REPORT

VAM - VULNERABILITY ANALYSIS & MAPPING

GHANA

Food Security and Vulnerability Analysis of Five Regions in Ghana

CONDUCTED IN MARCH 2004

Ghana

WFP Ghana
University for Development Studies – Tamale, Ghana
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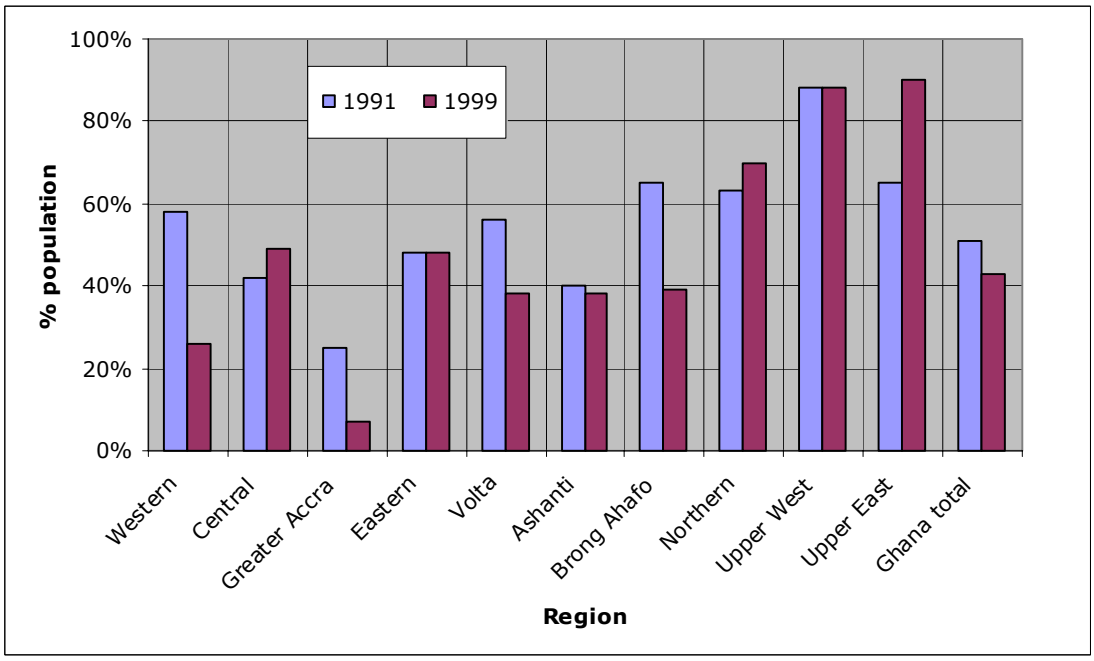
1.0 – Background and Overview

Ghana with a population of about 20 million people and an area of about 237,000 square kilometres is divided into 10 political regions. The UNDP Human Development Report ranked Ghana 129th of 175 countries and approximately 45% of the population live below the poverty line of one USD per day[1].

1.1 - Food access

During the 1990s, poverty decreased nationally in Ghana but with striking regional differences. While poverty in other parts of Ghana decreased slightly as a result of the economic recovery programme (ERP) of the 1990s, it increased in northern Ghana during the same period. Chart 1.1 shows the variation in poverty and poverty changes by region, illustrating that the lowest levels of poverty lie in the *Greater Accra* region, followed by *Western, Ashanti, Volta* and *Brong Ahafo* regions. Poverty increased in the 1990s in *Central*, *Northern* and *Upper East* regions and remained the same in *Eastern* and *Upper West* regions. However, the highest levels of poverty remained, by 1999, in *Upper East, Upper West* and *Northern* regions of the country.

Chart 1.1 – Poverty trends by region – 1991 to 1999



Data source: Ghana Statistical Service, October 2000

However poverty and food security are not mutually exclusive. Activities to address poverty will reduce peoples' vulnerability to food insecurity. Comparing poverty and food insecurity, the following points should be noted:

- The poor are **not** a homogeneous group.
- Income poverty does not translate into reduced **availability** or **access** to food in all circumstances. If all food insecure people are poor, not all poor are food insecure (e.g. need food aid).
- Food is **critical** in the lives of the "ultra-poor"
- It is thus necessary to make a clear distinction between the **chronically poor** and the **transient**

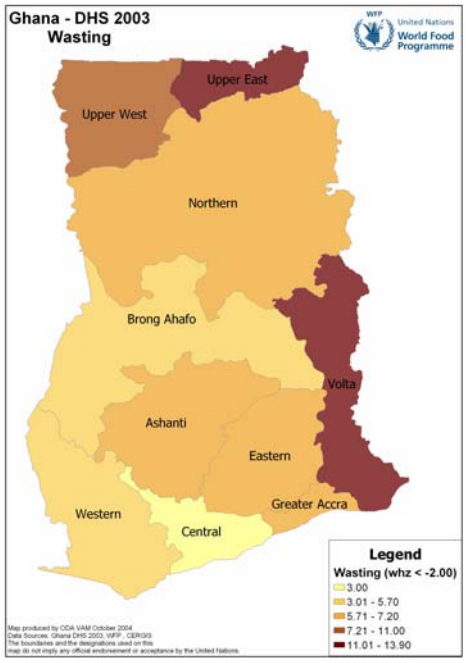
[1] UNDP Human Development Report, 2003

1.2 – Food availability

Agriculture is Ghana's most important economic sector, employing more than half the population on a formal and informal basis and accounting for almost 55% of the GDP and export earnings. Ghana's basic food commodities are maize, rice, tubers, plantains, meat and fish – all of which are locally produced. According to FAO, the country's minimum calorie needs per person are estimated at 2,300 kcals/day. Shortfalls in local production are usually supplemented with imports from commercial purchases and small amounts of food aid.

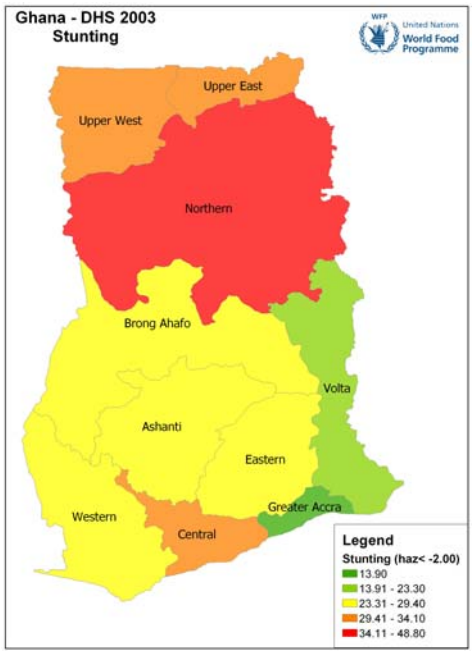
In the northern savannah region, agriculture is the main economic activity of most of the population. However, it continues to operate at the subsistence level, mostly on marginal and/or fragile lands. Production is largely rainfed and labour intensive and is further constrained by lack of inputs and the use of traditional methods. Over the past five years, cereal production has been relatively stagnant while the production of cassava and yams has increased by about 4 percent each year. Most of the cereal production is concentrated in *Upper East* and *Upper West* regions where millet and sorghum are the predominant crops while the *Northern* region produces a mixture of sorghum, rice, roots and tubers, and maize. Agricultural activity in *Ashanti* and *Central* regions is less than in the three northern regions and consists of some maize (*Ashanti*) and then tree crops.

1.3 – Food utilization

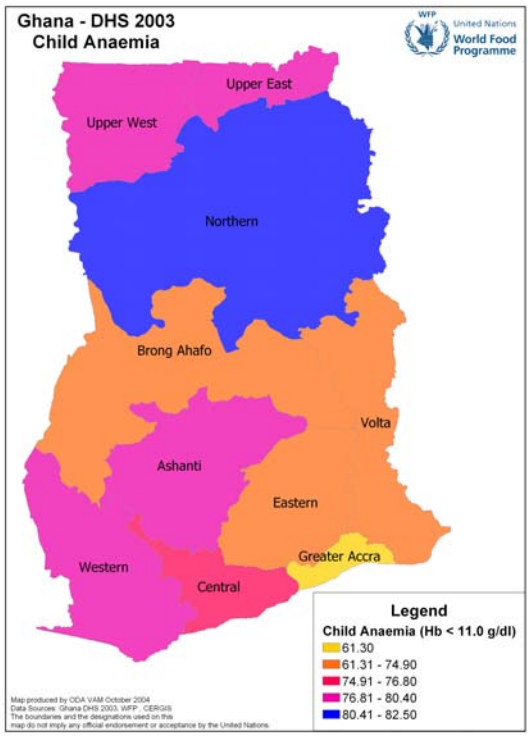


Nutritional status is the best composite indicator of food security utilization. The map to the left shows the prevalence of acute malnutrition (wasting) by region as determined by the 2003 Demographic and Health Survey. The regions with the highest prevalence of wasting are *Upper East* and *Volta*, followed by *Upper West*. *Northern*, *Ashanti*, *Eastern* and *Greater Accra* are all in the same group while children in *Central* region have the lowest prevalence of acute malnutrition in the country.

The prevalence of chronic malnutrition ranges from about 15% to nearly 50% within the country, as illustrated in the chart to the right. The highest prevalence is found in *Northern* region followed by the *Upper East*, *Upper West* and *Central* regions. The prevalence of maternal malnutrition ranges from more than 20% in *Upper East* to less than 3% in *Greater Accra*. High prevalence of maternal



malnutrition is also found in *Upper West, Northern* and *Western* regions.



Micronutrient malnutrition is equally widespread in the regions given the levels of anaemia, goitre and night blindness that exist in communities. The chart on the left shows the prevalence of anaemia in young children. Although levels of anaemia are high in all regions, *Northern* region has the highest prevalence of child anaemia followed by *Upper West*, *Upper East*, *Western* and *Ashanti* regions.

The prevalence of maternal anaemia is highest in *Upper East* region (about 50%), followed by *Upper West* and *Northern*. The lowest levels are in *Central*, *Western* and *Brong Ahafo* regions, followed by *Ashanti* and *Greater Accra*.

In summary, the availability of food through local production in the north of Ghana is limited, poverty is higher than anyplace else in the country, reducing purchasing power and limiting access. In addition, nearly every outcome measure of nutritional status from the 2003 DHS survey indicates high levels of both acute and chronic malnutrition plus very high levels of child and maternal anaemia in the three northern regions.

1.4 – World Food Programme Ghana

WFP Ghana is presently implementing a Country Programme that was approved for the period 2001-2005. The Country Programme focuses on three basic activities:

1. Supplementary feeding and health and nutrition education (Activity 1);
2. Girl's education in the Northern Savannah (Activity 2);
3. Savannah Resources Management Programme (Activity 3).

An updated Vulnerability Analysis was necessary to guide the formulation of a new country programme (2006-2010). *Upper West, Upper East, Northern*, *Ashanti* and *Central* Regions were identified as regions that should be covered in a VAM study – the three northern regions because of poor indicators of food insecurity at all levels, *Central* because of relatively higher levels of poverty, and *Ashanti* region because it was identified as a 'hot spot' by the Millennium Hunger Study.

The analysis of the data from the VAM survey was undertaken to provide clear understanding about who is food insecure, where they are located and the structural and immediate causes of hunger and food insecurity. The analysis is also aimed at identifying groups of the population where food aid will have a comparative advantage and WFP could intervene. It would further justify the role of food aid and proposed potential measures or programme strategies that should be undertaken to mitigate the problems and finally identify potential implementing partners.

1.5 – Food security concepts and definitions

Food security is a condition in which a population has physical, social and economic access to sufficient, safe and nutritious foods over a given period to meet dietary needs and preferences for an active life. A food secure population can meet its consumption needs during the given consumption period by using strategies that do not compromise future food security (some sort of consumption smoothing).

Food insecurity is the inverse of food security. It is a condition in which a population does not have access to sufficient, safe and nutritious food over a given period to meet dietary needs and preferences for an active life. Possible causes are insufficient food availability, insufficient food access and inadequate food utilization. More importantly for this definition, food insecurity has a temporal dimension. Chronic (or long-term) food insecurity occurs when a population has continuously inadequate consumption. Chronic food insecurity arises from conditions of poor food production, limited incomes and poor health. Current (or transitory) food insecurity occurs when a population suffers a temporary decline in consumption. Current food insecurity can result from instability in food production, food prices, household incomes and health conditions.

Vulnerability is an important concept in food security. It is defined as the probability of an acute decline in food access or consumption levels below minimum survival needs. It is a result of both exposure to risk factors - such as drought, conflict or extreme price fluctuations - and also of underlying socio-economic processes which reduce the capacity of people's ability to cope.

Thus, vulnerability can be viewed as follows:

Vulnerability = exposure to risk + inability to cope

For the purpose of this study, *household* is defined as a group of people who constitute a production and consumption unit within a compound. They are usually bound together in production by the household farm and consumption by usually taking at least one meal a day from a common pot. The household is the basic unit of analysis in the for this research study.

2.0 - Objectives and Methodology

2.1 – Objectives

The general objective of this study was to answer five questions essential to any WFP Vulnerability Analysis and Mapping Study:

1. Who are the food insecure?
2. Where they are located?
3. How many are they?
4. What are the underlying and immediate causes of hunger and food insecurity?
5. Could food aid have a role and where can WFP intervene?

The specific objectives of this study are to:

- Identify the areas and the populations living in food insecurity;
- Understand and analyse the living conditions, and the vulnerability of the farming communities and households;
- Establish profiles of communities and households vulnerable to food insecurity;
- Describe the reasons, the period and the degree of food insecurity that affect households;
- Specify the coping mechanisms of households in different situations of vulnerability to food insecurity;
- Establish in order of priority, the districts that could benefit from WFP food aid;
- Determine whether food aid as an incentive, is appropriate for community projects already targeted by other partners;
- Identify appropriate institutional mechanisms through which households and communities can manage and maintain the assets created;
- Together with other partners propose adequate intervention measures to redress poverty and food insecurity.

2.2 - Study Area

The field survey was undertaken in five of the 10 regions of Ghana – *Ashanti*, *Central*, *Northern*, *Upper East*, and *Upper West*. The three regions in the extreme north of the country have consistently been identified as being the most vulnerable and food insecure in the country. The Millennium Hunger study showed *Ashanti* to be a 'hot spot' in Ghana in terms of hunger while *Central* region is 4th highest in poverty indicators.

Concerns have however been raised with regards to *Western* and *Volta* regions which many believe to be very vulnerable based on the same secondary data. Five districts were chosen from each of the regions and based on population, environmental and ethnic diversity, the sample size for each district was determined.

2.3 - Sampling procedure

Actual choice of communities in the districts was done in the field using stratified random sampling and/or cluster random sampling. In districts where many communities were to be selected the district was divided into the existing sub-

district or agricultural zones and the communities randomly sampled by the Supervisors from the zones. In districts where few communities were sampled, the zones were clustered and the communities randomly sampled. Some communities were purposively sampled to ensure some representation of communities that are adjacent to forest reserves.

Sampling of compounds/households for interview was undertaken by either systematic random sampling or simple random sampling. The method used depended very much on the nature of the settlements; generally, the former is for nucleated settlements and the latter for dispersed settlements. The important consideration was to ensure that households chosen were representative of the population.

Compounds are not necessarily households, thus for compounds that consisted of more than one household, the households with children under 5 years were chosen. If there were under fives in more than one household in a compound, simple random sampling was done to obtain the household to be interviewed. The final sample is presented in Table 2.1 below.

Table 2.1 – Survey sample by region

Region	Communities	Households & Mothers	Children < 5 years
Upper West	20	196	246
Upper East	21	195	194
Northern	27	276	291
Ashanti	28	339	391
Central	28	295	301
Total	**124**	**1301**	**1421**

Source: Field Survey, April/May 2004.

2.4 - Data Collection

Data collection was undertaken at three levels: community, household and individual. Questionnaires were also administered to groups of key informants in the communities, which were formed to get equal representation of men and women but also to have input from people of different ages. Relevant information about the socio-cultural and political organizations of communities was also sought from key informants, usually before the day of actual data collection.

At the household level, men usually were the main respondent for most of the household questionnaire. However, there was a special women's questionnaire that collected information on water and sanitation, food consumption and the health and nutrition of women and children.

All children under five in the selected household were weighed and measured at designated centres within the community. When the mother had completed her interview, she too was weighed and measured. These nutritional outcomes were then linked to the household data to provide valuable insight to the linkages between household food security and malnutrition.

2.5 - Data entry and analysis

Most of the questions were pre-coded before data collection while those with open-ended questions were coded before data entry. After the data collection was completed, the questionnaires were reviewed carefully and the data were entered using Epi-Info software.

The data analysis was undertaken by several teams. A team from the University of Development Studies carried out the descriptive analysis of the household, women and child sections at both regional and district/district cluster levels. Another team from WFP VAM in Rome carried out additional analyses using multivariate and cluster analysis techniques. Descriptive data analyses were done using SPSS software while principal components analyses were done using ADDATI software. Spatial analysis was also used to create homogeneous district clusters in order to generalize findings to districts not covered in the sample.

3.0 – Descriptive results – Household survey

3.1 – Household Demographics

3.1.1 – Household size and composition

Household sizes and composition have implications for food production and consumption and hence food security and vulnerability. The gender proportions in households have implications for food security. Apart from easy access to farmland, households with more males are less constrained in terms of availability of farm labour. Women generally have constraints in the acquisition of farmland and use of family labour in most Ghanaian societies, particularly northern Ghana. Table 3.1 shows that households are generally larger in the north as compared to the south. The average household in the *Northern* region has 6 people, while households in the *Upper East* and *Upper West* regions on the average have 5 people. Households in the *Ashanti* and *Central* regions are generally smaller, with an average size of 4 people.

Table 3.1 Household Sizes and Composition by Gender and by Region

Region	Total number of people in sampled households	Average Household size	Percentage female
Ashanti	2176	4	53%
Central	1626	4	54%
Northern	2207	6	51%
Upper East	1483	5	51%
Upper West	1411	5	49%

Source: Field Survey, April /May 2004

Age distribution of households has implications for food production and utilization as well as dependency ratio. By the World Bank definition, the dependency ratio refers to persons in the "dependent" ages (under 15 years plus 60 years or older) to those in the "economically productive" ages (15-59 years). Table 3.2 presents percentage age distribution of household members and the percentage with disabled members. From the table, it is clear that dependent household members are slightly higher than those in the economically active group in all the regions with the exception to the *Central* region. Household dependency ratio indicates that every working household member in all the five regions takes care of at least one other person. Disability in household members is not a major problem in all the regions except for *Northern* region where about 15% of households have at least one member who is disabled - mainly amputees.

Table 3.2 Households Age Structure & disabilities by Region

Region	% Household Members in Age Group				% HH with disabled member
	0-5 Years	6-14 Years	15-59 Years	60+ Years	
Ashanti	29%	24%	44%	3%	2%
Central	25%	20%	50%	5%	1%
Northern	25%	23%	47%	4%	15%
Upper East	24%	26%	45%	5%	3%
Upper West	25%	21%	47%	7%	1%

Source: Field Survey, April /May 2004

3.1.2 - Education

Education is very important in all aspects of life. The number of years or the level of education determines the sort of employment one gets and hence their contribution to household income and food supply. Table 3.3 confirms an already

known fact that education in northern Ghana is the most deprived in terms of education. Among all the five regions, the children in the northern region sample have the highest dropout rate with between 74% and 79% of males and females respectively dropping out of school before completion. Average number of years spent in school is also lowest in the northern region sample. School dropout rate is higher among females in all five regions except for the *Upper East*.

Table 3.3 - Average Grades Obtained in School and Dropout Rate by Region

Region	Average Number of Grades Obtained in School		Percentage of Enrolled Students/Pupils Currently in School	
	Male	Female	Male	Female
Ashanti	6 years	5 years	37%	30%
Central	5 years	4 years	32%	30%
Northern	2 years	1 year	26%	21%
Upper East	4 years	3 years	39%	41%
Upper West	4 years	3 years	29%	29%

Source: Field Survey, April /May 2004

3.1.3 - Native Languages of sampled households

Ethnicity is one of the factors that were taken into consideration in the sampling of households. Dagaari, Twi and Fanti are the dominant languages in the *Upper West*, *Ashanti* and *Central* regions respectively with over 75% of sampled households speaking these languages in the three regions. Samples for the *Upper East* and *Northern* regions are more evenly distributed in terms of ethnicity. About 31% of sampled households in the *Upper East* region speak Gruni. Dagbani and Gonja are the dominant languages in the *Northern* region. The diverse nature of ethnicity in the *Upper East* and *Northern* regions implies that food production and particularly food utilization could be more varied compared to the *Upper West*, *Ashanti* and *Central* regions.

3.1.4 - Headship of households

Headship of households has implications for food production. Female-headed households within a compound of households will be constrained in terms of access to resources such as land and use of family labour especially in Northern Ghana. In addition, elderly-headed households are likely to experience shortfalls in production, income and food in cases where the household head is the main breadwinner. Table 3.4 shows that there are more female-headed households in the sample in the southern regions of *Ashanti* and *Central* than there are in the north. This is reasonable since in the north of Ghana, females are only allowed to head households in the event of death or absence of the male household head. The *Upper West* region has the highest percentage of elderly-headed households (24%) followed by the *Central* region (20%).

Table 3.4: Household Headship by Gender, Age and Region

Region	Female-Headed	% Elderly-Headed[1] Households
Ashanti	14%	8%
Central	25%	20%
Northern	4%	16%
Upper East	5%	7%
Upper West	3%	24%

Source: Field Survey, April /May 2004

1 Household Heads aged 60 years and above

3.2 – Housing and household facilities

3.2.1 - House ownership, crowding and construction materials

Ownership of houses as well as materials used for roofing and for buildings are very good indications of wealth and thus poverty and vulnerability. The information in Table 3.5 shows that just less than 60% of households in *Ashanti* region sample own their homes while between 85-90% of households in the other regions are home owners. On the average, there are 4 persons per room in the *Ashanti* and 2 persons per room in *Central*, *Upper East*, and *Northern* regions. Upper West households had the fewest average persons per room in the sample. Despite the lower levels of ownership and greater crowding in *Ashanti* region households, their homes tend to be constructed of higher quality and more durable materials, with 92% having a roof made of corrugated iron sheets and only 14% with a dirt floor. Houses in the *Central* sample are also quite well constructed as compared to the three regions in the north. Houses in the *Northern* region sample are the most likely to have a thatch or straw roof while those in the *Upper West* sample are most likely to have a dirt floor. Due to the kind of construction material used for houses in the north, it is far easier for people to construct houses as compared to the south which may explain why more households in the north of Ghana live in their own houses.

Table 3.5: House ownership, crowding and main construction materials by Region

Region	Owning	Crowding (persons/room)	Roofing materials		Dirt floor
			Thatch grass or straw	Corrugated iron sheets	
Ashanti	58%	4.0	6%	92%	14%
Central	84%	2.0	16%	78%	11%
Northern	86%	2.0	60%	27%	21%
Upper East	89%	2.0	47%	35%	48%
Upper West	89%	1.4	35%	51%	67%

Source: Field Survey, April /May 2004

3.2.2 - Sources of lighting and cooking fuel

Sources of lighting and fuel are good indicators of standards of living of households and communities and the degree of destruction of natural resources. In most cases, the fuel sources are fuel wood and charcoal (see Table 3.6 below). That means there is a high dependence on the use of natural resources by the people. Over 90% of households in the three northern regions depend on fuel wood as the main source of cooking fuel. The implications are that these households will face severe household energy crisis in the event of scarcity of forest resources such as fuel wood.

Table 3.6: Main Sources of lighting and cooking fuel by Region

Region	Sources of lighting			Sources of cooking fuel			
	Pan lamp	Kerosene lantern	Solar	Electricity	Fuel wood	Charcoal	Plant stalks
Ashanti	1%	52%	0	47%	84%	16%	0
Central	1%	74%	0	25%	89%	11%	0
Northern	2%	87%	1%	10%	96%	4%	0
Upper East	4%	91%	0	5%	91%	2%	7%
Upper West	10%	85%	4%	1%	95%	5%	0

Source: Field Survey, April /May 2004

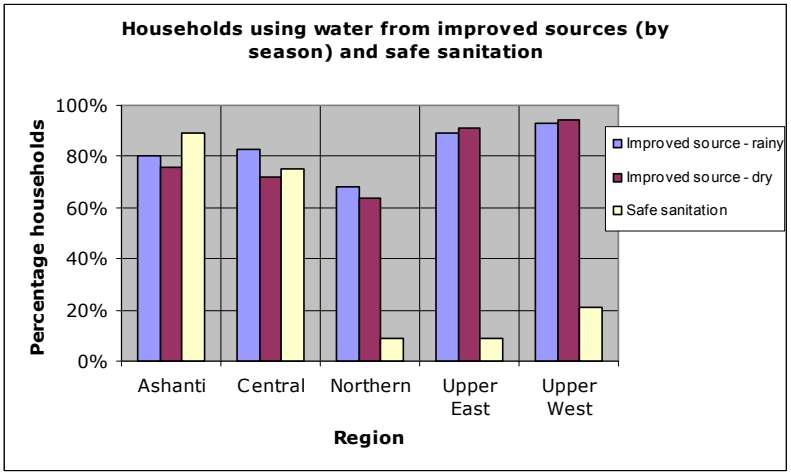
The *Ashanti* and *Central* regions also have more households depending on fuel wood for cooking. However, a significant proportion of households in these two regions use charcoal, which is a more efficient utilization of fuel wood. Ironically,

the *Ashanti* and *Central* regions are located in the forest zone of Ghana where the exploitation of the forest for fuel may not significantly damage the environment. The same cannot be said for the northern regions, which are located in the Guinea savannah zone with a lesser endowment in forest resources.

Access to electricity is much higher in *Ashanti* region sample households where nearly half relay on electricity for lighting. One-quarter of the households in the *Central* region sample also use electricity for lighting while most of the sampled households in the northern regions rely on kerosene lanterns for lighting.

3.2.2 - Access to improved sources of drinking water and sanitation facilities

Access to drinking water from improved sources and to safe sanitation facilities greatly influences the health status of a population. By UNICEF definition, water from improved sources refers to treated surface water and untreated water from protected springs, boreholes, and sanitary wells. With regards to sanitation, UNICEF defines them as excreta disposal facilities that can effectively prevent human, animal and insect contact with excreta.



Access to drinking water from improved sources and use of safe sanitation facilities is presented the chart to the left. The *Upper East* and *Upper West* regions have greater access to drinking water from improved sources in both seasons, as compared to the other regions. In these two regions, over 90% of households have access to safe drinking water. This is partly attributable to interventions by development agencies in the provision of boreholes in the two upper regions. The *Northern* region on the other hand, has serious problems of safe water supply with about 35% of households consuming water from unsafe sources. In the *Central* and *Ashanti* regions about three-quarters of the households are using water from improved sources.

Although there are sanitation problems across the country, the situation is worse in the three northern regions where 80-90% of households use unsafe excreta disposal facilities. Use of pan latrines and defecation in open spaces or near by bushes are the main toilet facilities in these regions. Sanitation is much better in sampled households living in *Ashanti* and *Central* regions.

3.3 – Asset ownership

The type of assets owned by households in any geographical area is a very useful indicator of the standard of living. Assets like cooking utensils, hoes, cutlasses, and lanterns are necessities and hence many households try as much as possible to acquire them. In most rural settings however, household assets such as beds, tables, chairs, radios and tapes, and motorbikes regarded as luxury items and thus acquired by the economically better-off households.

3.3.1 – Household productive and durable asset ownership

Tables 3.7a and 3.7b present the percentage of households owning productive and durable assets by region. Ownership of household productive assets seems higher in the regions in the north and is most likely linked to the type of livelihoods pursued by those households. Most own a variety of farming tools and even boat and fishing gear ownership is slightly higher, especially in the Northern region. In addition over 70% of households in the three regions in the north own bicycles. The main reason could be the absence of reliable means of transport rather than a relatively better living standard or economic situation.

Table 3.7a: Percentage households owning productive assets by region

Asset	% of Households Owning Asset				
	Ashanti	Central	Northern	Upper East	Upper West
Hoe	42%	61%	91%	95%	86%
Axe	21%	24%	63%	57%	33%
Sickle	6%	5%	43%	66%	14%
Cutlass	76%	89%	89%	79%	93%
Bicycle	13%	20%	84%	72%	86%
Motorbike	1%	1%	3%	6%	8%
Boat/Canoe	0	2%	6%	1%	1%
Fishing Gear	0	2%	8%	4%	0

Source: Field Survey, April /May 2004

More households in the *Ashanti* and *Central* regions as compared to the three other regions own assets like beds, tables and chairs. Again, this difference in asset ownership can highlight differences in livelihood activities with households in the *Ashanti* and *Central* regions relying less on farming for food and income. They have smaller houses but they are of better construction and with better furnishings.

Table 3.7b: Percentage households owning durable assets by region

Asset	% of Households Owning Asset				
	Ashanti	Central	Northern	Upper East	Upper West
Bed	91%	91%	72%	53%	71%
Table	71%	89%	63%	68%	69%
Chair	72%	82%	57%	60%	63%
Lantern	92%	97%	96%	93%	93%
Cooking utensils	97%	96%	92%	97%	89%
Radio/Tape	59%	63%	65%	65%	69%
Sewing Machine	21%	22%	17%	19%	20%
Television	5%	0	0	0	0

3.3.2 Tree assets

The number and type of trees owned by households are other good indicators of household wealth in rural Ghana. Table 3.8 presents ownership of tree assets by households in the five regions. It is clear from the table that there is form of diversity in the kind of trees owned across the regions. Trees such as oil palm, citrus, cocoa, and pineapple are virtually absent in the in the three northern regions of *Upper East*, *Upper West* and *Northern* but very in the *Ashanti* and *Central* regions. On the other hand, *shea* and *dawadawa* are absent in the *Ashanti* and *Central* regions. Although trees found in the northern and southern parts of Ghana both have their economic value, trees in the south seem to more valuable with cocoa and oil palm being the top foreign exchange earning

commodities. This is one of the main reasons why poverty is higher among Northern households.

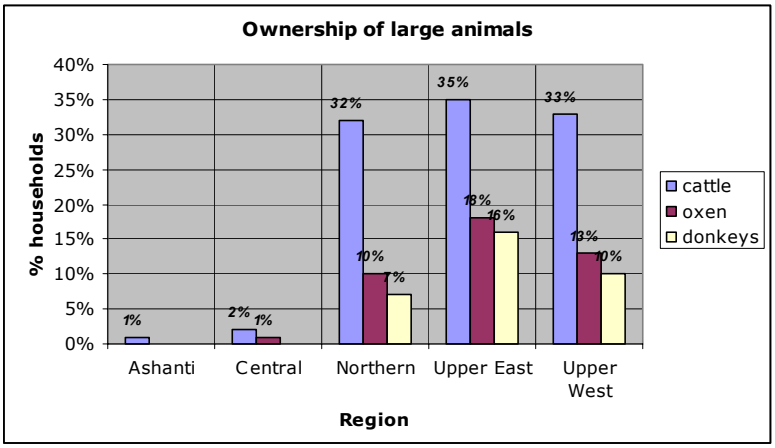
Table 3.8: Tree ownership by type and Region

Tree Type	% Households owning trees				
	Ashanti	Central	Northern	Upper East	Upper West
Coconut	3%	23%	3%	1%	0
Oil palm	12%	41%	2%	1%	1%
Banana	5%	10%	3%	2%	1%
Citrus	6%	17%	2%	2%	0
Cashew	0	1%	21%	4%	15%
Mango	4%	10%	24%	37%	58%
Cocoa	18%	28%	2%	0	0
Pineapple	3%	13%	2%	0	0
Shea	0	0	36%	25%	88%
Dawadawa	0	0	32%	23%	84%

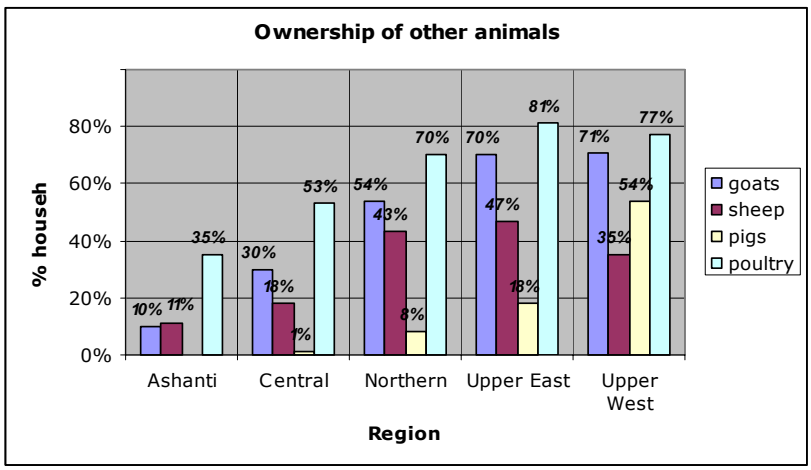
Source: Field survey, April /May 2004

3.3.3 – Livestock ownership

In terms of livestock or ownership of animals, households in the three northern regions keep more of all types of animals compared to the two southern regions. This could be because most rural northern households regard livestock as a form of savings from which withdrawals are made to meet urgent household needs rather than an enterprise.



The graph on the left compares the percentage of households owning large animals such as cattle, oxen or donkeys, by region. Ownership is much higher in the northern regions for all types and with households in the *Upper East* and *West* regions more likely to own oxen and donkeys. The median number of cattle owned is highest in *Upper West* (8) than the other two regions (4 cattle). On average, households with oxen will own two of them while households owning donkeys in *Upper East* and *Northern* regions will only have one, as compared to *Upper West* where they mostly have three.



Ownership of goats and sheep is also higher in the northern regions. More than half the

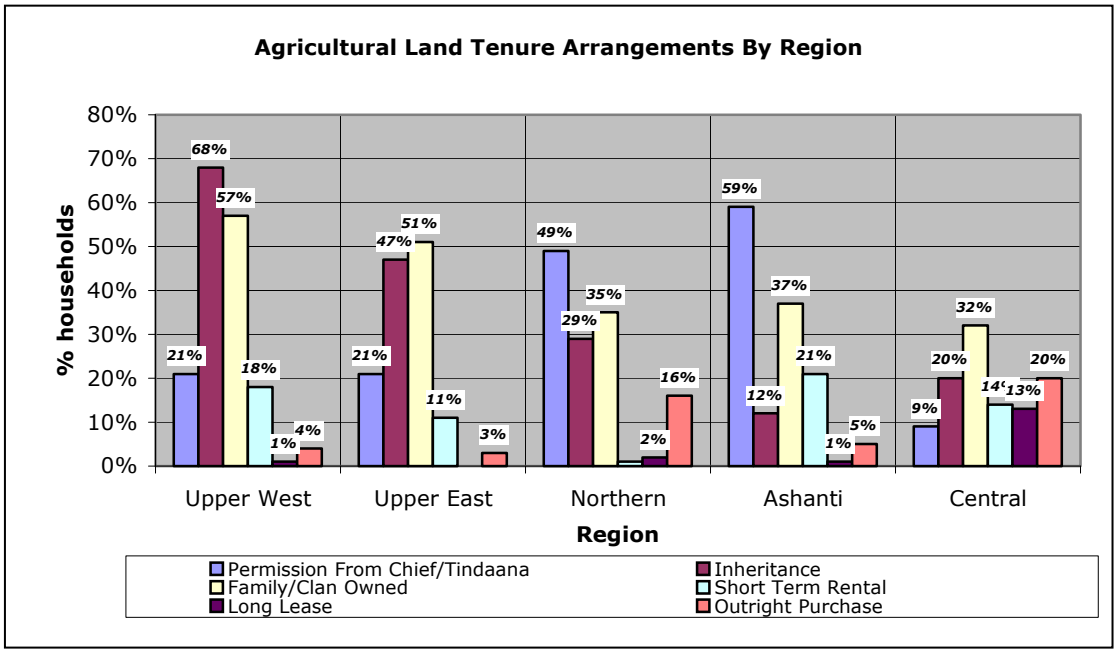
households in *Upper West* owned pigs. In the *Ashanti* sample, about one-third of the households owned poultry with an average of 6 birds. Poultry was owned by at least three-quarters of households in the three northern regions with highest median number of birds being 9, in *Upper West*. Overall, households in the *Upper West* were more likely to own different types of livestock and to own slightly more animals than the other regions.

3.4 – Land tenure and farming systems

Land is one of the most important factors in crop production. Access to land and the contractual agreements under which is land is acquired not only influence the output levels of households but also the kinds of crops grown. For example, land acquired under short-term lease arrangement might not be used for the cultivation of tree crops.

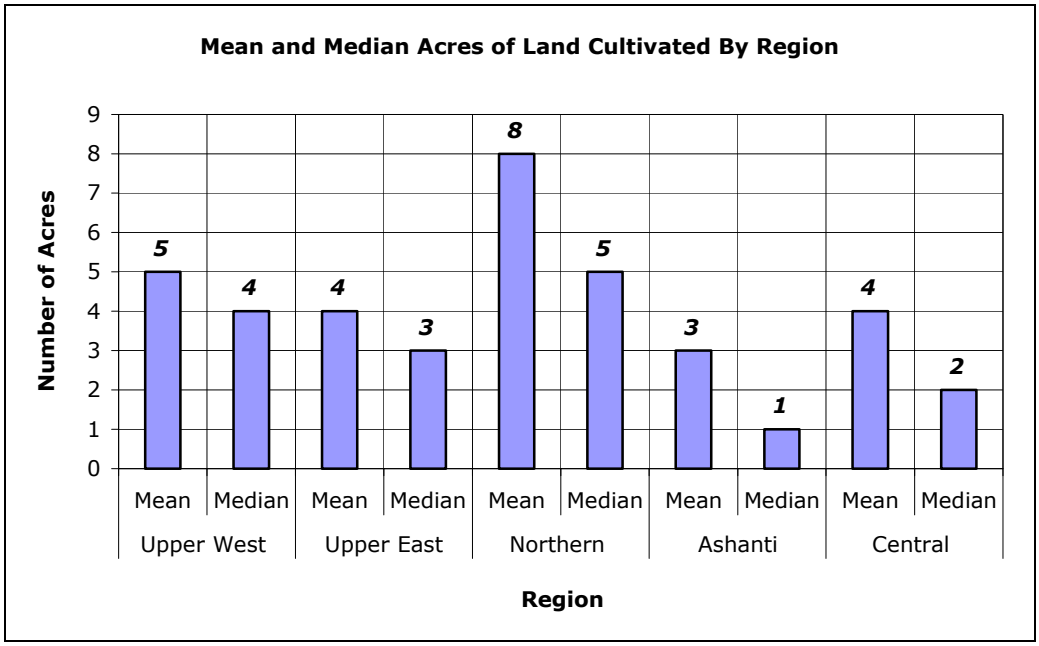
3.4.1 – Agricultural land tenure

Households were asked to name the main type of tenure for their agricultural land. The chart below presents land arrangements for agricultural production by region. In the three northern regions, households acquire land for farming mainly through inheritance, from traditional custodians of land (chiefs or *Tindaanas*) in the case of virgin or fallowed land, and by cultivating family/clan-owned land. Unlike in the south, acquisition of farmland either by long-term lease or outright purchase is not common among northern households.



In terms of land size (acreage per household), *Ashanti* region is the most constrained with half of the households cultivating less than one acre in the 2003-farming season. Although household land holding is higher in the three Northern regions, it may not indicate higher crop output since soils in the north are poorer as compared to soils in the south.

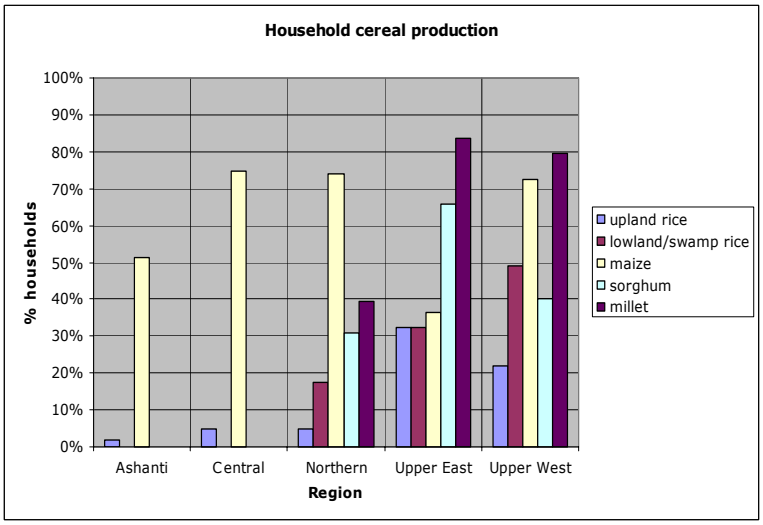
Mean and median acres of land cultivated in the 2003-production season are presented in the following chart. With the large difference between mean and median acres cultivated in the *Northern* region, there appears to be some large scale farmers in the region, thus further showing that this region is very heterogeneous in terms of food security and livelihood activities.



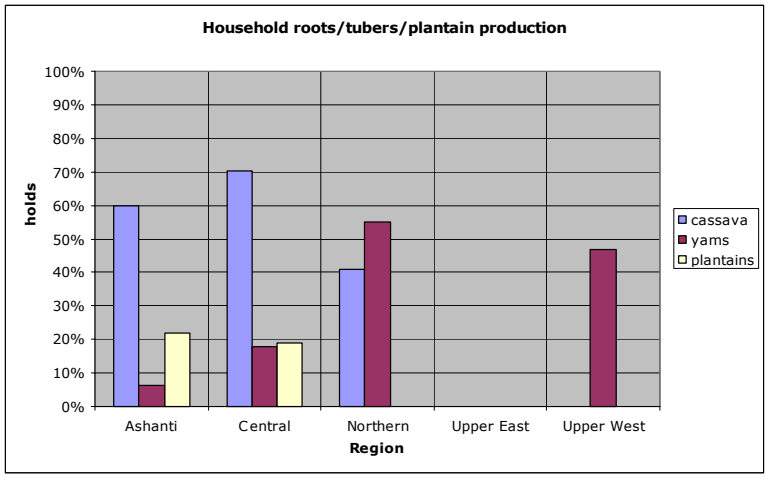
3.4.2 Crop production systems

The kinds of crops cultivated by households vary across the different regions and across ecological zones. In the three Northern regions, commonly cultivated crops are rice, millet, maize, sorghum, beans and groundnut. These crops are staple food crops in the three northern regions and are cultivated by almost every household. Although some households in the south also grow these crops, the production of yam, plantain and cassava is done on a relatively higher scale among many southern households.

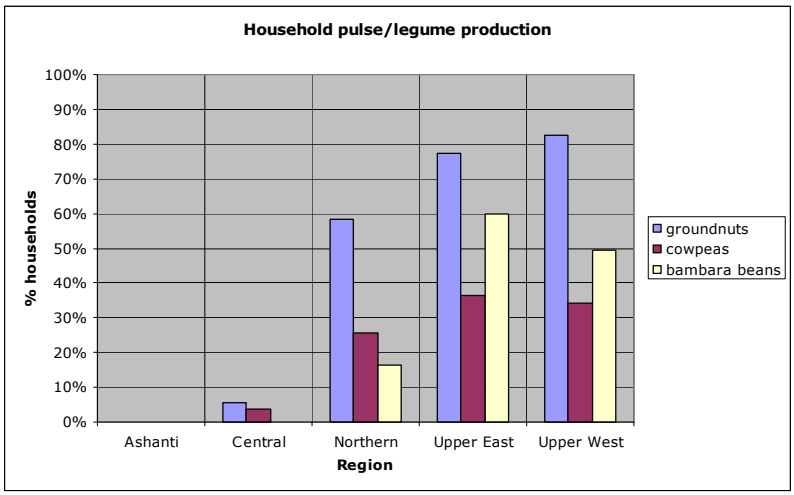
Vegetables are cultivated and consumed by almost all households in the five regions. In the three northern regions, vegetables are mainly cultivated as an intercrop, mostly with field crops such as cereals in the rainy season. Fresh vegetables are thus very scarce among northern households in the dry season with many depending on the market for vegetables. In order to ensure all year round availability of vegetables, some households both in northern and southern Ghana establish backyard gardens. More households in the *Upper East* (38%) and *Upper West* (29%) regions own vegetables gardens as compared to the *Northern* (7%), *Central* (18%) and *Ashanti* (16%) regions.



Cereal production in sampled households varied between regions with the *Upper East* and *West* regions growing combinations of upland and lowland or swamp rice, sorghum, millet and even some maize. Households in *Central* and *Ashanti* regions are only producing maize but only half the households in the *Ashanti* household sample.



Cassava, yams and plantains are generally grown by fewer households in the sample area with the exception of cassava in *Central* region. There was no significant amount of cultivation of any of these foods in *Upper East* region and only yams were found in *Upper West*. Plantains were an important staple food for about 20% of the sample households in *Ashanti* and *Central* regions. Cassava is a prime source of food for households in the southern sample.



The production of groundnuts, cow peas and bambara beans is also limited to the northern regions. Between 60-80% of the sample households in the north had cultivated groundnuts in 2003 and more than half in *Upper East* and *Upper West* had grown bambara beans. Again, there was very little or no cultivation of pulses or legumes by households in the southern regions.

3.4.3 – Seed sources and adequacy

The availability of planting material or seed is a very useful indicator of the food situation in households. Most households usually select enough seed for the next planting season from their own harvest and it is usually under severe food shortage situations that households consume their seed stock. Households' source of seed for the previous season is presented in Table 3.9.

For *Upper West* farming households, farmers tend to retain seed/cuttings from previous production for lowland/swamp rice, maize, sorghum, millet, cowpeas, bambara beans and yams while they rely more on purchases of seed for upland rice and groundnuts. In *Upper East*, there is about equal reliance on using seeds from own production and purchase for rice and groundnuts but then more reliance on using seeds and cuttings from the previous season for all other crops. In *Northern* region, there is equal reliance on purchase/own production for lowland/swamp rice seed, groundnuts and cowpea seeds. For other crops, most are cultivated with seed or cuttings from the previous season. In this region also there is some reliance on seeds/cuttings from gifts and in all northern regions there is some borrowing or exchange.

Agricultural production in the *Ashanti* and *Central* region samples is lower and less diverse but most framers tend to cultivate cassava, yams and plantains from their own cuttings while seed for maize is evenly coming from own production and purchases.

Table 3.9: Sources of seed for main crops

Region	Type of Crop	% Households using seed by source				
		Own Production	Purchase	Loan	Exchange	Gift
Upper West	Upland rice	46%	51%	5%	0	0
	Lowland/swamp rice	67%	32%	1%	3%	0
	Groundnuts	39%	53%	7%	1%	2%
	Maize	71%	26%	3%	1%	
	Sorghum	76%	26%	3%	1%	0
	Millet	74%	22%	2%	1%	1%
	Cowpea	51%	37%	8%	2%	0
	Bambara beans	61%	24%	9%	2%	3%
	Yam	52%	32%	9%	7%	0
Upper East	Upland rice	41%	48%	7%	2%	2%
	Lowland/swamp rice	40%	49%	7%	2%	2%
	Groundnuts	44%	52%	5%	0	1%
	Maize	65%	37%	2%	0	3%
	Sorghum	73%	25%	3%	0	2%
	Millet	77%	23%	1%	0	3%
	Cowpea	66%	33%	10%	3%	0
	Bambara beans	62%	36%	4%	1%	0
Northern	Lowland/swamp rice	45%	41%	10%	0	7%
	Groundnuts	47%	42%	11%	0	2%
	Maize	64%	29%	4%	0	4%
	Sorghum	72%	24%	1%	0	3%
	Millet	56%	36%	5%	1%	2%
	Cowpea	48%	46%	6%	0	0
	Cassava	74%	7%	3%	2%	14%
	Yam	76%	20%	2%	0	2%
Ashanti	Maize	55%	43%	1%	0	3%
	Cassava	87%	12%	2%	0	0
	Plantains	67%	39%	0	0	0
Central	Maize	49%	51%	1%	0	0
	Cassava	78%	20%	0	0	3%
	Yam	71%	27%	4%	0	2%
	Plantains	80%	20%	0	0	0

Source: Field survey, April /May 2004

It is clear from the table that a significant proportion of households depend on the market for seed. The implications are that, households either consumed their seed during lean season or that the quality of crop harvested was too poor for some to be used as seed.

Table 3.10 presents the percentage of households currently with enough seed of main food crops. Although quantity of seed stored by households is not solicited, a qualitative idea of households with enough seed provides some information

about the food supply situation during the off-season. For major crops such as rice, millet, groundnut, cowpea, yam and plantains, more than half the households in most cases do not have enough seed of these crops for the next planting season. Enough seed of these crops is usually selected and stored at harvest time, especially in the north. More households not having enough seed for the next season is indicative of severe food shortage during the lean season.

Table 3.10: Households with adequate seed stocks for major crops

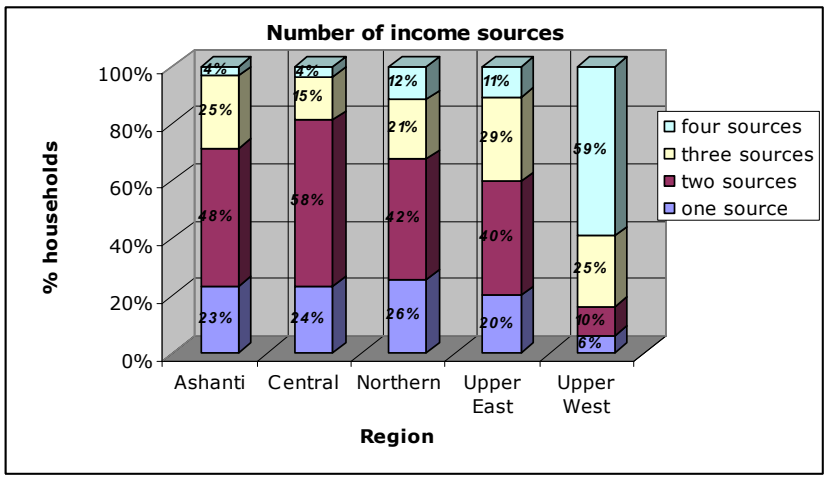
	Ashanti	Central	Northern	Upper East	Upper West
Upland rice	-	-	3%	15%	8%
Lowland/swamp rice	-	1%	13%	15%	43%
Groundnuts	-	1%	45%	41%	68%
Maize	28%	59%	58%	27%	81%
Millet	49%	58%	35%	1%	3%
Cowpea	5%	12%	47%	2%	36%
Yam	1%	1%	11%	8%	19%
Cocoyam	-	1%	-	-	-
Frafra potatoes	15%	14%	-	-	-
Bambara Beans	1%	-	32%	61%	76%
Sorghum	-	-	23%	43%	38%
Soyabean	-	-	4%	8%	5%

Source: Field survey, April /May 2004

3.5 – Household income and expenditure

3.5.1 Household income

Income activities of households are very useful indicators of their standard of living of living and hence vulnerability. While the kind of income activities determine how much households earn, the number or diversity of income activities influences households ability to cope in risks situations. In the event of difficulty, households with more diversified sources of income will be less vulnerable than those with one income activity.



From the above graph, income activities are more diverse in the *Upper West* region as compared to the other four regions. Nearly 60% of households in the *Upper West* region have four income activities. The majority of households in the southern regions have two income activities while households in *Northern* and *Upper East* regions have slightly more diversity but fewer than *Upper West*.

Table 3.11 presents the main income activities of the sampled households, by region. In *Ashanti* region, many households were earning income from agricultural activities such as the sales of roots & tubers, cash crops and cereals

(presumably maize). However, a great percentage were earning income from non-farm income activities such as petty trade, small business, skilled labour and wage labour, than households in the other regions. Households in *Central* region were slightly more reliant on agriculture activities for income with similar reliance on non-agriculture income activities. In *Northern* region, the reliance in farm-based income activities greatly increased to include sales of legumes and income from sales of livestock and/or animal products. The percentage of households relying on income from petty trade or small business is in general lower than in the southern provinces. In addition, households in the *Upper East* and *West* regions rely more on wage labour income, presumably agriculture-based.

Table 3.11: Main income earning activities by Region

Ashanti Region		
Sale of roots & tubers = 42%	Petty trade = 33%	Sale of cash crops = 27%
Sale of cereals = 26%	Small business = 20%	Skilled labour = 19%
Wage labour = 16%	Remittances = 8%	Firewood/charcoal = < 1%
Central Region		
Sale of cereals = 41%	Sale of cash crops = 35%	Sale of roots & tubers = 31%
Small business = 22%	Petty trade = 19%	Skilled labour = 13%
Wage labour = 8%	Remittances = 4%	Firewood/charcoal = 4%
Northern region		
Sale of cereals = 51%	Sale of roots & tubers = 43%	Sale of legumes = 29%
Livestock/animal products = 25%	Petty trade = 14%	Pito brewing = 10%
Skilled labour = 8%	Remittances = 1%	Firewood/charcoal = 8%
Upper East region		
Livestock/animal products = 53%	Sale of cereals = 38%	Petty trade = 26%
Wage labour = 21%	Sale of legumes = 16%	Small business = 13%
Skilled labour = 12%	Remittances = 4%	Firewood/charcoal = 14%
Upper West region		
Livestock/animal products = 75%	Sale of cereals = 61%	Sale of legumes = 52%
Wage labour = 28%	Skilled labour = 21%	Small business = 21%
Sale of roots & tubers = 17%	Remittances = 8%	Firewood/charcoal = 24%

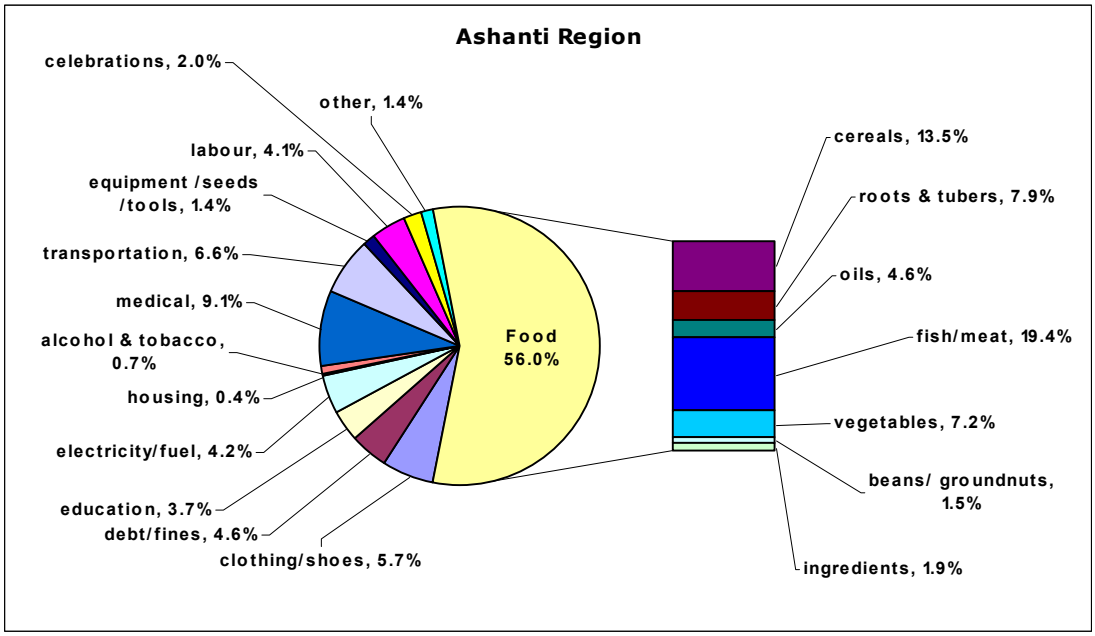
Source: Field survey, April /May 2004

A comparison was also made of reliance on remittance income or income from sales of firewood and/or charcoal, between the regions. Interestingly, 8% of households in the *Ashanti* and *Upper West* samples received income from remittances as compared to only 1% in Northern and 4% in the other two regions. Reliance on income from firewood and charcoal sales increased greatly from south to north – up to one-quarter of the households in the *Upper West* sample.

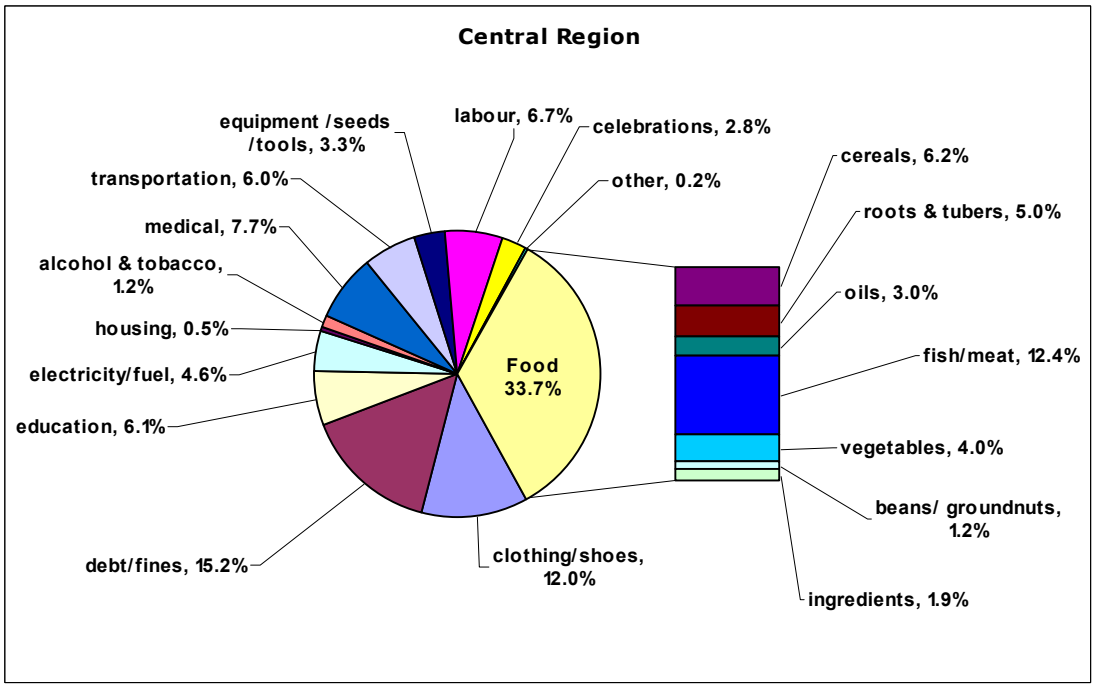
3.5.2 - Household expenditure

Expenditure pattern of households is very useful in the assessment of their standard of living and vulnerability status. Household per capita expenditure is a very useful indicator of what households can provide their members. In the sample, the mean expenditure per household member is highest in the *Upper West* region at $33 per month and lowest in the *Northern* region at $11 per month. Mean per capita monthly expenditure was $14 in *Upper East*, $16 in *Ashanti* and $27 in *Central* regions.

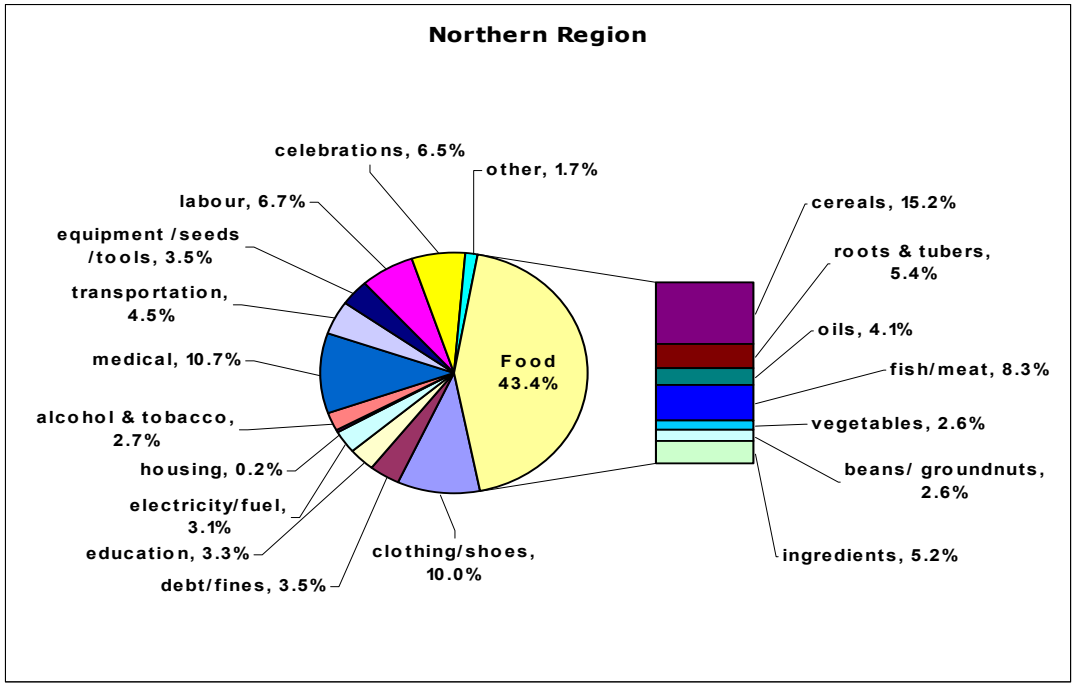
Percentage of total expenditure is highest for food in all regions, followed by medical, clothing, fines/debts, education and transportation. The latter shares varied some by region. Overall allocation of monthly expenditure by region is presented in the following graphs.



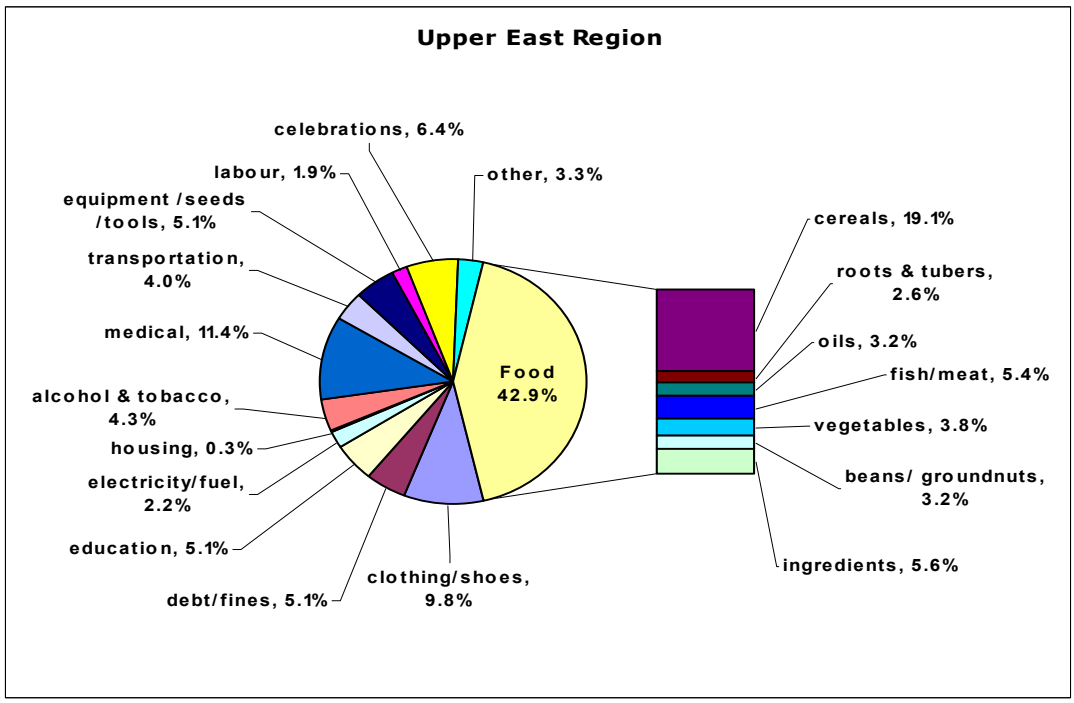
Households in the *Ashanti* sample have the highest percentage of total expenditure for food – 56 percent. The bulk of this comes from high allocations of expenditure for fish and meat as well as cereals, roots and tubers, and vegetables which shows dependence on purchased food as well as a higher quality diet. They also have a higher allocation for transportation expenses.



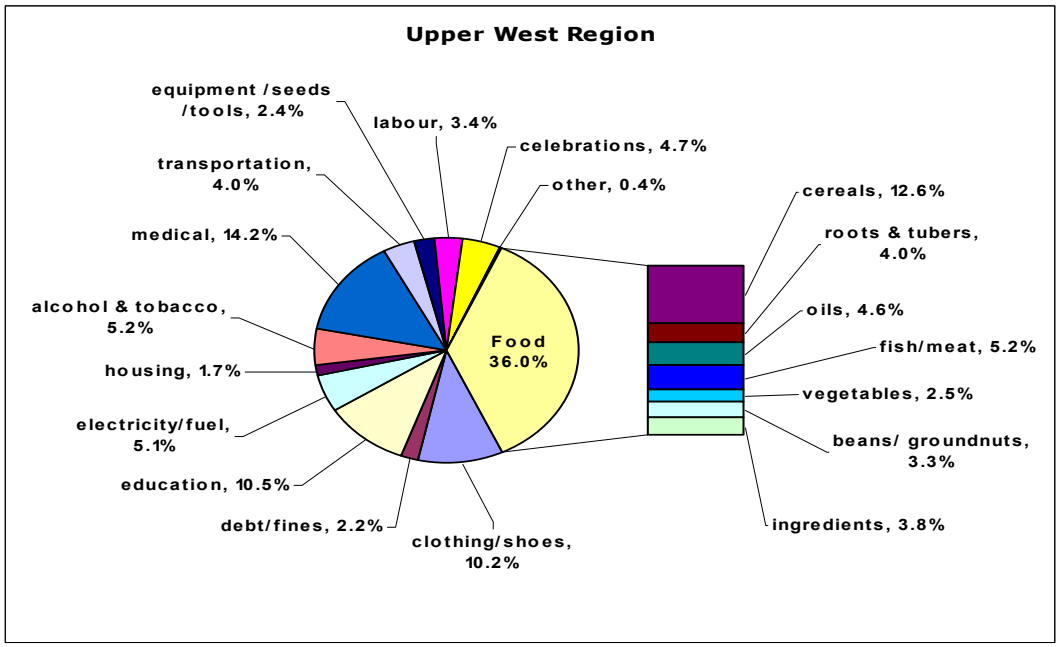
Households in the *Central* sample have the lowest allocation for food expenditure and lowest for cereals. Their allocation for fish and meat is also quite high while medical is the lowest of the regions. They have by far the highest allocation to repayment of debts as well as the highest percentage expenditure for clothing and shoes. Their allocation to transportation, education and hiring labour is a bit higher than most of the regions.



Households in the *Northern* sample had relatively higher allocation of expenditure for celebrations, other foods and for hiring labour. Otherwise, their expenditure patterns are somewhere between those of the extreme north and those southern regions in the sample. Their share of expenditure for cereals is second highest in the sample.



Households in the *Upper East* sample had the highest share of expenditure for cereals in the sample but the lowest for roots and tubers. Their allocation for fish and meat was also low, compared to the other regions while expenditure on beans and legumes was higher. In general, there is lower expenditure for transportation and for hiring labour as well as for fuel, electricity and water.



Lastly, expenditure allocations in *Upper West* are characterized by being the lowest for fish and meat, and relatively low for food overall. They have the highest allocation for medical expenses as well as for alcohol and tobacco. They have by far the highest allocation of expenditure for educational expenses of any regional sample.

3.6 – Household food consumption

3.6.1 – Number of meals

Food consumption is a very useful indicator of the food security situation of households. Usually, the number of times household members eat in a day is a food saving strategy, where households plan their food consumption pattern based on their own food stock as well as their expectations of inflows and outflows of food. With time, variations are introduced in this consumption pattern in response to variations in household's food stocks and their expectations of inflows and outflows of food. Under such conditions, the number of times household members eat becomes a coping mechanism.

In the sample, most of the children were eating at least three meals per day, with some regional variations. For *Ashanti*, *Central* and *Northern* regions, over 90% of the children eat three meals as compared to about 80% of the children in *Upper East* and *Upper West* regions. For adults, the average number of meals per day is between 2 and 3 – 80% of adults in *Ashanti*, *Central* and *Northern* regions are eating 3 meals per day. However, the situation is different in *Upper East* and *Upper West* where only one-quarter of the adults had three meals per day and the others having two or even one per day.

3.6.2 - Diversity and sources of food consumed

Although the number of times household members eat daily provide some information on food availability situation, number of food items households consume as well as number of days households eat these food items in a week are useful indicators of the quality of food eaten. Table 3.13 present lists of food items eaten by households at least once in a week.

For households in the *Ashanti* sample, there is fairly high level of regular consumption of rice, cassava, yams, fish, oils/fats and vegetables with lower consumption of meat and other cereals. They are also characterized by low

reliance on wild foods for their normal diet. In *Central*, the households are characterized by high levels of consumption of rice, other cereals, cassava, fish, oils and fats, and vegetables. They have relatively lower consumption of legumes and iodized salt. *Northern* households have regular consumption of other cereals, fish, meat and eggs when compared to the other regions but a bit lower consumption of rice. They also consume wild foods more than households in the other regional samples. In *Upper East*, the households have a diet of rice plus other cereals, legumes, fish and vegetables. They rarely consume cassava and have low consumption of yams and other roots & tubers. Lastly, the households in the *Upper West* regularly consume rice, fish and vegetables with high use of iodized salt. However, they have lower consumption of other cereals, meat, oils and fats, and fruits and very low consumption of eggs.

Table 3.12: Food items consumed by households in past week

Food Item	% households eating food item at least once last week				
	Ashanti	Central	Northern	Upper East	Upper West
Rice	89%	89%	82%	89%	84%
Maize, millet, sorghum	70%	92%	97%	98%	71%
Cassava	94%	97%	68%	4%	22%
Yams, etc.	78%	66%	74%	34%	55%
Legumes	68%	63%	77%	89%	77%
Fish	96%	97%	95%	97%	93%
Meat	35%	51%	63%	55%	38%
Oil/Fat	96%	91%	83%	79%	61%
Eggs	55%	66%	84%	29%	8%
Vegetables	96%	94%	85%	87%	89%
Iodised Salt	40%	37%	41%	47%	90%
Fruits	73%	76%	68%	75%	61%
Wild Foods	7%	21%	30%	18%	19%

Source: Field survey, April /May 2004

Frequency of consumption of staple foods and their sources are outlined in Table 3.12. These percentages are only for those households who consumed the food item in the past seven days. Again, looking at consumption by region, households in the *Ashanti* sample are characterised by very regular consumption of cassava and fish but lower consumption of other cereals, meat and eggs. *Central* sample households are very regular consumers of cassava, fish and vegetables.

Very regular consumption of other cereals and fish are characteristics of the *Northern* region sample households. However, they also have less regular consumption of rice and eggs. Households in the *Upper East* sample are regularly eating other cereals, fish and wild foods but less often consumers of rice and meat. Finally, households in the *Upper West* sample are regularly eating rice, other cereals, iodised salt and meat. However, their consumption of legumes is limited to between 1 and 5 days a week while meat consumption is found only 1-2 times per week in more than 70% of the meat-eating households.

Regarding the sources of the main foods, households in *Ashanti* region rely mostly on purchases for their food basket, with the exception of cassava where 64% of consumers get it from their own production. In *Central*, they also rely heavily on purchases with only cassava coming mostly from own production. Between 60-70% of households in the *Northern* region sample rely on their own production of other cereals, yams and legumes for home consumption. The rest of their food basket is mostly purchased. In *Upper East*, households in the sample are relying on their own production only for other cereals and legumes while the rest of the food items are purchased. Households in the *Upper West* sample are more self-sufficient in terms of producing a lot of the food they

consume but this also means they are heavily reliant on subsistence farming for consumption and perhaps have little left for sales. Or else, if they need money, they have to sell food that they would normally consume, thus reducing own consumption in times of need.

Table 3.13: Frequency of consumption of staple foods by Region

Region	Food Item	6-7 days	Main Source	% Households depending on source
Ashanti	Rice	26%	Purchase	99%
	Other cereals	24%	Purchase	76%
	Cassava	67%	Own Production	64%
	Fish	85%	Purchase	99%
	Meat	19%	Purchase	100%
	Eggs	12%	Purchase	78%
Central	Rice	28%	Purchase	83%
	Other cereals	47%	Purchase	59%
	Cassava	69%	Own Production	56%
	Fish	90%	Purchase	93%
	Fats and Oils	47%	Purchase	79%
	Vegetables	73%	Purchase	82%
	Wild Foods	36%	Purchase	65%
Northern	Rice	11%	Purchase	80%
	Other cereals	80%	Own Production	63%
	Yams, etc.	36%	Own Production	70%
	Legumes	29%	Own Production	61%
	Fish	86%	Purchase	89%
	Eggs	11%	Purchase	67%
	Vegetables	38%	Purchase	81%
Upper East	Rice	7%	Purchase	83%
	Other cereals	76%	Own Production	63%
	Legumes	47%	Own Production	57%
	Fish	89%	Purchase	92%
	Meat	21%	Purchase	86%
	Vegetables	37%	Purchase	51%
	Wild Foods	62%	Purchase	56%
Upper West	Rice	62%	Own Production	57%
	Other cereals	79%	Own Production	91%
	Legumes	5%	Own Production	63%
	Fish	62%	Purchase	97%
	Meat	5%	Purchase	97%
	Vegetables	41%	Own Production	58%
	Iodised Salt	81%	Purchase	95%

Source: Field survey, April /May 2004

3.7 – Maternal health and nutrition

Women and children are usually the most vulnerable in most societies and thus mostly affected by food shortages and threats to human health as well.

3.7.1 – Pregnancy and children

Table 3.14 shows the average number of lifetime pregnancies for women in the sample, by region.

Table 3.14: Average number of pregnancies by age group and Region

Region	Age Group (years)						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Ashanti	1	2	3	5	6	7	9
Central	2	2	3	4	5	7	6
Northern	1	3	3	4	6	7	9
Upper East	1	2	3	4	5	6	6
Upper West	1	2	3	4	6	5	8

Source: Field Survey, April /May 2004

Women in *Ashanti* and *Northern* samples tended to have the highest average number of lifetime pregnancies than the rest. Lowest number of pregnancies was found in women from *Upper East* and *Central* regions. Average number of pregnancies increased with age group but appears to not change much in older age groups in *Central* and *Upper East* regions.

Table 3.15: Average number of living children by maternal age and Region

Region	Average number of living children						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Ashanti	1	2	3	4	6	7	7
Central	2	2	3	4	5	6	6
Northern	1	2	3	4	5	6	8
Upper East	1	2	3	4	4	5	6
Upper West	1	2	3	4	5	5	6

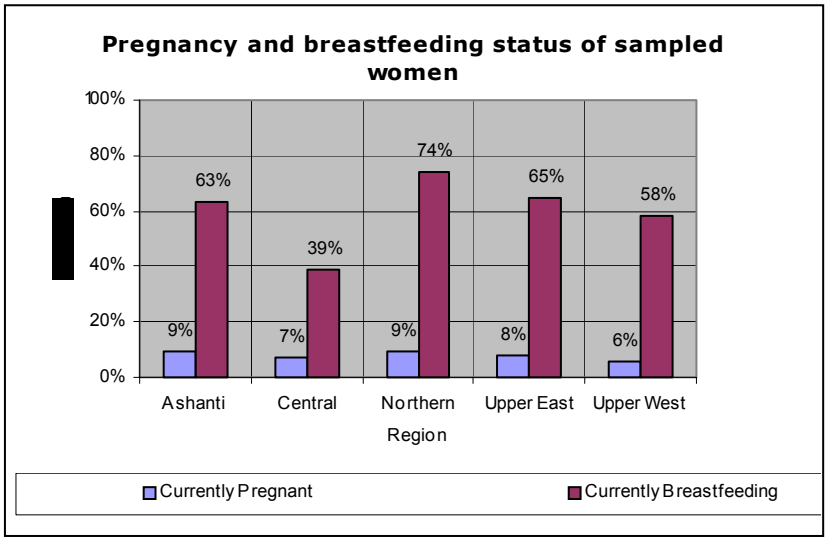
Source: Field Survey, April /May 2004

At the time of the survey, the average number of living children for sampled women was highest in the *Northern* region where for all women the average was four children as compared to three for the rest of the regions. Women in the *Northern* region also had a high average number of pregnancies. In *Central* and *Upper East* regions, the average number of pregnancies and average number of living children was the same for the oldest group of women.

3.7.2 – Antenatal care

Mothers of children under five years of age had varying access to trained professionals during delivery. Overall, nearly 90% of all deliveries had been attended by trained professionals, only 84% of recent deliveries in *Central* and *Upper West* regions had appropriate supervision as compared to about 90% in *Upper East* and *Northern* regions. Nearly all (95%) of recent deliveries among sample women in *Ashanti* region had been attended by trained professionals.

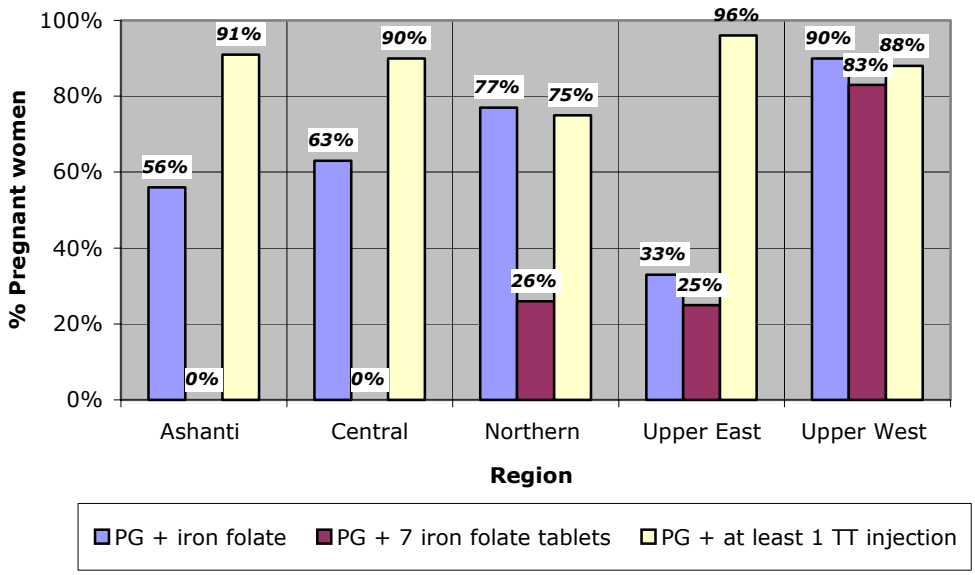
The chart below indicates that though the numbers of women currently pregnant are low over 50% of women in all regions except the *Central* Region are currently breastfeeding. Indeed as many as over 70% of women in the *Northern* region were breastfeeding while about 9% were pregnant at the time of the survey. About 80% of the women in the sample were either pregnant or breastfeeding. Women form a large proportion of the farm work force, thus if so many are unable to participate fully in farm work because they have to care for the unborn and living children, food production will be adversely affected. There are several other implications of these situations with regards vulnerability.



There was also a difference in access and utilization of appropriate antenatal care during pregnancy for women of the different regions. The following chart shows

that women in the *Northern* region had the worst access to antenatal care as indicated by the lowest percentage of pregnancies where women had received at least one tetanus toxoid injection. Access was highest for women in *Upper East*, followed by *Ashanti*, *Central* and *Upper West*.

Pregant Receiving Iron Folate and Tetanus Injection



Pregnant women in all regions were taking iron folate tablets at the time of the survey but the lowest usage was found in *Upper East*, followed by *Ashanti*, *Central* and *Northern* regions. About 90% of the pregnant women in the *Upper West* sample were using iron folate tablets. Full compliance (taking 7 tablets in past week) was non-existent in *Ashanti* and *Central* regions and low in Northern and *Upper East* regions. Full compliance was very high amongst pregnant women in *Upper West* region at the time of the survey.

During pregnancy, both the nutritional demands from a developing foetus and the increased volume of blood in the woman's body increases the need for micronutrients either through diet or supplementation. Quite often pregnant women suffer from micronutrient deficiency diseases more commonly than non-pregnant women. In order to estimate the prevalence of vitamin A deficiency in the sampled women, they were asked if they had suffered from night blindness during their most recent pregnancy. Night blindness (inability to see clearly at dawn and dusk) is an early clinical sign of vitamin A deficiency. In the sample, 13% of women in *Ashanti* region reported night blindness in their last pregnancy, followed by 8% in *Central* and *Upper West* regions and 7% in *Northern* and *Upper East* regions.

Supplementation with vitamin A during pregnancy can damage a foetus so in order to treat vitamin A deficiency as a result of pregnancy, women are supposed to receive a single high dose of vitamin A immediately after birth which also benefits the new born who receives this valuable micronutrient through breast milk. The lowest levels of supplementation were found in the *Northern* region (37%), followed by *Ashanti* (55%) and *Upper East* (66%) while nearly three-quarters of the women in *Central* and *Upper West* had received vitamin A supplements.

3.7.3 – Recent morbidity & mosquito nets

The women were also asked about episodes of diarrhoea or fever in the two weeks prior to the survey, the typical recall period. Two week period prevalence of diarrhoea was highest in *Ashanti* and *Northern* regions and was lowest in the *Upper West* sample (Table 3.16). There were no significant relationships between diarrhoea and use of drinking water from improved sources or season but women from households using safer drinking water had slightly lower prevalence of diarrhoea. In the entire sample, the prevalence of diarrhoea in women was the same for those with a toilet and those without. However, when looking at only women from the *Ashanti* sample, the prevalence was 42% for women with no toilet as compared to only 19% for those with a toilet ($p < 0.01$).

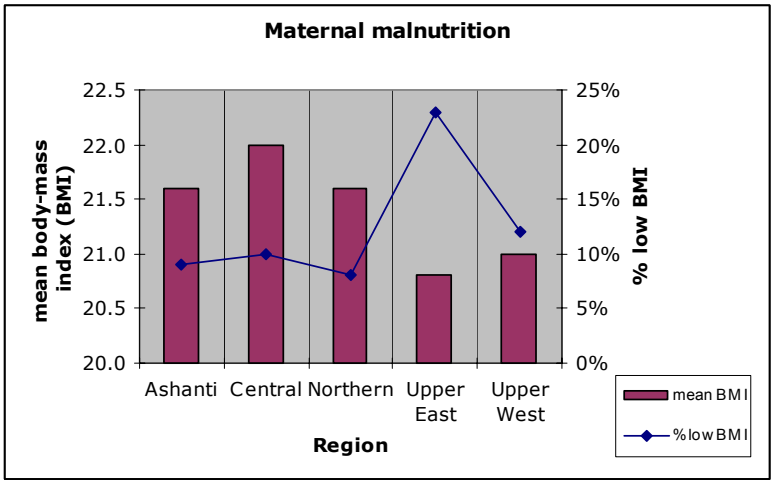
Table 4.16: Recent morbidity & used of mosquito nets by women by Region

	Ashanti	Central	Northern	Upper East	Upper West
Diarrhoea – past 2 weeks	22%	14%	21%	14%	10%
Fever – past 2 weeks	35%	27%	30%	30%	17%
Using mosquito nets	9%	8%	17%	45%	24%

Prevalence of fever was also highest in women from the *Ashanti* sample and lowest in the *Upper West* sample with the other regions being similar. Mosquito net usage is very low in *Ashanti* and *Central* households and highest in *Upper East*. There are no statistical correlations between use of mosquito nets and recent bouts of fever.

3.7.4 – Maternal malnutrition

The graph to the left shows the mean body mass index[2] and prevalence of low body mass (less than 18.5 kg/m^2) among non-pregnant sampled women. The mean BMI was highest in the sample of women in *Central* region, followed by those in *Northern* and *Ashanti* regions. The prevalence of low BMI was lowest in those regions as well, between 8-10% of total. In the *Upper West* and *Upper East*, the mean BMI in non-pregnant women was the lowest. However, the prevalence of maternal malnutrition was quite different, indicating that many of the women in the *Upper West* sample may be just above the cut-point. Low BMI is more common in women living in houses with dirt floors, a thatched roof or no toilet.



3.8 – Shocks and coping strategies

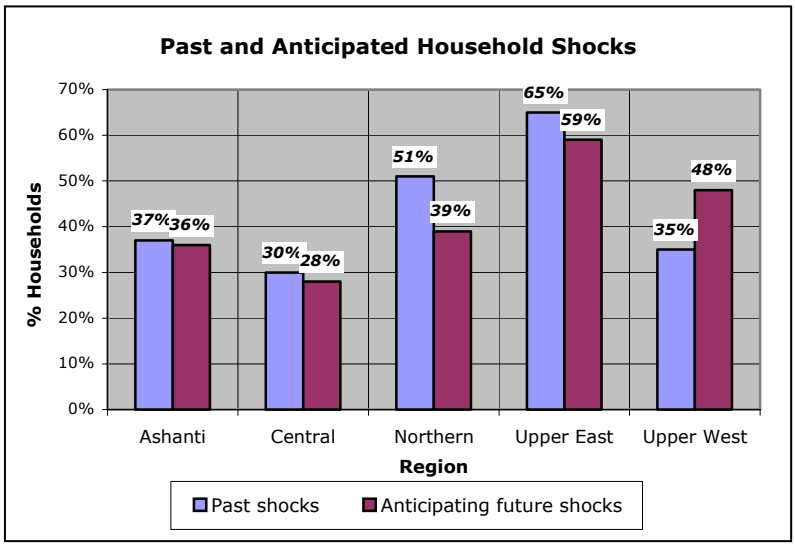
Food insecurity and vulnerability usually arise out difficulties that prevent households from either producing or purchasing enough food to feed their members. These difficulties have varied causes. The percentages of households that have experienced difficulties in the past as well as the percentage

[2] Body mass index (BMI) = weight (kgs)/height (m)^2

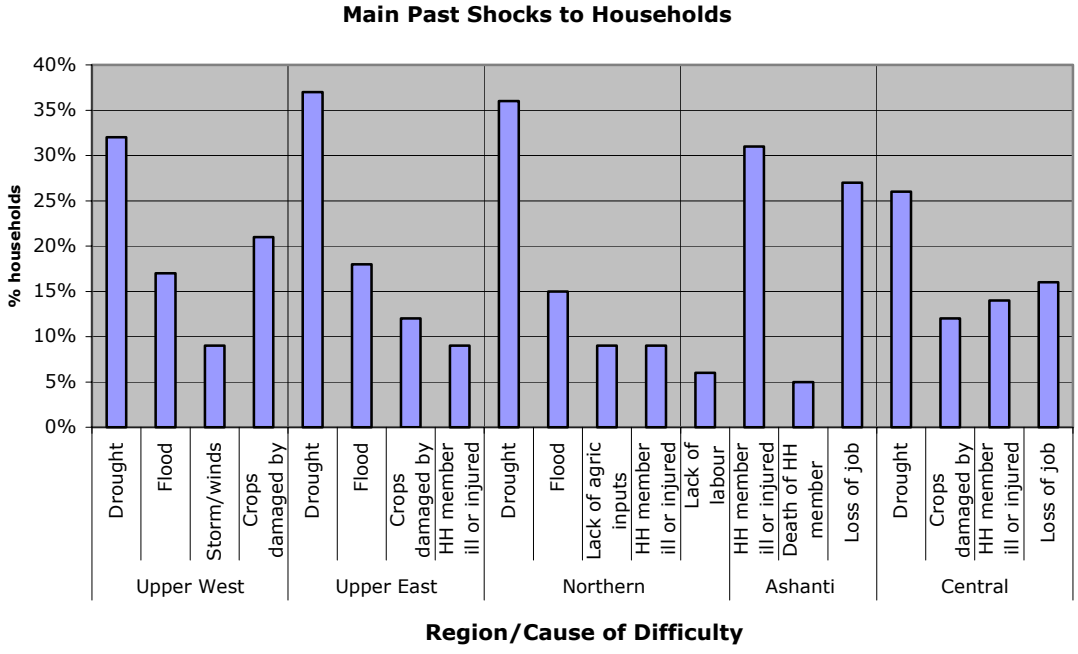
anticipating the occurrence of future difficulties are very useful in the assessment of vulnerability.

3.8.1 – Past shocks

In terms of past and anticipated events affecting household food security, the three regions in the north are most affected. In the past year, 65% of the households in the *Upper East* sample had experienced a shock to household food security, followed by half the households in the *Northern* sample. About one-third of the households in the other regions had experienced shocks to household food security. When asked about future shocks, fewer households in all regions predicted difficulties, with the exception of those in *Upper West* region.



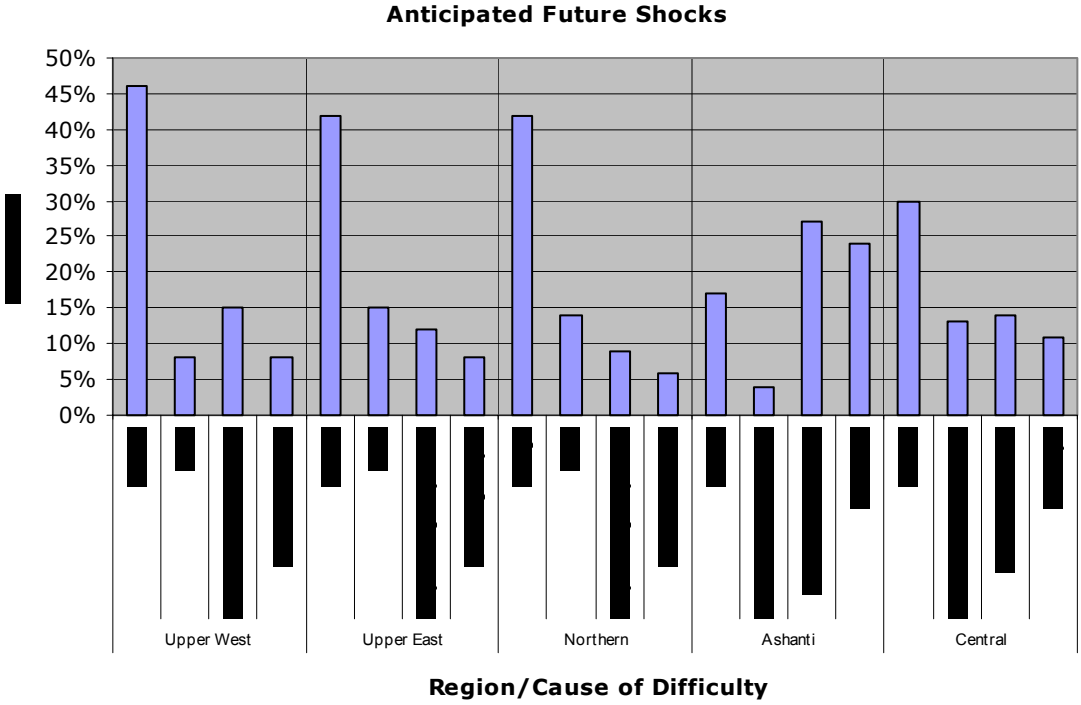
Drought is the number one cause of difficulties as well as the most likely cause of future difficulties in the three northern regions. For the *Ashanti* and *Central* regions, illness of household member and loss of job respectively are the main cause of difficulties. Households in the *Central* region are however expecting future difficulties to arise out of drought. The following graph presents the main shocks to household food insecurity by region. For households in *Ashanti* region, the main shocks experienced were illness or injury of a household member, death of household member and loss of jobs. In *Central*, they were a combination of covariate and idiosyncratic – drought, crop damage by insects, illness or injury of household member and loss of job.



For the three northern regions, they were almost all related to agriculture – drought, flood, lack of inputs, storm/wind damage, crop damage by insects and lack of labour.

3.8.2 – Anticipated shocks

Anticipated shocks in the future were similar to those already experienced by households – mostly related to agricultural production. However there were more households that were worried about having enough or adequate agricultural inputs for production. Drought was mentioned by households in all regions, but more so in the three northern regions.



3.8.3 – Use of coping to manage shocks

In the event of difficulties, households in most cases respond by adopting certain strategies to mitigate the effect of the difficulties on the household. Although coping strategies adopted in the wake of difficulties vary across the five regions, prominent coping strategies include the sale of livestock, borrowing of food and money, reduction in food consumption and additional wage labour. Coping strategies for past and future difficulties are presented on Table 3.17. In *Ashanti*, sample households tended to rely on borrowing money or food, reducing food consumption and increasing income through additional wage labour. For the future, they would also relay on borrowing and additional income activities.

Table 3.17: Main coping strategies used to manage shocks

Region	Past Coping Strategies	%	Future Coping Strategies	%
Ashanti	Borrow money	38%	Borrow food	67%
	Reduce food consumption	30%	Borrow money	28%
	Additional wage labour	17%	Petty trade/hawking	23%
	Borrow food	16%	Additional wage labour	19%
Central	Borrow money	64%	Reduce food consumption	29%
	Borrow food	35%	Eat less desirable foods	27%
	Eat less desirable foods	35%	Borrow food	26%
	Petty trade/hawking	28%	Remove children from school	19%

Northern	Borrow money	41%	Borrow food	71%
	Sell livestock	38%	Borrow money	22%
	Borrow food	38%	Sell livestock	21%
	Selling firewood	24%	Petty trade/hawking	15%
Upper East	Sell livestock	44%	Borrow food	28%
	Borrow money	24%	Borrow money	23%
	Borrow food	22%	Sell livestock	22%
	Petty trade/hawking	18%	Temporary migration	20%
Upper West	Sell livestock	37%	Borrow food	35%
	Reduce food consumption	35%	Reduce food consumption	26%
	Sell household assets	25%	Eat less desirable foods	18%
	Additional wage labour	21%	Consume seeds for planting	16%

Source: Field survey, April /May 2004

Households in the *Central* sample also relied on borrowing in the past, changing their eating habits and increasing income through petty trade. For the future, they would relay more on changing their eating habits, borrowing food or saving money by withdrawing children from school. In the past, households in the *Northern* region have also borrowed money and food as well as increased their income through livestock and firewood sales. In the future, they would do much of the same if necessary. Livestock sales were the most common strategy in *Upper East*, followed by borrowing and petty trade. In the future, they predicted they would again borrow and sell livestock but also mentioned the possibility of temporary migration to find work and money.

The strategies used by households in the Upper West sample were different from the other regions in that in the past, a substantial number has also sold household assets along with livestock and reducing their food consumption. In the future, they also plan to borrow food and change their eating habits to manage shocks but also predicted they would consume some of the seed they reserve for planting new crops.

4.0 – Household food consumption typologies

Using data from the household survey, Principal Components Analysis (PCA) and Cluster analysis techniques were used to create clusters of households characterized by distinct food consumption patterns, similar reliance on accessing food through their own production and similar dietary diversity. The following six consumption groups were identified:

4.1 - Households with very limited food access and reliance on own production – 5% of sample

- Limited access to any one food item
- High reliance on food from own production
- Low dietary diversity
- Low meal frequency (only 25% of adults eating 3 times per day)

	Never (0-1 day/week)	Occasionally (2-3 days/week)	Often (4-5 days/week)	Daily (6-7 days/week)
Rice	■			
Other cereals			■	
Cassava	■			
Other tubers	■			
Groundnuts/beans		■		
Fish		■		
Meat	■			
Eggs	■			
Oils/fats		■		
Vegetables		■		
Fruits		■		
Iodized salt	■			
Wild foods	■			

- Household size is 6 persons; 81% owning homes with 1.5 persons/room. Highest percentage of houses with thatch roof and dirt floor.
- Almost none use electricity and more than 90% have no toilet. 85% using water from improved sources.
- Average ownership of cattle, high ownership of goats, sheep and pigs.
- Medium to low ownership of household productive and durable assets.
- Nearly all with agriculture cultivation – about 4 hectares in total.
- Main income activities are livestock sales (77%), sales of cereals (54%), sales of foods and tubers (26%). Highest percentage relying on firewood sales (22%) with low reliance on remittance (3%) and salaried work (1%) income. Highest average number of income sources – more than 40% have 4 sources.
- About 43% of monthly expenditure is for food – group with highest share of expenditure for cereals (21%), medical (14%), alcohol & tobacco (5.4%) and education (7.6%).
- Lowest prevalence of maternal fever (20%) and highest use of mosquito nets (33%).
- Highest prevalence of maternal malnutrition (20.3%)

4.2 - Households with limited access to food but high diversity; rely on purchases – 10% of sample

- Low consumption frequency of any item but almost all are consumed.
- Only 19% of food consumed is produced (mainly cassava).
- Low dietary diversity score, mainly due to low frequency.
- Number of meals is good with 79% of adults eating 3 meals per day.

	Never (0-1 day/week)	Occasionally (2-3 days/week)	Often (4-5 days/week)	Daily (6-7 days/week)
Rice				
Other cereals				
Cassava				
Other tubers				
Groundnuts/beans				
Fish				
Meat				
Eggs				
Oils/fats				
Vegetables				
Fruits				
Iodized salt				
Wild foods				

- Average HH size is 6 persons; only 71% owning their homes – the lowest in the sample – with 3 persons per room (highest).
- Only 15% of homes have thatch roof with 79% having iron sheeting, the highest in the sample. Only 10% have a dirt/earth floor – the lowest in the sample.
- Highest use of electricity (38%) for lighting. Lowest use of wood for cooking (79%) and highest use of charcoal for cooking (21%). Only 30% have no toilet and 85% use safe sources for drinking water.
- Very low livestock ownership. Very low ownership of farming assets and low ownership of durable assets.
- Rely mostly on 2 income activities with only 4% using 4 activities. No one distinguishing income activity - main income activities are petty trade, agricultural sales, skilled labour and small business. Highest percentage of salaried workers (11%). Second highest reliance on remittances (6%).
- Only 77% with agriculture cultivation with an average of 2 hectares.
- High share of monthly expenditure for food – 46% of total. Highest share of expenditure on meat & fish (14%), roots & tubers (6.3%), cooking oil (4.2%), transportation, debts and fines and housing/rent.
- Third highest prevalence of maternal malnutrition (13.2%).

4.3 - Households with typical diet but low diversity – 29% of sample

- Daily consumption of cereals and fish. Oil, vegetables and fruit consumed on a regular basis.
- High reliance on own production – 75% of households produce the cereals they consume. Low dietary diversity – only a few food items consumed with high frequency.
- Half of the adults are eating 3 meals per day.

	Never (0-1 day/week)	Occasionally (2-3 days/week)	Often (4-5 days/week)	Daily (6-7 days/week)
Rice				
Other cereals				
Cassava				
Other tubers				
Groundnuts/beans				
Fish				
Meat				
Eggs				
Oils/fats				
Vegetables				
Fruits				
Iodized salt				
Wild foods				

- Average household size is 6 persons with 85% owning their homes and an average of 2 persons per room. About half with thatch roof and the other half with iron roof and half with dirt/earth floor.
- Only 5% with access to electricity and nearly all using wood for cooking.
- More than 80% with no toilet and about 85% using safe drinking water.
- High livestock ownership – 33% with cattle, 62% with goats and 39% with sheep and 16% with donkeys.
- Ownership of agricultural assets is fairly high and medium ownership of durable assets.
- Most households have 3 income activities with one-quarter using 4 activities. Main activities are sales of cereals or livestock and some sales of pulses. High reliance on firewood sales (16%).
- Nearly all with agricultural cultivation with median of 4 hectares.
- Lower share of expenditure for food (41.6%) but higher expenditure for cereals and cooking oil. Other expenditure shares normal.
- Maternal morbidity levels normal and higher use of bednets (29%). Higher maternal malnutrition (14.1%).

4.4 - Households with typical diet – high diversity – 9%

- Daily consumption of cereals and fish with frequent consumption of groundnuts, beans and fruit.
- High reliance on own production – 75% of cereals, 70% of cassava and 60% of groundnuts.
- High dietary diversity with high number of items and high frequency.
- High meal frequency – 79% of adults eating 3 times per day.
- Largest household size – 8 persons on average, with 94% owning their homes. About half with thatch roof and one-third with iron roof and 30% with dirt/earth floor.
- Very low access to electricity, with most using wood for cooking. Most without safe sanitation and lowest access to safe drinking water sources (75%).
- High ownership of livestock for both large and small ruminants and highest poultry ownership.
- Most with 2-3 sources of income with only one-quarter relying on four sources. Main sources in clued sales of cereals, root & tubers and pulses as well as livestock. Highest reliance on pito brewing (11%) for income.
- Almost all engaged in agricultural production with the largest median area cultivated – 5 hectares.
- Ownership of productive assets is the highest in the sample.
- Lowest share of expenditure for food – 37.6% of total. Highest share of expenditure for alcohol and tobacco (5.6%), clothing & shoes (13.4%) and celebrations/events (7.4%).
- For mothers, lowest levels of vitamin A supplementation, but lowest prevalence of diarrhoea. Maternal malnutrition around 11 percent.

4.5 - Households with good food consumption – 19%

- Daily consumption of cassava, cereals fish and vegetables with frequent consumption of oils.
- Low reliance on production (19% overall) but more than half of cassava consumed is from own production.
- High dietary diversity – high number of items, frequency and meals.
- Average household size of 6 with three-quarters owning their own home. High number of persons per room (3) but high percentage of houses with iron roof and very low percentage with dirt/earth floors.

- About one-third have access to electricity and 75% have a toilet and access to safe drinking water.
- Very low ownership of livestock – only 44% owning chickens.
- Most households rely on no more than 2 income sources with the main sources being sales of roots & tubers, cereals and cash crops. Also engaged in petty trade and small business. Highest reliance on remittances (7%).
- Only 80% with agricultural production and only 2 hectares on average.
- Asset ownership is low for agricultural assets but moderate for durable assets.
- Highest share of expenditure on food (46.8%) with highest share for roots & tubers (7.9%), meat/fish (15.8%) and vegetables (5.5%).
- Highest share of expenditure also for debts/fines (9.8%), and utilities (4.5%) and high expenditure on transportation (5.9%).
- For women, low access to vitamin A supplementation and high prevalence of both diarrhoea and fever and lowest use of bednets for sleeping. Lower prevalence of maternal malnutrition.

4.6 - Households with very good food consumption – 15% of sample

- Daily consumption of fish, oil, vegetables and combinations of rice, other cereals or cassava.
- Meat, eggs and fruit eaten on a regular basis (4-5 times per week)
- Low reliance on own production (18% overall)
- Highest dietary diversity – high number of foods and frequency.
- Nearly 90% of households with adults eating 3 times per day.
- Average household size and three quarters owning their own homes. One-quarter with thatch roof and the rest with iron roof. Only 20% with dirt/earth floor.
- One-third using electricity and 85% using wood for cooking. Around 40% with no toilet and 80% using drinking water from safe sources.
- Medium livestock ownership.
- Rely mostly on 2 sources of income such as sales of rots & tubers, sales of cereals, petty trade, cash crop sales, small business and skilled labour. 8% rely on salaried work.
- About 80% with agriculture cultivation with an average of 3 hectares cultivated.
- Ownership of productive and durable assets is fairly high.
- Low share of total expenditure for food with higher shares for agricultural inputs, hiring labour and communications/other.
- Highest reported morbidity for women but lowest prevalence of maternal malnutrition (8.2%).

5.0 – District food security and vulnerability typologies

For the Ghana VAM survey, 19 districts or district clusters were sampled in the five regions but no sample was large enough to provide statistically valid results. The challenge of this sampling technique was to determine the best way to:

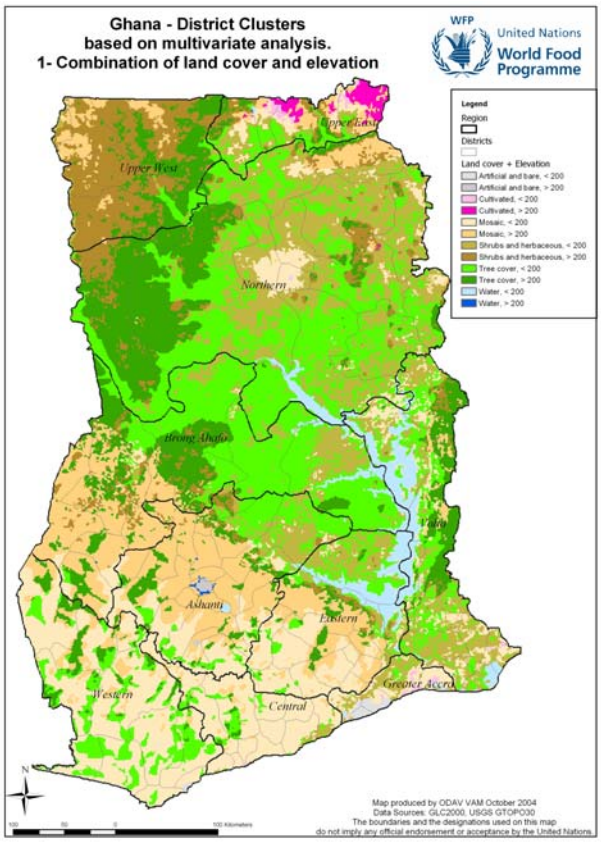
- Present findings at the district level for those districts in the sample.
- Extrapolate findings to non-sampled districts in the five regions.

5.1 – Creating homogeneous district clusters

Over the past year, the VAM unit in WFP headquarters has been using spatial analysis and principal components analysis techniques in order to create homogeneous clusters of districts in countries where VAM-HQ has been providing technical support for primary data collection activities. The rationale for using these techniques is so that separate, representative samples can be drawn for each of the clusters in order to identify the areas of a country that are most vulnerable to food insecurity, rather than just providing results at national or, at best, regional level. For example, if Ghana is divided into nine regions and has more than 100 districts, it is financially and logistically impossible to draw a sample large enough in each district to allow for district level analyses and findings. Conversely, if samples are drawn to only represent the nine regions, the findings are too general to be useful in targeting the most food insecure areas of a country.

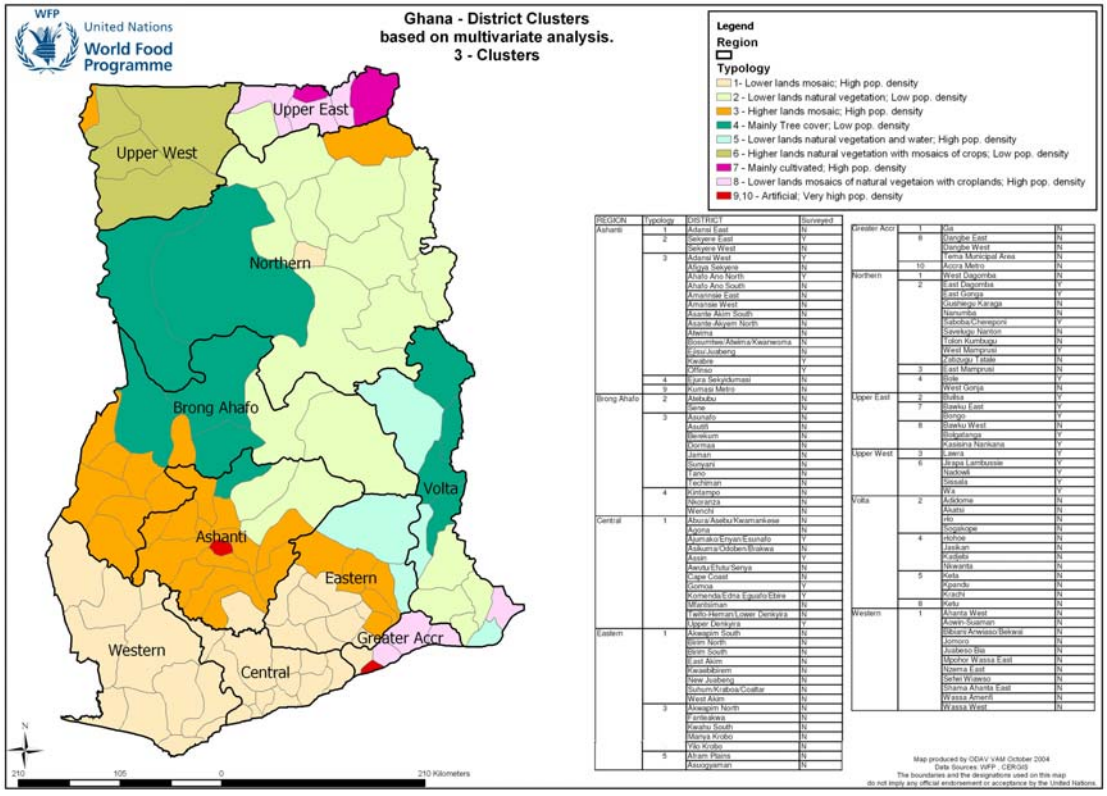
Therefore VAM-HQ used spatial analysis and principal components analysis techniques to create homogeneous clusters of districts based upon the following information acquired from remote sensing sources:

- Elevation
- Ground cover
- Population density



The analysis resulted in the creation of nine homogeneous district clusters for the country that are not constrained by regional administrative boundaries. The assumption is that people living in these similar districts are more likely to have similar livelihoods due to the similarity in elevation and land cover as well as population density.

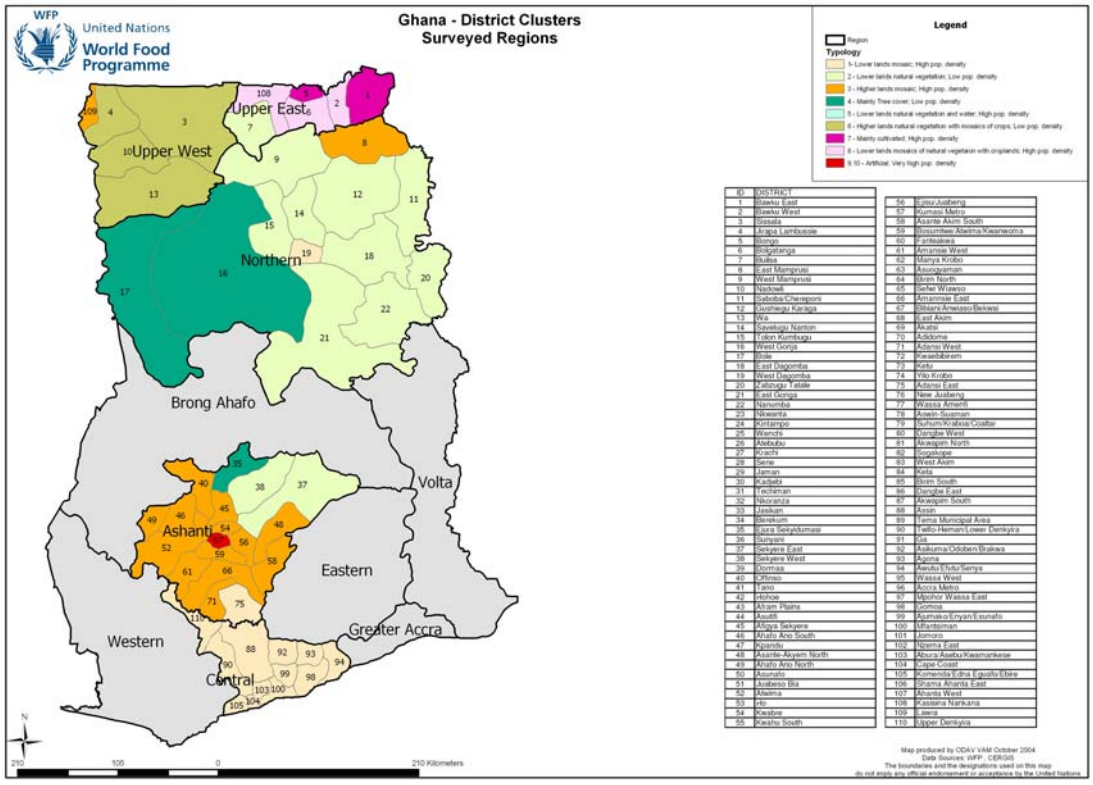
The map on the left shows the overlay of land cover and elevation for the country and the resulting 12 combinations. Note how the distribution is not constrained by administrative boundaries. There is a lot of mixed ground cover in the southern and north-western part of the country while the central and north central is mainly tree cover. The highest concentration of agricultural cultivation is found in the north-eastern part of Ghana, as illustrated by the pink colours in the map.



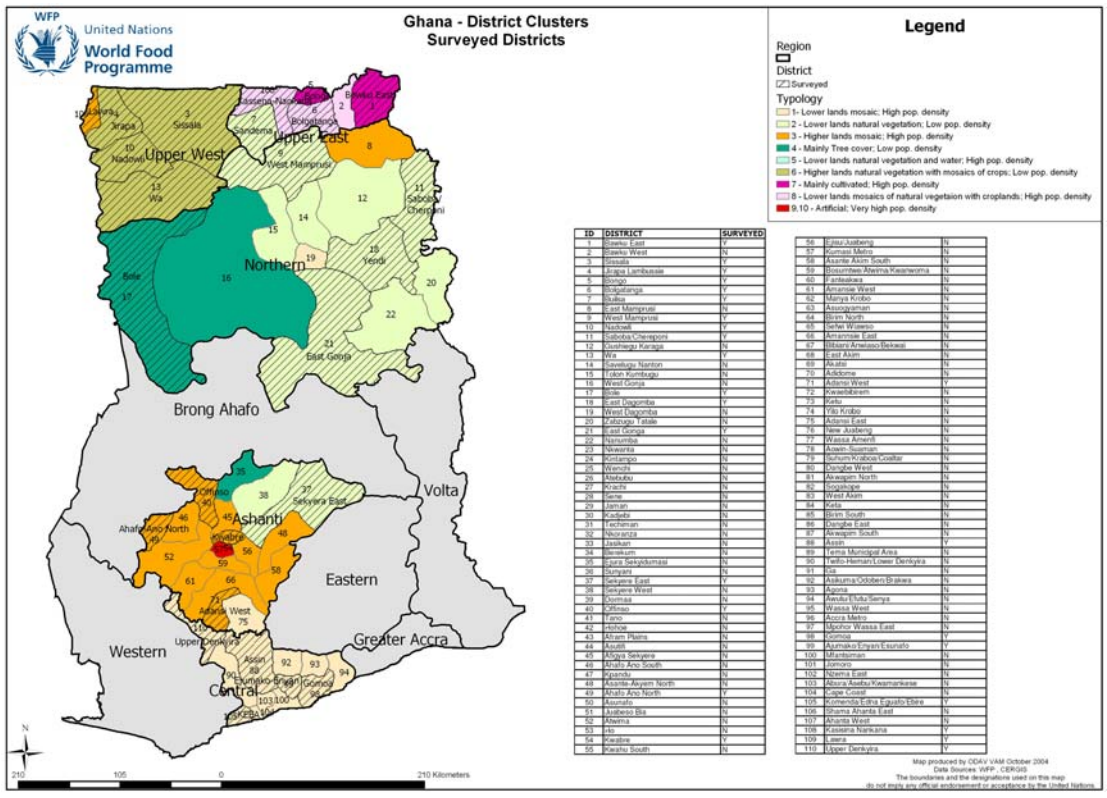
The above map shows the resulting homogeneous district clusters after population density was added and principal components analysis was used to determine those districts with similar combinations of the three types of information (% of the various land cover/elevation combinations plus high, medium, low and very low population density). The nine typologies are indicated by the different colours in the map and are described below:

1. Lower land with mixed ground cover and high population density (all of *Central* & *Western* regions, one district in *Ashanti* & *Greater Accra*, part of *Eastern* plus Tamale district in *Northern* region).
2. Lower lands with natural vegetation and low population density (eastern half of *Northern* & *Brong Ahafo* regions, northern *Ashanti*, southern *Upper East* and southern *Volta* regions).
3. Higher lands with mixed ground cover and higher population density (southern parts of *Ashanti* & *Brong Ahafo* regions, central *Eastern* region, East Mamprusi in *Northern* and Lawra in *Upper West* regions).
4. Mainly tree cover with low population density (north-western *Brong Ahafo*, western *Northern* & north-eastern *Volta* regions plus Ejura Sekyidumasi in *Ashanti* region).
5. Lower lands with natural vegetation and water with higher population density (parts of *Eastern* and *Volta* regions along the Volta River and delta).
6. Higher lands with natural vegetation and mixtures of crops and low population density (almost all of *Upper West* region).
7. Mainly cultivated land with high population density (Bawku East and Bongo in *Upper East* region).
8. Lower land with mixture of natural vegetation and croplands with high population density (the rest of *Upper East* and parts of *Greater Accra* regions)
9. Artificial ground cover with very high population density (Kumasi and Accra metro areas).

The map below shows the typologies in the districts of the five regions considered in the vulnerability analysis study.



However, not all of the districts in the five regions were sampled for the household data collection. The next map shows those districts included in the sample and their distribution in the five regions.



5.2 – District typologies

In order to understand the various types and levels of vulnerability at the district level, principal components analysis (PCA) and cluster analysis was conducted using the following variables:

- Cultivation of agricultural land and home gardens (availability)
- Share of total monthly expenditure for food and education (access)
- Diversification of income sources (access/risk mitigation)
- Percentage of households in each of the six food consumption groups (access)
- Prevalence of maternal malnutrition (utilization)
- Use of drinking water from improved sources in the dry season (utilization)
- Past exposure to risks and shocks (risk)

The analysis resulted in six distinct typologies of vulnerability in the sample of 19 district/district clusters. Using the results of the spatial analysis which resulted in the identification of homogeneous district clusters, the analysis of household data from the sampled districts can therefore be extrapolated to the non-sampled districts for the five regions. The following are the results for the sampled regions while the extrapolation to non-sampled districts can be found in the table at the end of this section. Proposed intervention strategies are mainly focused on the role of food aid and/or multi-sectoral responses to vulnerability.

Type 1 – Highest vulnerability to food insecurity

- Characterized by limited access to food
- Highest percentage of households with 'very limited access to food'
- High percentage of households with 'typical diet – low diversity'
- Highest share of monthly expenditure for education (11% of total)
- Most household have highly diverse sources of income to reduce vulnerability to economic shocks.
- **Districts**: *Jirapa, Lawra, Nadowli, Sissala* & *Wa*
- **Proposed intervention strategies**: Food for Work, School Feeding, general economic development and poverty reduction programmes.

Type 2 – Highest vulnerability to maternal malnutrition

- Very high (around 30%) prevalence of maternal malnutrition (Body-Mass Index less than 18.5 kg/m^2).
- Majority of households have 'typical diet but low diversity'
- Between 60-70% of the households experienced risks or shocks to household food security in the past year.
- **Districts**:
    - *Sandema* – Half of total monthly expenditure is for food; 15% have limited access to food.
    - *Bongo, Bogatanga, Bowku East* – More than half have a garden, low share of monthly expenditure for food (37%) but high income diversification.
- **Proposed intervention strategies:** Maternal-child Health programmes, activities to promote economic development.

Type 3 – Highest vulnerability to economic shocks or problems

- Vulnerable in terms of access to food – 25% have 'limited access to food but higher diversity'
- Less than 60% are cultivating agricultural land
- High share of monthly expenditure for food (56% of total)
- Lowest exposure to risk in the past year (25%).
- Low average number of household and productive assets.
- **District**: *Kwabre*
- **Proposed intervention strategies:** Poverty reduction programmes

Type 4 – Vulnerability to seasonal changes in availability and access to food

- Nearly half with 'typical diet but low diversity' with 30% having 'good and very good food consumption'
- Half experiencing recent risks/shocks to household food security.
- Only 46% using drinking water from improved sources in the dry season.
- High diversification of income sources
- Monthly share of total expenditure for food is 46% with only 2% allocated to education
- High average number of household and productive assets
- **Districts**: *West Mamprusi, Saboba/Cherponi, East Gonja*
- **Proposed intervention strategies**: School feeding, programmes to improve access to safe drinking water, poverty reduction programmes.

Type 5 – Less vulnerable – able to cope with shocks and risks

- Middle class – 85% with 'typical diet' including both low and high diversity.
- Nearly 80% experienced risks and shocks in the past year.
- Around 80% are using drinking water from improved sources, year round.
- Are mostly farmers but with diversification of income sources
- About 45% of total monthly expenditure is for food.
- High average number of household and productive assets
- **Districts**: *Yendi*, *Kassena-Nankana*
- **Proposed intervention strategies**: Increased agricultural extension programmes, programmes to improve access to safe drinking water

Type 6 – Least vulnerable districts – three sub-groups

- All have a high percentage of households in the best food consumption typologies plus other distinguishing characteristics.
- **Districts**:
    1. *Bole, Offinso, Ahafo-Ano North*
    2. *Sekyera East, Adansi West*
    3. *Assin, Gomoa, KEEA, Denkyira, Ejumako-Enyan*
- **Proposed intervention strategies**: The second two groups could benefit from programmes to improve access to safe drinking water.

5.3 – Extrapolation to non-sampled districts

Using the results of the spatial analysis exercise the following table presents the vulnerability classifications and program options for all districts in the five regions of Ashanti, Central, Northern, Upper East and Upper West regions.

Region	District	Surveyed	Vulnerability Type Codes	Possible program options[1]
Ashanti	Kwabre	Y	3	PR
	Sekyere West	N	4	SF, IW, PR
	Ejura Sekyidumasi	N	6.1	
	Offinso	Y	6.1	
	Afigya Sekyere	N	6.1	
	Ahafo Ano South	N	6.1	
	Asante-Akyem North	N	6.1	
	Ahafo Ano North	Y	6.1	
	Atwima	N	6.1	
	Ejisu/Juabeng	N	6.1	

[1] *PR = poverty reduction, SF = school feeding, IW = improved access to safe drinking water, AE = agricultural extension programs, MCH = maternal-child health, ED = economic development*

	Asante Akim South	N	6.1	
	Bosumtwe/Atwima/Kwanwoma	N	6.1	
	Amansie West	N	6.1	
	Amannsie East	N	6.1	
	Sekyere East	Y	6.2	IW
	Adansi West	Y	6.2	IW
	Adansi East	N	6.3	IW
	Kumasi Metro	N	.	
Central	Assin	Y	6.3	IW
	Twifo-Heman/Lower Denkyira	N	6.3	IW
	Asikuma/Odoben/Brakwa	N	6.3	IW
	Agona	N	6.3	IW
	Awutu/Efutu/Senya	N	6.3	IW
	Gomoa	Y	6.3	IW
	Ajumako/Enyan/Esunafo	Y	6.3	IW
	Mfantsiman	N	6.3	IW
	Abura/Asebu/Kwamankese	N	6.3	IW
	Cape Coast	N	6.3	IW
	Komenda/Edna Eguafo/Ebire	Y	6.3	IW
	Upper Denkyira	Y	6.3	IW
Northern	West Mamprusi	Y	4	SF, IW, PR
	Saboba/Chereponi	Y	4	SF, IW, PR
	Gushiegu Karaga	N	4	SF, IW, PR
	Savelugu Nanton	N	4	SF, IW, PR
	Tolon Kumbugu	N	4	SF, IW, PR
	Zabzugu Tatale	N	4	SF, IW, PR
	East Gonga	Y	4	SF, IW, PR
	Nanumba	N	4	SF, IW, PR
	East Dagomba	Y	5	AE, IW
	East Mamprusi	N	6.1	
	West Gonja	N	6.1	
	Bole	Y	6.1	
	West Dagomba	N	6.3	IW
Upper East	Builsa	Y	2	MCH, ED
	Bawku East	Y	2	MCH, ED
	Bongo	Y	2	MCH, ED
	Bolgatanga	Y	2	MCH, ED
	Bawku West	N	5	AE, IW
	Kasisina Nankana	Y	5	AE, IW
Upper West	Sissala	Y	1	FFW, SF, ED/PR
	Jirapa Lambussie	Y	1	FFW, SF, ED/PR
	Nadowli	Y	1	FFW, SF, ED/PR
	Wa	Y	1	FFW, SF, ED/PR
	Lawra	Y	1	FFW, SF, ED/PR