

Excerpts from the Niger Comprehensive Food Security Vulnerability Assessment (CFSVA)

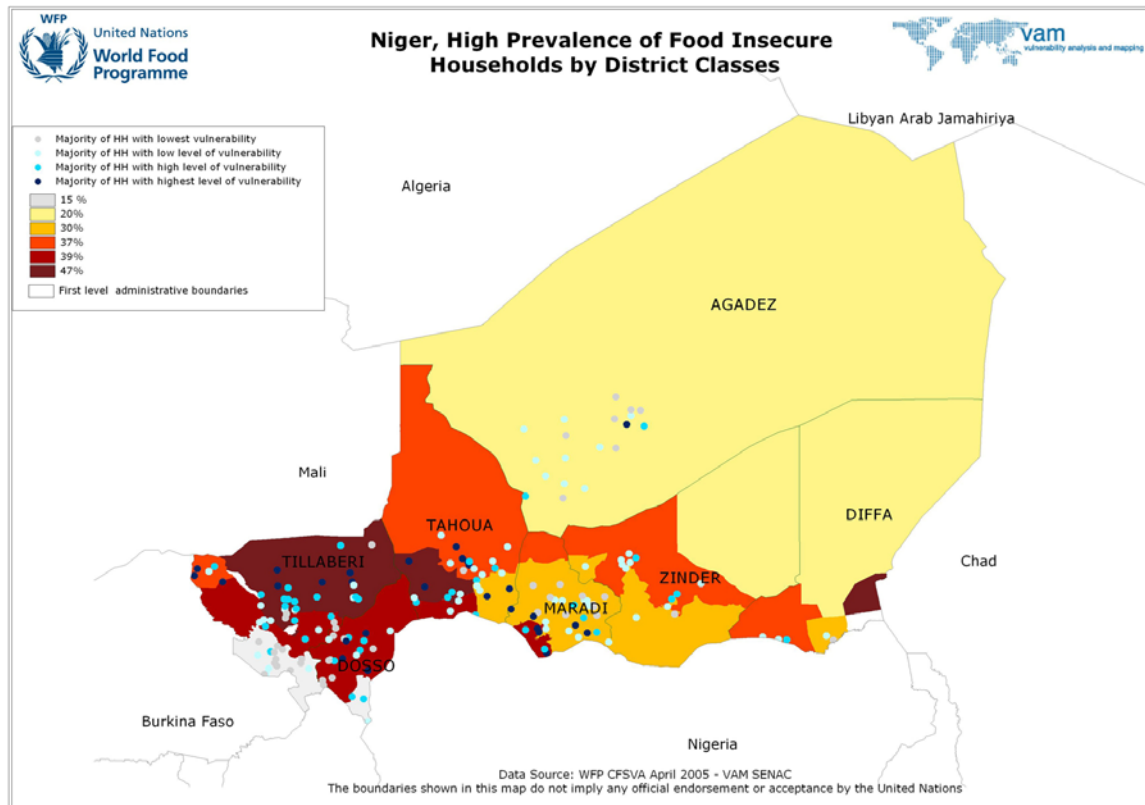
Main findings

In May 2005, approximately 2.9 million chronically food-insecure people in rural Niger were at greatly increased risk and another 0.9 million were considered highly vulnerable.

Food insecurity	Vulnerability profiles
Food-insecure - 28% (2.9 million)	<ul style="list-style-type: none"> • This group has the highest percentage – 26% – of households headed by women. • 10% of household heads are widows, more than twice the figure for the whole sample. • 89% of household heads have no education; the remaining 11% have only primary education. • 30% have no access to improved water sources; 97percent of households in this group have no access to improved sanitation. • 57% live in houses with one room only. • This group has the lowest percentages of households owning assets such as a radio (36%), an iron (9%), a cart (13%) and a bicycle (5%). • Agriculture is the most common activity, reported by 47% of households (lower than the sample average). Remittances, aid, gifts and begging are important income sources among these households.
Vulnerable to become food secure - 8% (900,000)	<ul style="list-style-type: none"> • Households headed by women comprise 23% of the group, the second highest percentage among the four vulnerability groups. • 10% of household heads are widows. • 75% of household heads are illiterate. • Access to improved water sources is a problem for fewer than 30% of the group, but 97% of these households have no access to improved sanitation. • Asset ownership appears to be better than in the group above, but all ownership percentages are below the figure for the whole sample. • The most common activity is agriculture. Petty trade is the second most important. <p>This household category is the truly vulnerable one. It should be carefully monitored because these households could easily shift towards food insecurity, if affected by shocks.</p>
Marginally food secure - 40%	<ul style="list-style-type: none"> • 18% are households headed by women. • 11% of household heads have primary education; 3% have secondary or higher. • 73% have access to improved water sources, but only 5% have improved sanitation. • 44% live in a two-room house; 11% have three or more rooms. • 47% of these households own a radio. • Agriculture (57%) and petty trade (12%) are the most reported primary income sources.

Food secure -
24%

- Women head only 17% of households, the lowest prevalence of such households.
- The percentage of widows is the lowest at 4%.
- 10% of household heads have primary education; 5% have secondary or higher.
- 77% have access to improved water sources; 6% have traditional or improved latrines.
- 42% of households have two rooms; 19% have three or more.
- Ownership is higher than the sample average for every considered asset: 58% own radios, 22% have carts, 10% have bicycles and 5% have motorcycles.
- Agriculture (76%) is the most reported income activity; animal breeding (13%) is the second.



Household food-security profiling

To develop Household food-security profiles, information on dietary diversity and the consumption frequency of staple and non-staple food was collected at the household level. Other indicators of food accessibility and availability were collected and analysed separately. The two analyses were combined to detect different levels of household food security.

Section 1 – Household food consumption groups

Detailed descriptions of the households in the food consumption typologies are presented in the following sub-sections (see the section on methodology).

Very poor food consumption – 14 percent

Households clustered in this group have poor dietary consumption. Millet is the only staple food consumed daily. Milk is consumed on average three days per week; the other food items are rarely if ever eaten. The diet type is likely to be poor in terms of macronutrient and micronutrient intake; the latter might be compromised by the very low dietary diversity. As with macronutrient intake, the diet might provide enough carbohydrates, but it is likely to be deficient in proteins and almost certainly in fats. Of 1800 sampled households, 252 were classified in this group, 14 percent of the sample.

Borderline food consumption – 23 percent

Food item (day/week avg. by HH profile)	Very poor food cons.	Borderline food consumption		Avge for the whole sample
	14%	15%	8%	
Rice	0	1	2	2
Millet	7	7	2	6
Sorghum	1	1	2	2
Maize	0	1	1	1
Wheat	0	0	0	1
Tubers	1	0	1	1
Nuts and pulses	1	0	1	2
Meat	1	1	1	1
Fish	0	0	0	0
Milk	3	0	2	3
Vegetables	1	6	5	5
Fruit	0	0	0	1
Sugar	1	2	3	3
Oils	1	1	3	4
SCORE	17	22	24	31

Two calculated dietary profiles have been assessed as borderline food consumption: the software considers each variable equally; it is not able to read the different profiles in qualitative terms. In this case, two households groups characterized by different dietary patterns would be considered in the same "diet-quality" category.

Households clustered in the first profiles eat millet and vegetables daily; sugar is consumed on average twice a week; the other items are never or rarely consumed. Households in the second profile do not have a fixed cereal as staple and tend to combine different cereals in order to eat every day. This might indicate that they manage to eat cereals every day, but they cannot access one staple on a daily basis, or they prefer to vary their diet. This different access pattern could be characterized positively or negatively. On the other hand, consumption of other food items is still limited. Vegetables are eaten five days per week on average; oil is consumed three days per week and milk twice a week. Households belonging to these two profiles are clearly able to cover their food needs

throughout the week, but their access to food appears to be limited. Diet quality and diversity seem to be poor among these households. Quantity might not be a problem.

Fairly good food consumption – 38 percent

A large percentage – 38 percent – of the sample has fairly good consumption patterns on a regular basis. This percentage groups together four main sub-groups of households identified according to four different dietary patterns, all of which have daily access to cereals as a staple and a fairly good combination of other foods eaten on a regular basis. Millet is the everyday staple and is integrated with other cereals. Milk, vegetables, sugar and oils are consumed at various frequencies by households in the four sub-groups. These four dietary profiles seem to indicate that even though there are different patterns, all the households manage to eat. The quantities of food should satisfy household needs; diet quality, even if not optimal, appears to be sufficiently diversified.

Food item (day/week avg. by HH profile)	Fairly good food consumption				Avge for the whole sample
	15%	5%	9%	8%	
Rice	1	2	4	4	2
Millet	7	7	7	7	6
Sorghum	2	2	1	1	2
Maize	1	1	1	1	1
Wheat	0	1	2	1	1
Tubers	1	6	0	1	1
Nuts and pulses	1	1	1	1	2
Meat	1	1	1	1	1
Fish	0	0	0	0	0
Milk	7	3	5	2	3
Vegetables	6	4	1	7	5
Fruit	0	0	0	0	1
Sugar	2	3	7	6	3
Oils	4	4	7	6	4
SCORE	33	34	35	38	31

Good food consumption – 25 percent

The rest of the sampled households have good food consumption frequency and dietary diversity. Four main dietary patterns were detected, all of which show good consumption of cereals, sugar, oils, vegetables and animal or vegetable protein sources.

Food item (day/week average by household profile)	Good food consumption				Average for the whole sample
	9%	4%	4%	7%	
Rice	2	2	4	3	2
Millet	7	7	6	7	6
Sorghum	3	2	2	2	2
Maize	0	1	2	1	1
Wheat	0	1	1	1	1
Tubers	1	1	2	1	1
Nuts and pulses	6	2	2	2	2
Meat	1	3	1	5	1
Fish	0	0	6	0	0
Milk	3	4	2	5	3
Vegetables	5	5	5	6	5
Fruit	0	6	1	1	1
Sugar	4	4	3	5	3
Oils	4	4	4	5	4
SCORE	38	41	41	45	31

Section 2 – Analysis of other food-accessibility indicators

Other indicators of food accessibility were analysed separately to factor into the food security classification information about expenditure, cereal production and sources of foods consumed.

The indicators were:

- percentage of food expenditure out of total expenditure;
- percentage of expenditure on cereals out of total food expenditure;
- total expenditure per capita;
- quantities of cereals produced per capita;
- percentage of food consumed that is self-produced;
- percentage of food consumed that is purchased; and
- percentage of food consumed that is received as gifts.

Principal component analysis and cluster analysis were used to group households that share patterns of food-accessibility indicators. Households were clustered on five principal components, which together account for 92 percent of the original variance of the system. To maintain homogeneity within groups, the sampled households were initially divided into ten clusters according to mathematical criteria only. But different combinations of indicators could mean different things in the field of food security, so the ten mathematically calculated clusters were manually regrouped into four main classes:

- **Households characterized by very weak access to food:**
This group accounts for 14 percent of the sampled households, of which 10 percent are characterized by very high expenditure on food – 75 percent of total expenditure – and very high cereal expenditure – 79 percent of total food expenditure. Per capita expenditure and per capita cereal production are well below the average. These households received as gifts 23 percent of the food they consumed on average; the average for the entire sample is 8 percent.
A smaller group of 4 percent spend a smaller percentage on cereals and on food in general; their levels of per capita expenditure and production are even lower, and they access 77 percent of the food they consume through gifts.

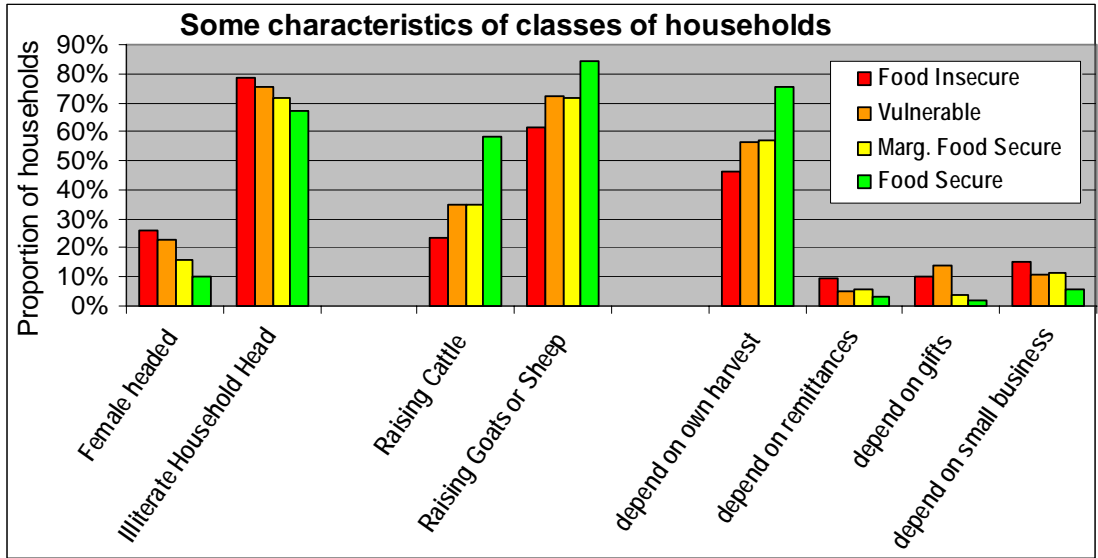
- **Households characterized by weak access to food:**
This group accounts for 49 percent of the sampled households. Two main profiles emerged from the analysis, both of which access 90 percent of their food through purchases; their level of per capita expenditure is below the sample average. Some of them tend to spend proportionally more on food, which accounts on average for 83 percent of their total expenditure; cereals account for 80 percent of disbursements on food. A few others spend proportionally less because their per capita cereal production is slightly higher, though below the sample average.
- **Households characterized by medium access to food:**
This group contains 30 percent of the sampled households. Per capita cereal production is higher than the sample average for these households; they tend to rely on their own production for their food needs. Per capita total expenditures are lower than the figure for the whole sample.
- **Households characterized by good access to food:**
This group contains 7 percent of the sampled households. Per capita total expenditures are on average four times higher for these households than for the whole sample. Two main profiles could be identified: in the first, per capita cereal production is much higher than the sample average and these households access on average a quarter of the food they consume through their own production; in the second, household access their food almost exclusively through purchase. Cereal expenditures are about 70 percent for all foods, but the share of total expenditure for food is well below the figure for the whole sample.

Section 3 – Classes of vulnerability to food insecurity

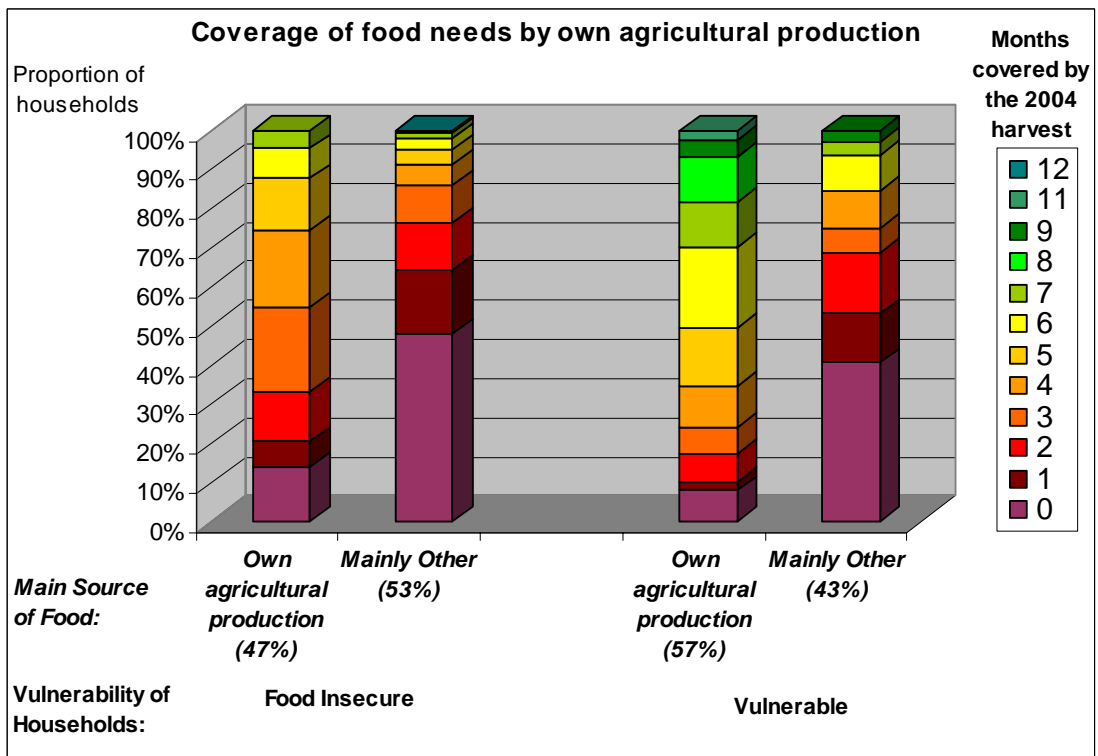
The different classes of vulnerability to food insecurity have been obtained by cross-tabulating the classification based on food consumption and that based on the other food accessibility indicators.

		Accessibility (%)				
		Very weak	Weak	Medium	Good	Total
Food consumption	Very poor	3	6	5	0	14
	Borderline	4	11	6	2	23
	Fairly good	4	19	12	3	38
	Good consumption	2	13	8	2	25
	Total	14	49	30	7	100

This cross-tabulation makes it possible to classify the sampled households into four categories according to their food access situation. The profiles are given in more detail in the Main Findings section at the beginning of this document.



In general, the most food-insecure households depend less on agricultural production and more on small businesses, remittances and gifts; they also have less livestock. Households headed by women and illiterate household heads are over-represented.



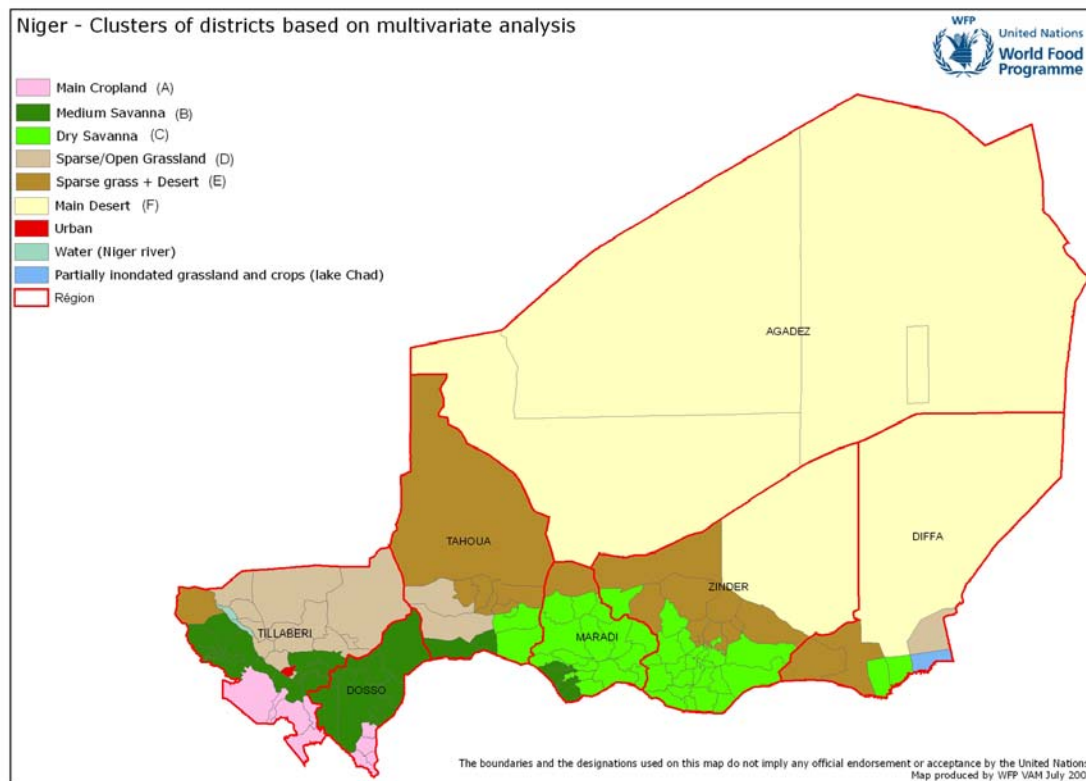
About 45 percent of food-insecure households and 52 percent of vulnerable households depend on their own production as the main source of food. However among the food-insecure households who depend on their own production, only 48 percent produce enough for more than three months. If no coping strategy were applied, 52 percent of the food-insecure households who produce their own food would have run out of food within three months of the harvest; similarly, 24 percent of the vulnerable households would run out of food three months or more after the harvest.

Food-insecure and vulnerable households depending more on other sources of food can rely even less on the 2004 harvest: 84 percent can eat for three months or less from their

own agricultural produce; they are more vulnerable to shocks that affect their main livelihoods – mainly petty trade, remittances, labour and livestock.

Section 4 – Geographic distribution of factors related to vulnerability and food insecurity

Using multivariate analysis of agro-ecological and population data, Niger has been subdivided into six zones or district clusters that each have distinct features related to food security.



Livelihoods

In southern Niger, where cropland and medium and dry savanna predominate, between 69 percent and 83 percent of the population depend mainly on their own agricultural production. In the northern grassland, dry grassland and desert areas, 35 percent to 46 percent rely primarily on this activity. In the intermediate zones, agriculture is still important as a secondary source of food.

In the desert (F), one third of the sample households depend on livestock for income, whereas in Northern Tillabéri – sparse open grassland – 31 percent of the population rely on transfers and gifts as sources of income. Petty trade and small businesses are important for a third of households in all areas, but less important in the north, which is mainly desert.

Shocks affecting agriculture and livestock raising

Households were asked to list in order of priority shocks that had negatively affected them during the previous 12 months. Exceptional drought was reported as a major shock¹ over the whole country except for northern desert areas, where 94 percent of sample households perceived the situation as “normal”. In the rest of the country, 50 percent of households reported “exceptional drought” as a major shock. Most remaining households reported drought as the third or fourth most significant shock.

Between 40 percent and 44 percent of the households, especially in sparse/open grassland and sparse grass/desert areas (D and E), were greatly affected by locust infestation. In the

¹ if the shock is listed first or second, it was considered important or major.

dry savanna (C), 12 percent of households reported major locust problems; in the rest of the country the locusts affected only 0-2 percent of sample households.

2004 harvest

Farmers among the sample households were asked to compare their most recent harvest with their best harvest year. Only 12 percent reported that their 2004 harvest had been the best; most indicated that it had been bad. In the northern sparse grass/desert zone (E), 36 percent had produced less than one 50 kg bag of cereal; the figure was 17 percent in the mainly desert area (F).

The current crop in mainly desert area is on average 75 percent of the “best harvest experienced”, shown as “harvest index” on the map; southern areas produced little more than a third of their best. The situation is more serious in the sparse/open grassland, where the figure is 17 percent, and sparse grass/desert areas, where it is 15 percent, far below their potential.

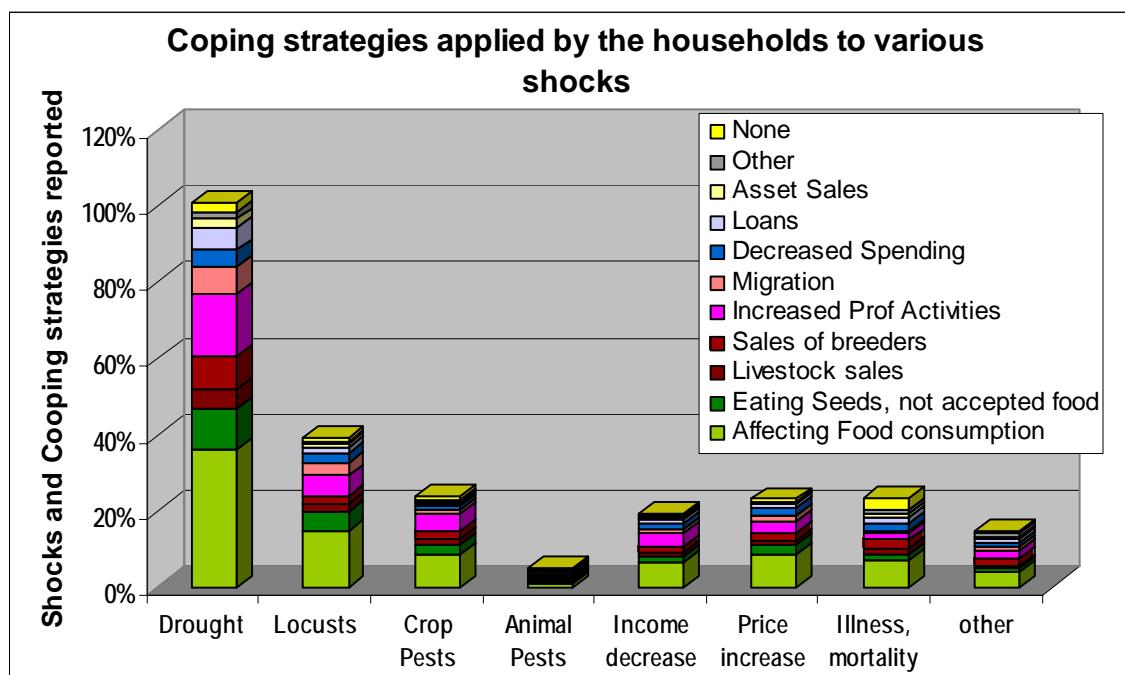
As a result, 2004 production covers the needs of the farming households on average for only 1.7 months in sparse grassland/desert and only 2.8 months in sparse/open grassland; in the rest of the country the harvest covers between 4.5 months and 6.7 months.

Economic shocks

Households reported problems with their purchasing power, especially in the southeastern dry savanna area (E), where price increases affected 17 percent and the incomes of 13 percent fell so much that it was declared a major shock.

Coping strategies

Households were asked how they coped with the negative effects of shocks experienced during the previous 12 months.



The coping strategies deployed by households during the last year are similar for all shocks experienced: 36 percent of reported shocks lead to strategies that affect food consumption, involving decreasing the quantity or quality of food consumed and/or missing meals. Other strategies are: (i) increased professional activities (16 percent); (ii) sale of livestock, often female animals, which affects future breeding (14 percent); and (iii) eating seeds and unusual foods (11 percent). Where there are animal pests and mortality, livestock sales are more common (23%). When illness or death strikes a household, there may be no available strategy (14%); increasing professional activities is achieved by only 8 percent in such cases.

Because of these combined shocks, 42 percent of sample households in sparse grass/desert areas and 36 percent in adjacent sparse/open grassland areas reduced the quantity or quality of food consumed.

Accessibility of food

In southern mainly cropland areas (A), 68 percent of households have sufficient capacity to access food; in the medium savanna areas (B), the figure is 42 percent. In the rest of the country only a minority of household can easily access food this way. The situation is critical in sparse grass/desert areas, where only 16 percent have satisfactory access to food.

Food consumption patterns

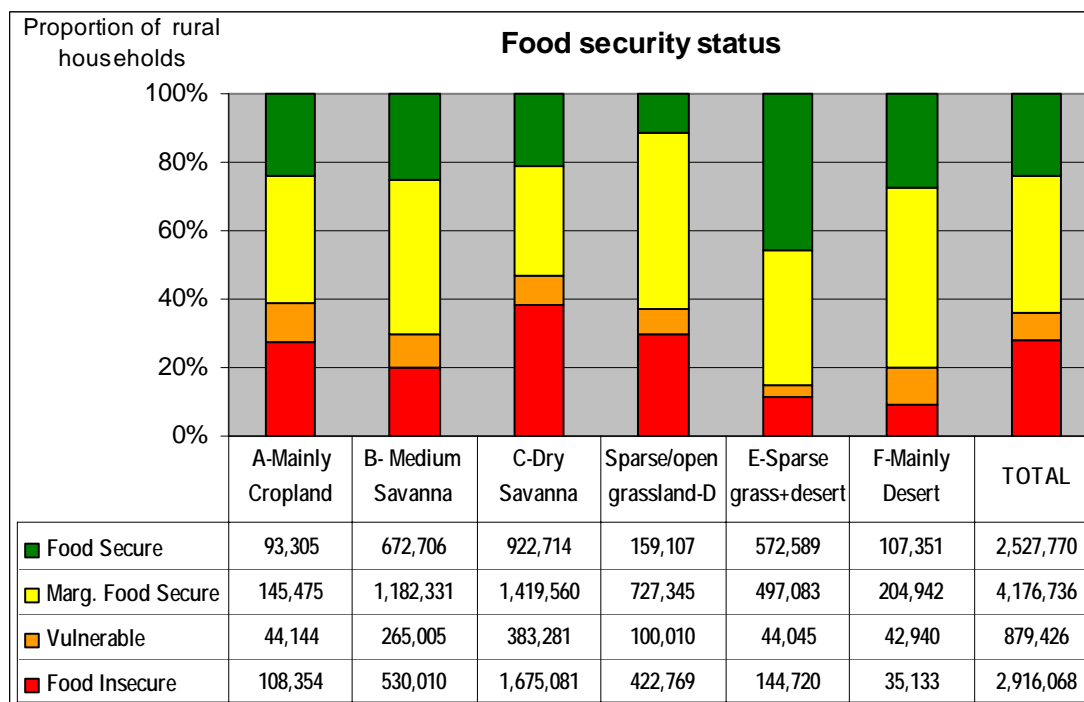
Only 12 percent of households in the mainly desert area (F) show borderline or poor food consumption patterns (see also Section 1); in the southwest, a large part of the sample population have borderline or poor food-consumption: 52 percent in sparse open grassland and 46 percent in medium savanna areas.

Food Security status:

The following table shows the percentages of households in each zone in the different food-insecurity categories.

Zone	Food security status in rural areas (%)			
	Food Insecure	Vulnerable	Marg. Food Secure	Food Secure
Mainly cropland (A)	12	4	40	46
Medium savanna (B)	28	11	37	24
Dry savanna (C)	20	10	45	25
Sparse/open grassland (D)	38	9	32	21
Sparse grass/desert (E)	30	7	52	11
Mainly desert (F)	9	11	53	28
<i>Entire country</i>	28	8	42	24

The 14 percent of households could be considered chronically food-insecure on the basis of their consumption patterns. The four food security categories vary in distribution across the six zones.



Proportionally, most food-insecure households are in sparse/open grassland - D (Tillabéri); many are in medium savanna areas (B), mainly because of poor food-consumption patterns. Large parts of the population in sparse grass/desert areas (E) are equally vulnerable to food insecurity.

About 2.9 million people of the estimated 10.5 million people in rural Niger are considered chronically food-insecure; another 900,000 are vulnerable to food insecurity. The map on page 2 illustrates the prevalence of highly food-insecure households by zone; highly food-insecure households are a combination of the food-insecure and vulnerable categories.

Taking into account food consumption patterns and accessibility to food (see Section 2), only 20 percent of households in the mainly desert area (F) and 15 percent in the mainly cropland areas (A) are considered food-insecure or vulnerable. In the rest of the country, the situation is much worse: between 30 percent and 47 percent of all households are food-insecure or vulnerable.

- The most critical area is in sparse/open grassland (D) in and around northern Tillabéri, the region with the poorest food consumption patterns and a weak livelihood base, where 40 % of households suffered from locust attacks, resulting in an alarming 47 percent of food-insecure and vulnerable households. Production suffered particularly, the harvest of the food-insecure households is only 12 percent of the potential. Even if only 22 percent of food-insecure households depend primarily on their own production for food and as of May 2005, 42 percent of the food-insecure were coping by reducing their food consumption.
- In the sparse grass/desert areas (E) of North Tahoua, parts of Zinder and south of Diffa, 84 percent have insufficient food accessibility. The 2004 harvest was very poor as a result of drought and locusts. In this zone, 37 percent of households are food-insecure and vulnerable. Agricultural produce covers on average only 1.3 months of need of the food insecure and even if only 33 percent of food-insecure households depend primarily on their own production for food, 48 percent of them are applying coping strategies that affect their food consumption.
- In the medium savanna areas of central Tillabéri and northern Dosso (B), 39 percent of households are food-insecure or vulnerable, with very poor food-consumption patterns; 65 percent of them depend on their own produce. The 2004 harvest was worse than usual because of drought.
- In the dry savanna areas (C) mainly in the south of Maradi and Zinder, 30 percent of households are very highly or highly vulnerable; 73 percent of them depend on their own food production. Because of drought and to a lesser extent locusts,

harvests have been only one third of the optimum, covering needs of the food-insecure for an average of only 2.8 months.

Methodology: Food access - frequency of consumption and dietary diversity

The number of different foods consumed in a household reflects its dietary diversity and provides a measure of the quality of the household diet. The variety of food groups consumed is a good food-security indicator, in that dietary diversity is highly correlated with caloric and protein adequacy, percentage of high-quality animal protein and household income.

For convenience, nutritionists divide foods into groups, of which a combination should be consumed on a daily basis to ensure a healthy diet. The main food groups are cereals, legumes and oilseeds, tubers and roots, vegetables and fruit, animal products, oil and fats.

To classify the sampled households on the basis of actual weekly food consumption and dietary diversity, the analysis used information on the frequency of consumption (0 to 7 days) for 14 food items or food groups:

- | | |
|-----------------------|------------------------------------|
| 1. Rice; | 8. Meat (chicken, beef, bushmeat); |
| 2. Millet; | 9. Fish; |
| 3. Sorghum; | 10. Milk; |
| 4. Maize; | 11. Vegetables; |
| 5. Wheat; | 12. Fruit; |
| 6. Yam/manioc/tubers; | 13. Sugar; |
| 7. Groundnuts/pulses; | 14. Oils. |

Because there is the need to analyse several variables simultaneously, multivariate statistical techniques have been used: principal component analysis (PCA) followed by cluster analysis.²

The aim of the analysis is to cluster households that share a particular diet pattern. The advantage of running a cluster analysis on principal components rather than the original variables is that relationships are clustered among variables. The main purpose of PCA in WFP/vulnerability analysis and mapping (VAM) analyses is to describe households on the basis of the relationships among selected variables. Data reduction is a secondary objective.

PCA was run on the frequency of consumption of the listed food items. Sorghum, maize and wheat were considered supplementary or non-active variables, which are variables that are not considered for building the principal components. Rice and millet are staple foods, but other cereals appear to be consumed as complements by only a few households. This subjective choice aims to reduce the complexity of the system before building the principal components; hence it allows a large number of principal components to be maintained for the clustering, which avoids "noise" resulting from outliers.

Using this approach, cluster analysis was run on the base of nine principal components obtained by PCA, which maintain 90 percent of the variance of the original dataset. Such high consistency with the original complexity of the dataset ensures a good reflection of the relationships among variables. In other words, cluster analysis groups together households that have a similar relationship among the food-consumption indicators as expressed in the principal components.

There are several different methods and algorithms that can be used to cluster statistical units; the number of clusters produced will vary depending on the type of clustering method. The algorithm developed in ADDATI implies random selection of initial centres - 100 different partitions were set initially, using the non-hierarchical clustering method of Diday's dynamical clouds.³ The best two partitions were cross-tabulated to create stable clusters, that is groups of households that consistently group together.

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

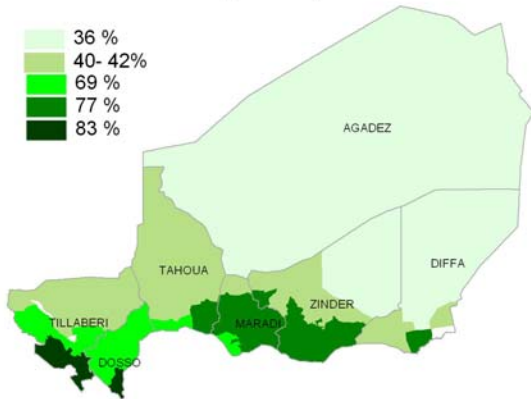
³ Proposed by Erwin Diday in 1971.

Based on this methodology, 11 groups of households were mathematically identified as characterized by their food consumption patterns.

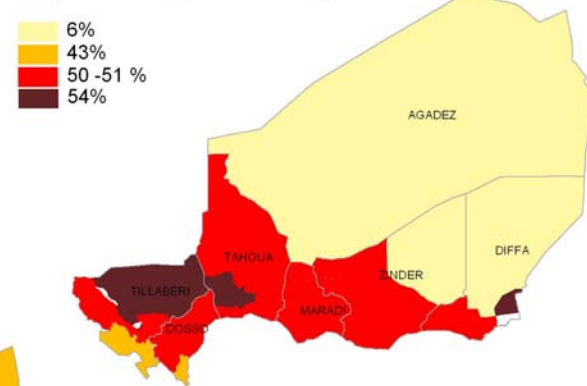
A food-security interpretation of this mathematical result involved consideration of clusters where households present similar levels of food access through different patterns. Four final groups could be considered in terms of household access to food:

1. Very poor food consumption - worst access to food;
2. Borderline food consumption - different dietary patterns;
3. Fairly good food consumption - different dietary patterns;
4. Good food consumption - different dietary patterns.

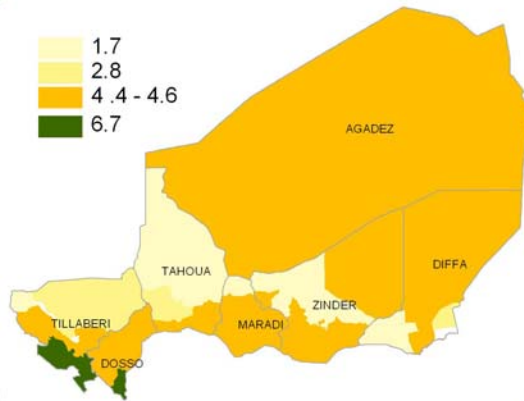
Proportion of the population depending on their own agricultural production for food



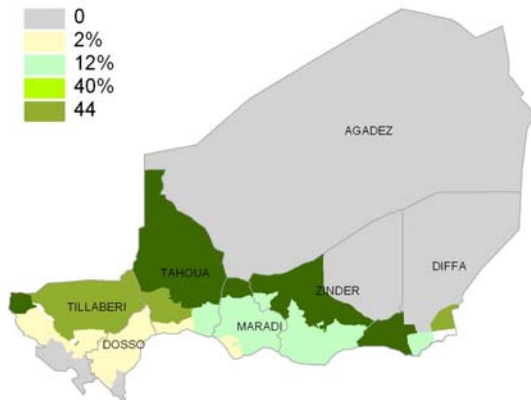
Proportion of the population suffering from severe drought



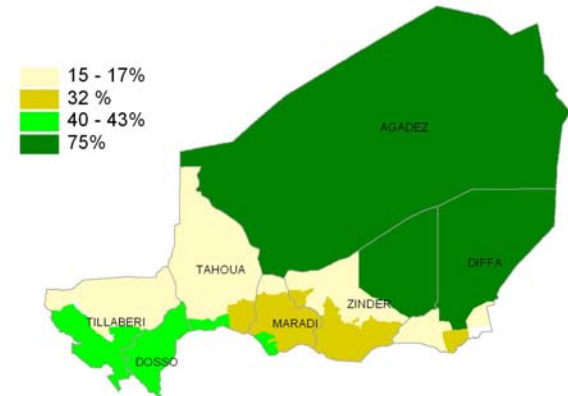
Number of months of food consumption covered by agricultural production



Proportion of the population suffering from locusts



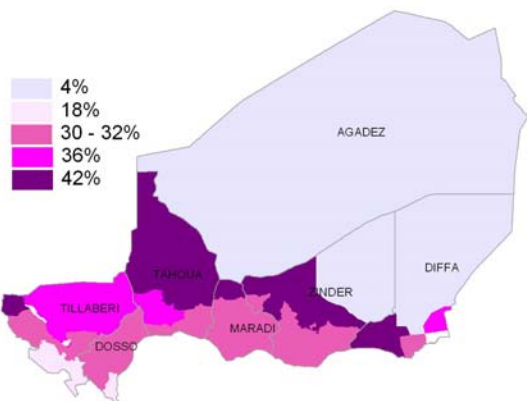
Harvest Index *



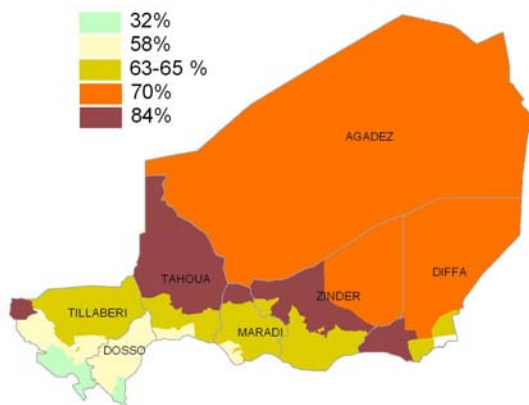
Map prepared by VAM - WFP, August 2005
Data Source: Niger CFSVA April - May 2005, VAM - SENAC

* Harvest of 2004 compared with the best harvest

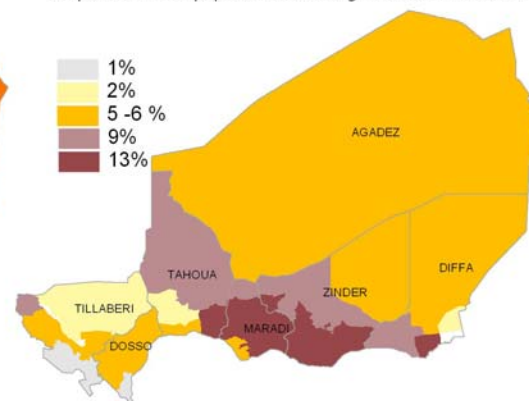
Proportion of the population with coping strategy affecting food consumption



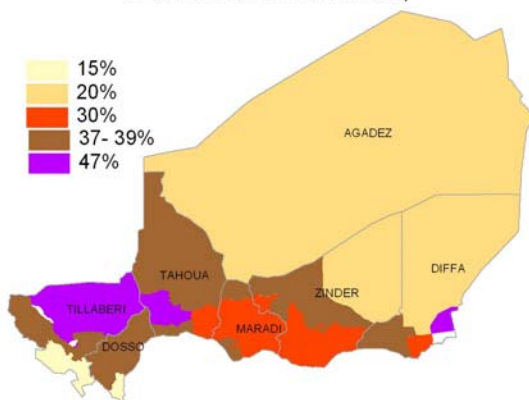
Proportion of the population with insufficient accessibility to food



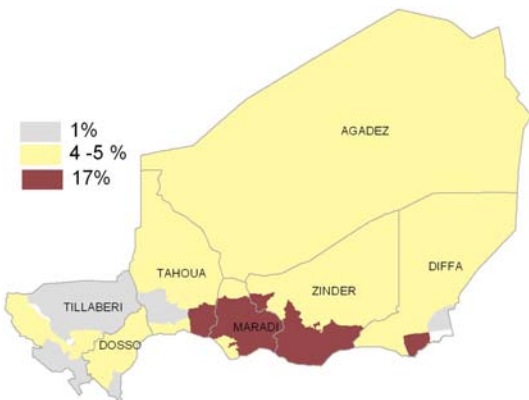
Proportion of the population suffering from reduced income



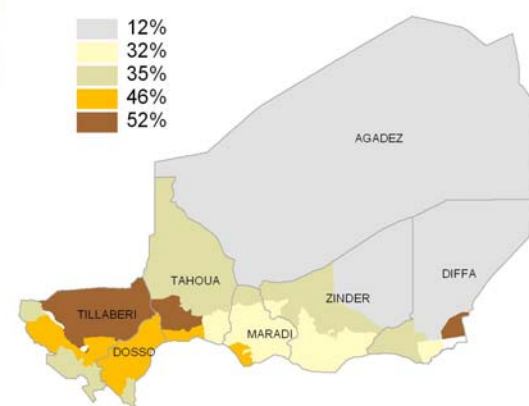
Chronic and severe food insecurity



Proportion of the population suffering from price increases



Proportion of the population with poor diet



Map prepared by VAM - WFP, August 2005
 Data Source: Niger CFSVA April - May 2005, VAM - SENIAC