8%***	***10%***	***2%***

Table 1.2 – Pregnancy and breastfeeding status and reproductive history by age group

Age group	Status at time of survey		Reproductive history		
	Pregnant	Breastfeeding	At least 1 miscarriage or abortion	Median # pregnancies	Median # children
15 to 19 years	15%	52%	10%	1	1
20 to 24 years	6%	42%	9%	2	2
25 to 29 years	7%	29%	12%	3	3
30 to 39 years	8%	31%	23%	6	5
40 to 49 years	1%	11%	17%	8	7
Total	***6%***	***30%***	***16%***	***4***	***4***

Table 1.3 – Pregnancy and breastfeeding status and reproductive history by strata

Age group	Status at time of survey		Reproductive history		
	Pregnant	Breastfeeding	At least 1 miscarriage or abortion	Median # pregnancies	Median # children
North Coast	11%	35%	17%	5	4
North Interior	4%	37%	11%	5	4
South Coast	5%	24%	17%	4	4
South Interior	6%	24%	18%	4	4

Table 1.4 – Relationship between education, mean age at first child & antenatal care

	No education	Primary		Secondary	
		Incomplete	*Complete*	*Incomplete*	*Complete*
Mean age at first child	17.0	17.8	18.0	18.7	20.3
Use skilled antenatal care	68%	74%	89%	86%	100%

Table 1.5 – Use of skilled antenatal care and size of child at birth, by strata

	Received skilled antenatal care*	Reported size at birth			
		Large or very large	Normal	Smaller than normal	Very small
North Coast	84%	10%	75%	6%	9%
North Interior	79%	20%	63%	6%	11%
South Coast	72%	19%	59%	12%	10%
South Interior	64%	16%	61%	14%	9%
Total	***74%***	***17%***	***64%***	***9%***	***10%***

**NC/SC < 0.05; NC/SI < 0.001; NI/SI < 0.001*

Table 1.6 – Night blindness and vitamin A supplementation in women

	Experienced night blindness during pregnancy			Had vitamin A supplement*
	N	%	*95% CI*	
North Coast	1	0.5%	*(0, 1.5)*	36%
North Interior	2	0.6%	*(0, 1.5)*	23%
South Coast	3	1.3%	*(0, 2.7)*	28%
South Interior	1	0.4%	*(0, 1.1)*	28%
Total	***7***	***0.7%***	***(0.2, 1.2)***	***28%***

**NC/NI < 0.05*

Table 1.7a – Two-week period prevalence of morbidity in women, by age group

Age groups	Morbidity in past 2 weeks		
	Fever	Diarrhoea	Both illnesses
15 to 19 years	22%	7%	5%
20 to 24	17%	9%	6%
25 to 29	23%	11%	7%
30 to 39	21%	10%	6%
40 to 49	21%	8%	6%
Total	***21%***	***10%***	***6%***

Table 1.7b – Two-week period prevalence of morbidity in women, by strata

	Morbidity in past 2 weeks		
	Fever*	Diarrhoea+	Both illnesses*+
North Coast	26%	16%	12%
North Interior	24%	12%	8%
South Coast	14%	7%	4%
South Interior	18%	4%	2%
Total	***21%***	***10%***	***6%***

* *NC/SC < 0.01* + *NC/SC < 0.05; NC/SI < 0.000* *+ *NC/SC < 0.01; NC/SI < 0.000*

Table 1.8 – Knowledge of correct hand washing practices in women, by strata

	Average # mentioned	When to wash hands				
		before preparing food	after defecating	after taking out the garbage	after changing diapers	before eating
North Coast	2.7	84%	64%	30%	10%	78%
North Interior	2.7	80%	72%	21%	20%	80%
South Coast	2.3	71%	78%	9%	16%	60%
South Interior	2.3	66%	67%	13%	14%	73%
Total	***2.5***	***74%***	***71%***	***18%***	***15%***	***73%***

Table 1.9a – Moderate malnutrition in children (6-59 months), by strata

	Wasting		Underweight		Stunting*	
	%	*95% CI*	*%*	*95% CI*	*%*	*95% CI*
North Coast	2.9%	*(0.4, 5.5)*	12.3%	*(7.3, 17.2)*	21.6%	*(15.6, 27.9)*
North Interior	1.1%	*(0.0, 2.3)*	12.8%	*(8.8, 16.8)*	35.9%	*(30.2, 41.6)*
South Coast	2.4%	*(0.3, 4.5)*	7.3%	*(3.7, 10.9)*	18.0%	*(12.7, 23.2)*
South Interior	0.4%	*(0.0, 1.3)*	7.0%	*(3.7, 10.4)*	22.5%	*(17.0, 27.9)*
Total	***1.6%***	***(0.8, 2.4)***	***9.9%***	***(7.9 – 11.9)***	***25.4%***	***(22.5 – 28.3)***

* *NC/NI < 0.01; NI/SC < 0.001; NI/SI < 0.01*

Table 1.9b – Severe stunting in children (6-59 months), by strata

	N	Severe stunting	
		%	95% CI
North Coast	171	5.3%	(1.9, 8.6)
North Interior	273	7.7%	(4.5, 10.9)
South Coast	206	4.4%	(1.6, 7.2)
South Interior	227	7.5%	(4.0, 10.9)
Total	***877***	***6.4%***	***(4.8 – 8.0)***

Table 1.10a – Breastfeeding practices, by strata

	Ever breastfed?	Children 0 – 24 months			
		Exclusive breastfeeding	breastfeeding plus liquids	breastfeeding plus solids	Not breastfeeding
North Coast	94%	14%	19%	41%	26%
North Interior	95%	11%	22%	39%	29%
South Coast	94%	17%	21%	26%	36%
South Interior	92%	11%	15%	28%	46%
Total	***94%***	***13%***	***19%***	***34%***	***34%***

Table 1.10b - Breastfeeding practices in boys (0-24 months), by age group

Age in months	Ever breastfed?	Children 0 – 24 months			
		Exclusive breastfeeding	breastfeeding plus liquids	breastfeeding plus solids	Not breastfeeding
0 to 5	98%	31%	41%	7%	21%
6 to 11	90%	12%	22%	47%	20%
12 to 17	93%	8%	13%	32%	46%
18 to 23	100%	9%	9%	26%	56%
Total		***13%***	***19%***	***30%***	***38%***

Table 1.10c - Breastfeeding practices in girls (0-24 months), by age group

Age in months	Ever breastfed?	Children 0 – 24 months			
		Exclusive breastfeeding	breastfeeding plus liquids	breastfeeding plus solids	Not breastfeeding
0 to 5	97%	53%	42%	6%	0
6 to 11	98%	0%	24%	58%	18%
12 to 17	100%	6%	11%	48%	35%
18 to 23	92%	0%	5%	36%	59%
Total		***13%***	***20%***	***39%***	***29%***

Table 1.11 –Currently breastfed & vitamin A supplementation, by sex and age group

Age group in months	Currently breastfed children	Currently breastfed		Received vitamin A	
		Boys	Girls	Boys	Girls
0 to 5 months	88%	79%	100%	48%	24%
6 to 11 months	81%	80%	82%	48%	38%
12 to 17 months	58%	53%	65%	53%	37%
18 to 23 months	42%	44%	40%	65%	49%
24 to 35 months	18%	23%	13%	50%	59%
36 to 47 months	6%	5%	8%	52%	55%
48 to 60 months	4%	6%	2%	52%	56%
Total	***32%***	***32%***	***31%***	***52%***	***50%***

Table 1.12 – Vitamin A supplementation in children, by strata

	% children receiving vitamin A supplements
North Coast	52%
North Interior	44%
South Coast	64%
South Interior	48%
Total	***51%***

Table 1.13a – Two-week period prevalence of illness, by strata

	Fever*	Cough+	ARI	Diarrhoea**	Treat diarrhoea	Have any illness++
North Coast	49%	58%	38%	42%	60%	72%
North Interior	42%	55%	35%	31%	47%	67%
South Coast	32%	47%	26%	24%	64%	63%
South Interior	33%	45%	32%	23%	53%	56%
Total	***39%***	***51%***	***33%***	***29%***	***55%***	***64%***

**NC/SC < 0.01; NC/SI < 0.01 +NC/SI < 0.05 **NC/SC < 0.001; NC/SI < 0.001 ++NC/SI < 0.01*

Table 1.13b - Two-week period prevalence of illness, by age group

Age in months	Fever	Cough	ARI	Diarrhoea	Treat diarrhoea	Have any illness
0 to 5	40%	51%	32%	28%	65%	65%
6 to 11	59%	61%	42%	40%	58%	78%
12 to 17	45%	59%	37%	45%	45%	73%
18 to 23	43%	50%	30%	38%	64%	69%
24 to 35	28%	55%	34%	29%	57%	68%
36 to 47	32%	46%	30%	22%	59%	55%
48 to 59	30%	44%	29%	20%	46%	55%
Total	***39%***	***51%***	***33%***	***29%***	***55%***	***64%***

Table 1.14 – Treatment of diarrhoea, by strata

	Treatment of diarrhoea						
	ORS	medicine	call health centre	visit health centre	laxative	traditional remedy	other
North Coast	30%	51%	6%	35%	2%	39%	5%
North Interior	21%	53%	1%	42%	2%	39%	3%
South Coast	34%	33%	0%	46%	1%	31%	5%
South Interior	15%	44%	7%	37%	2%	20%	4%
Total	***24%***	***45%***	***3%***	***40%***	***1%***	***32%***	***4%***