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Rwanda

Comprehensive Food Security and Vulnerability Analysis (CFSVA)

Conducted in
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Strengthening Emergency Needs Assessment Capacity (SENAC)

***Rwanda*: Comprehensive Food Security and Vulnerability Analysis (CFSVA)**

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RWANDA

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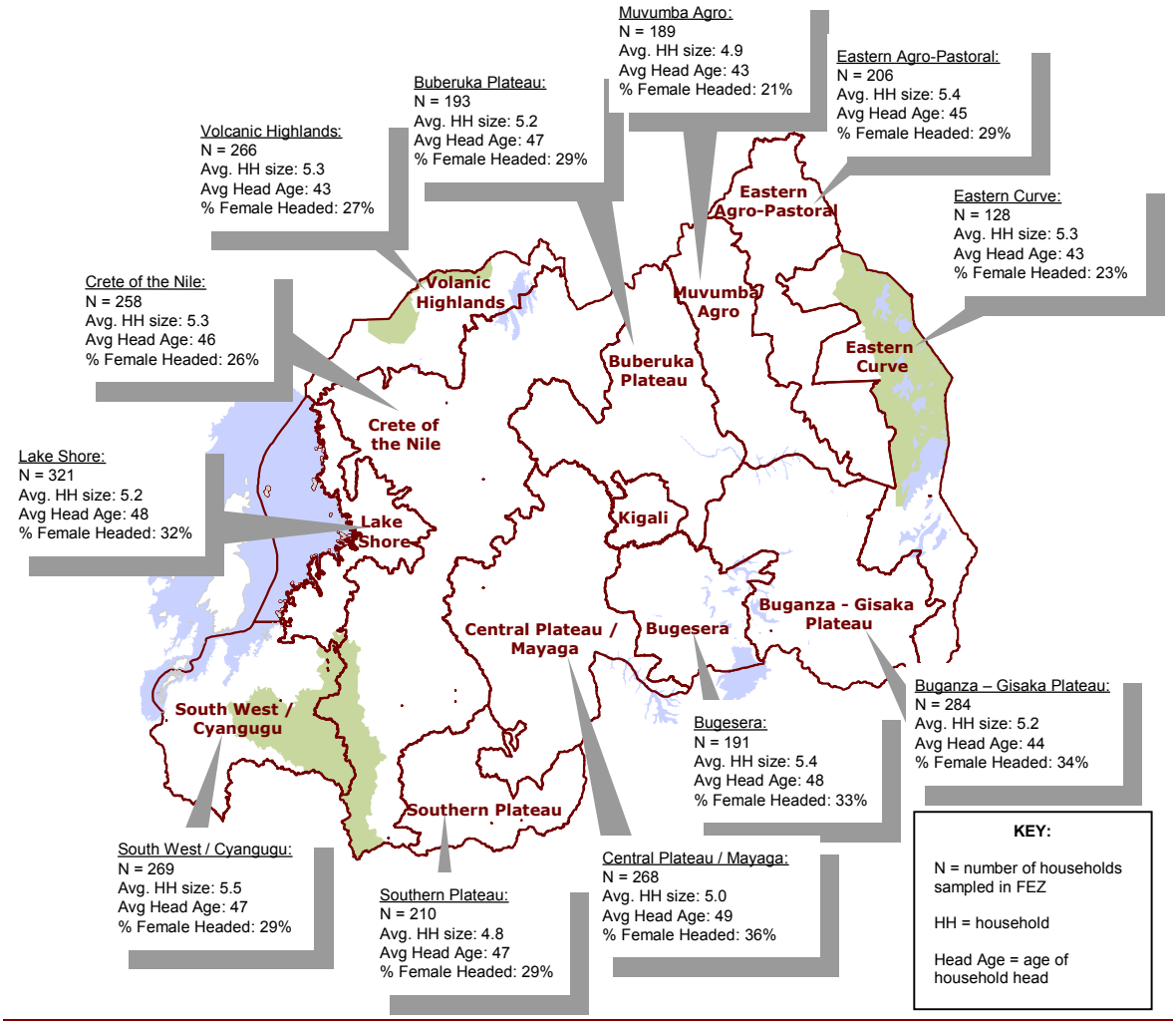
EXECUTIVE SUMMARY

Despite a decade of rapid and sustained economic growth along the path of recovery from the devastating 1994 genocide, the population of Rwanda remains highly vulnerable to food insecurity and malnutrition. Analysis of 2000/01 Household Living Conditions Survey data suggests that over 70 percent of the rural population is considered to be food poor,[1] 45 percent of the children aged 6–59 months are stunted and 3.9 percent are wasted.[2] It is against this background that WFP proposed to undertake a national Comprehensive Food Security and Vulnerability Analysis (CFSVA) with the objective of measuring the extent and depth of food insecurity and vulnerability and identifying the underlying causes. A total of 2,786 households were selected through multiple stage cluster sampling to ensure that it was representative at the sub-provincial level. The zone of Kigali was not surveyed. Data are discussed by food economy zones (FEZ)[3] and, in the annexes, by former provinces and current provinces.



Household livelihood strategies have a direct impact on food availability, food access and ultimately food security – and vice versa. Principal component analysis and cluster analysis were used to establish eight livelihood strategy profiles

[1] Profile of Poverty in Rwanda, MINECOFIN 2002. Food poverty was defined by food consumption expenditure below 45,000 RWF per equivalent adult per year (approx. US$90).
[2] Demographic Health Survey III (DHS III) 2005, National Institute of Statistics and ORC MACRO.
[3] Food economy zones (FEZ) guided the sampling scheme using weights related to food insecurity and vulnerability.

Livelihood profile	Short description	Geographic distribution
Agriculturalists	As 30 percent of the population, agriculturalists depend nearly exclusively on agriculture to sustain their livelihoods. Their average yearly income is the lowest (54,000 RWF[4]), with 75 percent coming from agriculture.	Muvumba Agro (42%) Buganza (48%) Crete of the Nile (45%) Lake Shore (52%)
Agro-labourers	As 20 percent of the population, agro-labourers have the second lowest average yearly income, at 66,000 RWF. Earnings from daily labour (cash and in kind) constitute 61 percent of the estimated income and agriculture contributes 30 percent.	Eastern Curve (34%) Bugesera (35%)
Agropastoralists	As 18 percent of the population, agro-pastoralists have a mixed income estimated at 93,000 RWF yearly, deriving from agriculture (62 percent) and livestock (33 percent). About 4 percent of the agro-pastoralists (less than 1 percent of the total population) depend also on fishing. For this subgroup, fishing contributes 34 percent of their income.	Everywhere except: Lake Shore (8%) Volcanic Highlands (12%) Cyangugu (14%)
Agro-sellers	As 5 percent of the population, agro-sellers depend on petty trade activity (62 percent of monthly income) and agriculture (32 percent). Their total average yearly income is the third highest, at 138,000 RWF.	Highest in Volcanic Highlands (15%)
Agro-traders	As 5 percent of the population, agro-traders differ from agro-sellers in that their commercial activity involves working as mediators in trading agricultural goods (53 percent of monthly income). Agriculture contributes 31 percent of their income. Their total yearly income is 141,000 RWF.	Little geographic variation
Agro-artisans	As 5 percent of the population, agro-artisans derive their livelihood from handicrafts (65 percent of their income) and agriculture (20 percent). Their average yearly income is 114,000 RWF.	Little geographic variation
Employee agriculturalists	As 5 percent of the population, employee agriculturalists have the highest estimated yearly income, at 317,000 RWF, 72 percent of which comes from salaries: public services (55 percent) or contractor/private employee (17 percent). Agriculture contributes 17 percent of their income.	Little geographic variation
Marginal livelihoods	As 3 percent of the population, the marginal livelihood group can be divided into three subgroups: one mainly dependent on aid, a second dependent on hunting/ gathering and a third on money transfers and unspecified activities. The group is referred to as "marginal" because few households belong to each of the subgroups. Their yearly income is among the lowest, at 63,000 RWF.	Little geographic variation but highest in Eastern Agropastoral and Muvumba-Agro (8% each)

Principal component and cluster analysis were also used to establish food consumption and food access profiles. Those profiles in turn were used to establish food security profiles for households. (For more information, including explanation of food scores and consumption calculations, see section 4. Household food security and vulnerability profiling)

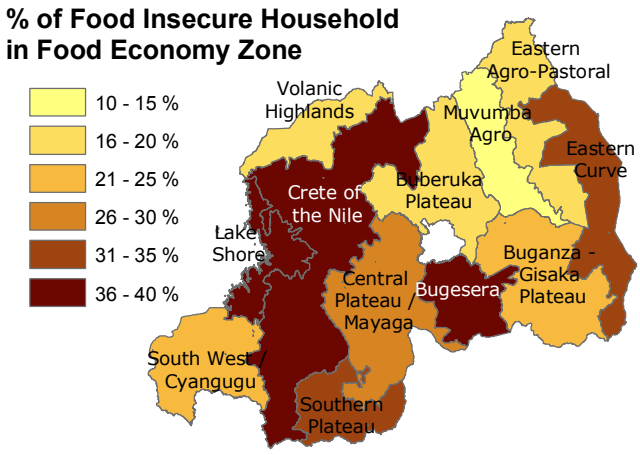
FOOD INSECURITY IN RWANDA – RESULTS OF THE CFSVA		
Food-insecure	28 percent of rural population	Poor or borderline food consumption and very weak food access; or weak or very weak access and poor consumption
Highly vulnerable to food insecurity	24 percent of rural population	Limited food access and consumption profiles (weak-to-medium access and poor-to-borderline consumption)
Moderately vulnerable to food insecurity	26 percent of rural population	At least one of the two profiles sub-optimal (weak access, borderline consumption) and the other component better (medium access or fairly good consumption)
Food-secure	22 percent of rural population	Fairly good to good food consumption and medium to good food access; includes those with good access but borderline consumption and those with good consumption but weak access

The high proportion of food-insecure (28 percent) is consistent with existing estimates of food poverty and malnutrition.[5] However, the "food-insecure" are a very heterogeneous group, spreading across all livelihood profiles and all geographic areas. Subgroups facing more acute problems of food insecurity could be identified. In addition, the poor harvest prior to the survey is likely to have decreased the food security situation of a significant number of households. About 66 percent of the households found to be food-insecure described their situation as unusual, likely an indication of the important seasonal/transient aspect of food insecurity.

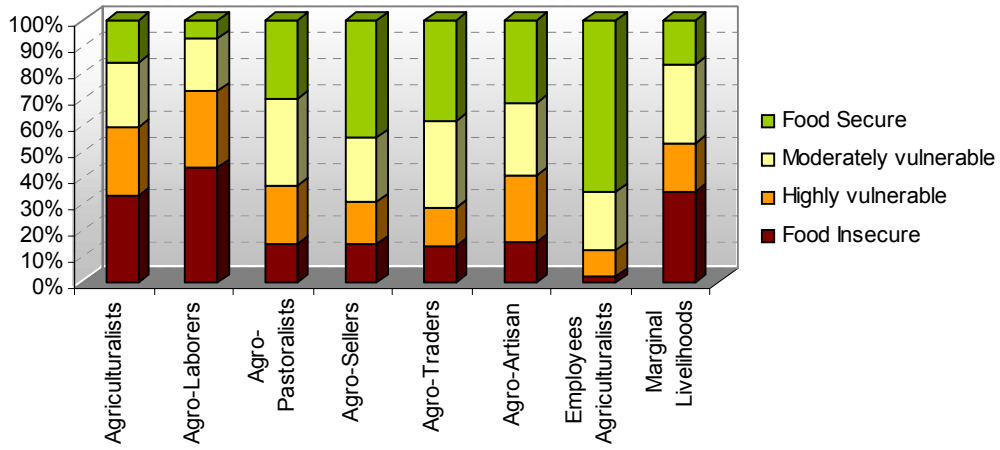
Geographically, while food insecurity is found across all food economy zones, the zones with the highest proportion of food-insecure are the Bugesera (40 percent, standard error 0.114), the Crete of the Nile (37 percent, standard error 0.105), the Lake Shore (37 percent, standard error 0.099), the Eastern Curve (34 percent, standard error 0.135)

[4] RWF= Rwandan franc. Figures are approximate. Conversion as of February 2007: 549 RWF = US$1.
[5] MINECOFIN. 2002. *Profile of Poverty in Rwanda*.

and the Southern Plateau (34 percent, standard error 0.111). Because of its high population, the Central Plateau with 28 percent of food-insecure (standard error 0.105) was also identified as critical. Those six zones total roughly 70 percent of the food-insecure.



Food insecurity was present among all livelihood groups but some groups were more prone to food insecurity: agriculturalists with no alternative source of income (33 percent, standard error 0.124)) and agro-labourers whose work opportunities were related to farm employment (43 percent, standard error 0.127). The marginal livelihoods profile also had a high proportion of food insecure (34 percent, coefficient B = 0)). The food insecure among these three livelihood profiles represented over 83 percent of the total food-insecure population.



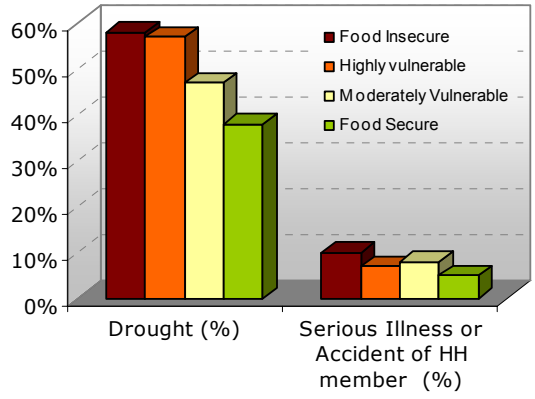
Over half of the food-insecure population (57 percent) lived in one of the six food economy zones listed above *and* belonged to one of the three livelihood profiles most prone to food insecurity; they represent 16 percent of the total population of Rwanda (excluding Kigali).

Some other demographic and other economic factors found to be correlated with food security status were:

- ***Households headed by women are more likely to be food-insecure than households headed by men.*** Thirty-seven percent of households headed by women were food-insecure, compared with 25 percent of households headed by men ($p < 0.01$).
- ***Households headed by isolated (widowed, separated or divorced) people are more likely to be food-insecure than households headed by married people.*** Thirty-seven percent of households headed by a widow(er) and 35 percent of the households headed by a person living apart from his/her spouse were food-insecure, compared with 22 percent among households headed by a married persons.

- ***Larger households are not more frequently food-insecure*.** The proportion of food-insecure was highest among households with one (33 percent) or three individuals (36 percent), compared with an average of 28 percent. There was no clear linear pattern in the distribution of food insecurity across ages.
- ***Households headed by an elderly individual (over 65) are more frequently food-insecure.*** Thirty-five percent of households headed by an older person were food-insecure, compared with 27 percent of households headed by a younger adult.
- ***Land size is an important factor in determining food insecurity.*** Of those that cultivated less than 0.1 ha, 41 percent were food-insecure compared with 21 percent of those cultivating 0.5 ha or more.
- ***Low-income households are more likely to be food-insecure.*** Over 90 percent of food-insecure households earned less than 100,000 RWF per year. Among the food-secure, the percentage of low-income households was less than 60 percent.
- ***Households with less educated and less literate heads tend to be more frequently food-insecure*.** Among households headed by a person who could not read or write simple messages, 34 percent were food-insecure compared with 21 percent among those with a literate head of household.

There was found to be an association between exposure to shock and food security status: 58 percent of the food-insecure reported having experienced drought, compared with 38 percent of the food-secure. Serious illness or accident was reported by 10 percent of the food-insecure compared with 5 percent of the food-secure.



A multivariate analysis[6] was conducted to identify possible causal relationships with food insecurity, after adjusting for other variables.

1. ***Livelihood groups, food economy zones and wealth quintiles explain the biggest part of the variation in food security***. In particular, agro-labourers were worse off than those with marginal livelihoods. Agriculturalists were worse off than those households labelled as having marginal livelihoods but were better off than agro-labourers. Compared with households in the South-West-Cyangugu, all other households had a lower food security score. The regression results suggested that Bugesera, Lake Shore, Crete of the Nile and Eastern Curve were the most food-insecure areas in Rwanda.
2. ***Dependency ratio was a significant variable for predicting food security in Rwanda***. The negative coefficient confirms the hypothesis that the higher the number of dependents to active members in a household, the more food-insecure the household was likely to be.
3. ***Literacy of the head of household*** is not significant after adjusting for other variables, but the value of 0.52 still renders it worthy of comment. The positive

[6] Regression coefficient estimates, Annex 6.

sign suggested that when the head of the household was literate, the household tended to have a higher level of food security.

4. ***Land ownership is significantly correlated with the food security status.*** The more the land farmed by the household, the more food-secure the household.
5. ***Ownership of a vegetable plot or a banana tree is correlated with food security***. Those owning a vegetable plot or banana tree were more likely to be better off than those without such an asset.
6. ***Households with access to credit have a better food security status than those without***. Access to credit was strongly correlated with wealth ($p < 0.001$).
7. ***Households with a chronically ill member are more likely to have a lower food security score.*** This was true even after adjusting for all the variables included in the model.

Using proxy indicators, ***HIV/AIDS was found to impact workforce availability and the physical and financial assets of affected households***. While the difference was not significant, affected households more frequently belonged to the worse-off groups for food consumption, food access and food security profiles.

The relation between food security status and malnutrition was less marked, possibly as a result of poor statistical power due to limited data collection of anthropometric data. The trends suggest, however, that food-insecure children aged 6–59 months were more likely to be wasted and/or stunted than food-secure children.

Forty percent of the food-insecure population (830,000 people, excluding Kigali) belonged at the same time to one of the priority food economy zones, to one of the three priority livelihood profiles and to a household with at least two of the following characteristics: (1) headed by a woman; (2) headed by an elderly person; (3) land-poor; (4) low income. ***Of these, 326,000 had three of the characteristics and were identified as the most critically food-insecure.***

The most critically food-insecure households shared characteristics of recurrent exposure to shock, limited access to land, generally low level of skill (including on-farm practices) and education, and limited access to economic opportunities. Exposure to shocks, especially drought, was higher among food-insecure households and they had more difficulty recovering from shocks.

The general poverty reduction framework developed by the Government of Rwanda, including broad economic development, microcredit and strengthening of the health and education sectors, was identified as crucial for reducing food insecurity and poverty. It was also recommended that there be monitoring of implementation of the new land law to prevent land impoverishment among the most vulnerable, including agriculturalists and agro-labourers.

In addition, three main strategies were recommended for reducing food insecurity:

1) the establishment of a food safety net ;
2) targeted emergency food assistance when necessary; and
3) establishment of a food security monitoring system.

While there is no clear pattern of chronic food deficit in Rwanda at the macro level, a food safety net is needed to prevent the onset of large-scale crisis and to improve the asset base and access to food of vulnerable households. Food-based intervention should be carefully planned and monitored to avoid negative impacts on markets. Bugesera, the Eastern Curve and to a lesser extent the Southern Plateau and the Central Plateau face exposure to recurrent shocks in addition to overall limited physical and economic access to food. In those areas, food-based interventions have a role to play and could include food-for-work (FFW) and food-for-asset (FFA) programmes to improve community infrastructure (health centres, schools, water and sanitation facilities). Food-for-training (FFT) programmes should be prioritized and should include agricultural and livestock training and livelihood improvement through vocational training.

In the Lake Shore and Crete of the Nile area, economic access to food was the major constraint faced by food-insecure households, along with limited access to land and poor agricultural practices that probably contributed to low productivity and environmental

damage. The role of food aid in those areas should be more limited and priority should be given to income generation and/or cash transfer intervention and building skills.

Emergency food assistance is needed for:

1) specific groups that were not specifically assessed by the CFSVA but that are clearly food-insecure and face malnutrition, including refugees and displaced people, under/malnourished people in therapeutic and supplementary feeding programmes, prevention of mother-to-child transmission and anti-retroviral therapy, pregnant women and mothers with children under 5; and

2) crisis situations that follow unusual exposure to external shocks, especially drought. Agriculturalists and agro-labourers are the two livelihood profiles most affected by drought because of their limited ability to access food from the market. Exposure to drought is likely to affect their food intake and resource base (e.g. leading to sale of assets).

A rigorous food security monitoring system is required to identify the onset of a crisis and target food distribution based on emergency food needs assessments.

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INTRODUCTION

After a decade of rapid and sustained economic growth, Rwanda has made significant progress toward rebuilding after the devastating 1994 genocide. Still, it remains one of Africa's poorest countries and the majority of the population (60 percent) lives below the poverty line.[7] Per capita income, even when adjusted for purchasing power parity, has yet to reach its 1990 levels. Population and Household Living Conditions Study (EICV) survey data from 2001 suggest that over 70 percent of the rural population is considered to be food poor,[8] 45 percent of the children aged 6–59 months are stunted and 3.9 percent are wasted.[9] Structural causes of food insecurity further remain to be addressed, including: (1) low productivity of the agricultural sector (per capita production is still below 1990 levels); (2) population pressure on land, resulting in suboptimal plot size and cultivation of marginal land; (3) soil erosion, loss of soil fertility and subsequent declines in productivity; (4) malfunctioning markets and lack of economic opportunities, especially in the rural areas; (5) diseases and epidemics like HIV/AIDS and malaria; and (6) long-term consequences of the conflict such as displacement, family separation and social disruption, which increase the number of vulnerable people and the depth of their vulnerability.

It is against this background that WFP proposed to undertake a national Comprehensive Food Security and Vulnerability Analysis (CFSVA) with the objective of measuring the extent and depth of food insecurity and vulnerability and identifying the underlying causes. The study is intended to inform relevant decision-making processes to mitigate food crises and increase food security. This report presents the results of the analysis of three sources of data: collection of quantitative primary data from 2,806 households selected nationwide to be representative at a sub-provincial level (food economy zones); collection of qualitative primary data; and secondary information (literature review).

The study was initiated by WFP and the Ministry of Agriculture (MINAGRI). It was implemented by the National Institute of Statistics, and received support from other stakeholders, including FEWS NET, MSF-Belgium, UNICEF, Ministry of Finance (MINECOFIN) and the Disaster Management Unit (DMU) of the Prime Minister's Office.

[7] Profile of Poverty in Rwanda, MINECOFIN 2002.
[8] Profile of Poverty in Rwanda, MINECOFIN 2002. Food poverty was defined by a food consumption expenditure below 45,000 RWF per equivalent adult per year (approximately US$90).
[9] Demographic Health Survey Rwanda III (DHSR III), National Institute of Statistics and ORC MACRO.

Part 1: CFSVA OBJECTIVES AND METHODOLOGY

1. OBJECTIVES AND ANALYTICAL FRAMEWORK

The purpose of this Comprehensive Food security and Vulnerability Analysis (CFSVA) is to provide an accurate baseline and understanding of chronic food insecurity and vulnerability conditions in rural Rwanda, and how best to respond to them. It seeks to answer five main questions:

1. Who are the "food-insecure" and "vulnerable"?
2. How many are they?
3. Where do they live?
4. Why are they food-insecure?
5. What intervention is appropriate to reduce their food insecurity and vulnerability?

The answers to those five questions will help develop and target programme activities toward those who most need them (profiles) in the most effective way (intervention). It will further support the development of a monitoring and evaluation system by establishing a baseline against which to measure post-shock changes.

Food security exists when "all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life[10]". It is understood as a multidimensional function of:

1) **food availability:** the amount of food physically available to a household (micro level) or at the national level (macro);

2) **food access:** the physical (e.g. road network, market) and economical (e.g. own production, exchange, purchase) ability of a household to acquire adequate amounts of food; and

3) **food utilization:** the intra-household use of the food accessible and the individual's ability to absorb and use nutrients (e.g. function of health status).

Vulnerability is "the probability of an acute decline in food access, or consumption, often in reference to some critical value that defines minimum levels of human well-being". It is a function of:

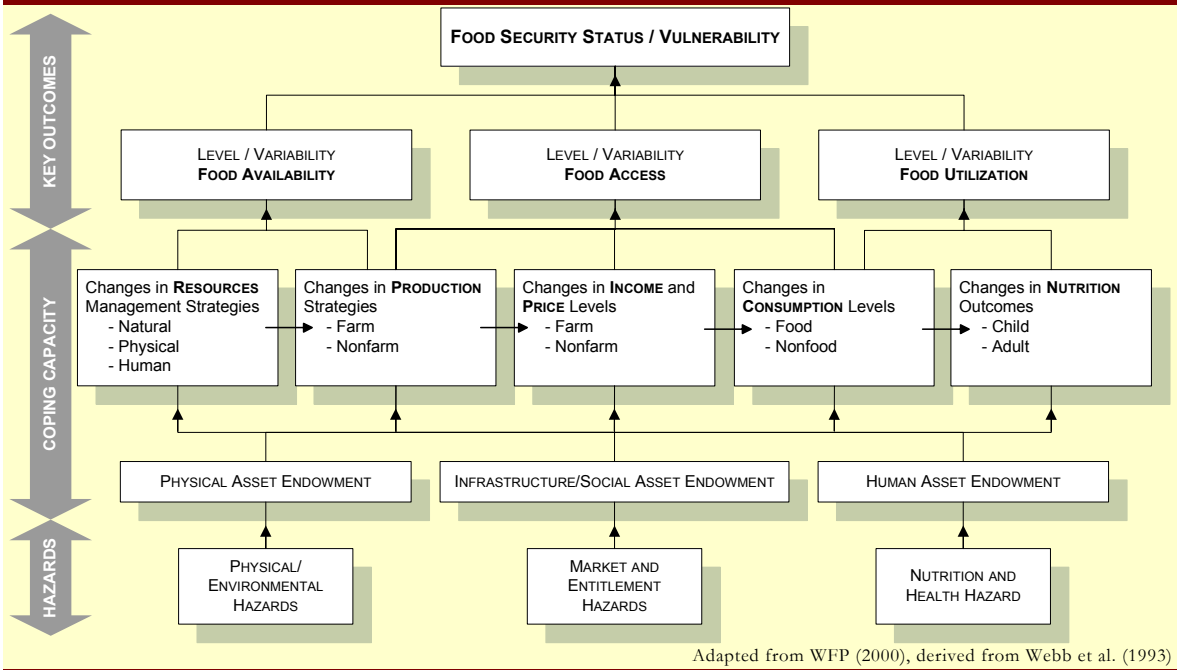
1) **exposure to risk:** the probability of an event that, if it did materialize, would cause a welfare loss (e.g. drought); and

2) **risk management:** the ability to mitigate the possible consequences of a probable event. This can in turn be divided into ex-ante risk management (preparedness) and ex-post risk management (ability to cope). The ability to cope is the response after an event occurred; it can be negative and affect the resource base of the household, such as the selling of assets, or positive (non-negative response such as migration). The ability to cope is undermined by the intensity of the event itself but also by poor structural and societal conditions such as poverty.

The following framework clarifies the relationships between different aspects of vulnerability and food security. The food security and vulnerability status of a given household is dynamic and therefore subject to change over time. It is important to note that vulnerability to shocks does not automatically lead to food insecurity, as the severity of the hazard and strength of coping mechanisms will determine the actual outcome.

[10] World Food Summit, 1996

Figure 1-1: Vulnerability and food security framework



Adapted from WFP (2000), derived from Webb et al. (1993)

2. SOURCES OF DATA

To achieve its objectives, the CFSVA draws on information from three data sources: (1) a secondary data and literature review; (2) quantitative primary data collection; and (3) qualitative primary data collection.

2.1 SECONDARY DATA AND LITERATURE REVIEW SOURCES

Rwanda is an extensively surveyed country and results of many of the government and private surveys are widely published at provincial and national levels. The material provides information about major issues regarding vulnerability and risks at national and provincial level. On some issues, however, there is no information available, e.g. on post-harvest losses or market access (which is highly variable locally and depends on road conditions and networks). An overview of the main data sources is presented in Annex 1.

2.2 QUANTITATIVE PRIMARY DATA COLLECTION

A nationwide household survey of food insecurity and vulnerability was implemented as part of the CFSVA. The questionnaire and methodology were developed by WFP, the National Statistics Institute of Rwanda (NSIR) and partners. Data collection was implemented by the NSIR with the support of WFP.

2.2.1 SURVEY INSTRUMENT

The household questionnaire (see Annex 2) was designed using a participatory approach that involved WFP and partners. The resulting instrument was a structured questionnaire using open-ended questions. Response options were provided to the enumerators but were not read to the respondents unless otherwise specified. For several questions, respondents were allowed to provide more than one response.

The survey instrument sought to collect quantitative data on 13 components: (1) demographics; (2) housing and facilities; (3) household and productive assets; (4) inputs to livelihoods; (5) migration and remittances; (6) sources of credit; (7) agricultural production; (8) expenditure; (9) food sources and consumption; (10) shocks and food security; (11) programme participation; (12) maternal health and nutrition; and (13) child health and nutrition. Sections 12 and 13 included measurement of weight and height. Standard height boards for adults and children were used to measure height. UNICEF SECA 890 electronic scales were used to weigh mothers and children.

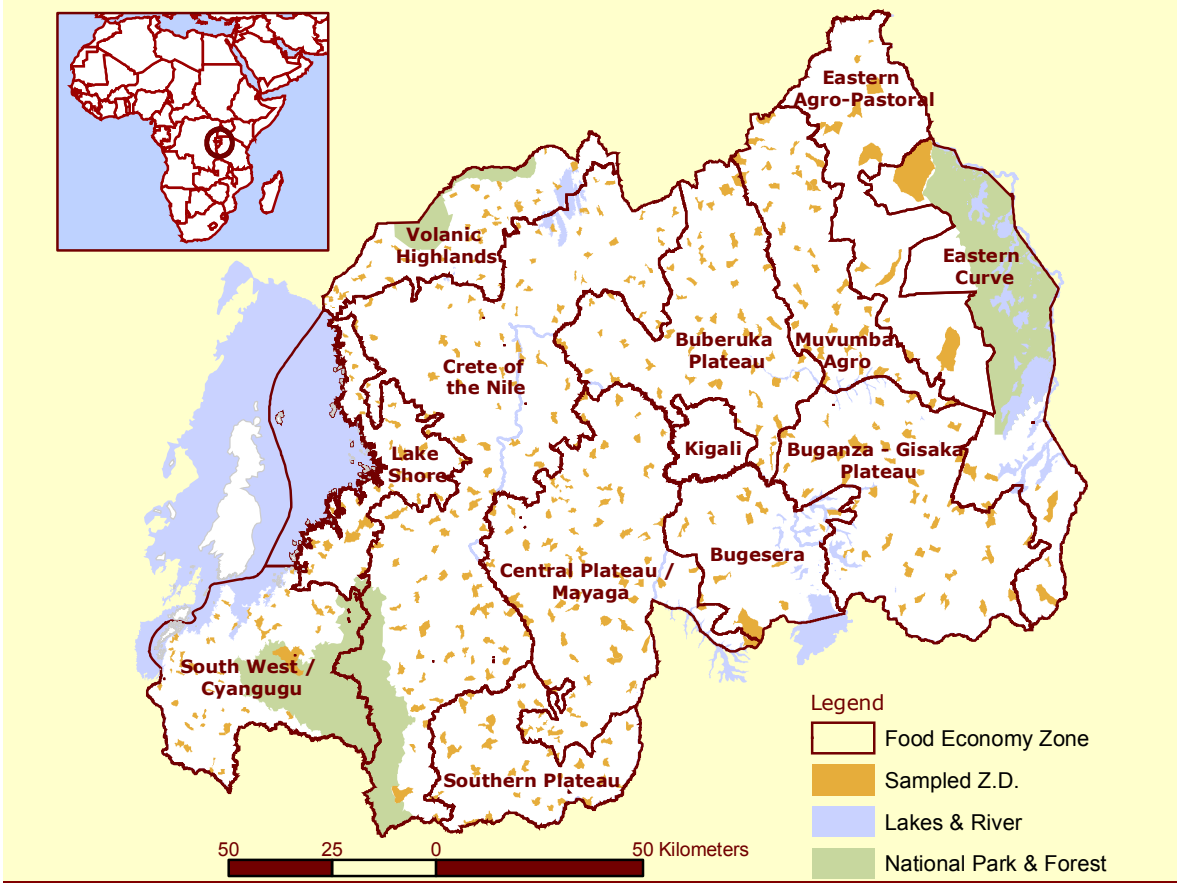
Face validity of the questionnaire was examined by local and food security experts and the questionnaire was piloted among a random sample of people not included in the

study. At each stage, the questionnaire and study protocol were revised accordingly. The questionnaire was first developed in English and then translated in the local language, Kinyarwanda. The translation was reviewed through independent back-translation and pilot interviews to address any inconsistencies.

2.2.2 SAMPLING PROCEDURES

The Rwanda CFSVA sought to characterize household food insecurity and vulnerability at the sub-provincial level. The country is divided into five provinces (Kigali-Ville, Northern Province, Southern Province, Eastern Province and Western Province), 30 districts and 416 sectors. Each sector is composed of cells, which are subdivided into *imidugudu*[11] Since it was impossible to cover and be representative of all 30 districts of Rwanda within the time and budget allocated to the study (and because there were too few provinces), it was decided to use the 12 food economy zones (FEZ) identified in 2003 by the Rwanda Vulnerability Baseline Assessment conducted by the Ministry of Agriculture and Animal Resources (MINAGRI), the Ministry of Youth, Culture and Sports (MIJESPOC), the Ministry of Local Administration, Community Development and Social Affairs (MINALOC), the World Food Programme (WFP) and FEWS NET. All FEZ but Kigali were surveyed.

Figure 2-1: Food economy zones and sampled economy zones



The sample universe for this study was all rural households of Rwanda. A multi-stage sampling procedure was used to select households within each food economy zone. *Zones de dénombrement* (ZD, enumeration zones) were selected first, followed by households. The 2002 census divided sectors in 7,727 ZD. ZD were also used for the 2002 and 2005 Population and Household Living Conditions Study (EICV). ZD were used for the first stage of sampling so that data from EICV studies could be incorporated in the analysis.

A total of 493 ZD were selected randomly (stratified by FEZ and well distributed throughout the former administrative provinces) from the list of all rural ZD. Within those ZD, comprehensive household lists were used to randomly select a total sample of 2,806 households. The sample size was designed to provide representative results at the FEZ level. The map in Figure 2.1 illustrates the levels of sampling.

[11] Villagisation programmes run by the government which aim to move Rwandans into new settlements or villages.

2.2.3 Data Collection

Data collection was conducted from 21 March to 10 April under the supervision of the NSIR. A total of 25 experienced teams conducted data collection. Each team was composed of four interviewers, one supervisor and one driver. Training was organized for the supervisors and interviewers. The training included a general overview on how to conduct interviews and practice sessions with the questionnaire and with measurement instruments. Interviewers were expected to conduct an average of four interviews per day. Clear instructions on which households to interview and how to find them were provided and entered into *fiches de ménages*. Supervisors were provided with a list of over-sampled households in the event that a household had to be replaced. A standardized consent form was used to secure the participation of selected individuals. Participation was voluntary, and respondents did not receive any money or compensation for participating. Names were not recorded.

2.2.4 Data entry and statistical analysis

A team of ten people at the NSIR handled data entry for the household and community questionnaires. A database was developed using CSPro for data entry. The database was imported in SPSS for analysis. Statistical analysis was conducted by WFP in Rwanda and Rome, with the support of NSIR. SPSS and ADDATI 5.2c were used to conduct PCA and clustering analysis. Nutritional indicators were calculated using EpiInfo EPINUT. All other analysis was done using SPSS.

2.2.5 Final Sample size and composition

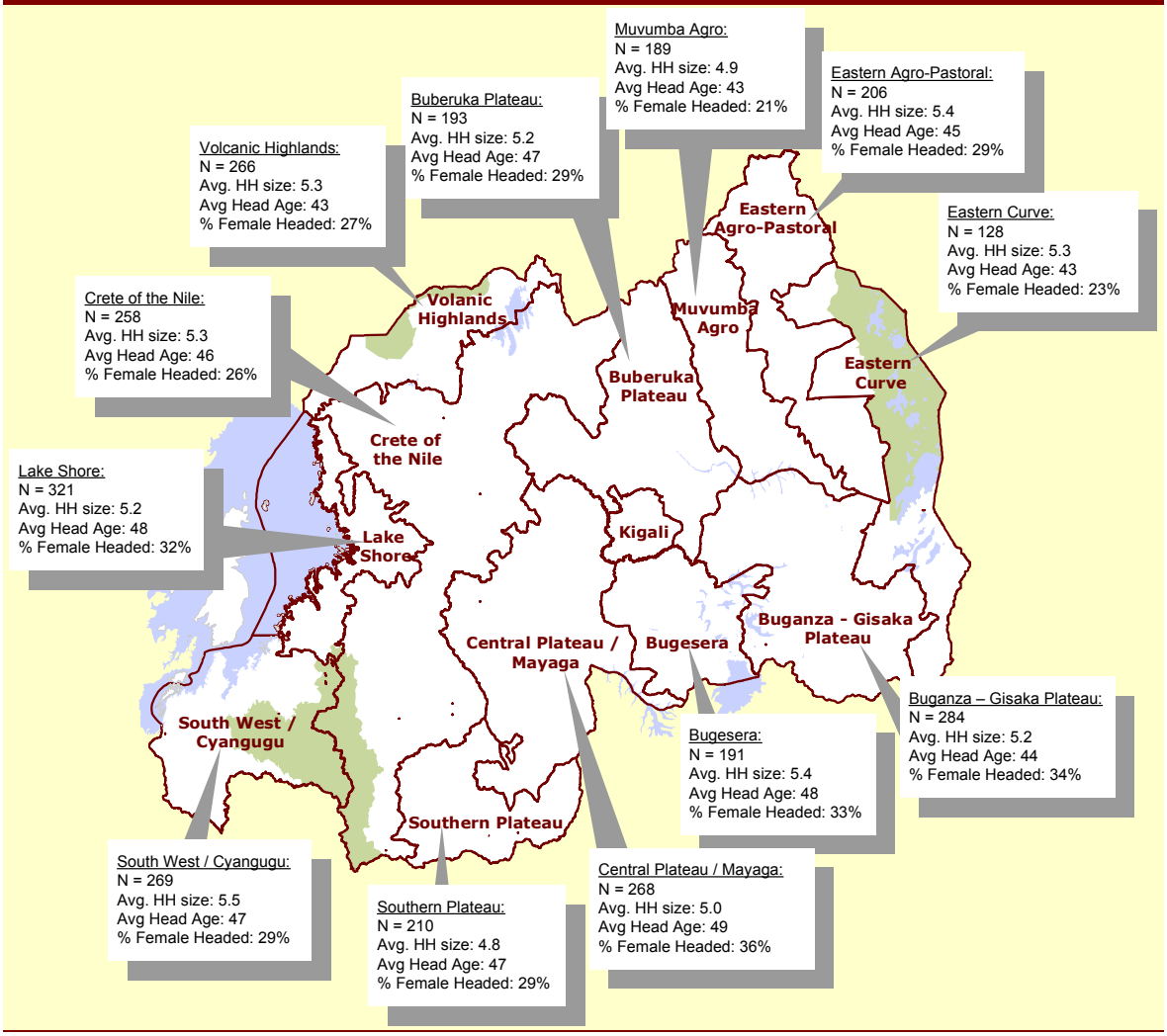
A total of 2,786 households were interviewed for this study. General characteristics of the sampled population are provided in Figure 2-2: Sample size and composition. The average household size was 5.2 people. The average age of the household head was 46, and 29 percent of the households were headed by women. More details are included in Part 3: Food security and vulnerability analysis.

2.3 Qualitative primary data collection

The quantitative survey of 2,786 households was supplemented by the collection of quantitative and qualitative data from key informant interviews (Annex 3). In each of the enumeration zones included in the sample (see Section 2.2.2), a community questionnaire was administered to a key informant, who was an official representative of the area, including the *chefs de zones*, *Nyumbakumi*[12] or any individual responsible for administrative services. A total of 472 key informant interviews were conducted. The community questionnaire was developed using an approach similar to that of the household questionnaire. It used both a closed-ended and an open-ended, structured format and covered five areas (occupation, contextual information, HIV/AIDS, migration and market information). The key informant interviews were intended to contextualize the information collected at the household level.

[12] Originally a Kiswahili word, meaning literally "ten houses". The "nyumbakumi" are, in a way, the civil society equivalent to what at the lowest level of Rwanda's local government system are called the Secretaries in charge of Security, who are members of what is referred to as the Cell Executive Committee.

Figure 2-2: Sample size and composition



3. LIMITATIONS OF THE STUDY

This study, like any research, was subject to limitations and threats to the reliability and validity of the results. While rigorous standards were applied, the following must be acknowledged:

Threat to external validity. Limitations in the ability to generalize the results from the sample to the general population must be acknowledged. The data were collected to be representative at the sub-provincial level (food economy zones) but were also well distributed across the former administrative provinces. Kigali town was not included in the survey and results are therefore valid only for the rest of the country. The sampling design and the very low rate of non-response contributed to reducing any threat to external validity. However, the survey data represents the situation at a given time. Data collection was conducted during a lean season following a *relatively* poor harvest. The overall food security situation at the time of the survey can therefore be considered worse than normal.

Threat to internal validity. Inaccurate recall and quantitative estimates may affect the validity of the results. The enumerators were trained to facilitate such recalls and to perform the anthropomorphic measurements. In some cases expectations may have affected the responses and set patterns, especially given that some regions of Rwanda have benefited from many programme-oriented assessments (e.g. in relation to food aid). All the information collected, especially on diseases and other health problems, was self-reported and not necessarily confirmed by medical diagnosis or independent observation. The use of a consent form emphasizing that no direct benefit was to be expected, the

anonymous character of the survey and the fact that the survey was not associated with aid programming all helped mitigate this bias.

Threat to reliability. Threat to the reliability or repeatability (Kalton *et al*., 2005) of the results was minimized through questionnaire design and training of the enumerators as described above. Training and careful translation of the household and community questionnaire were conducted to reduce individual variation on how enumerators understood the questions. It is possible, however, that misinterpretation of the questions contained in the survey instruments may have affected the results.

Possible bias. Timing of the survey (it followed a particularly poor harvest in some of the chronically food-insecure areas) may have led to more households reporting high levels of food insecurity than normal.

Part 2: Country Level Background

1. General Historical and Political Context

After decades of internal tensions and episodes of violence that culminated in the 1994 genocide and the total collapse of all institutions, the Republic of Rwanda has engaged in an unprecedented rebuilding effort of both the state and society. Political reforms have included the enactment of a new constitution (June 2003). That same year the first multi-party presidential and parliamentary elections since independence in 1962 took place, resulting in the election of President Paul Kagame.

The current decentralization process has transferred some responsibilities from the government to local authorities and supports the emergence of popular participation in the decision-making process. The provincial and district level administrative divisions have recently been revised. Formerly Rwanda had 12 provinces, but their number has now been reduced to 5 (Eastern, Western, Southern, Northern and the Province of Kigali). The participation of women, youths and other vulnerable groups is also promoted (e.g. by reserving a certain number of seats in Parliament for each group). Women constitute 48.8 percent of the representatives in the Lower House and 34.6 percent in the Senate. The country has also been successful in providing a secure environment for economic growth, population return and general development.

Major political and development challenges remain. Consequences of the genocide affected regional stability as thousands of *Interhamwe*[13] people allegedly responsible for the genocide sought refuge in the Democratic Republic of the Congo (DRC), triggering Rwanda's involvement in DRC in 1996. This regional conflict continues. In Rwanda, 40,000 refugees from the DRC and 2,600 refugees from Burundi remain in camps.[14] Thousands of legal cases related to the genocide still need to be resolved, hindering the reconciliation and reconstruction effort. Rising economic inequalities further hamper the rebuilding process.

Box 1 – Justice and the genocide

Rwanda's economy began to decline in the late 1980s due to poor agricultural production, land erosion and loss of fertility. Lower market prices for coffee, Rwanda's primary cash crop, also affected per capita incomes and precipitated many people's descent into poverty. During the 1994 genocide, almost 1 million people lost their lives, and 3 million people sought refuge in nearby countries. The war also led to massive destruction of property, infrastructure and resources such as livestock and seed stocks. A high incidence of rape contributed to the spread of HIV/AIDS. Victims of rape and other violent crimes suffered extensive trauma. After the war, 107,000 people were jailed and many are still awaiting trial in overcrowded prisons.

In June 2002, *gacaca* as a system of justice was launched on a pilot basis. *Gacaca* courts combine participatory justice and reconciliation techniques exercised at the local level. This has the advantage of accelerating the delivery of justice and the process of reconciliation. Nevertheless, the system was for a long time marred with irregularities and many genocide victims did not trust it, while hundreds of judges were themselves accused of crimes. Because of the problems, the *gacaca* system was extensively revised in 2004 and 2005. By 2005, *gacaca* courts had still tried only 3,000 cases, and trials were further delayed by the reform process. The government plans to expand the *gacaca* system to all parts of the country, starting in May 2006. According to officials, the goal is to conclude all trials by the end of 2007. The expansion of *gacaca* courts has led to the movement of people fearing persecution for alleged crimes.

2. Geography, Climate and Natural Resources

Located just below the equator, Rwanda is a small (26,338 km^2) landlocked country bordering Burundi (to the south), Tanzania (to the east), Uganda (to the north) and the Democratic Republic of the Congo (to the west). Despite its small size, the country has very diverse ecosystems. It forms part of the Great East African Plateau, which rises from the lowlands in the west (950 m altitude), characterized by swamps and lakes, to the highlands of the east, which divide the country between the Nile basin and the Congo basin. The highlands reach 4,507 m; to their west, altitudes decrease rapidly to Lake Kivu, which constitutes the western border of Rwanda. The terrain is hilly and the country is

[13] The Interahamwe (Kinyarwanda meaning Those Who Stand Together or Those Who Fight Together) was the most important of the militias formed by the Hutu ethnic majority of Rwanda.
[14] Source: UNHCR Rwanda.

often referred to as "the land of a thousand hills". Soil erosion is a major problem in Rwanda, especially in the highlands of the western region.

The climate of Rwanda is a moderate tropical climate characterized by mild temperatures (20 degrees Celsius average), with a short dry season from January to February and a long dry season from June to September. The average yearly rainfall is 1400 mm with important geographic variation. Precipitation is heaviest and most regular in the western and northwestern areas, while the eastern region has less abundant and more erratic rains.[15]

Rwanda's limited natural resources include heavy minerals such as cassiterite, columbite-tantalite and wolframite and, to a lesser extent, gold and sapphires. The potential for hydroelectric power is substantial and is exploited through joint hydroelectric projects with Burundi and the Democratic Republic of the Congo.

Given the predominant role of agriculture in the economy, Rwanda's most important natural asset is its land. Analysis of the "green national accounting indicators" as established by the World Bank for Rwanda shows that although the gross net national savings are below the income group average, when adjusted for the environmental impact, they are significantly higher, indicating a major increase in the present value of social welfare. However, the industry and services sectors are relatively underdeveloped and access to utilities such as clean water and electricity is limited, especially in rural areas. The World Bank environmental indicators may be understood as follows:

- Agricultural activities and population pressure have a high impact on the environment, leading to, for example, an extremely high rate of deforestation (3.9 percent, while the sub-Saharan country and income group average is 0.8 percent). This is likely due to the high consumption of wood as the only source of energy in many rural in rural areas, which has led to a very low extension of forested areas compared with total land (12 percent, not even half the ratio of sub-Saharan countries and low- and middle-income countries). Extraction of nutrients from the soil through agriculture causes further environmental damages, including decreasing levels of soil fertility, erosion and degradation of watersheds.
- Low carbon dioxide damage and low mineral and energy depletion are due to the overall underdevelopment of the country, especially of industrial activities, rather than to the implementation of policies to control the impact on the environment. However, progressive measures to protect the environment (e.g. better control of forest use and of marshland exploitation for clay) have been implemented.

3. POVERTY REDUCTION AND FOOD SECURITY POLICIES

Despite a decade of rapid economic growth, poverty remains widespread in Rwanda. The country was ranked 159th out of 174 countries in the United Nations Development Programme (UNDP) 2005 Human Development Index. An estimated 80 percent of the population live below the US$2/day purchasing power parity (PPP) poverty line (World Bank data, 2002) and 60 percent live below the national poverty line (EICV data, 2000). While it is expected that the 2005 EICV study will show an improvement in poverty levels among the population, poverty remains a challenge for Rwanda.

Specific objectives of Rwanda's PRSP – Vision 2020

1) Reduce the population living below the poverty line from 60 percent to 30 percent by 2015; achieve annual economic growth equivalent to 7–8 percent of gross domestic product (GDP) until 2020 (poverty, economic growth).
2) Achieve equal (50 percent) participation of women in tertiary training (gender equality).
3) Reduce the population growth rate from 3.2 percent to 2.5 percent by 2010 (population growth).
4) Reduce the average number of children per family from 6 to 4 by 2010 (fertility rate).
5) Reduce the maternal mortality ratio from 810/100,000 to 202/100,000 by 2015; make reproductive health services available to all (maternal mortality).
6) Reduce infant mortality from 107/1,000 to 35/1,000 by 2015 (infant and child mortality).
7) Increase net primary enrolment from 72 percent to 100 percent by 2015 (literacy, basic education).

Rwanda has made poverty reduction a priority in its reconstruction process and adhered to the World Bank Poverty Reduction Strategy Paper (PRSP) as early as 1997. The current PRSP plan was completed in 2002 using a broad-based participatory approach. It is

[15] Sperling, L. 1997. *The Effects of the Rwandan War on Crop Production and Varietal Diversity: A Comparison of Two Crops*. Overseas Development Institute (ODI) Network Paper. London, ODI.

currently under review. The initiative is integrated in a "Vision 2020" plan that outlines medium- term strategies and goals to reduce poverty. Six main domains are identified as key to Rwanda's development: (1) rural development and agricultural transformation; (2) human development; (3) economic infrastructure; (4) good governance; (5) private sector development; and (6) institutional capacity-building.

In relation to the PRSP, Rwanda has initiated a Labour-Intensive Local Development Programme that promotes employment-intensive and income-generating investments using local resources.

At the macroeconomic level, the commitment of Rwanda to adopt reforms to sustain economic growth and reduce poverty contributed to its reaching its "enhanced completion point" under the Heavily Indebted Poor Country (HIPC) initiative in April 2005. Total debt relief from all of Rwanda's creditors under the Enhanced HIPC Initiative is estimated at US$1.4 billion.[16]

With regard to food availability, the government has set forth these objectives: (1) to promote the use of improved seeds, including the strengthening of national seed service and increasing the role of the private sector; (2) to increase productivity through improved access to inputs, including fertilizers, and outreach programmes; (3) to expand cultivated areas, especially through integrated management of marshlands; and (4) to improve effective water harvesting and management (National Agriculture Policy, March 2004). The priority crops are Irish potato, rice, maize, wheat, sorghum, beans, peas, soya, groundnuts and sunflower. In addition, a nutrition policy was recently developed as a guide for developing nutrition-oriented interventions. Its main components were an outreach programme to promote better practices and strengthening of care (especially maternal) and the development of national nutritional surveillance capacities.

[16] *Rwanda – African Economic Outlook*, AfDB/OECD, 2006.

Part 3: Food security and vulnerability analysis

In this section, results from the three data sources – secondary data analysis, quantitative primary data collection and qualitative primary data collection – are discussed and compared with findings from the literature.

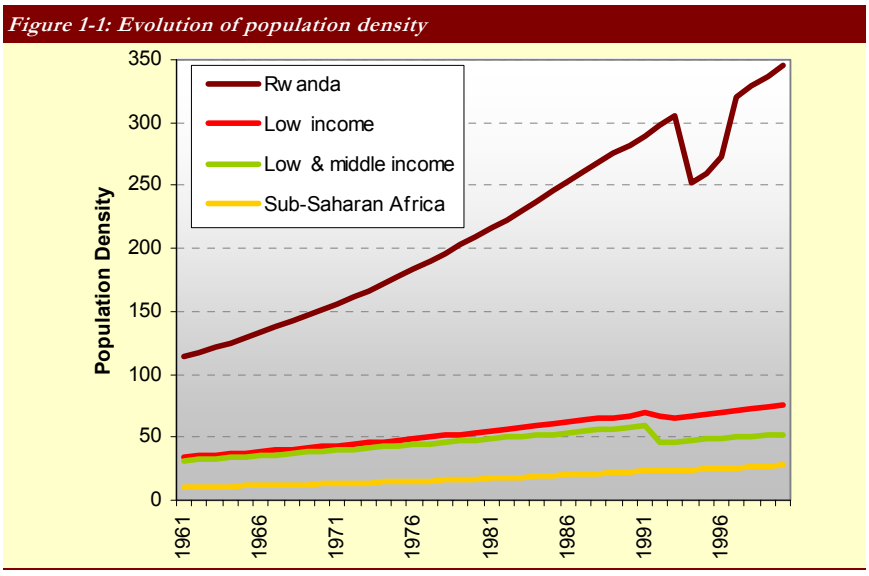
1. Socio-economic situation

1.1 Population dynamics

1.1.1 Demographics

Rwanda's population in 2002 was estimated at 8.1 million, with an annual growth rate of 2.6 percent[17] and, in 2000, a record population density of 345 inhabitants/km^2, one of the highest in the world. Most of the population lives in rural areas. Most sub-Saharan African countries had rapid and significant increases in their urban population over the last decades, leading to 36 percent of the population living in urban areas. However, in Rwanda, only 7 percent of the population was classified as urban in 2003 (3 percent in 1960). The population is young; with 45.7 percent of the population in the 0–14 age group, slightly above the sub-Saharan average of 43.7 percent (2003 World Bank estimates). The average household size is 5.5 people and the dependency ratio is high (0.9 for the young working-age dependents, above the regional average (World Bank). Women constitute 52.3 percent of the population, possibly as a result of the genocide. The consequences of the 1994 dramatic events are further illustrated by the high proportion of orphans (single or double) in the population: 35 percent.[18]

Figure 1-1: Evolution of population density



The country's growth in population is frequently blamed for – in a Malthusian scenario[19] – the depletion of its natural resources, environmental degradation (e.g. erosion) and conflicts. With a projected population of 10 million by 2015 (World Bank), providing the growing population with access to land and services (such as education and health) is a major challenge to Rwanda's sustainable development. The Rwanda PRSP proposes to reduce population growth from 3.2 percent to 2.5 percent by 2010. The strategy calls for increased public awareness about birth control and improved access to reproductive health services, including family planning. While recent figures suggest a positive trend with a slowdown of population growth from 3.2 percent in 1991 to 2.6 percent in 2002, Rwanda is far from having achieved a demographic transition with lower death and birth rates. The crude death rate is 22 per 1,000 people, and the crude birth rate is 43 per 1,000 people. (It is 18 and 39, respectively, for sub-Saharan Africa (World Bank).) According to the 2005

[17] Republic of Rwanda, *Rwanda Development Indicators*, 7th Edition, 2004
[18] *Ibid.*
[19] Malthus first postulated that population growth is exponential while food production grows only arithmetically. Hence, a growing population will tend to surpass its food production capacity, resulting in a crisis. There is much argument about the role of family planning policy and innovation capacity in preventing or mitigating such a crisis.

Demographic and Health Survey (DHS), Rwanda's total fertility rate is 6.1 children per woman, slightly higher than in the previous survey (5.8 in 2000), and about the same as the DHS conducted in the early 1990s (6.2 in 1990–1992).

The results of the CFSVA are consistent with these published figures. The average household size was estimated at 5.2. The 0–14 age group constituted 45 percent of the population. Women were more numerous in every age group and totalled 53 percent of the population. Twenty-two percent of the households reported taking care of orphans.

Table 1-1: CFSVA demographics

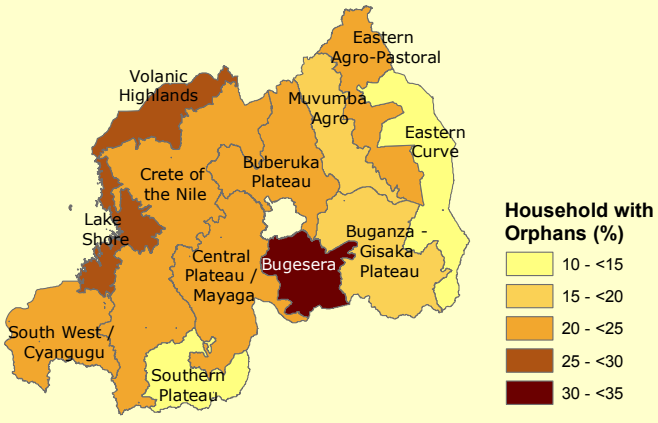
Average household size	Average age, head of household (years)	Households headed by a woman (%)	Males aged 0–14 (%)	Females aged 0–14 (%)	Males aged 15–59 (%)	Females aged 15–59 (%)	Males aged >60 (%)	Females aged >60 (%)	Households caring for orphans (%)
5.2	46	29	21	23	23	27	2	3	22

There were few differences geographically, although there were more households headed by women in the Bugesera (33 percent), Buganza – Gisaka plateau (34 percent) and the Central Plateau – Mayaga (36 percent). The proportion of the population between 0 and 14 years of age was highest in the Muvumba Agro region (51 percent) and the Volcanic Highlands (49 percent).

1.1.2 Orphans and other vulnerable groups

Orphans and other vulnerable children (OVC) are a significant group in Rwanda. In 2005, the Ministry of Local Administration (MINALOC) with support from UNICEF developed a national policy towards OVCs. It defined mechanisms for socio-economic support to the estimated 1,264,000 under-18 children identified in the 2002 General Population Census as orphans. Rwanda has one of the highest proportions in the world of orphans under 18 (35 percent).[20] The CFSVA found that, based on the household composition, 7 percent of the total population were orphans (outside Kigali). Orphans were distributed evenly between boys and girls (49 percent male, 51 percent female). Households taking care of orphans cared for an average of 1.7 children. Bugesera was the area with most households taking care of orphans (31 percent) and where the proportion of orphans in the population was highest (9 percent). Second was the Lake Shore area (27 percent of households with orphans, 9 percent of orphans in the population) and the Volcanic Highlands (25 percent of households with orphans, 9 percent of orphans in the population). Among orphans, 30 percent were double orphans, 53 percent were fatherless and 17 percent were motherless.

Figure 1-2: Proportion of orphans in population (CFSVA data)



A recent study[21] suggests that access to education is not significantly lower among double orphans than among children with both parents, possibly as a result of government policy on free access to primary education. At higher levels of education, the State provides for orphans of the genocide and some AIDS orphans.

[20] UNAIDS and CNLS. 2006. *Rwanda: Follow-up to the declaration of commitment on HIV/AIDS (UNGASS)*.
[21] Ibid.

Other vulnerable groups have been identified through household livelihood and vulnerability studies conducted by Save the Children, WFP/VAM and partners.[22] Those studies led to the definition of eight main vulnerable groups in Rwanda:

1) households headed by women;
2) widows;
3) women with husbands in prison;
4) divorced and abandoned women
5) land-poor, including the landless and those whose soil is of poor quality;
6) households with chronically ill members;
7) orphans and households headed by children;
8) the destitute: the elderly, the physically and psychologically handicapped, the *abatindi*[23] and resettled Rwandans in *imidugudus* (resettlement villages).

While the CFSVA did not specifically seek to define those groups, the analysis of the data provided the following relevant information:

- As discussed above, 30 percent of the heads of household were women, and of these, 78 percent were widows; another 16 percent were divorced or living apart. The average age of women heading households was 52, compared with 43 among men who headed households.
- Twenty-one percent of households reported having at least one adult aged 15 to 59 with a condition that made him or her not fully functional for at least 3 of the previous 12 months. The proportion was highest in the Eastern Curve (34 percent) and Bugesera (45 percent). Not fully functional adults were more frequently women (62 percent) and were on average 37.5 years old. The reported reasons for not being functional were "short illnesses" (55 percent), "disability" (20 percent), "chronic illnesses" (15 percent) and "other" (10 percent).
- Section 2.1.2 discusses in more detail the questions of land poor and land distribution in Rwanda. While the CFSVA found 94 percent of the households were occupied in agriculture, 26 percent cultivated less than 0.1 hectare in Season A and the same percentage cultivated less than 0.1 hectare in season B.

1.1.3 Migration and refugees

There have been massive population movements in and out of Rwanda over the last decade, including the displacement of an estimated 2 million people out of Rwanda in 1994, most of whom came back in the following years, especially after 1997.[24] Political instability in the Great Lakes region led to the continued presence of refugees in Rwanda. There are 43,000 Congolese and Burundian refugees settled in northern, western and southern Rwanda, living amongst impoverished communities that struggle to meet their own food needs. The impact of the refugees on the situation of food security and vulnerability in the host area needs to be assessed carefully and addressed. Recent Rwandan returnees from Tanzania in the Eastern Region (4,500) need to be monitored.

The CFSVA sampling procedures did not target refugees in camps. CFSVA data show, however, that 24 percent of the households were hosting people temporarily for more than three months. Another 11 percent reported that at least one person had moved out of the household during the previous three months. Reasons for moving out were predominantly work (47 percent) and school/education (26 percent). The proportion of households with a member that had left was highest in the Bugesera (31 percent) and in the Eastern Curve region (21 percent). This is likely due to the fact that the CFSVA data collection took place during a lean season following a relatively poor harvest, forcing people to migrate as a coping mechanism. Work was the rationale given for leaving the household in Bugesera (57 percent) and Eastern Curve (70 percent). Migrants did not usually move far. Among household members who moved away, a majority (43 percent) moved within the same commune, another 30 percent moved to another commune and 20 percent moved to urban areas. Migrants from Bugesera and the eastern areas (Eastern Curve, Muvumba Agro and

[22] Save The Children-UK. 2003. *Household Food Economy Approach studies (1999 – 2004)*; WFP/MINAGRI/MINALOC food security and vulnerability assessment [year?].
[23] *Abatindi* are the chronically poor, they suffer from poverty for an extended duration, they lack both physical and social capital and, as a result, they lack the capability to meet the basic necessities and their assets stock is low. Their prospect of becoming average poor is limited.
[24] Norwegian Refugee Council. 2005. *Ensuring durable solutions for Rwanda's displaced people: a chapter closed too early.* Available at www.idpproject.org.

Eastern Agropastoral) were least likely to move to urban areas (less than 7 percent in each zone). Moving abroad was uncommon, except in the Volcanic Highlands Area bordering the Democratic Republic of the Congo and Uganda (39 percent).

1.2 Economic characteristics and livelihoods

1.2.1 Macro-economic environment

Economic growth

Over the last decade, Rwanda has made significant progress in rebuilding its economy, sustaining economic growth and stabilizing inflation and exchange rate. Following a total collapse of the economy in 1994 – the GDP fell by 50 percent that year – Rwanda experienced rapid growth. Growth averaged 2.3 percent over the period from 1990 to 2003 (below the average for sub-Saharan Africa (2.8 percent)), but more significantly, it was over 6 percent from 1997 to 2002. After a slowdown in 2003 (+0.3 percent) attributed to poor climatic conditions that affected agricultural output, GDP growth rebounded to 5.2 percent in 2004 and 7.1 percent in 2005.

Despite this progress, Rwanda remains among the poorest countries in the world in terms of income. Gross national income (GNI) in 2003 was estimated at US$1.8 billion, with an estimated GNI per capita PPP (adjusted for purchasing power parity) of US$1,290, far below the sub-Saharan Africa average of US$1,750. The country ranks 183 out of 208 countries[25]. When adjusted for population growth, GDP growth is only slightly above 0, at 0.3 percent in 2003, compared with 1.6 percent for sub-Saharan Africa (World Bank data). Figures are shown in the following table:

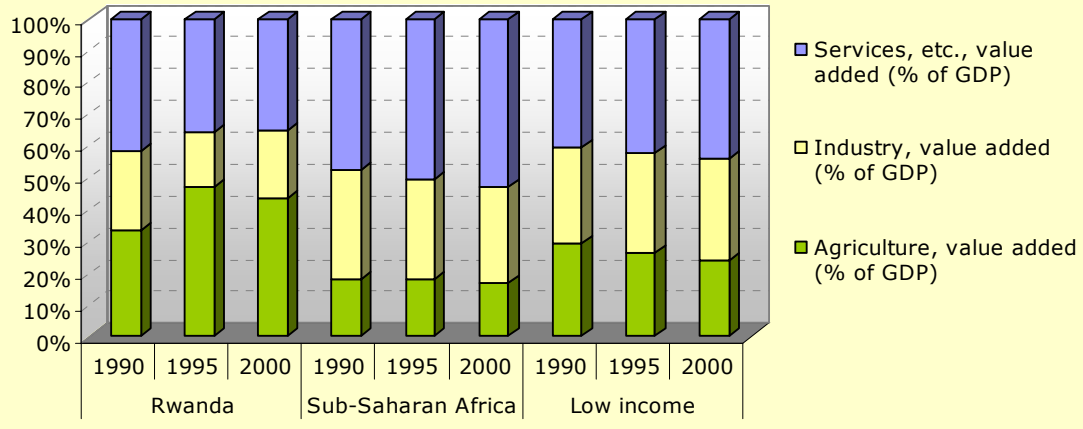
Annual gross national income (GNI) for Rwanda, in millions of US$

1999	2000	2001	2002	2003	2004	2005
1,824.5	1,719.6	1,653.3	1,625.3	1,745.6	1,948.5	2,372.1

Structure of the economy

Rwanda's economy is based largely on the agricultural sector, which accounted for 38 percent of the GDP in 2005, more than double the average for sub-Saharan Africa (17 percent). Until the 1990s, Rwanda underwent a rapid structural transformation of its economy, oriented mostly towards the development of its service sector. However, while the average country in sub-Saharan Africa continued to experience a similar positive structural shift during the 1990s, in Rwanda about 11 percent of the GDP was transferred from the services and industry sectors back towards agriculture. The role of the agricultural sector in Rwanda's GDP is now more than 2.5 times more important than in the GDP of the average country in sub-Saharan Africa, while that difference was less than 2 during the previous decade. This evolution back toward agriculture is likely linked to the loss of human resources, the collapse of the tourism industry, damages to the industrial infrastructures due to the war and the retreat to rural areas and subsistence agriculture that was a by-product of the conflict.

Figure 1-3: Structure of the economy



[25] World Bank, GNI per capita 2005, Atlas method and PPP.

The development of the industrial sector has been oriented mostly towards import substitution. The most significant products are beer, soft drinks, cigarettes, hoes, wheelbarrows, soap, cement, mattresses, plastic pipe, roofing materials, textiles and bottled water. By mid-1997, 75 percent of the factories functioning before the war had returned to production at an average of 75 percent of their capacity. Possibilities for economic expansion are limited by inadequate infrastructure and transport and limited internal markets. Service activities are predominantly informal; the role of the sector in the overall economy is probably higher than statistics indicate. International tourism, an important source of currency before the war, started up again only recently (World Bank data).

External trade and equilibrium

Rwanda has a small and narrow export base and an low trade dependency. Its exports of goods and services represented less than 10 percent of its GNI in 2003,[26] far less than the average for sub-Saharan Africa. Annual exports per capita amount to just US$18 compared with an average of US$145 in sub-Saharan Africa.[27] Export-related sectors were disproportionately affected by the war in the 1990s, as exports dropped in volume by 60 percent. Currently, the value of export in absolute terms is similar to that of 1990. Imports as a percentage of GNI are also lower than the regional average. However, imports are significantly higher than exports, a situation that has worsened during the last decade (imports rose from 14 to 24 percent of the GNI). The ratio between real trade and GDP growth over time indicates that the country is slowly becoming more dependent in trade terms. Given the relative small size of the domestic market, trade is crucial to economic growth and poverty reduction. In addition to general poverty and the subsistence-oriented agriculture base of the economy, geographical constraints have an important impact on the ability of the country to enter the international market. Rwanda is a landlocked country and has a poor and expensive communication sector (e.g. poor roads, high fuel costs). Nevertheless, membership in the Common Market for Eastern and Southern Africa (COMESA) free trade area and access to the markets of the United States and the European Union through preferential trade agreements should favour the development of an export market.

Agricultural products (mostly coffee and tea) represent more than 70 percent of exports.[28] During the 1960s and 1970s the economy benefited from the high price of coffee, but the drop in the international price had a dramatic impact on the sector in the 1980s and late 1990s. The impact of the war and population movement led to complete neglect of coffee plants, which require special attention. In 2005 total coffee production was 20,341 metric tons (mt), compared with 35,000–40,000 mt per year in the pre-war period. Tea is now the largest export crop.[29] Other major export products are cassiterite tin (15 percent of total exports)[30] and coltan (13 percent of total exports) An additional constraint is the relatively high price volatility for those goods on the world market, which can significantly affect Rwanda's economic performances (World Bank data).

Rwanda is severely indebted: its total external debt was US$1.54 billion in 2000 (more than 80 percent of the GNI). The debt has increased dramatically faster than the regional average increase. Total debt has doubled over the past decade. The proportion of the debt that is public or publicly guaranteed is significantly higher in Rwanda compared with the regional and income-group average. More than half of those debts are International Bank for Reconstruction and Development (IBRD) loans at market rate and International Development Association (IDA) credit at concessional rates.[31] These figures are due to the huge efforts and investments made during recent years to rebuild the Rwandese economy following the genocide, and to the severe trade imbalance.

The debt service related to these massive quantities of borrowed money represents 1.1 percent of the GNI. Given the limited exports of goods and services, the total debt service expressed as a percentage of exports is over 10 percent, higher than the regional average. However, Rwanda reached its Heavily Indebted Poor Countries (HIPC) "initiative

[26] In 2001: 5.6 percent; in 2002: 4.2 percent; in 2003: 3.6 percent; in 2004: 3.7 percent; in 2005: 5.2 percent.
[27] Diopa, N., Brentona P. and Asarkaya, Y. 2005. *Trade costs, export development and poverty in Rwanda*. World Bank Policy Research Working Paper 3784. Washington DC, World Bank.
[28] Fifty percent in 2005; 54 percent in 2004; 59 percent in 2003; 54 percent in 2002; and 45 percent in 2001.
[29] FAO. 2003. *Rwanda, Special Programme for Food Security.* Rome, FAO.
[30] It was 14.29 percent in 2005; 16.19 percent in 2004; 7.12 percent in 2003; 2.09 percent in 2002; and 1.21 percent in 2001.
[31] Much of the debt of developing countries has been "multilateralized" through successive debt relief programmes: the International Monetary Fund (IMF) or the World Bank would take over debts at a discount, allowing private banks to write them off.

decision point" in December 2000, which helped alleviate the burden of the multilateral debt and led to progress on inflation, privatization and GDP growth through activities aimed at reducing poverty. The HIPC "enhanced completion point" was reached in April 2005 and will further contribute to reducing the debt burden on Rwanda.

ODA and FDI

The Rwandan economy is highly dependent on official development assistance (ODA) and official aid; in 2005 these were equivalent 21 percent of the national GNI, much more than the regional average (6 percent in 2003). ODA clearly outpaces foreign direct investment (FDI). Net private capital flow accounted for less than 1 percent of the GNI between 2003 and 2005 and was below its 1990 level in absolute value. (Over the same period net private capital flow for sub-Saharan Africa increased by 600 percent in absolute value.) In Rwanda, FDI was the only contributor to net private capital flow. Bank and trade-related lending are negative due to the repayment of commercial bank lending and private credit.

Regional integration

"Regional and international economic integration" is one of the seven key objectives of the Rwanda Vision 2020 development goals. As a landlocked country, international trade and services, especially with neighbouring countries, are key to Rwanda's economic growth. To achieve its objectives, Rwanda joined the Common Market for Eastern and Southern Africa (COMESA), which pursues regional economic integration and partnerships between its members and the European Union. The country is further engaged in talks to join the East African Community, a group consisting of Kenya, Tanzania and Uganda that seeks to become a free-trade area.

Rwanda took part in the International Conference on the Great Lakes Region, whose 11 core countries have adopted a common vision on peace, security, democracy and economic and social development in the region. However, instability in the Great Lakes Region and the involvement of Rwanda in regional conflicts have hindered economic integration.

Beyond the region, Rwanda actively supports the New Partnership for Africa's Development (NEPAD), a "made in Africa" plan to address the continent's challenges. One of 15 countries on the NEPAD Implementation Committee, Rwanda was among the first to undergo a peer review of its governance led by NEPAD.

Poverty and human capital

An estimated 80 percent of the population lives below the US$2 per day PPP poverty line (2002 World Bank data) and 60 percent lives below the national poverty line (2000 EICV data). To identify the population living in poverty, the following criteria were developed using a participatory approach. The poor are those that:

- are confronted by a complex of interrelated problems and cannot resolve them;
- do not have enough land, income or other resources to satisfy their basic needs and as a result live in precarious conditions (basic needs include food, clothing, medical costs, children's schooling, etc.);
- are unable to look after themselves and;
- have a total level of household expenditure of less than 64,000 RWF per equivalent adult in 2000 prices, or their food expenditures fall below 45,000 RWF per equivalent adult per annum.

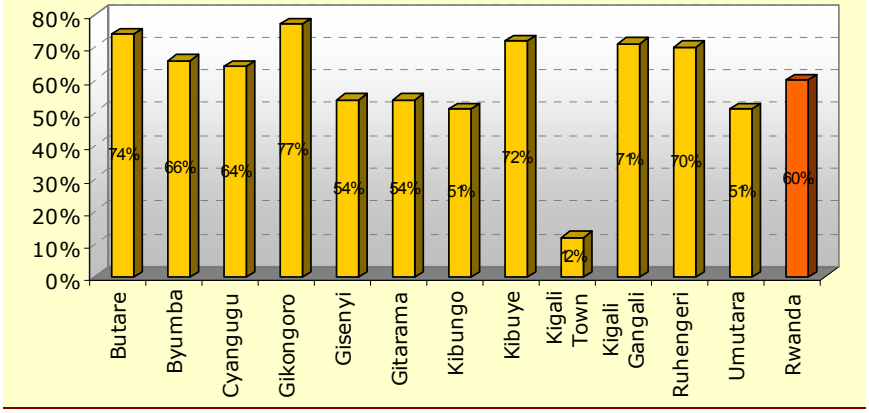
Four major statistical surveys were conducted recently in relation to poverty: household expenditure (EICV) surveys in 2001 and 2005, the Population and Housing Census in 2002 and the core welfare indicators survey in 2003 (QUIBB). It is expected that the 2005 EICV data will show improvements in poverty levels. The results of those studies include a poverty profiling of the population, with key characteristics for each poverty and wealth group.

Table 1-2: Poverty profile and categories of households[32]

Category of household	Characteristics
Umutindi nyajujya (absolute poverty)	Need to beg in order to survive; have no land, and lack shelter, adequate clothing and food; often fall sick and lack access to medical care; children are malnourished and do not go to school.
Umutindi (very poor)	Are physically capable of working on land owned by others, but either have no land or have very small landholdings and no livestock.
Umukene (poor)	Have some land and housing; live off their own labour and production but have no surplus to consume or sell at market; often do not have access to health care and children do not always go to school.
Umukene wifashije (resourceful poor)	Shares many of the characteristics of the *umukene* but with small ruminants; children go to primary school.
Umukungu (food-rich)	Larger shareholdings with fertile soil and enough to eat; have livestock, often have paid jobs and can access healthcare.
Umukire (rich)	Has land and livestock, and often salaried jobs; have good housing, often own a vehicle and have enough money to lend and get credit from the bank; many migrate to urban centres.

Although the lack of standard definitions makes comparison over time difficult, World Bank data indicate that income poverty rates have been falling steadily every year over the last decade, but still remain higher than before 1994. The differences in poverty rates between rural and urban areas are striking: poverty is much more common in rural areas (66 percent) than in towns (12 percent in Kigali and 19 percent in other towns). Figure 1-4, based on data from EICV 2000, shows the poverty index by province (before the local government reform). The provinces with highest poverty rates are former Gikongoro (77 percent), former Butare (74 percent), former Kibuye (72 percent), former Kigali Rural (71 percent) and former Ruhengeri (70 percent).[33]

Figure 1-4: Provincial poverty levels



1.2.2 ACTIVITIES AND LIVELIHOOD GROUPS

Objectives and methodology of livelihood profiling

One of the objectives of the CFSVA is to describe household food insecurity and vulnerability based on household characteristics. Household livelihood strategies have a direct impact on food access and food security. The aim of the livelihood profiling analysis is to use cluster analysis to group households that are engaged in the same activities or combination of activities.

Households were asked what activities they conducted throughout the year to sustain their livelihoods. They were then asked the contribution of that activity to their direct consumption of food and to the household income. Information on expenditure was used to estimate the total income of the household and subsequently the absolute contribution of each activity to the household income. This information was used in the clustering analysis and resulted in the profiles described below. Livelihood groups and geographic clusters will be used to frame our discussion of the various dimensions of food security explored later in the document.

[32] MINECOFIN. 2002. *Participatory Poverty Assessment.*
[33] UNDP. 2003. *Rwanda country position paper.* Regional Workshop on Aging and Poverty, sponsored by Ministry of Finance and Economic Planning and Ministry of Local Government and Social Affairs.

Livelihood profiles

Eight livelihood profiles were developed based on the CFSVA. Table 1-3 provides a description of each profile. (Yearly incomes and proportions are estimates.)

Table 1-3 – Livelihood profiles

Livelihood profile	N sample	% in population weighted	Short description	Geographic distribution
Agriculturalists	1027	39	Depend nearly exclusively on agriculture to sustain livelihood; average estimated yearly income is the lowest (54,000 RWF), with 75% deriving from agriculture.	Muvumba Agro (42%) Buganza (48%) Crete of the Nile (45%) Lake Shore (52%)
Agro-Labourers	612	20	Have the second lowest average yearly income, at 66,000 RWF per month. Earnings from daily labour (cash and in kind) constitute 61% of income and from agriculture 30%.	Eastern Curve (34%), Bugesera (35%)
Agropastoralists	486	18	Have a mixed income of 93,000 RWF yearly deriving from agriculture (62%) and livestock (33%). About 4% of group (less than 1% of total population) depend also on fishing; for the subgroup, fishing contributes 34% of the income.	Everywhere except Lake Shore (8%), Volcanic Highlands (12%) and Cyangugu (14%)
Agro-sellers	142	5	Depend on petty trade activity (62% of monthly income) and agriculture (32%); total yearly income is the second highest, at 138,000 RWF.	Highest in Volcanic Highlands (15%)
Agro-traders	141	5	Differ from agro-sellers in that their commercial activity is to work as intermediaries in trading agricultural goods (53% of monthly income); agriculture contributes 31% of income. Total yearly income high at 141,000 RWF.	Little geographic variation
Agro-artisans	130	5	Derive livelihoods from handicraft (65% of income) and agriculture (20%). Average yearly income 114,000 RWF.	Little geographic variation
Employee agriculturalists	112	5	Have the highest monthly income, at 317,000 RWF. Salaries make up 72% of income, mostly public services (55%) or contractor/private employee (17%). Agriculture contributes 17% of income.	Little geographic variation
Marginal livelihoods	101	3	Composed of three subgroups, one mainly dependent on aid, a second on hunting/gathering and a third on money transfers and unspecified activities. Referred to as "marginal" because there are few households in each subgroup; because of small sample sizes for each subgroup they were regrouped in one category. Total yearly income is among the lowest, at 63,000 RWF.	Little geographic variation but highest in Eastern Agropastoral and Muvumba - Agro (8% each)

Demographics of livelihood groups

Table 1-4 summarize some demographic statistics by livelihood groups. Agriculturalists, agro-labourers and agropastoralists are the three main livelihood profiles, representing 77 percent of the population. Agriculturalists contrast with other groups because of smaller average household size (4.6), older household head (49 years) and, perhaps most importantly, a higher proportion of households headed by women (38 percent, 9 percent above national average). These statistics, and the low average income level of the group, constitute risk factors for food security.

Table 1-4: Demographics of livelihood groups

	N (weighted)	%	Population[34]	Household size (average)	Average age of household head (years)	Households headed by woman (%)	Households with orphans (%)	Households with migrants (%)
Agriculturalists	1080	39	2 909 469	4.7	49	39	22	11
Agro-labourers	544	20	1 464 173	5.2	43	29	21	12
Agropastoralists	493	18	1 328 667	6.0	48	21	26	12
Agro-sellers	150	5	404 353	5.7	40	23	23	6
Agro-traders	138	5	371 296	6.0	41	21	17	8
Agro-artisans	128	5	344 533	5.6	42	9	19	13
Employees agriculturalists	132	5	354 477	5.9	41	14	25	18
Marginal livelihoods	90	3	243 574	4.9	48	29	22	17

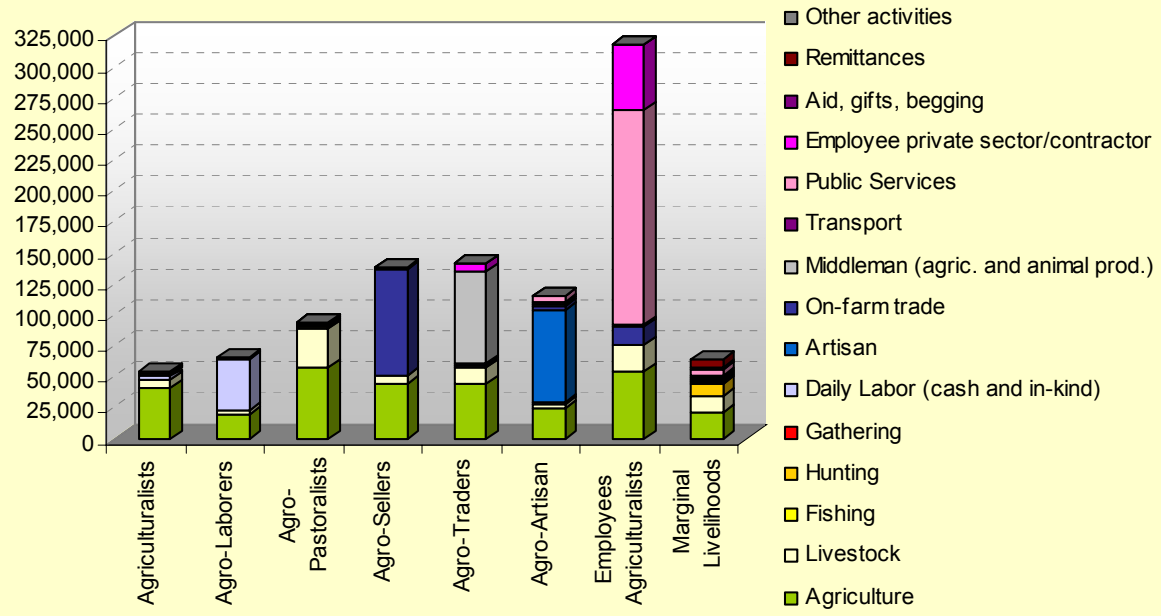
[34] Estimates based on sample universe of 7,497,235 people based on 2002 Census, excludes Kigali.

Households headed by women were in fact more numerous among the three groups with the lowest average monthly income: agriculturalists (38 percent), agro-labourers (28 percent) and marginal livelihoods (25 percent). Those three profiles further had the smallest average household size, with respectively 4.6, 5.2 and 4.8 individuals per household.

Income and activities by livelihood profiles

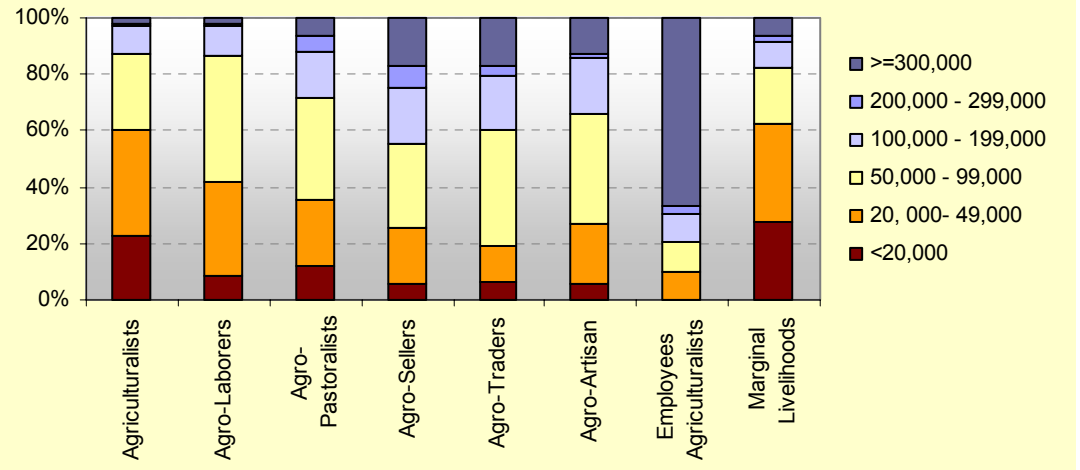
Estimated income and activities conducted by households throughout the year were the basis for the livelihood profiling. Figure 1-5 illustrates those parameters for each livelihood profile.

Figure 1-5: Estimated yearly income and activities by livelihood



Given the disparity of income across livelihood groups, it is not surprising that the percentage of households with less than 20,000 RWF (approximately US$40) a year varies across groups. It is highest among agriculturalists (22 percent) and marginal livelihoods (27 percent) (compared with 11 percent or less among the other livelihood groups). In those two groups, over 55 percent of households lived on 50,000 RWF (approximately US$100) or less per year.

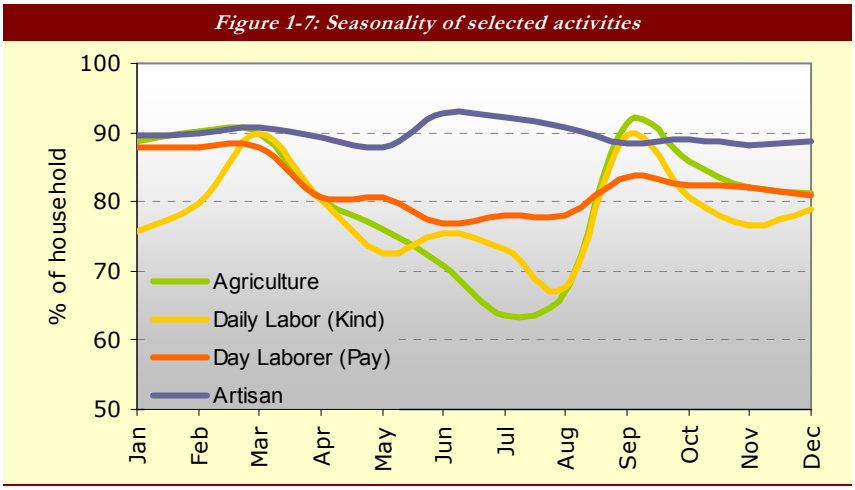
Figure 1-6: Income classes by livelihood groups



Seasonality

Activities such as pastoral work and commercial activities were conducted throughout the year. Agricultural work showed two activity peaks corresponding to the agricultural (planting/rainy) seasons, with a higher percentage of households involved in agricultural work during the January–March and September–October periods. Daily labour, whether paid in cash or paid in kind, showed a similar pattern. This illustrates the connection of availability of work to agriculture (with possible lack of work during the lean season). The only activity undertaken as an income replacement for agricultural work was craftsmanship (artisan work). Figure 1-7 illustrates the seasonality of selected activities. It is expressed for each month as the percentage of household conducting a specific activity for 100 percent of the household involved in that activity. For example, among the households doing day labour paid in cash, 80 percent are active in that activity in January.

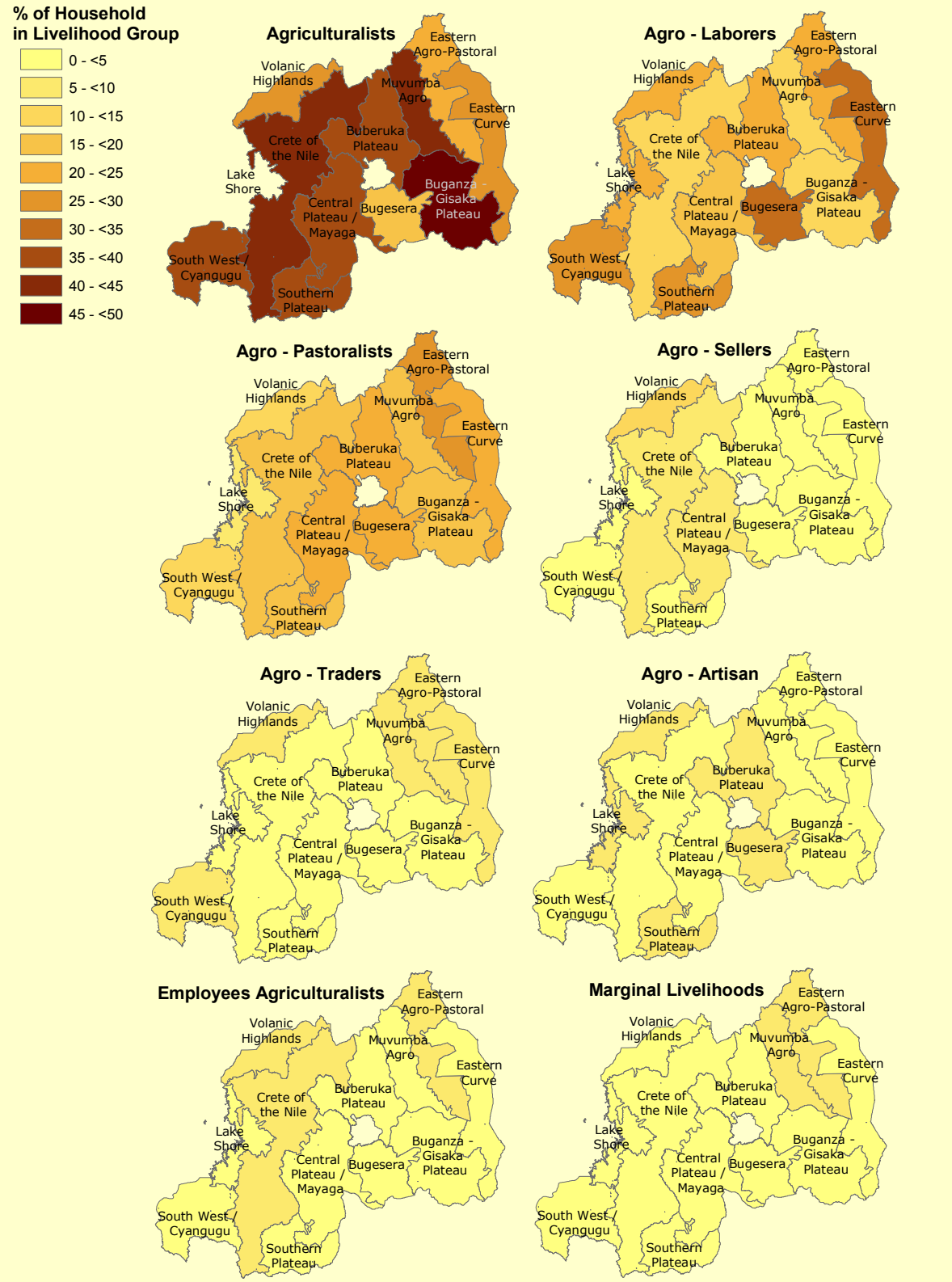
Figure 1-7: Seasonality of selected activities



Geographic clustering of livelihood profiles

In every food economy zone over 70 percent of the population belonged to the agriculturalists, agro-labourers and agropastoralists livelihood profiles, except in the Volcanic Highlands were those three groups represented 63 percent of the population. In that zone, agro-sellers were more numerous – 15 percent compared with 5 percent nationally. Figure 1-8 shows the geographic distribution of each livelihood profile.

Figure 1-8: Geographic distribution of livelihood profiles



1.2.3 Living conditions and wealth

Housing conditions

The average number of people sleeping in a household dwelling was slightly below the average for the region household size (5.2) at 4.9. Household size was typically defined as

the group of people that ate together. On average, the number of people per sleeping room was relatively low, at 2.3. Less than 1 percent of the households had six or more people per sleeping room, compared with 9 percent in Uganda.[35] The average number of people per sleeping room and percentage of household with six or more people per sleeping room were above average in the Eastern Agropastoral region (2 percent).

The main roof materials were tiles (47 percent), galvanized iron (41 percent) and straw (11 percent). Straw was more frequently found in the eastern part of the country (Eastern Agropastoral, Muvumba Agro and Eastern Curve). Galvanized iron was most frequent in the eastern and central areas while tile was found mainly in the west. Across livelihood groups, straw was more frequently found among agriculturalists and agro-labourers. Concrete floors were not frequent (12 percent) compared with mud floors (86 percent). However 64 percent of employee agriculturalists and 37 percent of agro-sellers had concrete floors, compared with 5 percent among both agriculturalists and agro-labourers.

Amenities

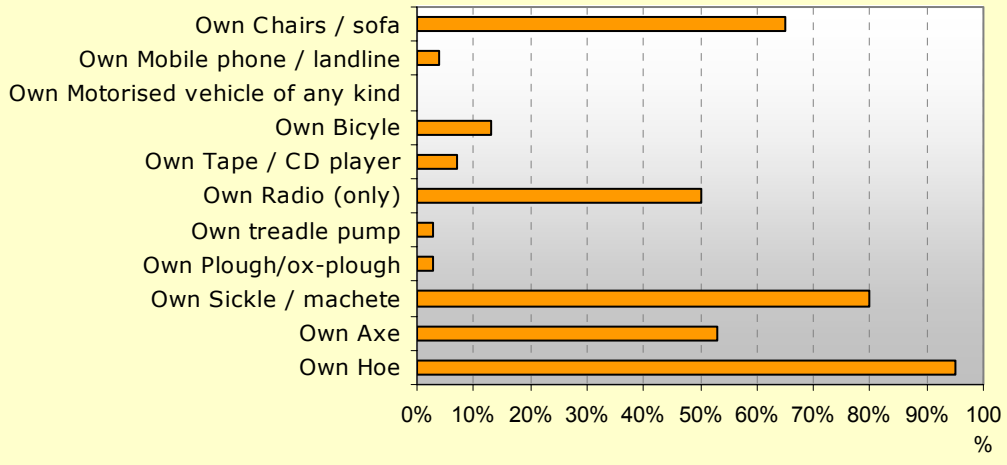
The most common toilet facilities were traditional pit latrines (70 percent) and open pits (22 percent). Open pits were most frequently used in the east, with 47 percent of the households in the Eastern Agropastoral and 41 percent in the Eastern Curve using this type of facility. No latrines/bush were also most frequent in the Eastern Curve, at 11 percent compared with 4 percent nationally. Across livelihood groups, agro-labourers had on average the poorest facilities, with 30 percent using open pits and 7 percent using no latrines/bush. Source of fuel for cooking was nearly exclusively charcoal (97 percent of households). Source of lighting was most frequently kerosene, oil or gas lamp (74 percent) or firewood (21 percent). Firewood was most frequent in the Southern Plateau (41 percent), Lake Shore area (34 percent) and Bugesera (29 percent). Among livelihood groups, 27 percent of the agriculturalists, 32 percent of the agro-labourers and 27 percent of the marginal livelihoods had access to firewood only.

The main sources of drinking water for three quarters of the households were improved drinking water sources (piped water, 67 percent; protected well or spring, 8 percent; borehole with pump, 2 percent). However, 17 percent used water from ponds, rivers and lakes as the primary source. Pond, river and lake water were most frequently used in the east of the country, especially the Eastern Agropastoral region (43 percent). Among livelihood groups, over 20 percent of the agro-labourers and marginal livelihoods used water from ponds, river and lakes as their main source of drinking water. The average walking distance to water sources was estimated at 24 minutes, with the longest average walks in the East and Bugesera (over 40 minutes).

Wealth

Households were asked whether they owned certain items. The objective was not only to establish the wealth of a household but also to identify items that could help discriminate between well-off households and poor households.

Figure 1-9: Ownership of assets



[35] WFP. 2005. *Uganda CFSVA 2005.*

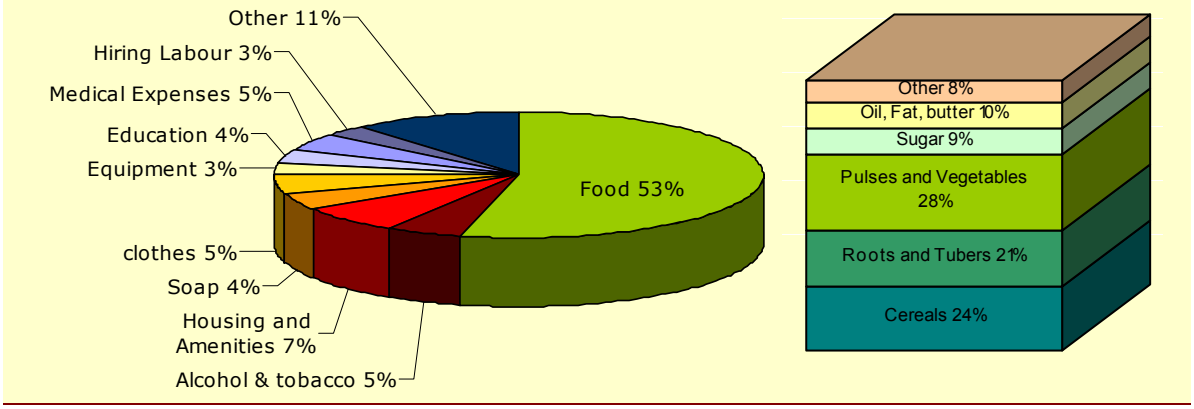
Tools related to agriculture were the items most frequently owned, with 95 percent of households owning a hoe, 53 percent an axe and 80 percent a sickle/machete. While hoes were owned in every region and among all livelihoods, axes and sickle/machetes showed more variation, with ownership lowest in the Bugesera, where only 38 percent of the households had an axe and 73 percent a sickle/machete. Generally, ownership was found to be lowest in the East and the Volcanic Highlands. Interestingly however, ownership of a radio and/or bicycle was found to be generally higher in those areas. Among livelihood groups, ownership of all the items included was found to be systematically lower among agro-labourers. Only 34 percent of households among that group owned a radio, for example, compared with a national average of 50 percent.

1.2.4 HOUSEHOLD EXPENDITURES

Household monthly expenditures averaged 20,000 RWF, or approximately 3,800 RWF per capita. Geographically, the Lake Shore had on average the lowest total expenditure per capita (2,900 RWF). In terms of livelihoods, average per capita expenditure was lowest among agriculturalists (1,900) and agro-labourers (2,700) per month.

Food expenditures represented 54 percent of total expenditures, although with important variation geographically and across livelihood groups; it was 65 percent or more in the Bugesera and Eastern Curve areas. Among livelihood groups, food expenditure as a percentage of total expenditure was highest among agro-labourers (63 percent), followed by marginal livelihoods (57 percent). Nationwide, maize, beans and peas alone accounted for 20 percent of total expenditures. Those items represented 39 percent of the expenditure in Bugesera, 33 percent in the Eastern Curve and 29 percent in the Southern Plateau.

Figure 1-10: Average monthly expenditure composition



Education and health expenditures represented respectively 4 percent and 5 percent of the total expenditure. The largest percentage of non-food items was devoted to alcohol and tobacco (5 percent) and soap (4 percent). Medical expenses were highest in the eastern part of the country, while expenditures on education showed little variation.

In terms of modes of payment, 97 percent of expenditures were made in cash, 3 percent on credit, and 1 percent through barter. Credit and barter were especially frequent in Bugesera, representing respectively 6 percent and 7 percent of expenditures, possibly because data collection was conducted during the lean season after a relatively poor harvest. Credit was also important in the Southern Plateau (5 percent) and Lake Shore area (4 percent), possibly for similar reasons.

1.3 LITERACY/EDUCATION

1.3.1 SCHOOL ENROLMENT

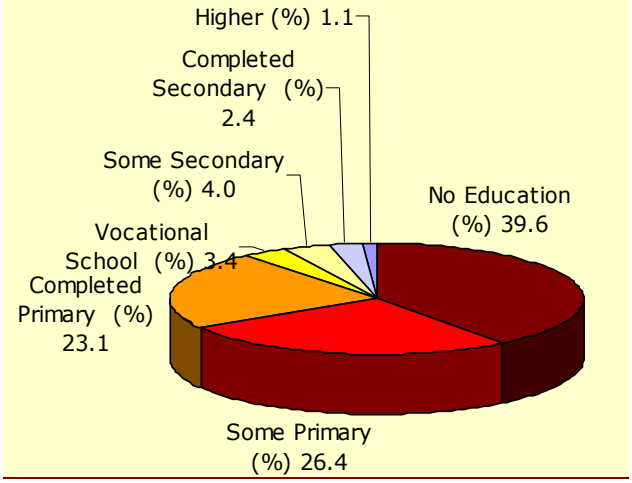
Education is a priority for Rwanda. The Government implemented a "Nine Year Basic Education for All" programme to ensure unpaid access to primary education and to the first three years of secondary schools. The policy includes an increased capitation grant so that even the poorest households can send their children to school. Net enrolment increased from 67 percent in 1990/91 to 87 percent in 2002/03, far above neighbouring Kenya

(66 percent in 2002/03) (World Bank data). If current trends persist Rwanda may reach full enrolment by 2010.

The CFSVA data confirm enrolment performance: 86 percent of the boys and 83 percent of the girls aged 7–14 were enrolled in primary school (net enrolment ratio). Only in the Lake Shore and the southwest Cyangugu region was net enrolment ratio among females below 80 percent (78 percent and 77 percent, respectively).

Despite such positive results at the primary level, the education sector still faces several challenges. The total primary completion rate remains low, at 37 percent for the 2000/01 to 2003/04 period, below the sub-Saharan Africa level over the same period (59 percent) and even below the national rate of the period 1988/89 to 2003/04 (44 percent) (World Bank). While access to education appeared to be even between girls and boys at the primary and secondary levels, differences in equity remain in terms of types of school, with a higher proportion of boys attending those public secondary schools with more resources. Significant gaps also exist at the tertiary level.[36]

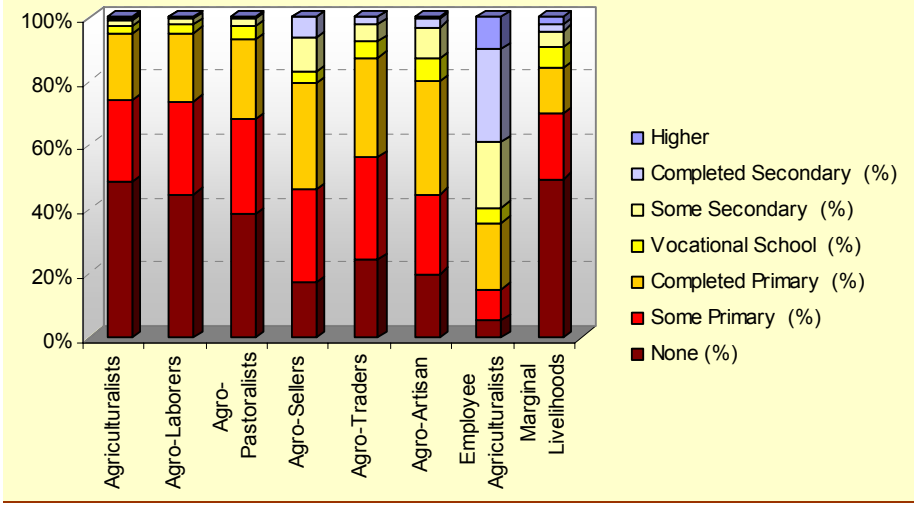
Figure 1-11 – Education level of heads of household



Relatively poor performance in education is illustrated by the CFSVA findings that two thirds (66 percent) of the heads of household did not complete primary education. Only 4 percent completed secondary or above. The lowest levels of education were found in the Eastern curve (74 percent did not complete primary), Bugesera (73 percent did not complete primary) and the Buberuka Plateau (71 percent did not complete primary). Levels of education among spouses of heads of households were comparable to those of the heads. The Government of Rwanda set itself the goal to increase the primary completion rate to above 75 percent by 2015 and increase the transition rate from primary to secondary school to above 75 percent.

Education level also varied greatly across livelihood groups. Activities requiring fewer skills (agriculturalists, agro-labourers and marginal livelihoods) were least educated, with over 70 percent of the heads of household in those groups having achieved at best some primary education. Employee agriculturalists had on average the most education.

Figure 1-12: Education level across livelihood profiles



Net primary enrolment also varied across livelihood groups, with school enrolment being especially low among marginal livelihoods (72 percent; only 66 percent among girls) and

[36] MINECOFIN. 2005. *Rwanda PRSP – Annual Progress Report*, p. 9.

surprisingly among employee agriculturalists, with a net primary enrolment of 86 percent, above the national average (83 percent) but only 75 percent among girls compared with 92 percent among boys. (The national net primary enrolment rate is 83 percent among girls.)

1.3.2 Absenteeism

When asked if anyone in the household had missed school for more than one week over the last six months, 13 percent of the households responded "yes". The main cause of absenteeism was sickness (46 percent among girls and 42 percent among boys). Absenteeism was slightly higher in the Eastern Agropastoral (17 percent), Muvumba Agro (17 percent) and Bugesera (18 percent) zones. In those zones distance to school was more frequently identified as a cause of absenteeism. In the Eastern Agropastoral zone, absenteeism was also more frequently reported by 3 to 6 percent of the households because of work-related reasons (e.g. taking care of siblings and work for cash), compared with about 1 percent for the national average. Frequency and causes for absenteeism showed little variation across livelihood groups.

1.3.3 Literacy

The literacy rate in Rwanda has increased over the past decade and is above the regional average of sub-Saharan Africa. The adult (over 15) literacy rate was estimated in 2002 at 75 percent among men and 63 percent among women, up from 63 percent and 44 percent in 1990. In comparison, the average sub-Saharan Africa literacy rate among men was 71 percent and among women 58 percent in 2002 (World Bank data). Perhaps more significantly, the youth (15–24) literacy rate for Rwanda was 86 percent for men and 84 percent for women in 2002, compared with 84 percent and 77 percent for sub-Saharan Africa (World Bank data).

The CFSVA data suggest, however, that only 56 percent of the heads of rural households could read and write a simple message in any language. The percentage was slightly lower (53) among spouses of heads of household. Among heads of household, the lowest literacy rate was found in the Bugesera area (49 percent). Among agriculturalists, agro-labourers and marginal livelihoods, 50 percent or fewer of the heads of household could read and write simple messages, compared with over 75 percent among agro-sellers, employee agriculturalists and agro-artisans. The results were similar among spouses of heads of household.

1.4 Health

1.4.1 Malaria

According to the Millennium Development Goals Status Report 2003, malaria is the leading cause of outpatient attendance; 40 percent of all health centre visits are due to malaria. It is also the principal cause of morbidity and mortality in every province in Rwanda. In 2000, malaria-related mortality was 200 per 100,000 people and for children under 5 it was 1,049. During the period 1999–2002, the percentage of children under 5 with insecticide-treated mosquito nets was only 5 percent. By 2003, however, the rate of children sleeping under impregnated mosquito nets had risen considerably and stood at 18 percent.[37] The provinces of Byumba, Butare, Umutara, and Gitarama are particularly affected by malaria.[38]

1.4.2 Health of women and children

The high fertility and mortality rates cited above (1.1.1 Demographics) reflect issues relevant to reproductive health, family planning (e.g. contraceptive use) and maternal and child health. The rate of condom use remains low (only 2.4 percent[39]).

Women in selected household were asked about general health practices. Overall, only 19 percent reported sleeping under a mosquito net the night prior to the interview. Nine percent reported never washing their hands and only 45 percent did so before preparing meals and 45 percent after going to the toilet. Poor hand washing practices were

[37] MINECOFIN. 2005. *Rwanda PRSP – Annual Progress Report*.
[38] United Nations and Government of Rwanda. 2003. *Millennium Development Goals, Status Report 2003*, p.23.
[39] United Nations and Government of Rwanda. 2003. *Millennium Development Goals, Status Report 2003*, p.23.

frequent in areas traditionally associated with high food insecurity. In the Eastern Curve, 27 percent of the women never washed their hands; in Bugesera it was 15 percent and in the Lake Share, 16 percent. Among livelihood groups, marginal livelihoods had the highest proportion of women never washing their hands (22 percent).

According to the Rwanda PRSP, the share of deliveries of babies assisted by trained medical personnel increased from 34.2 percent in 2003 to 39.8 percent in 2004.[40] The CFSVA data show that 48 percent of women with a child of any age had seen someone for antenatal care. Almost all the women with a child below 59 months had seen medical personnel while pregnant, most frequently a doctor (22 percent) or a nurse (75 percent). Only 2 percent reported seeing no medical personnel.

Of children below 59 months in selected households, 61 percent had been sick in the previous two weeks. The most frequently reported symptoms were cough (87 percent) and fever (81 percent). Diarrhoea was reported in 45 percent of the cases. In 58 percent of the cases, the child had been seen at a health facility. Overall 68 percent of the children had received measles vaccinations and the same proportion had received deworming tablets in the six months prior to the survey.

1.4.3 HIV/AIDS

Section 4.2.6 provides a detailed discussion of HIV/AIDS in relation with food security status.

2. FOOD AVAILABILITY: THE AGRICULTURAL SECTOR IN RWANDA

In Rwanda, like in much of the developing world, small subsistence farmers produce most of the agricultural output. Farms can be understood as a system of interaction between available resources (human, natural and financial) and exploitation practices. What follows is a short discussion on the the agricultural sector in Rwanda.

2.1 THE AGRICULTURAL SECTOR IN RWANDA

2.1.1 CONTRIBUTION TO THE SOCIO-ECONOMIC ENVIRONMENT

The agricultural sector is central to Rwanda's socio-economic environment. It dominates the economy in terms of contribution to the GDP (42 percent in 2003, as compared with less than 30 percent for the average country in its income group) and also in terms of human resources. It accounts for over 90 percent of employment (nearly 100 percent for women and 88 percent for men, mostly in subsistence agriculture), far more than the regional and income group average. Agricultural exports represent over 70 percent of the total value of exports; coffee and tea are the two main export crops and the most widely cultivated cash crops (World Bank data).

Agriculture is not only one of the most important sectors of Rwanda's socio-economic environment; it is also one of its most challenging. As early as 1984, a World Bank study of Rwandan farming systems stressed the need to increase agricultural productivity and reduce soil erosion and land degradation.[41] What follows is a more detailed discussion of the agricultural sector in relation to food security.

2.1.2 LAND DISTRIBUTION/TENURE

Land distribution and tenure in Rwanda has been severely constrained for decades by the local demographic dynamic, historical context, legal framework, market situation and institutional capacities. This results in: sub-optimal plot size, with an average of 0.1 ha of arable land per capita; a rural population density of 684 people per km^2 of arable land, nearly twice that of sub-Saharan Africa as a whole (World Bank data, 2005); and use of marginal land unsuitable for sustainable use and sensitive to drought, erosion and loss of fertility. The size of average agricultural plots decreased by 25 percent between 1990 and 2000.

Land area was estimated in 2002 to be 25,000 km^2, of which 45.2 percent was arable land, 10.9 percent permanent cropland and 43.9 percent other land area (World Bank data). As

[40] MINECOFIN. 2005. *Rwanda PRSP – Annual Progress Report*, page 44.
[41] Jones, W.I. and Egli, R. 1984. *Farming Systems in Africa: the Great Lakes Highlands of Zaire, Rwanda and Burundi*. World Bank Technical Paper 27. Washington DC, World Bank.

a comparison, only 7 percent of the land area of sub-Saharan Africa is considered to be arable. Virtually all arable land in Rwanda is already being used, with the exception of Akagera National Park.[42] Population growth and returning refugees have generally increased pressure on forest and park areas.

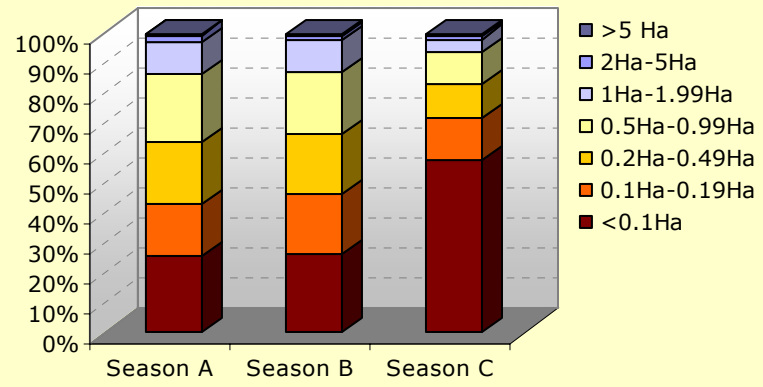
Table 2-1: Factors affecting land distribution and tenure

1) dense and growing population;
2) historical context of conflict and mass population movements, resulting in conflicting land claims and inability to address the needs of landless returnees;
3) until recently, weak legal framework for land rights, often unenforceable, resulting in uncertainty and ambiguous practices;
4) women's access and rights to land uncertain and inequitable;
5) weak (albeit nascent) land market; and
6) lack of institutional and technical capacity to implement and sustain land reforms.

A new Land Law was passed in September 2005, after years of preparation. The new law is meant to transform small, fragmented, and minimally productive plots into a more prosperous system of larger holdings producing for local, and international, markets. Yet the implementation of the law creates new challenges as its main focus is on privatization and commercialization of land. Poorer farmers may become disenfranchised and it is unclear whether smallholders of intensive and highly productive crops for export are supported. Concentration of land holdings in the hands of a few may deepen the marginalization of the rural poor.[43] The new law enables farmers to use their land as collateral to gain broader access to credit, including from micro-finance institutions and lending facilities established by the Rwanda Development Bank (BRD). Poorer farmers face higher risks of being unable to pay back loans and lose their land when confronted with shocks such as drought. As part of the reform, a national land survey will be conducted to develop an accurate and complete database.[44]

The data from the CFSVA confirm that land availability is limited. While 94 percent of the households are engaged in agriculture, over 40 percent of them cultivates less than 0.2 ha during season "A" and season "B" (see Figure 2-2, for description of seasons) the intermediate season "C" is not widely cultivated and less than 40 percent of the households cultivated 0.2 ha or more during that season. On average, 20 percent of the land cultivated during season "A" and "B" is not legally owned by the household that cultivates it.

Figure 2-1: Land cultivation by season (percent of household)



2.1.3 LAND MANAGEMENT AND AGRICULTURAL INPUT

Limited land availability and population pressure have resulted in both suboptimal plot sizes and cultivation of marginal lands, with subsequent erosion and loss of fertility or located in drought prone areas. A third factor that contributes to stagnating and declining agricultural productivity is the low level of use of inputs, including fertilizers, mechanization and improved seeds. According to World Bank data, fertilizer use was limited to 4.8 kg per ha of arable land in 2000–2002, about a quarter of the sub-Saharan

[42] 1997. *International Conflict and the Environment: Rwanda Case Study*.
[43] Wyss, K. 2006. *A Thousand Hills for 9 Million People. Land Reform in Rwanda: Restoration of Feudal Order or Genuine Transformation. FAST Country Risk Profile Rwanda*. Swiss Peace Foundation Working Paper
[44] Government of Rwanda. 2005. *Memorandum of Economic and Financial Policies of the Government of Rwanda*.

country average (132 kg). The level of mechanization is also extremely low, with only 1 tractor per 100 km^2 of arable land, compared with 15 for sub-Saharan Africa.

The CFSVA data show that only 7 percent of households involved in agriculture used chemical fertilizers and 79 percent used natural fertilizers (e.g. compost). The use of both type of fertilizers was lowest in the east, especially the Eastern curve, where no households used chemical fertilizers and only 44 percent used natural ones. Use of fertilizers of either type was found to be generally higher in the Volcanic Highlands, Crete of the Nile and Buberuka Plateau. Only 3 percent of the rural households nationwide reported owning a plough or an ox-plough.

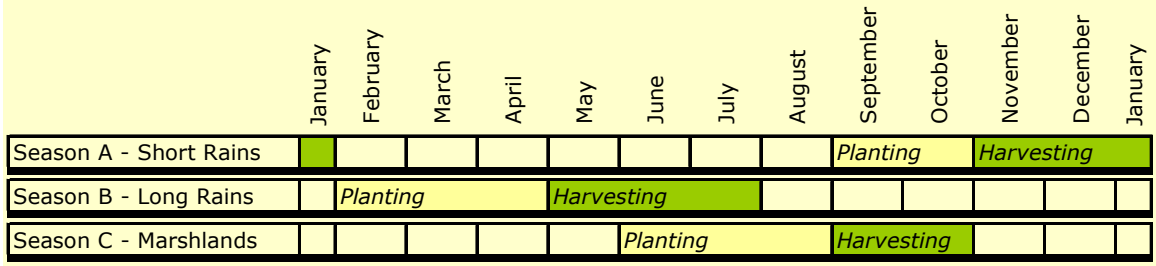
In terms of livelihoods, it is important to note that the use of chemical and natural fertilizers was lowest among agriculturalists and agro-labourers, the two livelihood types that depend most exclusively on agriculture to sustain their livelihoods. Use of fertilizers was also found to be very low among the marginal livelihood groups.

While it is generally recognized that the use of improved seeds is limited in Rwanda, the CFSVA found a high dependency on purchase as a source of planting material. For cereals such as maize and sorghum, over 25 percent of the households obtained seeds through purchase, compared with over 60 percent that used reserved production from previous harvests. The purchase frequency was even higher for kidney beans, with 40 percent of the households depending on purchase compared with 55 percent using reserved production. Households in the Bugesera and the Southern Plateau were found to be more frequently dependent on purchase to acquire seeds, possibly as a result of the poor food security conditions in those areas, which lead households to consume any surplus they may have kept as planting material.

2.1.4 Cropping season

Throughout Rwanda, the bimodal distribution of rain allows for two main cropping seasons. Season A starts with the short rainfall period of September to October. Season B starts with a longer rainfall period, from February to April. Short season C (starting in June) is distinguished for (somewhat limited) marshlands cultivation using swamp or basin-retained water.

Figure 2-2: Cropping seasons



Rainfall is generally more reliable in the western parts of the country, whereas precipitation in the eastern areas is erratic, making agricultural production unreliable. The eastern region was for centuries a cattle-grazing region, but in recent decades it has been cultivated due to increasing pressure for land.[45] Erratic weather conditions periodically lead to crop failure, especially within the food economy zones of Bugesera, Eastern Curve, Eastern Agropastoral, Central Plateau-Mayaga and part of the Buganza-Gisaka Plateau (eastern and central Rwanda).

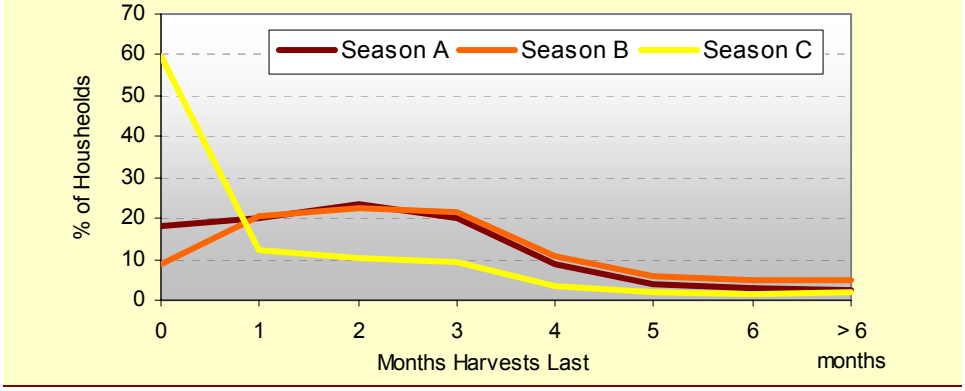
2.1.5 Production seasonal availability

Households were asked how long their production from each agricultural season lasted. Season B was found to last the longest on average, with 52 percent of the households reporting two months or less, 43 percent reporting three to six months and 5 percent reporting more than six months. In season A, the harvest lasted less than two months for

[45] Percival, V. and Homer-Dixon, T. 1995. *Environmental Scarcity and Violent Conflict: The Case of Rwanda*.

61 percent of the households. Harvest from season C, which is less frequently cultivated, did not last long: 83 percent reported it lasting two months or less.

Figure 2-3: Production seasonal availability



In terms of livelihood groups, harvests lasted the least among marginal livelihoods, with an average of one month for season A and two months for season B. The production of season A lasted two months or less for about 80 percent of the households. More critically, harvests lasted the least for the two livelihood profiles that depend most heavily on agricultural production, agriculturalists and agropastoralists. The harvest from season A lasted two months or less for 60 percent of agriculturalists and 75 percent of agropastoralists. For season B, the figures were 51 percent and 65 percent.

Geographically, harvest lasted least in the Bugesera, with 86 percent responding two months or less for season A (an average of 1.2 months) and 67 percent responding two months or less for season B (an average of two months), compared with figures for the population as a whole of 61 percent in season A and 52 percent in season B. Harvest lasted even less on the Southern Plateau: for season A, 85 percent responded the harvest lasted them two months or less (average 1.4 months) and for season B it was 76 percent (average 1.8 months). Harvest from season A lasted a short time in the Eastern Curve, with 88 percent responding two months or less (average one month); while season B lasted longer than in the Bugesera and Southern Plateau.

The results show that the hunger season is mainly in March/April and, to a lesser extent, September/October.

2.1.6 Agricultural production

Data from the Ministry of Agriculture show that overall, agricultural production increased 17 percent between 1990 and 2000. The World Bank Food and Crop Production Index further shows a 30 percent increase between the 1992–1994 period and 2002–2004. Those positive figures, however, hide three major issues in relation to agricultural production: the impact of population growth, the vulnerability of the production to external shocks and regional disparities.

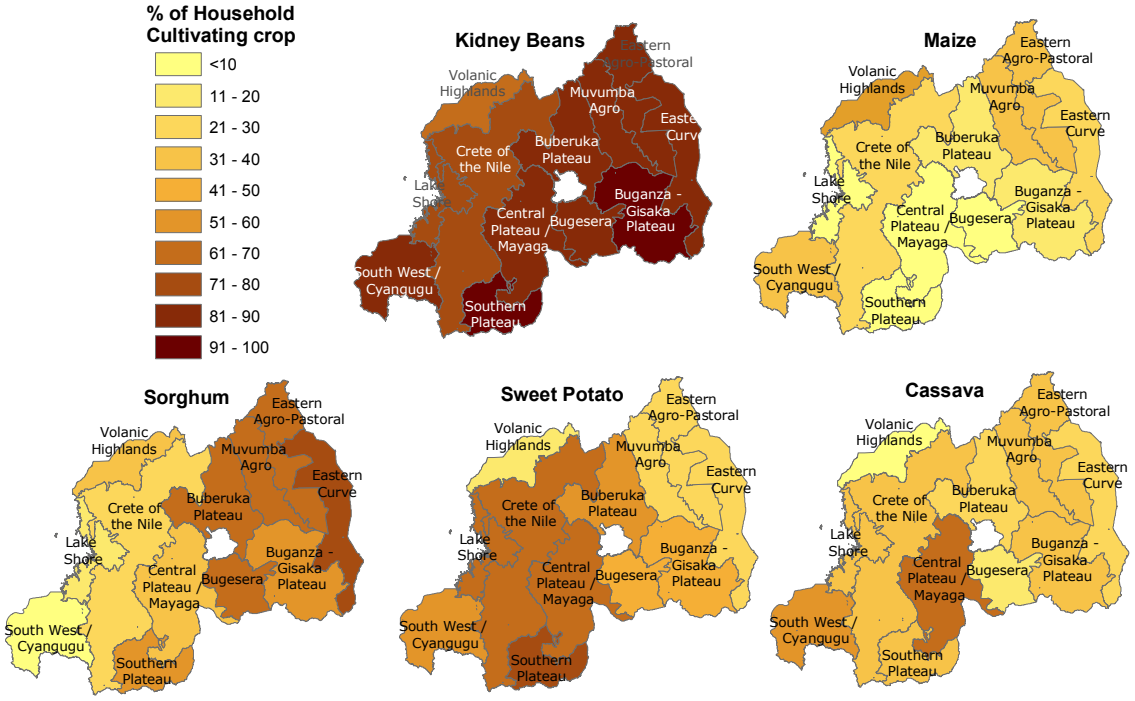
First, while total agricultural production has increased, per capita agricultural production has remained relatively constant over the last few years and is over 20 percent below levels during the early 1990s. Perhaps even more critically, productivity of most crops has decreased. Cereal yields decreased approximately 10 percent and stand currently at 1 mt per hectare, slightly below the average for sub-Saharan Africa. The productivity of roots and tubers is roughly 20 percent below that of sub-Saharan Africa, at 6.3 mt per hectare[46]. In fact, while productivity has stagnated or even decreased in Rwanda, most sub-Saharan countries experienced steady growth of their productivity, and their current productivity is roughly 25 percent higher than a decade ago and 50 percent higher than two decades ago. The production increase is supported by the extension of cultivated area, including to non-suitable land (e.g. high slopes, drought-prone), contributing to the land problems discussed in Section 2.1.2.

The CFSVA collected information on which crops each household cultivated. The five main crops were kidney beans, (cultivated by 82 percent of the households on an average of 46 percent of the available cropland), followed by sweet potato, (cultivated by 55 percent

[46] Figures are from World Bank Development Indicators (2005) and FAOSTAT (2005).

of the households), sorghum (39 percent), cassava (37 percent) and maize (21 percent). Coffee was the only significant cash crop, cultivated by 4 percent of the households. Regional variations exist and are illustrated in Figure 2-4. Across livelihood groups, the importance of the various crops varied, although no clear specialization appeared.

Figure 2-4: Geographic distribution of main crop production



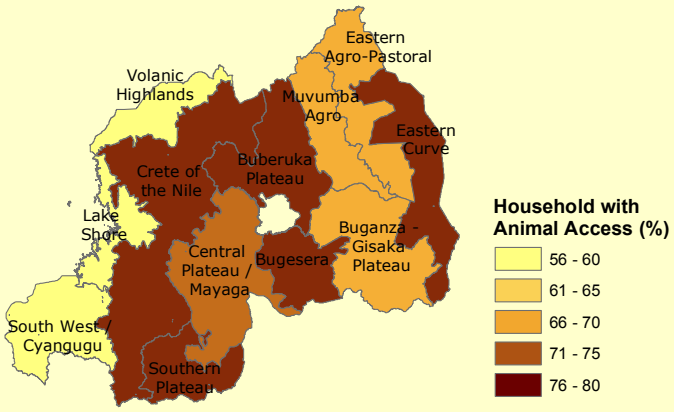
The relative low diversity of crops cultivated in Rwanda is further illustrated in the lack of crop diversity at the household level. Fewer than half (48 percent) of the households cultivated four or more different crops throughout the year; about a quarter (26 percent) cultivated just one or two different crops.

2.1.7 Other productive assets

In addition to information on land use (discussed in detail in Section 2.1.2 on land tenure), households provided information on ownership of productive assets. Overall, 66 percent reported owning fruit trees, fewer in the Eastern Agropastoral, Muvumba Agro and Volcanic Highlands (50–51 percent). Banana (for cooking) trees were frequently owned (66 percent), less so in the Eastern Curve (50 percent) and Volcanic Highlands (44 percent). Only 36 percent of the households had a vegetable plot/garden.

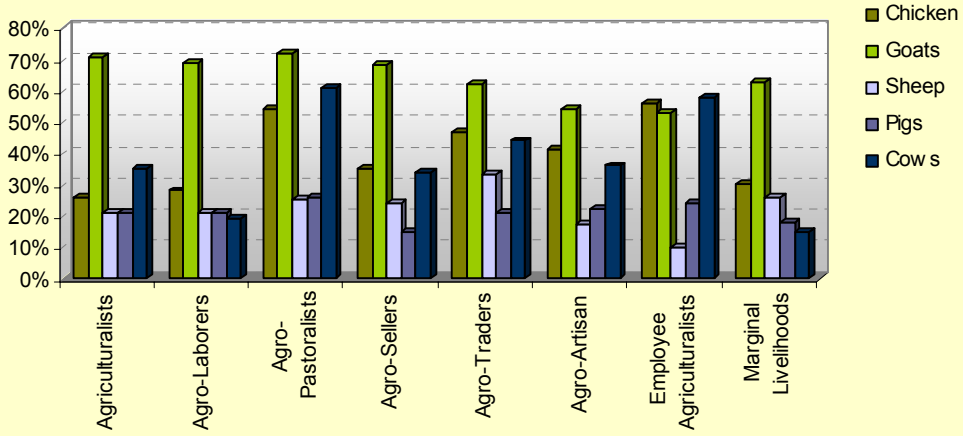
Seventy-two percent of households had animals. The most common were goats (68 percent of animal-owning households), chickens (37 percent) and cows (39 percent). Goats were least frequent in the Crete of the Nile (43 percent) and Volcanic Highlands areas (37 percent), where sheep were more common. The following map illustrates the distribution of animal ownership.

Figure 2-5: Distribution of animal ownership



In terms of livelihood groups, animal ownership was high among agropastoralists, who owned cows, chicken and pigs more frequently than other groups and tended to own more cows than other groups (five compared with the national average of three).

Figure 2-6: Animal ownership across livelihood groups



2.2 HOUSEHOLD ACCESS PROFILING

2.2.1 METHODOLOGY FOR ANALYSING FOOD ACCESS DATA

Food access is the ability of a household to acquire adequate amounts of food, whether through purchase or through harvest of a household's own production. Using this definition, access profiles were developed on the basis of: (1) total per capita expenditure; (2) per capita expenditure on food; (3) food expenditure as a percentage of total expenditure; and (4) cumulative months of availability of harvest for each of the three seasons.

Principal component analysis (PCA) was run on the four variables and resulted in three factors that accounted for 91 percent of the variance of the original dataset. (PCA was used in place of the original variables because the resulting factors represented the original variables together with the *relationship* between them.) A cluster analysis (CA) was run on the principal components to group together households that shared a particular access pattern. Subsequently, a total of 20 "summary" access patterns were obtained and scored using a continuous scale. The scores ranked the patterns from worst to best: very weak access corresponded to a score of 1, good food access to a score of 4. The ranking was reviewed by experts in food security. Finally, the access scores were used as the dependent variable in a regression analysis on the original variables:

$$Y_{\text{Access Score}} = b_0 + b_1X_{\text{Per Cap. Food Exp.}} + b_2X_{\text{Per Cap. Total Exp}} + b_3X_{\text{\%Food Exp}} + b_4X_{\text{Harvest Months}}$$

For the access model, the result of the regression gave the following coefficient:

$$Y_{Access\ Score} = 3.05 + .034X_{Per\ Cap.Food\ Exp} + 000X_{Per\ Cap.Total\ Exp} + 0.000X_{\%Food\ Exp} + .072X_{Harvest\ Months}$$

The regression equation was used to score every household in the sample with values between 0.5 and 4.5. The continuous outcome obtained was subsequently categorized in four classes of food access: "very weak", "weak", "medium" and "good", on the basis of the ranking of the patterns.

2.2.2 HOUSEHOLD FOOD ACCESS PROFILES

Table 2-2 provides a short description of each of the four food access profiles established according to the methodology described above. It is important to note that data collection was conducted during the lean period and followed a relatively poor harvest season, which may have had an impact on the figures.

Table 2-2: Food access profiles

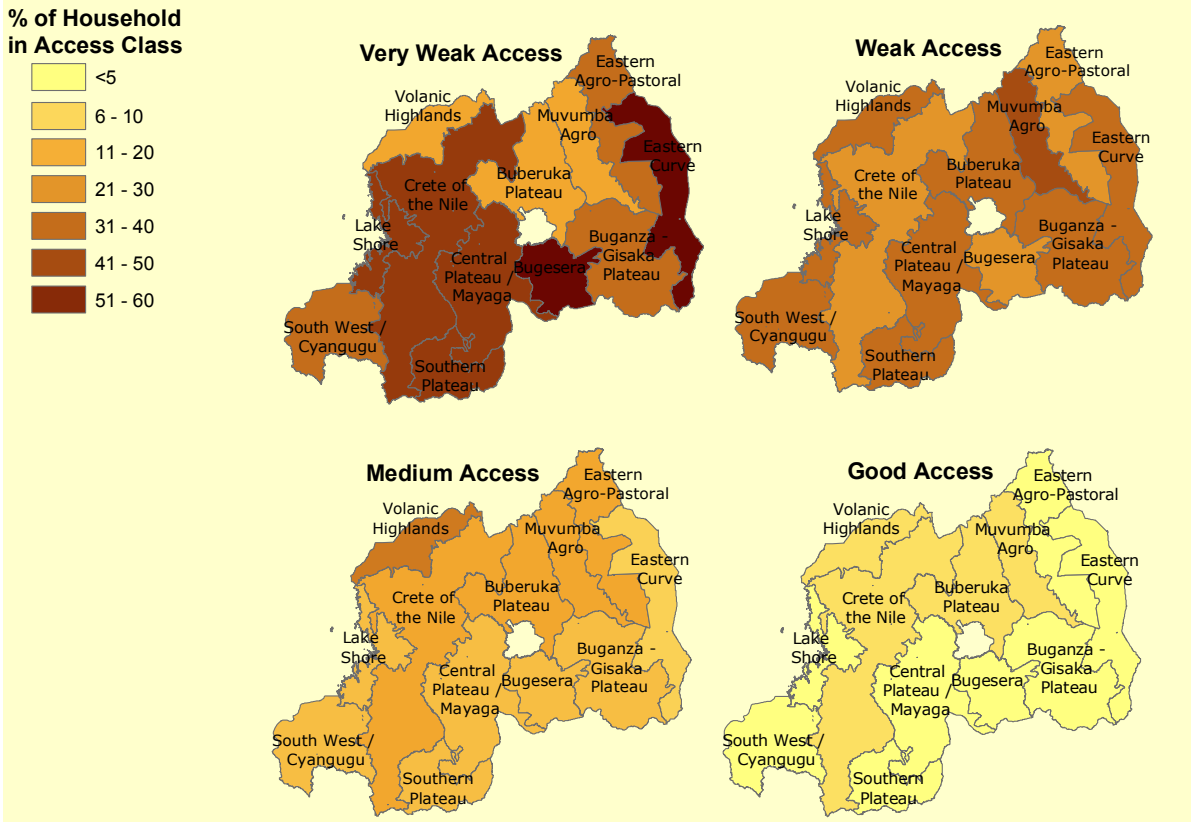
Food access profile	N sample	% in population (weighted)	Population estimate[47]	Cut-off point	Short description
Very weak	1,096	38	2,841,000	<1.5	The way these households obtain food is very unreliable and insufficient.
Four profiles: Households with poor ranking in at least two of the following items: (1) total per capita expenditure; (2) per capita food expenditure as a percentage of total expenditure; and (3) months of harvest availability. On average monthly per capita food expenditure is 78 percent of the total expenditure (1,600 RWF of 2,000 RWF). Harvests last an average of three months per year.					
Weak	950	34	2,539,000	1.5–2.4	The way these households acquire food is difficult and unreliable.
Six profiles: On average, total monthly per capita expenditures remain low (3,100 RWF), with food representing 56 percent (1,700 RWF). Harvests throughout the year last longer (6 months).					
Medium	595	23	1,757,000	2.5–3.4	These households have fewer difficulties obtaining food.
Seven profiles: Total monthly per capita expenditures are above 5,000 RWF with little expenditure on food (33 percent) and about seven months of harvest availability throughout the year.					
Good	118	5	360,000	3.5–4.4	Households that can easily obtain sufficient food.
Four profiles: Households with high per capita expenditure (18,000 RWF, availability of cash) and long availability of harvest (up to ten months). Where harvest does not last, financial resources are high *[available?]*. Per capita food expenditure represents 19 percent of the total per capita expenditure.					

2.2.3 GEOGRAPHIC DISTRIBUTION OF FOOD ACCESS PROFILES

Access to food is especially problematic in the Eastern Curve, Bugesera, Southern Plateau and Lake Shore areas, where over 45 percent of the households were found to have weak access capabilities. Similar trends were seen for the former provinces of Kigali Ngali, Butare, Kibuye and Kibungo.

[47] Based on sample universe included in the survey, 2002 Census (excludes Kigali, not sampled)

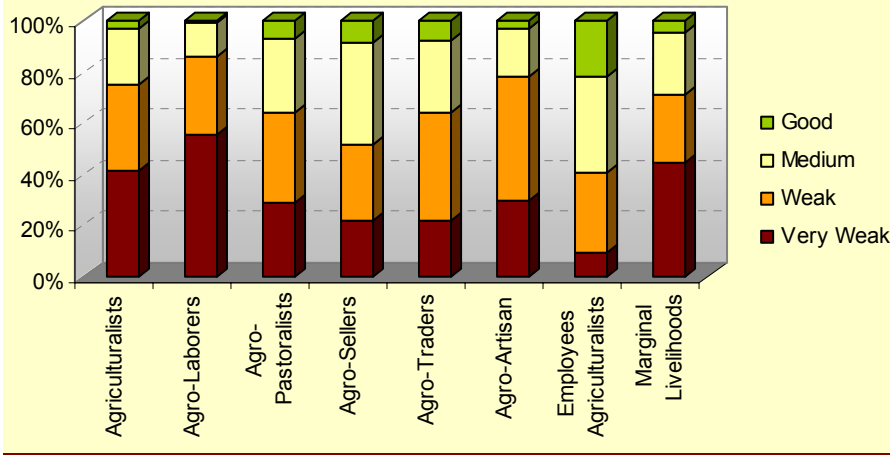
Figure 2-7: Geographic distribution of access profiles



2.2.4 Distribution of food access profiles among livelihood groups

Employee agriculturalists have the best access to food, with less than 10 percent of the households in that group having weak access. The weakest access was found among agro-labourers, with over 80 percent of the households having a weak or very weak access profile.

Figure 2-8: Food access profiles across livelihood groups



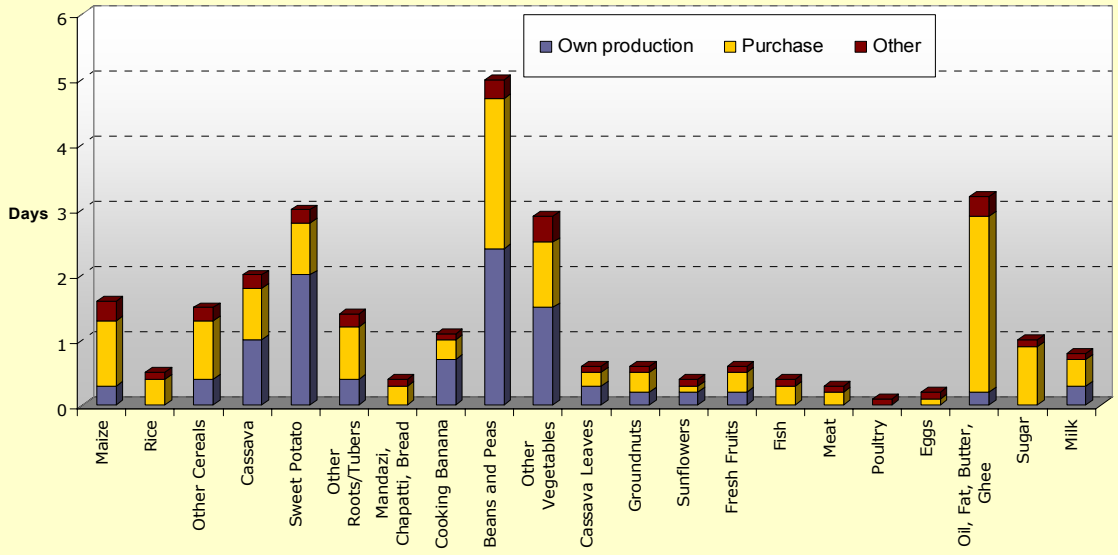
3. Food Consumption

3.1 Food sources and diversity

In order to establish food consumption profiles, households were asked how many days a week they consumed a series of 21 food items during the week prior to data collection and what the source for those items was (self-production, purchase or other). The results are illustrated in Figure 3-1. Beans and peas are the most widely consumed food item, on

average five times a week. The food consumption profile analysis will explore in more detail consumption patterns across livelihoods and geographic areas.

Figure 3-1: Consumption levels (days/week) and sources for selected food items



3.2 HOUSEHOLD FOOD CONSUMPTION PROFILING

3.2.1 METHODOLOGY FOR ANALYSING FOOD CONSUMPTION DATA

The information on food consumption over the one-week period prior to data collection was used to establish food consumption profiles. Diet diversity is a demonstrated proxy indicator of the access dimension of food security and nutrition intake. Principal component analysis (PCA) was run on the consumption of 21 food items and resulted in six factors which accounted for 84 percent of the variance of the original dataset. As with the access profiles, PCA was used not to reduce the number of variables but to obtain factors that represented both the original variables and the relationship between those variables. Cluster analysis (CA) was then run on the principal components in order to group together households that share a particular consumption pattern. A total of 19 "summary" consumption patterns were obtained. Each consumption pattern was scored using a continuous scale from worst to best. The scores were then used as the outcome in a regression analysis on the original aggregated consumption variables (staple, pulse, vegetables, fruits, animal products, oil, sugar and milk):

$$Y_{\text{Consumption Score}} = b_0 + b_1X_{\text{Staple}} + b_2X_{\text{Pulse}} + b_3X_{\text{Vegetables}} + b_4X_{\text{Fruits}} + b_5X_{\text{Animal Products}} + b_5X_{\text{Oil}} + b_6X_{\text{Sugar}} + b_7X_{\text{Milk}}$$

For the consumption model, the result of the regression gave the following coefficient:

$$Y_{\text{Consumption Score}} = -0.830 + 0.190X_{\text{Staple}} + 0.194X_{\text{Pulse}} + 0.111X_{\text{Vegetables}} + 0.078X_{\text{Fruits}} + 0.159X_{\text{Animal Products}} + 0.147X_{\text{Oil}} + 0.000X_{\text{Sugar}} + 0.064X_{\text{Milk}}$$

The regression equation was used to score every household in the sample with values between 0.5 and 4.5. The continuous outcome obtained was subsequently categorized in four classes of food consumption: "poor", "borderline", "fairly good" and "good". The rationale is that households within a certain range of score are very likely to belong to determinate consumption profiles because of the high homogeneity within each subgroup.

3.2.2 HOUSEHOLD FOOD CONSUMPTION GROUPS AND PROFILES

Table 3-1 labels the main food consumption groups and provides a short description of the associated dietary profile. Cut-off points were decided after qualitative judgment of the food consumption profiles. As was the case for the access profiles, it is important to note that data collection was conducted during the lean period and following a relatively poor

harvest season and many households may have had poor diet diversity due to exceptional conditions.

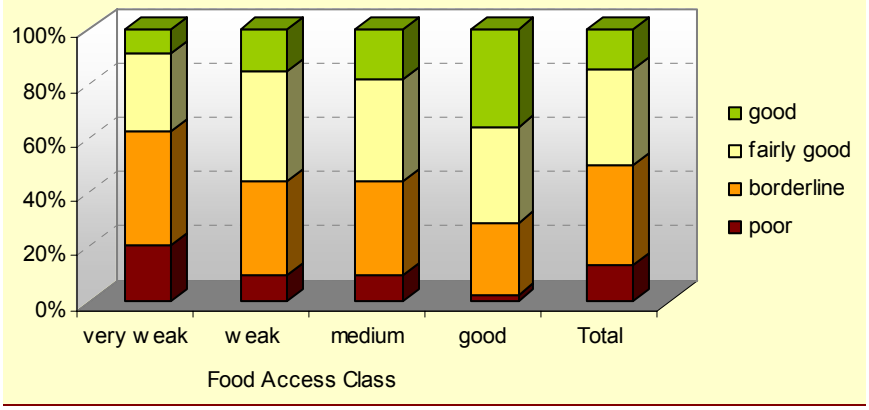
Table 3-1: Food consumption profiles

Food consumption profile	N (sample)	% in population (weighted)	Population estimate[48]	Ranking cut-off point	Short description
Poor	388	14	1,027,000	<1.5	Four sub-profiles Consume mainly staple foods (cereals and tubers); some of the worse-off do not consume even staples daily. Pulse and vegetables rarely consumed (twice a week on average); meat, milk and fruits never consumed.
Borderline	1014	37	2,763,000	1.5–2.4	Four sub-profiles Consumes staples seven days a week (average), vegetables three days and pulses five days. Meat, milk and fruits never consumed.
Fairly good	958	35	2,618,000	2.5–3.4	Five sub-profiles Staples, pulses and oil consumed on a daily basis. Vegetables consumed quite regularly (average four times a week). Meat and milk rarely consumed.
Good	418	14	1,089,000	3.5–4.4	Seven sub-profiles Staples, pulses and oil consumed on a daily basis. Vegetables consumed four to six times a week and meat and/or milk consumed at least once a week and up to six times a week.

3.2.3 CONSUMPTION PROFILES AND FOOD ACCESS

As stated above, diet diversity is a demonstrated proxy indicator of the access dimension of food security and nutrition intake. The access profiles, computed according to expenditure and harvest availability throughout the year, also reflect the access dimension of food security. The two profiles (consumption and access) show a significant correlation ($p<0.001$). The proportion of households with poor consumption profiles was highest among those with a very weak access profile (21 percent, compared with 10 percent among weak access, 9 percent among medium access and 2 percent among those with good access).

Figure 3-2: Access and consumption profiles

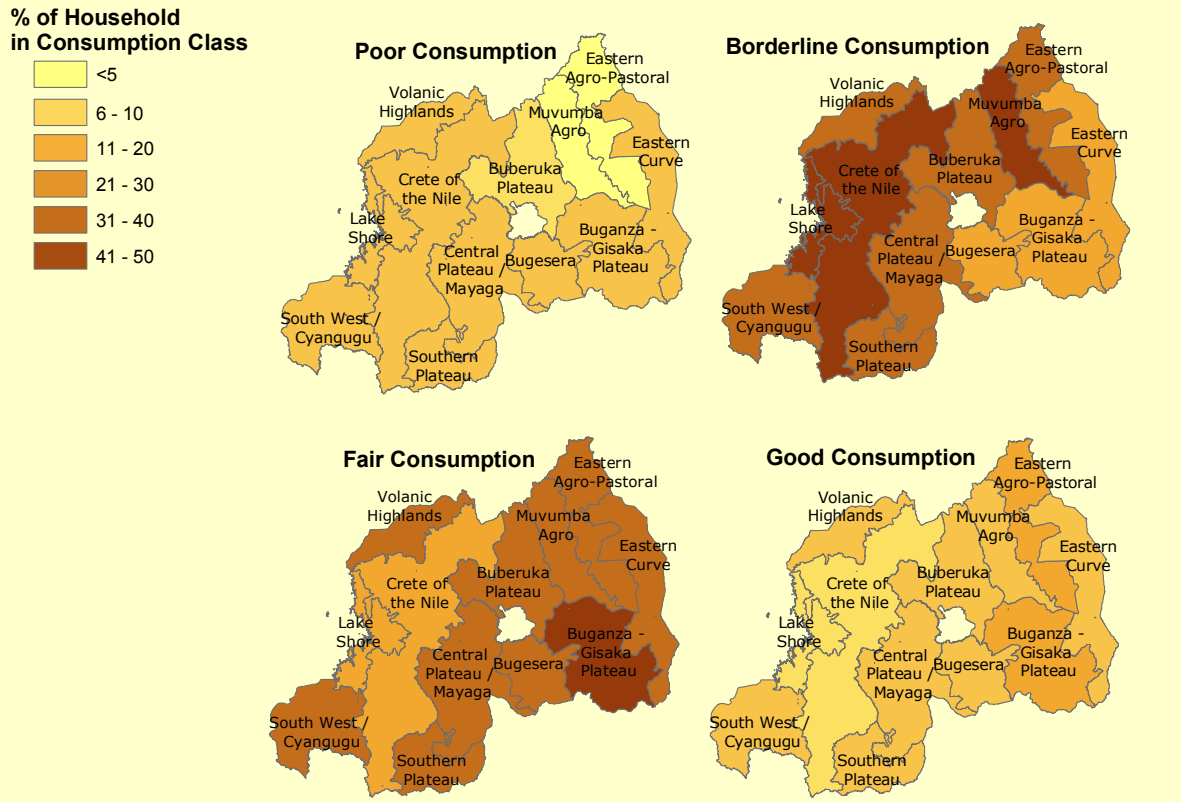


3.2.4 GEOGRAPHIC DISTRIBUTION OF CONSUMPTION PROFILES

The proportion of households with a poor consumption profile was highest in the Crete of the Nile (20 percent), Bugesera (19 percent), Eastern Curve (19 percent) and Lake Shore (18 percent). In the Crete of the Nile and Lake Shore zones, the proportion of borderline consumption households in the population was also high so that over 60 percent of the population in both areas belongs to the poor or borderline consumption profiles.

[48] Based on 2002 Census, excludes Kigali (not sampled).

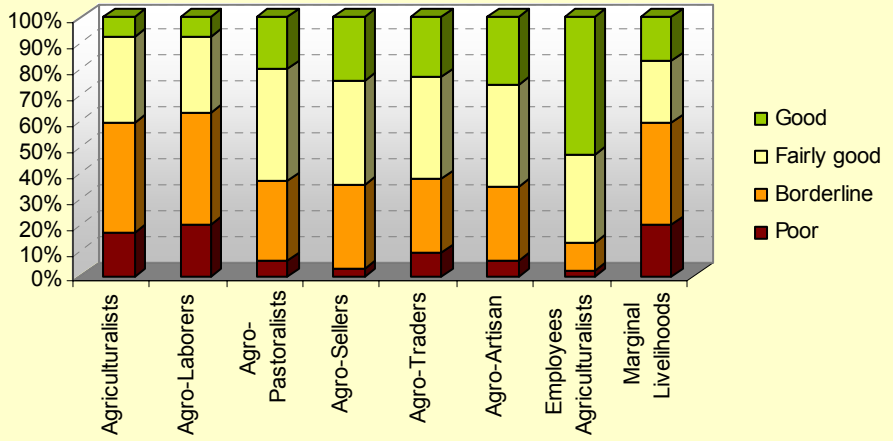
Figure 3-3: Geographic distribution of consumption profiles



3.2.5 Distribution of consumption profiles among livelihood groups

The proportion of households with a poor consumption profile was highest among agriculturalists (17 percent), agro-labourers (20 percent) and marginal livelihoods (20 percent). The percentage of households belonging to the poor or borderline food consumption profile was 59 percent among agriculturalists and 63 percent among agro-labourers, 59 percent among marginal livelihoods and 38 percent or less among all other livelihood profiles.

Figure 3-4: Consumption profiles across livelihood profiles



4. Household food security and vulnerability profiling

4.1 Methodology for analysing food security and vulnerability data

The food consumption and food access profiles provide two alternative proxies of a household's food security status, one focusing on food intake and the second on the ability of a household to access food. A simple combination of both profiles is used to compute a food security score.

Figure 4-1: Food access and consumption profiles cross tabulation

		Food Access Profile				
		very weak	weak	medium	good	Total
Food Consumption classification	poor	7.8%	3.2%	2.2%	0.1%	13.3%
	borderline	15.8%	11.8%	8.1%	1.3%	37.0%
	fairly good	11.0%	13.5%	8.9%	1.7%	35.1%
	good	3.2%	5.3%	4.3%	1.7%	14.6%
	Total	37.9%	33.9%	23.4%	4.8%	100.0%

The sum of the consumption and access scores (computed to establish the profiles - result of the regression discussed above) was calculated for each household. The resulting food security score was categorized using cut-off points derived by linear combination of the two scores (see value in table below). Four food-security profiles were established: (1) food-insecure, (2) highly vulnerable, (3) moderately vulnerable and (4) food-secure.

4.2 HOUSEHOLD FOOD SECURITY AND VULNERABILITY PROFILES

4.2.1 FOOD SECURITY PROFILES

Table 4-1: Food security profiles

Food security profile	N (sample)	% in population (weighted)	Population estimate[49]	Ranking cut-off point	Short description
Food insecure	783	28	2,073,000	< 3.5	Poor or borderline food consumption and very weak food access; OR weak or very weak access and poor consumption.
Highly vulnerable to food insecurity	694	24	1,796,000	3.5–4.4	Food access and consumption profiles are borderline (weak to medium access and poor to borderline consumption).
Moderately vulnerable to food insecurity	693	26	1,951,000	4.5–.4	One of the two profiles is sub-optimal (weak access, borderline consumption) while the other component is better (medium access or fairly good consumption).
Food-secure	589	22	1,677,000	> 5.5	Fairly good to good food consumption and medium to good food access; includes those with good access but borderline consumption and those with good consumption but weak access.

The relatively high rate of food insecurity is not surprising given that 60 percent lived below the national poverty line in 2000 and 80 percent had less than US$2 per person per day PPP. The high rate of stunting among children under 5, estimated at 45 percent according to preliminary results of the DHS 2005, is further indicative of the high rate of food insecurity (although food insecurity is not the only cause of malnutrition). Nevertheless these results should interpreted cautiously, especially in terms of intervention planning, because of the timing of the study and the variability of the characteristics of the food-insecure.

First, the above figures include a potentially important fraction of the population affected by exceptionally poor climate and harvest conditions in the months prior to implementation of the CFSVA. The poor harvest in 2005/06 may have forced households to adopt poorer diet diversity practices than usual and may have affected their ability to access food. The food-insecure represent therefore a "worst case scenario" and it is likely that the number of chronic food-insecure is in fact lower. Among the food-insecure, 40 percent reported their diet practices to be "unusual", likely because of such external shock.

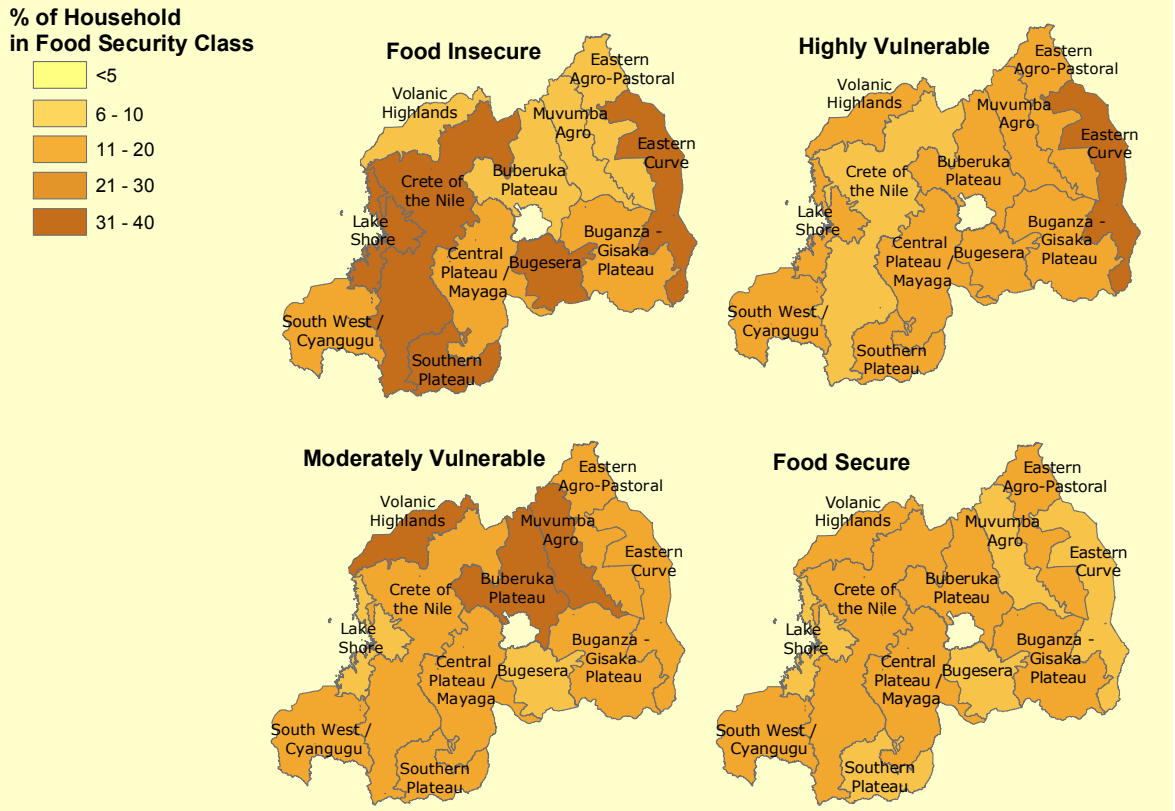
Second, the food-insecure are far from being a homogenous group in terms of characteristics such as livelihoods and in terms of needs and depth of food insecurity. What follows is a discussion of sub-categories among the food-insecure based on geographic, livelihood and vulnerability factors.

[49] Based on 2002 Census, excludes Kigali (not sampled).

4.2.2 GEOGRAPHIC DISTRIBUTION OF FOOD SECURITY AND VULNERABILITY PROFILES

The percentage of the population in each food security profile varies greatly geographically, as illustrated in Figure 4-2.

Figure 4-2: Food security profiles geographic distribution

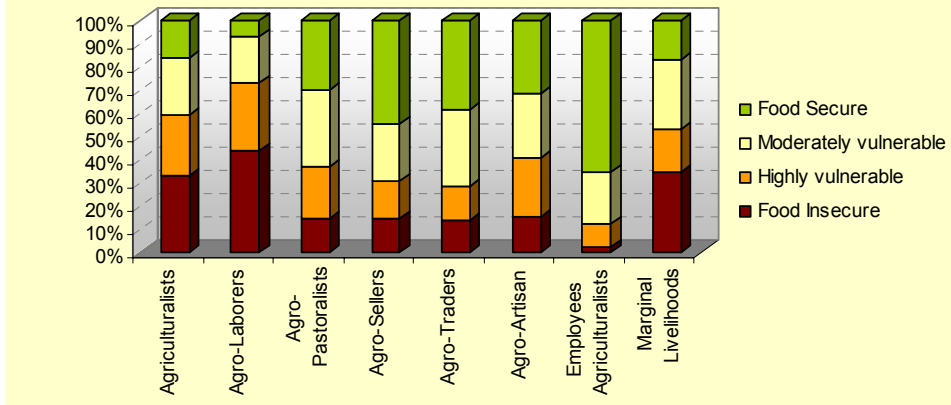


The zones with the highest proportion of food-insecure are the Bugesera (40 percent), the Crete of the Nile (37 percent), the Lake Shore (37 percent), the Southern Plateau (34 percent) and the Eastern Curve (33 percent).

4.2.3 FOOD SECURITY AMONG LIVELIHOOD GROUPS

Perhaps not surprisingly, food insecurity appeared to be correlated with the livelihood strategy adopted by the households. While food insecurity exists among every profile, agriculturalists with no alternative source of income and agro-labourers – whose work opportunities are related to on-farm employment – are among the most food-insecure, with respectively 33 percent and 44 percent of food-insecure in the population. Marginal livelihoods also had a high proportion of food insecure (34 percent). Agriculturalists, agro-labourers and marginal livelihoods must be considered priorities for food insecurity reduction strategies.

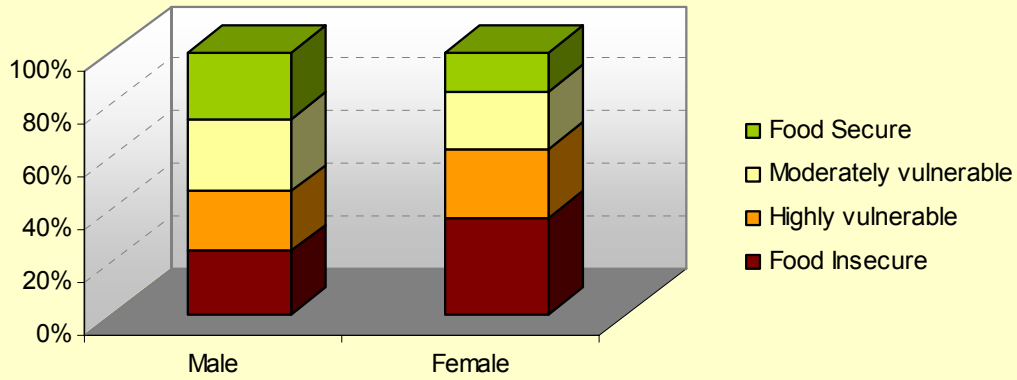
Figure 4-3 Food insecurity and livelihood profile



4.2.4 FOOD SECURITY AND VULNERABILITY FACTORS

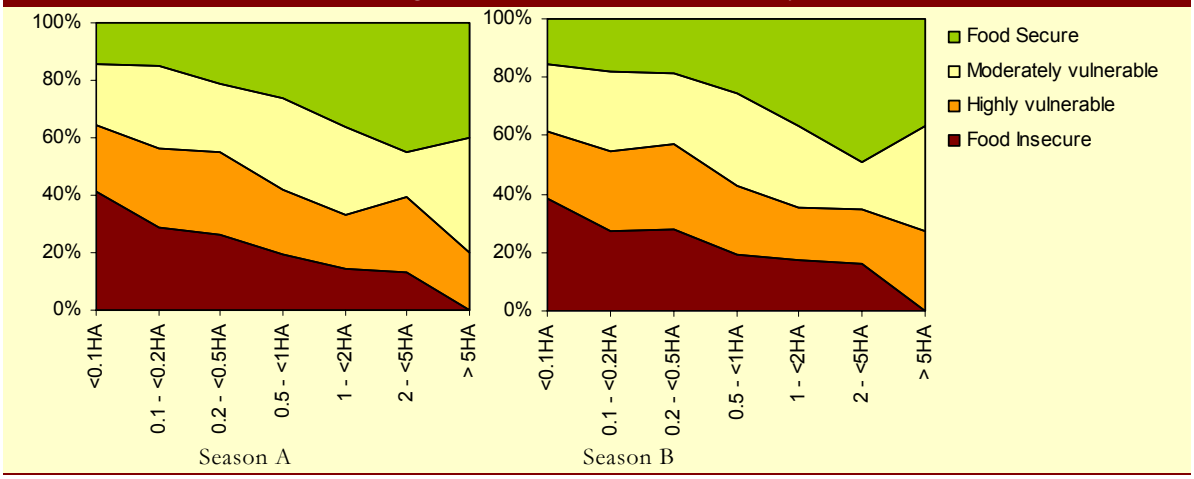
Definitions of vulnerable groups established by prior studies are especially helpful for distinguishing subgroups among the food-insecure. These studies identified among the most vulnerable groups households headed by women, plus widows and the land-poor, including the landless and those with poor-quality soils. The CFSVA data confirms the findings of the previous studies. Demographic and other economic factors were also found to be correlated with food security status. This section explores the relationship between food security and selected factors.

Figure 4-4: Gender of head of household and food insecurity



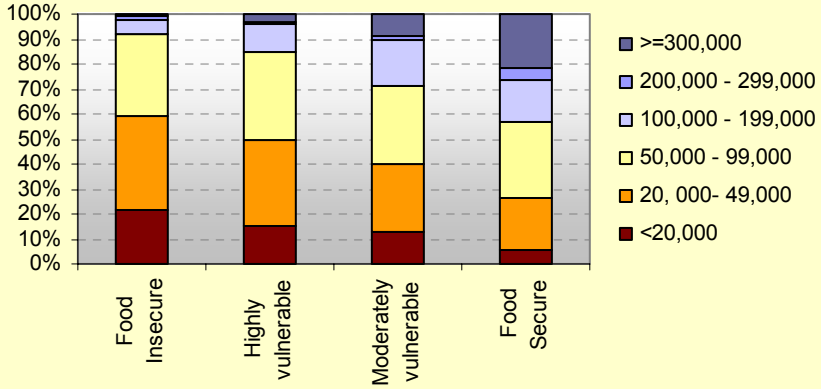
- **Household headed by women are more likely to be food-insecure than households headed by men.** Thirty-seven percent of the households headed by women were food-insecure, compared with 25 percent among households headed by men ($p < 0.01$).
- **Households headed by isolated (widowed, separated or divorced) people are more likely to be food-insecure than households headed by married people.** Thirty-seven percent of the households headed by a widow(er) and 35 percent of the households headed by a head living apart from his/her spouse were food-insecure, compared with 22 percent among households headed by a married person.
- **Larger households do not tend to be more frequently food-insecure.** The proportion of food-insecure was highest among households with one or three individuals (respectively 33 percent and 36 percent of food-insecure), compared with an average of 28 percent, but there was no clear linear pattern in the distribution of food insecurity across ages.
- **Households headed by an elderly person (> 65) are on average more frequently food-insecure.** Thirty-five percent of the households headed by an older person were food-insecure; compared with 27 percent among households headed by a younger adult.
- **Land size is an important factor in determining food insecurity.** Of those who cultivated less than 0.1 ha of land 41 percent were food-insecure, compared with 21 percent or less for those cultivating 0.5 ha or more.

Figure 4-5: Land access and food security



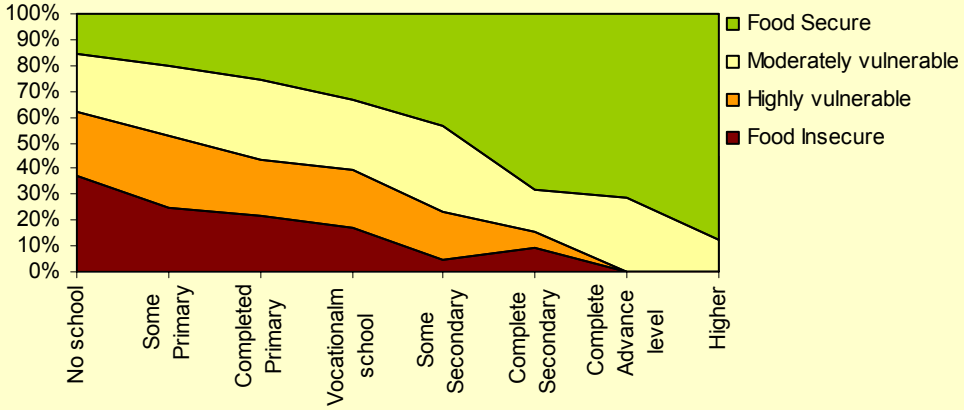
- **Poor income households are more likely to be food-insecure.** Over 90 percent of the food-insecure earned less than 100,000 RWF per year. Among the food-secure, fewer than 60 percent earned less than 100,000 RWF.

Figure 4-6: Income classes and food insecurity



- **Households with less educated and less literate heads tend to be more frequently food-insecure.** Among households headed by a person who could not read and write simple messages, 34 percent were food-insecure, compared with 21 percent among those headed by a literate person.

Figure 4-7: Education and food security status



4.2.5 SUMMARY OF HIGHLY FOOD-INSECURE GROUP

The following table of food-insecure subgroups was established based on the discussion above. It seeks to identify and provide estimates of the importance of each food-insecure subgroup in the population. Because the primary approach to targeting is geographic, food economy zones form the columns, while other criteria were used to define the subgroups.

The last column represents the total for all food economy zones and not just the five priority zones.

Table 4-2: Population in food-insecure subgroups (rounded '000)

	Priority food economy zones						Total priority FEZ	Total for Rwanda
	Eastern Curve	Bugesera	Crete of the Nile	Lake Shore	Central Plateau - Mayaga	Southern Plateau		
Total population[50]	84,000	230,500	1,947,500	390,000	1,135,000	422,500	4,209,000	7,497,235
Food insecure (all livelihoods)	28,000	92,000	725,500	145,000	314,000	144,500	1,449,500	2,073,000
Agriculturalists, food insecure	12,500	19,000	403,000	86,500	106,500	58,500	685,500	975,000
Agrolabourers, food insecure	12,500	46,000	163,000	44,500	115,000	55,500	436,500	651,000
Marginal livelihoods, food insecure	0	5,500	38,500	0	13,500	5,500	63,500	85,000
Households headed by women, food insecure	7,500	34,000	267,500	59,000	131,500	49,000	549,000	795,500
<0.1 ha in seasons A & B, food insecure	6,000	28,000	295,000	25,000	141,000	57,000	553,000	733,500
Households headed by elderly person, food insecure	0	11,000	130,500	21,500	43,000	24,500	230,500	330,500
Income poor (<50,000 RWF)	15,500	32,500	519,000	64,500	161,000	84,500	877,500	1,226,500
Food insecure and one vulnerability factor[51]	24,500	61,500	608,000	101,500	251,000	119,500	1,165,500	1,649,000
Food insecure and two vulnerability factors	7,000	25,000	379,500	49,500	141,000	66,500	668,500	931,500
Food insecure and three vulnerability factors	0	14,000	135,500	16,500	63,500	22,000	251,500	350,000
Food insecure and at least four vulnerability factors	0	3,000	18,000	2,500	17,500	5,500	46,500	71,000
Food insecure in priority livelihood with one vulnerability factor[52]	21,000	53,000	515,000	96,000	196,000	100,000	981,000	1,406,000
Food insecure in priority livelihood with two vulnerability factors	7,000	22,500	328,000	49,500	118,000	64,000	589,000	830,500
Food insecure in priority livelihood with three vulnerability factors	0	11,000	126,500	16,500	55,000	22,000	231,000	326,000
Food insecure in priority livelihood with at least four vulnerability factors	0	0	18,000	2,500	14,500	5,500	41,000	65,000

4.2.6 Food Security and HIV/AIDS

Like many African countries, Rwanda has been dramatically affected by the HIV/AIDS epidemic. An estimated 3.0 percent of adults (ages 15–49) were living with HIV/AIDS by the end of 2005.[53] In 2005, 210,000 children under 17 had lost their mothers, fathers or both parents to AIDS.

The CFSVA data were used to examine the impact of HIV/AIDS on food security in Rwanda. Due to the methodological and ethical challenges posed by HIV, proxies were used to identify infected people and affected households; mortality and morbidity indicators were therefore included in the survey. In particular, chronic illness (CI) was used as a proxy for HIV – but it is important to be aware of its many limitations because it can be subject to inclusive errors. The rationale for using chronic illness as a proxy is that if it means people cannot work (even if the illness is not due to HIV), it is still an important factor for vulnerability analysis. An affected household was defined as one where the death of a household member had occurred in the previous six months due to chronic illness or a household where a chronically ill person was present. The presence of orphans in the household was also studied.

[50] Based on sample universe of rural Rwanda, 2002 census data, excludes Kigali.
[51] The vulnerability factors are the gender of the head of the household (female), the age (elderly), land poverty (<0.1 ha in both seasons A and B) and income poverty (<50,000 RWF).
[52] The priority livelihoods are agriculturalists, agro-labourers and marginal livelihoods.
[53] DHS Rwanda, 2005.

Looking at the presence of chronically ill persons in the household, 22 percent of the sampled households reported having a member that had not been able to work in the previous three months. The causes were divided into four categories: short illness, disability, chronic illness (HIV, tuberculosis (TB) or cancer) and an "other" category. Only those who reported chronic illness (16 percent of those with a non-functioning member) were included as affected by HIV/AIDS.

Looking at mortality, the death of a family member during the previous six months was reported in 3 percent of the sampled households. Information about the age, sex and cause of death was collected for a maximum of three cases per household. Those households where at least one death occurred due to chronic illness, HIV and TB were included among the category of HIV-affected households.]

Overall, 4.5 percent of the sampled households were characterized as "affected households" either because of the presence of a chronically ill adult or because they experienced a death in the previous six months due to a chronic illness. This percentage seems to be a good proxy for HIV in Rwanda (although overestimated); the DHS yielded 3 percent as the national prevalence rate. However, the CFSVA data was undertaken in rural areas only. Because of the small sample size, food security categories were merged as follows to obtain sufficient sample size for the analysis:

- The "very weak" and "weak" categories in the access profiles were merged, resulting in three categories: weak, medium and good.
- For the consumption profiles, the "poor" and "borderline" categories were merged, resulting in three categories: poor, fairly good and good.
- For the food security categories, the "food insecure" and "highly vulnerable" were merged, again resulting in three categories shown in the table below.

The following table provides the distribution of households (frequencies) among the access, consumption and food security profiles by household status (affected versus not affected).

Table 4-3: Distribution of affected households by profiles

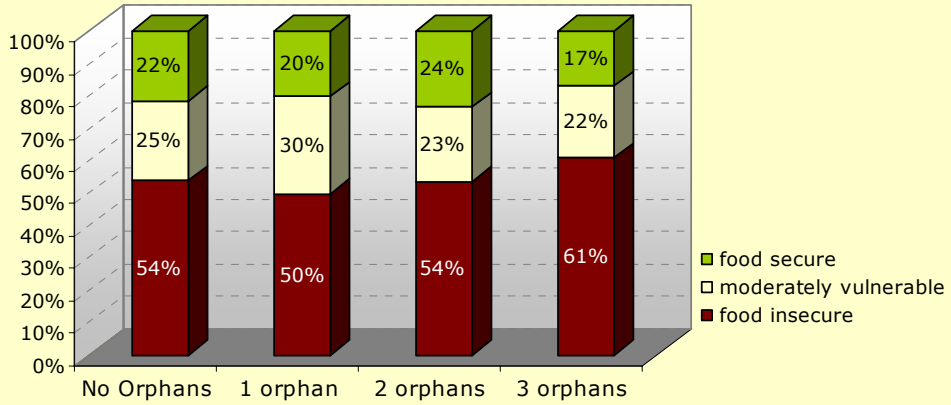
	Categories	Not affected (%)	Affected (%)
Food consumption profile	poor	50	55
	fairly good	35	31
	good	15	15
Food access profile	very weak	39	48
	weak	35	31
	medium/good	26	21
Food security profile	food-insecure	53	61
	moderately vulnerable	25	21
	food-secure	22	18

For the three profiles, the frequency of households among the worse-off categories above for each profile (food-insecure, very weak, poor) was higher among those affected compared with those not affected. Looking at the mean scores, however, showed no significant difference. The results must therefore be interpreted with caution and are at best indicative of a trend.

One way of analysing why affected households are possibly more prone to food insecurity is to look at the strategies they undertake in order to face the shock of a death or a illness. Not surprisingly, those chronically ill cannot work to their full potential. On average, a sick household head was unable to work for 7 days out of each month. Even where a sick head of household could work every day, in 23 percent of the cases she or he would work fewer hours than normal. Affected households therefore face a loss of labour force, yet they do not show higher expenses for hired labour compared with non-affected households, suggesting that the loss is not compensated by hiring external labourers. Given that affected household do not invest in hiring labour and their labour force decreases as those who are sick work less, we would expect to see effects on production. A shift towards less labour-intensive crops and tubers (e.g. cassava, sweet potatoes) would be expected but is not supported by the CFSVA data.

The impact of HIV and AIDS on financial and physical capital is notable. Looking at the expenses, 6.7 percent of the affected households had to sell assets to pay for medicines or for a funeral while only 3.1 percent of the non-affected households had to do so. When disaggregating productive and non-productive asset types, 62.5 percent of households sell productive assets and 25 percent sell non-productive assets. In addition, 40 percent of the affected households had to borrow money for the same reasons. Looking at orphans, the CFSVA data did not show that households caring for orphans were more food-insecure than those that did not. Of households hosting three or more orphans, 61 percent were food-insecure, more than those hosting no orphans (54 percent), 1 orphan (50 percent) and 2 orphans (54 percent).

Figure 4-8: Orphan care and food security status



4.2.7 Multivariate analysis of factors correlated with food security

General linear model (GLM) analysis was performed on the CFSVA data to better understand the causes of food insecurity in Rwanda. It should be emphasized that the analysis does not prove the causality of the relation between selected factors and the food security status, but rather the existence of a correlation. The dependent variable for the analysis was the food security score, while a set of independent variables were chosen on the basis of the sustainable livelihood approach, including livelihood strategies, human capital assets indicators, financial capital assets indicators, physical assets indicators and risk exposure indicators.

The analysis followed several steps. The main ones were:

1. Recoding and computing for analysis some of the variables selected:
   - In addition to the "age of household head", the squared value of the same was computed and included in the regression.
   - A variable called "sexhhhea" was computed as follows: the health status of a household was lumped together with the sex of the household head so that four categories were obtained: "affected household headed by a woman"; "affected household headed by a man"; "non-affected household headed by a woman" and "non-affected household headed by a man".
   - A wealth index was computed using principal component analysis (PCA). Following Filmer and Pritchett methodology, the following variables were used in the PCA: type of floor; type of ceiling; cooking fuel; electricity; number of rooms per household; type of toilet; source of water; source of light; assets owned and the first component of three extracted (using rotated varimax) was saved as the new wealth index variable. The wealth index variable was subsequently divided into quintiles.
   - A new "land" variable was computed lumping together two variables: "Does the household farm land (s31)" and "Land area cultivated" (s31b). All the households answering "No" at s31 were recoded as "no land" in the new variable while for those that answered "Yes", the code corresponding to the area of land farmed was reported. All the households having a value of 9 (missing value) were recoded with the most frequent category (0.2-0.49 ha).

2. To explore multicollinearity, principal component analysis (PCA) using rotated factors (varimax) was undertaken on all the independent variables so that highly correlated ones were eliminated.
3. Once the variables were explored and were ready for analysis, several models were tried. First, a model including the "sexhhhea" variable was run but it was subsequently decided to disaggregate it into the three original variables to better understand what the effect of "wealth" was on each of them.
   - Disaggregating sexhhhea into "sex of household head", "chronically ill (CI) members", "deaths occurred in the household", "sex of household head" is not significant but CI is significant even when controlling for wealth. Wealth seems to be a stronger predictor of food insecurity than sex of household head.
   - Shocks were not significant and were omitted from the analysis.

The model is reported below and suggests that in Rwanda:

Livelihood groups, food economy zones and wealth quintiles explain the biggest part of the variation in food security. In particular: Agro-labourers are worse off than those with marginal livelihoods; agriculturalists are also worse off than those with marginal livelihood but are better off than agro-labourers. The highest food security scores are those in the South–West–Cyangugu. The regression results suggest that Bugesera, Lake Shore, Crete of the Nile and Eastern Curve are the most food-insecure areas in Rwanda.

1. **Dependency ratio was a significant variable for predicting food security**. The negative coefficient confirms the thesis that within a household, the higher the number of dependents compared with active members, the more food-insecure the household is likely to be.
2. **When the head of the household is literate, the household is more likely to have a higher level of food security.** Literacy of the head of the household is not significant after adjusting for the other variables, but the value of .52 as described in the bivariate analysis still renders it interesting for comments.
3. **Land ownership is significantly correlated with food security status.** The more land farmed by the household, the more food-secure the household.
4. **Ownership of a vegetable plot or a banana tree is correlated with food security**. Households owning those assets are more likely to be better off than those without.
5. **Households with access to credit have a better food security status than those without**. Although "access to credit" is correlated with wealth, the link is not that strong (.242) and the degree of access can give us some indication of food security dynamics in Rwanda.
6. **Households with a chronically ill member are more likely to have a lower food security score** after adjusting for all the variables included in the model.

4.2.8 External shocks and coping strategies

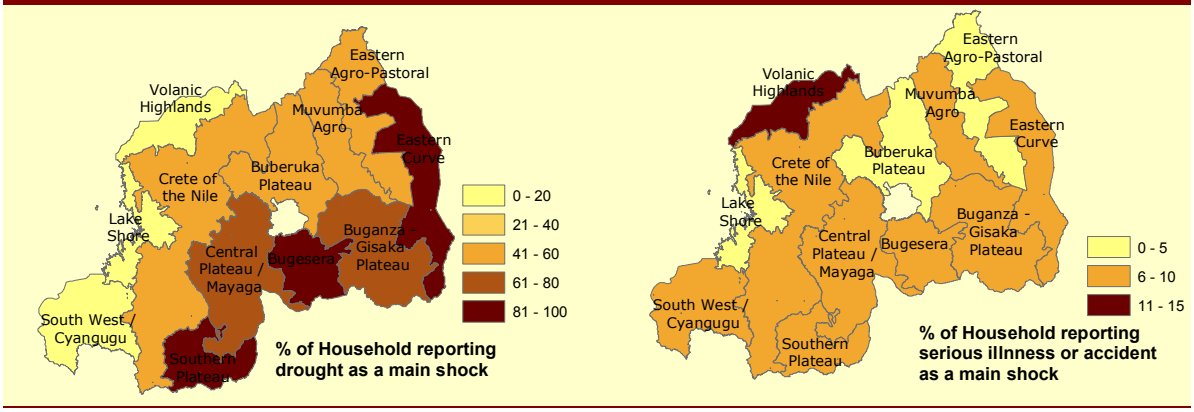
As outlined in the definition provided in Part 1:1, vulnerability to food insecurity is in part a function of risk of exposure to external shock and risk management (coping mechanisms). Information on shock exposure was collected from households that experienced an unusual situation during the year prior to the survey that affected the household's ability to provide for itself or eat in the manner to which it was accustomed, or what the household owned. A distinction was made between covariate shocks (affecting all the households in a given area, such as drought) and idiosyncratic shocks (affecting only selected households in a given area, such as disease). Before discussing the results it is important to note that these are *perceived* exposure. What one household may perceive as a shock is not necessarily perceived as such by another. Underreporting is likely to happen where shocks occur on a regular basis.

Table 4-4: Reported shock exposure (all, covariate and idiosyncratic shocks)

Food economy zone	ALL (%)	COV (%)	IDIO (%)	Livelihood group	ALL (%)	COV (%)	IDIO (%)
Eastern Agropastoral	69	62	24	Agriculturalists	65	54	28
Muvumba Agro	58	50	20	Agro-Labourers	76	59	38
Eastern Curve	90	88	6	Agropastoralists	73	63	27
Buganza-Gisaka Plateau	83	81	21	Agro-Sellers	47	33	23
Bugesera	92	87	27	Agro-Traders	57	46	26
Buberuka Plateau	61	54	20	Agro-Artisan	66	55	30
Crete of the Nile	65	52	35	Employees agriculturalists	45	39	12
Volcanic Highlands	59	25	44	Marginal livelihoods	50	28	29
Lake Shore	32	16	22				
Central Plateau - Mayaga	79	74	25				
Southern Plateau	90	85	31				
South West - Cyangugu	36	11	32	ALL	66	54	29

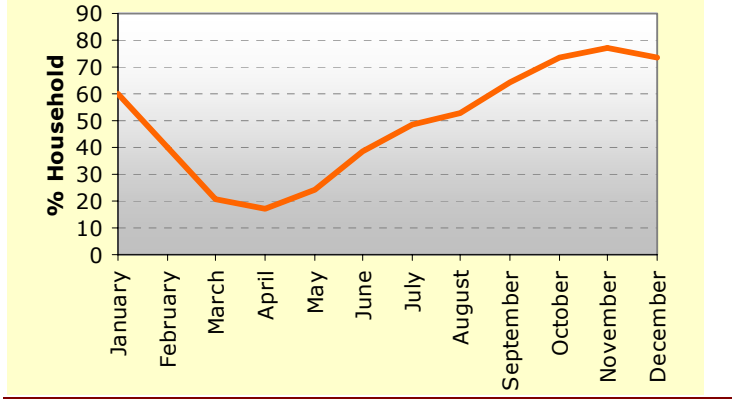
Overall, 66 percent of the households reported exposure to a shock that affected the household's ability to provide for itself or eat in the manner to which they were accustomed, or what the household owned. A higher proportion reported exposure to covariate shocks (54 percent) compared with idiosyncratic shocks (29 percent). Geographic disparities existed, with shocks being more frequently reported in the Eastern Curve (90 percent), Bugesera (92 percent) and Southern Plateau (90 percent), three of the five zones with very high prevalence of food insecurity and vulnerability. Those zones further correspond to zones with higher rates of reported covariate shock. Idiosyncratic shocks were reported especially frequently in the Volcanic Highlands (44 percent).

Figure 4-9: Geographic distribution of main shocks



Among covariate shocks, drought was the most frequently reported shock (51 percent) overall, while other covariate shocks were reported by few households, including floods (1 percent) and landslides (2 percent). Although rainfall pattern in Rwanda follows a bimodal distribution, report of drought shock exposure over time (recall period of one year) showed a unimodal distribution, with the main drought-sensitive period being October/November; 80 percent of the households that reported drought as the main shock mentioned those months as the months they were affected. Drought was associated systematically with a decrease in sufficient food to eat (95 percent) and decrease of income (96 percent). Decrease or loss of assets was associated with drought for 63 percent of the households that reported that shock as their main problem.

Figure 4-10: Monthly drought shock report

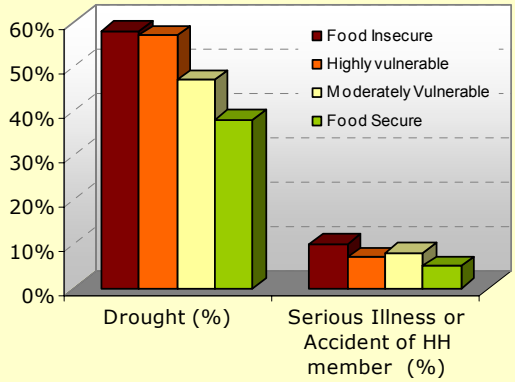


The main coping mechanisms for drought affected food consumption: relying on less-preferred foods (23 percent), reducing the size (12 percent) or the number (11 percent) of meals. Alternative work opportunities were also sought and included work in exchange for food only (10 percent). Sale of assets was limited, except sale of livestock (small animals), reported by 8 percent of the households. Although the coping mechanisms used varied across food economy zones and livelihood groups, no specific pattern emerged. Only 9 percent of affected households responded that they recovered from the shock and 30 percent recovered partially. Recovery was lowest in the Eastern Curve, Bugesera and Southern Plateau, likely due to the higher intensity of the shock in those areas. Recovery was least frequently reported among agriculturalists, agro-labourers and marginal livelihoods.

Among idiosyncratic shocks, health-related shocks, including serious illness or accident, was the most frequently reported, albeit only by 7 percent of all households. Not surprisingly, reports of idiosyncratic shocks did not show any pattern over time. The impact was very noticeable, however: among households that reported health-related shock as their main shock, 99 percent associated it with a loss of income and 97 percent with a decrease in the ability to get enough food to eat. The shock was associated with a loss of assets by 77 percent of the households, more than in the case of drought (63 percent). The coping mechanisms used by affected household reflected more frequent impact on assets; the main coping mechanisms were the sale of small animals (16 percent), spending savings (10 percent), borrowing food (8 percent) or money (9 percent) and selling land (9 percent). A larger proportion of households recovered from health-related shocks compared with drought, although it remained low in absolute percentage terms: 18 percent reported that they recovered and 33 percent reported having "partially recovered".

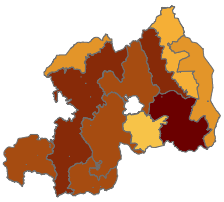
The CFSVA further suggests a correlation between exposure to shock and food security status. Of the food insecure 58 percent reported having experienced drought, compared with 38 percent of the food-secure. Serious illness or accident was reported by 10 percent of the food-insecure compared with 5 percent of the food-secure. The data should be interpreted with caution. It is possible that food-insecure households reported exposure to shocks more frequently not because they are actually exposed to shocks more frequently, but because their lower ability to cope with shocks makes them more vulnerable to them.

Figure 4-11: Exposure to shocks and food security status



4.3 LIVELIHOOD FOOD SECURITY AND VULNERABILITY SUMMARY PROFILES

Agriculturalists – 38 percent



Food security profile

Food insecure	Highly vulnerable	Moderately vulnerable	Food-secure
33%	26%	25%	16%

Food access profile

Very weak	Weak	Medium	Good
41%	34%	22%	3%

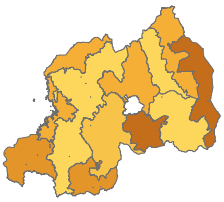
Food consumption profile

Poor	Borderline	Fairly good	Good
17%	43%	33%	7%

Overview

Agriculturalists are among the five livelihood groups with the highest proportion of food-insecure households. Among the characteristics of the group are the average low income and dependency on agriculture as the sole source of income. Household heads are on average older, less educated and less literate than for other groups. Although agriculturalists depend heavily on agriculture for sustaining their livelihoods, their access to land is limited. They tend to use fertilizers (natural and chemical) less frequently than other groups. Lack of skills and limited access to land likely contribute to their higher level of food insecurity. Although agriculturalists did not report exposure to shocks more frequently than other groups, they were less likely to report that the household had recovered from a shock like a drought, possibly because of the lower ability to use coping mechanism due to overall poverty.

Agro-labourers – 22 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	food-secure
44%	29%	20%	7%

Food access profile

Very weak	Weak	Medium	Good
55%	31%	13%	1%

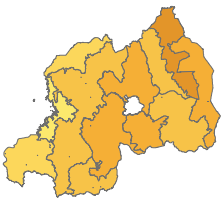
Food consumption profile

Poor	Borderline	Fairly good	Good
20%	43%	30%	7%

Overview

Like agriculturalists, agro-labourer households have low income and are more likely headed by a less-educated person, and are frequently headed by a woman. They complement their income with daily labour activity. Labour activity follows a seasonal pattern and is associated with low-skill farm work. They have the lowest level of access to land, which likely explains their use of day labour to sustain their livelihoods. As with agriculturalists, lack of skills (e.g. to generate alternative income and increase productivity) and limited access to land are likely the main constraints for agro-labourers.

Agropastoralists – 17 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	food-secure
14%	23%	33%	30%

Food access profile

Very weak	Weak	Medium	Good
29%	35%	29%	7%

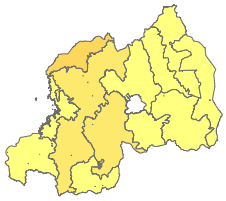
Food consumption profile

Poor	Borderline	Fairly good	Good
6%	31%	43%	20%

Overview

Agropastoralists can be considered to be food-secure as a group. Few households have poor consumption although access remains a problem. Agropastoralists more frequently own cows, chicken and pigs compared with other groups. Average educational achievement among heads of households remains low.

Agro-sellers – 5 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	food-secure
15%	16%	25%	45%

Food access profile

Very weak	Weak	Medium	Good
22%	30%	40%	9%

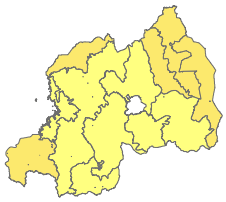
Food consumption profile

Poor	Borderline	Fairly good	Good
3%	33%	40%	25%

Overview

Agro-sellers are among the most food-secure group. They depend on petty trade activity and agriculture; their total estimated monthly income is the second highest. They can be seen as agriculturalists who are educated and well off (e.g. access to more land), with additional income from their commercial activity.

Agro-traders – 5 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	food-secure
14%	15%	33%	39%

Food access profile

Very weak	Weak	Medium	Good
22%	42%	28%	8%

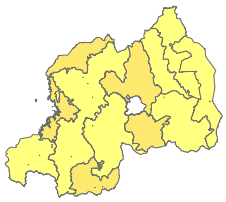
Food consumption profile

Poor	Borderline	Fairly good	Good
9%	29%	39%	23%

Overview

Like agro-sellers and agro-artisans, agro-traders can be seen as somewhat specialized agriculturalists that generate additional income from off-farm activities. In the case of agro-traders the activity is that of intermediaries in the trade of agricultural goods. Like the two other groups, agro-traders have higher education achievement than agriculturalists and agro-labourers, which possibly explains their access to economic opportunities. They also have access to more land on average. As a result, agro-traders are more frequently food-secure than agriculturalists and agropastoralists.

Agro-artisans – 5 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	Food-secure
16%	25%	28%	31%

Food access profile

Very weak	Weak	Medium	Good
30%	48%	19%	3%

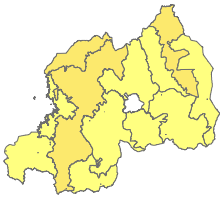
Food consumption profile

Poor	Borderline	Fairly good	Good
6%	29%	39%	26%

Overview

Like agro-sellers and traders, agro-artisans are on average a relatively food-secure group, likely because of the additional income they generate through artisan activities. Among the three groups, agro-artisans have on average the lowest income, but it is still roughly twice as much as the income of agriculturalists.

Employee agriculturalists – 4 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	Food-secure
2%	10%	22%	66%

Food access profile

Very weak	Weak	Medium	Good
9%	32%	37%	22%

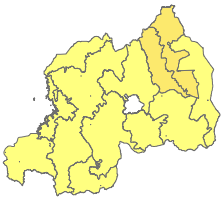
Food consumption profile

Poor	Borderline	Fairly good	Good
2%	11%	34%	53%

Overview

Employee agriculturalists are the most food-secure. They have high average incomes from wages/salary, especially public services. Agriculture contributes to the income in a marginal way. Not surprisingly, they are on average highly educated.

Marginal livelihoods – 3 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	Food-secure
34%	19%	30%	17%

Food access profile

Very weak	Weak	Medium	Good
44%	27%	24%	4%

Food consumption profile

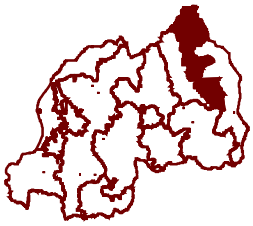
Poor	Borderline	Fairly good	Good
20%	40%	24%	16%

Overview

Households characterized by marginal livelihoods depend on aid and/or hunting gathering and/or money transfer and unspecified activities. They share similar characteristics with agriculturalists and agro-labourers, including low education achievement (the marginal livelihoods group has the lowest proportion of literate household heads), the highest frequency of households headed by a woman, the lowest income and lowest access to land. School enrolment is the lowest among children of this group, especially for girls, but is still above 70 percent. The marginal livelihood group is the one with the highest proportion of food-insecure people, which is more frequently associated with a very weak access profile. Like agriculturalists, the marginal livelihood households appeared to be less likely to recover from a shock.

4.4 GEOGRAPHIC FOOD SECURITY AND VULNERABILITY SUMMARY PROFILES

Eastern Agropastoral – 4 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	Food-secure
20%	24%	27%	29%

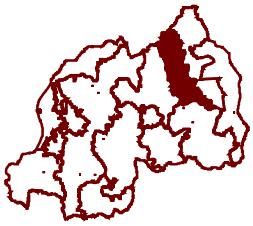
Food access profile

Very weak	Weak	Medium	Good
41%	30%	26%	4%

Food consumption profile

Poor	Borderline	Fairly good	Good
6%	35%	36%	23%

Muvumba Agro – 5 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	Food-secure
14%	29%	37%	20%

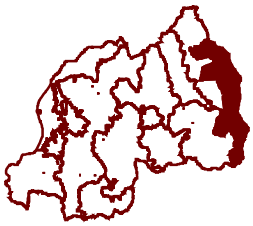
Food access profile

Very weak	Weak	Medium	Good
24%	43%	26%	8%

Food consumption profile

Poor	Borderline	Fairly good	Good
5%	44%	38%	13%

Eastern Curve – 4 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	Food-secure
33%	33%	20%	13%

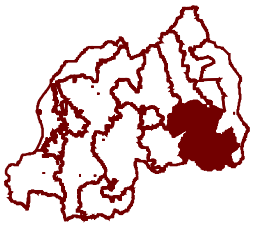
Food access profile

Very weak	Weak	Medium	Good
53%	33%	10%	3%

Food consumption profile

Poor	Borderline	Fairly good	Good
19%	30%	35%	16%

Buganza – Gisaka Plateau – 8 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	Food-secure
25%	21%	27%	27%

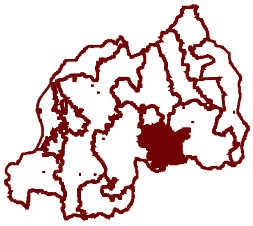
Food access profile

Very weak	Weak	Medium	Good
37%	39%	20%	4%

Food consumption profile

Poor	Borderline	Fairly good	Good
11%	27%	41%	21%

Bugesera – 7 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	Food-secure
40%	22%	19%	19%

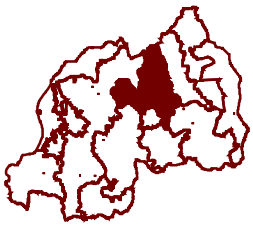
Food access profile

Very weak	Weak	Medium	Good
58%	28%	11%	4%

Food consumption profile

Poor	Borderline	Fairly good	Good
19%	29%	35%	17%

Buberuka Plateau – 8 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	Food-secure
16%	25%	34%	25%

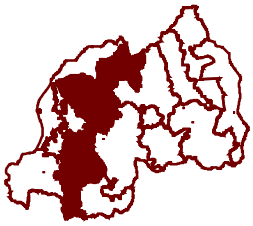
Food access profile

Very weak	Weak	Medium	Good
29%	34%	29%	7%

Food consumption profile

Poor	Borderline	Fairly good	Good
11%	39%	32%	18%

Crete of the Nile – 14 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	Food-secure
37%	20%	22%	22%

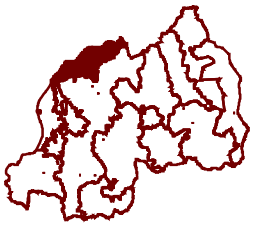
Food access profile

Very weak	Weak	Medium	Good
41%	27%	26%	6%

Food consumption profile

Poor	Borderline	Fairly good	Good
20%	41%	30%	9%

Volcanic Highlands – 14 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	Food-secure
18%	25%	31%	26%

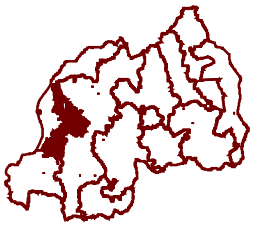
Food access profile

Very weak	Weak	Medium	Good
22%	40%	32%	6%

Food consumption profile

Poor	Borderline	Fairly good	Good
11%	37%	40%	13%

Lake Shore – 15 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	Food-secure
37%	30%	20%	13%

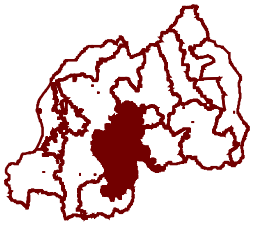
Food access profile

Very weak	Weak	Medium	Good
46%	35%	17%	2%

Food consumption profile

Poor	Borderline	Fairly good	Good
19%	46%	25%	10%

Central Plateau / Mayaga – 8 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	Food-secure
28%	25%	26%	21%

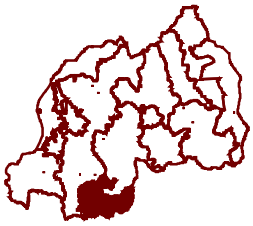
Food access profile

Very weak	Weak	Medium	Good
43%	35%	19%	3%

Food consumption profile

Poor	Borderline	Fairly good	Good
11%	34%	39%	16%

Southern Plateau – 8 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	Food-secure
34%	27%	22%	17%

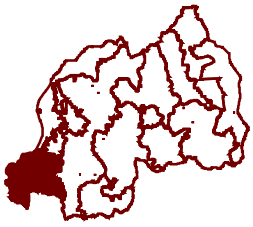
Food access profile

Very weak	Weak	Medium	Good
49%	32%	19%	1%

Food consumption profile

Poor	Borderline	Fairly good	Good
15%	32%	36%	17%

South West / Cyangugu – 10 percent



Food security profile

Food-insecure	Highly vulnerable	Moderately vulnerable	Food-secure
22%	26%	25%	27%

Food access profile

Very weak	Weak	Medium	Good
35%	40%	20%	5%

Food consumption profile

Poor	Borderline	Fairly good	Good
12%	32%	38%	18%

5. FOOD UTILIZATION AND NUTRITIONAL STATUS

5.1 NUTRITIONAL STATUS OF CHILDREN

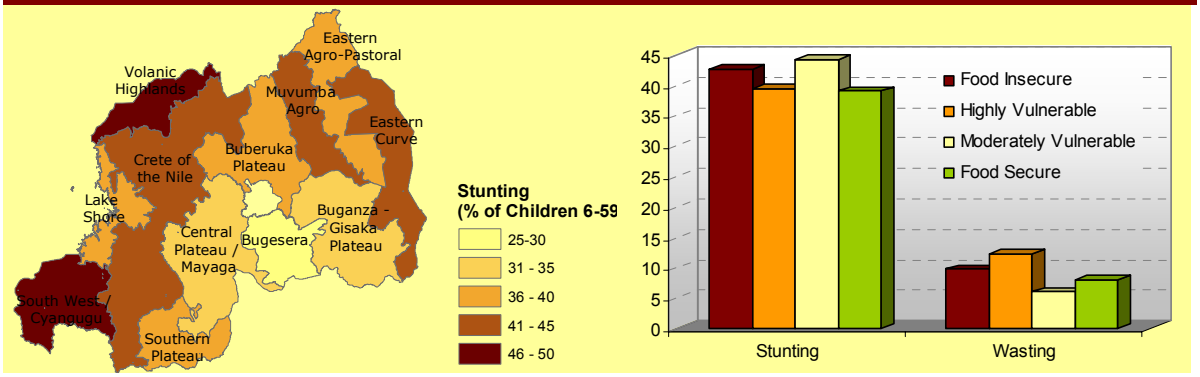
In the last part of the interview, children were measured for weight and height. Data were taken from 2,059 children; however, not all teams were equipped with a correct weighing scale, which reduced the number of valid measurements and therefore the sample size for that component. It should be noted that the sampling procedure does not ensure proper representative results at the food economy zones level (see Part 1:3, "Limitations of the study", for a more detailed discussion). The figures below are provided simply as an indication of trends in malnutrition and of the correlation with food insecurity. Three standard indicators are used:

- Height by age (stunting): Height by age is a measure of linear growth and as such an indicator of long-term effects of undernutrition not affected by seasonal changes. Stunting was computed for 1,540 children.
- Height by weight (wasting): Height by weight is an indication of the current nutritional status of a child and reflects recent nutritional intake and/or episode of illness. Severe wasting is often linked to acute food shortage. Wasting was computed for 975 children.
- Weight by age (underweight): Weight by age combines information from stunting and wasting. Children can be underweight because they are stunted, wasted or both. Underweight was computed for 779 children.

The status of children was measured and compared with a standard population using the nutrition module of EpiInfo. Standard World Health Organization (WHO) cut-off points were used to differentiate between categories. Children below more than two standard deviation (-2 s.d.) were considered stunted, wasted or underweight. Children below more than three standard deviation (-3 s.d.) were considered severely stunted, wasted or underweight.

Results from the 2001 EICV indicate a prevalence of stunting of 45 percent among young children 3 to 59 months old (47 percent among boys, 43 percent among girls). Severe stunting was also high, at 20 percent. The CFSVA suggest similar trend, with stunting estimated at 41 percent (22 percent severe). The preliminary results of the 2005 DHS show values within the same range. The following figure presents an indicative (i.e. not statistically representative) geographic distribution of stunting.

Figure 5-1: Malnutrition across FEZ and food security profiles



Severe stunting was most frequent among agriculturalists, agro-labourers and marginal livelihoods. The rate of wasting was found to be very high, at 9 percent (4 percent severe wasting) and was especially critical in the Bugesera (16 percent) and the Southern Plateau (12 percent).

The relation between food security status and malnutrition is not clearly marked, possibly as a result of the poor statistical power resulting from limited data collection of anthropometric data; other factors such as health contribute to malnutrition.

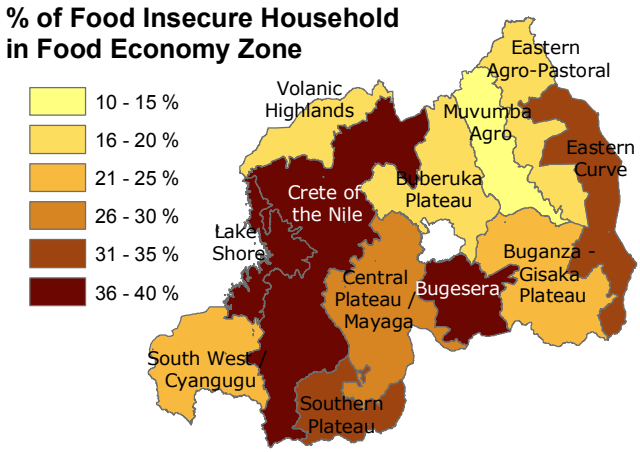
Part 4: Recommendations for programme interventions

1. Conclusion

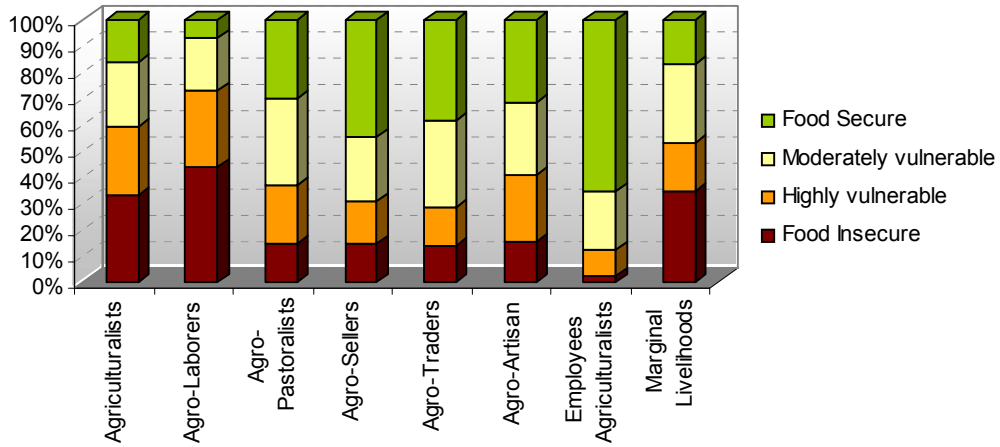
1.1 Priority areas and causes of food insecurity and vulnerability

The high proportion of food-insecure (28 percent) is consistent with the existing estimates of food poverty and malnutrition. However, "food-insecure" is a very heterogeneous group, spreading across all livelihood profiles and all geographic areas. Subgroups facing more acute problems of food insecurity were identified. In addition, the poor harvest prior to the survey is likely to have worsened the food security situation of a significant number of households. About 66 percent of the households found to be food-insecure described their situation as unusual, likely an indication of the important seasonal/transient aspect of food insecurity.

Geographically, while food insecurity is found across all food economy zones, the zones with the highest proportion of food-insecure are the Bugesera (40 percent, standard error 0.114), the Crete of the Nile (37 percent, standard error 0.105), the Lake Shore (37 percent, standard error 0.099), the Eastern Curve (34 percent, standard error 0.135) and the Southern Plateau (34 percent, standard error 0.111). Because of its high population, the Central Plateau with 28 percent of food-insecure was also identified as critical. Roughly 70 percent of the food-insecure live in those six zones.



Similarly, food insecurity was present among all livelihood groups, but some groups were more prone to food insecurity on average, including agriculturalists with no alternative source of income (33 percent, standard error 0.124) and agro-labourers (43 percent, standard error 0.127), whose work opportunities are related to on-farm employment. The marginal livelihoods group also had a high proportion of food insecure (34 percent, coefficient B = 0). Over 83 percent of the total number of food-insecure fell within those three livelihood profiles.



Overall, 57 percent of the food-insecure lived in one of the six food economy zones listed above *and* belonged to one of the three livelihood profiles most prone to food insecurity. They represent 16 percent of the total population of Rwanda (excluding Kigali).

Demographic and other economic factors found to be correlated with food security status were:

- **Households headed by women are more likely to be food-insecure than male headed households.** Thirty-seven percentage of the households headed by women were food-insecure, compared with 25 percent among of households headed by men ($p < 0.01$).
- **Households headed by isolated (widow, separated and divorced) people are more likely to be food-insecure than households headed by married people.** Thirty-seven percent (37 percent) of the households headed by a widow(er) and 35 percent of the households headed by a person living apart from his/her spouse were food-insecure, compared with 22 percent among households headed by a married person.
- **Larger households do not tend to be more frequently food-insecure**. The proportion of food-insecure was highest among households with one or three individuals (respectively 33 percent and 36 percent of food-insecure), compared with an average of 28 percent; there was no clear linear pattern in the distribution of food insecurity across ages.
- **Households headed by an elderly person (over 65) are on average more frequently food-insecure.** Thirty-five percent of households headed by an elderly person were food-insecure, compared with 27 percent among households headed by a younger adult.
- **Land size is an important factor in determining food insecurity.** Forty-one percent of those who cultivated less than 0.1 ha were food-insecure, compared with 21 percent or less for those cultivating 0.5 ha or more.
- **Poor income households are more likely to be food-insecure.** Over 90 percent of the food-insecure households earned less than 100,000 RWF per year. Among the food-secure it was less than 60 percent.
- **Households headed by less-educated and less-literate people tend to be more frequently food-insecure**. Among households headed by a person who could not read and write simple messages, 34 percent were food-insecure, compared with 21 percent among those with a literate head.

Using proxy indicators, HIV/AIDS was found to impact workforce availability and the physical and financial assets of affected households. While the difference was not significant, affected households more frequently belonged to the groups worst off for the consumption, access and food security profiles.

Critical to those households are recurrent exposure to shock, limited access to land, generally low level of skill (including on-farm practices) and education, and limited access

to economic opportunity. Exposure to shocks, especially covariate shock like drought, was higher among food-insecure households and they had more difficulty recovering from shocks.

1.2 Current food aid and non-food aid interventions

The World Food Programme in Rwanda carries out two main activities: the protracted relief and recovery operation (PRRO) and the country programme. The PRRO provides for the food needs of refugees and returnees and supports the most vulnerable population. Appropriate nutritional interventions are also provided through Ministry of Health clinics for women, young children and people living with HIV/AIDS. Livelihood support to protect and build productive community assets is implemented through the food-for-assets (work and training) activities. The relief provisions of the PRRO are utilized only when required in the event of a large shock, such as a significant crop failure, or substantial refugee movements caused by unrest in the region. The country programme has two components: the school feeding programme implemented with MINEDUC and support to people living with HIV/AIDS and families affected by HIV/AIDS, in collaboration with both local and international NGOs.

2. Recommendations

2.1 Food interventions by priority area and priority group

Two main food intervention strategies are recommended for Rwanda: (1) emergency food assistance and (2) the establishment of a food safety net. Emergency food assistance is needed for:

groups that were not specifically assessed by the CFSVA but that that are clearly food-insecure and face malnutrition, including the refugees and displaced people, under/malnourished individuals in therapeutic and supplementary feeding programmes, prevention of mother-to-child transmission and anti-retroviral therapy, pregnant women and mothers with children under 5; and

1) crisis situations that follow unusual exposure to external shocks, especially drought, which was identified as the main shock and the ability to respond to the shock was correlated with food security status; even when food is available on the market, agriculturalists and agro-labourers do not have the ability to access food it because of their limited resources; exposure to drought is therefore likely to affect their food intake and resource base (i.e. lead to sale of assets); a food security monitoring system is needed to identify the onset of a crisis and appropriately target food distribution based on food emergency needs assessments.

While there is no clear pattern of chronic food deficit in Rwanda at the macro level, a food safety net is needed in Rwanda to prevent the onset of large scale crises and improve the asset base and access to food of vulnerable households. Food-based intervention should be carefully planned and monitored to avoid negative impact on emerging markets.

Bugesera and the Eastern Curve, and to a lesser extent the Southern Plateau and the Central Plateau, face exposure to recurrent shocks in addition to overall limited physical and economic access to food. There, food-based interventions have a role to play and could include food-for-work (FFW) and food-for-asset creation programmes to improve community infrastructure (health centres, schools, water and sanitation facilities). Cash for work could also be developed where markets function well. Food-for-training (FFT) should be prioritized and include agricultural and livestock training as well as livelihood improvement through vocational training.

In the Lake Shore and Crete of the Nile areas, economic access to food seems to be the major constraint faced by food-insecure households, along with limited access to land and poor agricultural practices, possibly contributing to low productivity and environmental damages. Arguably, the role of food aid in those areas should be more limited; generating income and/or cash transfer interventions, along with building skills, should be prioritized.

2.2 NON-FOOD INTERVENTIONS BY PRIORITY AREA AND PRIORITY GROUP

The general poverty reduction framework developed by the Government of Rwanda, including broad economic development, microcredit and strengthening the health and education sectors, will without doubt contribute to improving food security and need not be enumerated here. What follows are remarks and recommendations suggested by analysis of the CFSVA data.

- Land access was found to be correlated with food security. The implementation of the new land law will have a significant impact on land distribution in Rwanda and must be carefully monitored to avoid a food security crisis if an increasing number of farmers become land-poor. This is especially critical for agriculturalists and agro-labourers, who already have limited access to land and whose limited resources (e.g. income) lead to a higher risk of losing land (e.g. through sale of land as a coping mechanism).
- The education level of the head of the household was found to be strongly correlated with the food security status of that household. Education has been widely supported by the Government of Rwanda through free education for primary and the first three years of secondary school. This very promising initiative needs to be complemented by:
  - education and skill-building opportunities for adults. Agriculturalists and agro-labourers – especially those who are food-insecure – have low skills which reduce their access to economic opportunities and possibly undermine their on-farm use of improved practices to increase productivity and reduce soil erosion and loss of fertility. Agriculturalists who depend solely on agricultural production to sustain their livelihoods were found to use fertilizers (natural and chemical) less frequently.
  - increased school attendance. Agriculturalists, agro-labourers and marginal livelihoods groups had the lowest level of school attendance, especially among girls. Geographically, the Lake Shore and South West/Cyangugu zones had the lowest attendance levels. The reasons for missing school, and possible interventions, need to be investigated.
- The Crete of the Nile, Lake Shore and Buganza-Gisaka Plateau food economy zones have the highest percentage of agriculturalists among their population (about 50 percent). This is a possible indication of the lack of economic opportunities and alternative sources of income for agricultural households. Income-generating activities, cash transfer and micro-credit should be supported to diversify livelihood strategies.