Comprehensive Food Security and Vulnerability Analysis

Tanzania 2012





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The findings presented in this reported are based on National Panel Survey data collected during the periods of October 2008-September 2009 and October 2010-September 2011.

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Foreword

The purpose of this report is to provide a general overview of Tanzania's food security situation in recent years. It aims to form an information base to support decision making and policy design with respect to food security. This report follows the Comprehensive Food Security Vulnerability Analysis (CFSVA) undertaken in coordination with the government of Tanzania in 2010.

The report focuses primarily on data generated by the Tanzania National Panel Survey (NPS) conducted as part of the World Bank Living Standards Measurement Survey (LSMS) in collaboration with the Tanzania National Bureau of Statistics (NBS). The findings presented are from the 2008-09 and 2010-11 surveys.

A distinctive feature of the National Panel Survey is that data are generated for the same set of selected households in both phases of the study. This study used this rich information to track households' food security over the two-year period.

The main objective of this study was to measure levels, patterns and trends of food insecurity indicators in both Tanzania Mainland and Zanzibar. The study presents findings at the administrative zone level for all indicators in Tanzania and Zanzibar.

This report provides comprehensive information about households' food security situation in Tanzania. I hope the report will be used by stakeholders in the food security and nutrition sectors to facilitate informed decision making, planning and research.

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The analysis and production of this report was led by technical staff based in WFP's Headquarters in Rome working closely with the WFP Tanzania Country Office and the WFP Regional Bureau in Johannesburg. Their technical input and guidance were instrumental in the successful completion of this CFSVA. The analysis and finalization of the report also benefited from a review and comments received from various stakeholders.

Finally, we would like to acknowledge the continued cooperation between WB and WFP in allocating resources and expertise to produce extensive statistics on poverty, food security and livelihoods through the LSMS-ISA. This information is vital to ensure informed policies and programs in Tanzania.

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List of Acronyms

CFSVA	Comprehensive Food Security and Vulnerability Analysis
EPAR	Evans School of Policy Analysis and Research
FAO	Food and Agriculture Organization
FCS	Food Consumption Score
FSSM	Food Security Statistics Module
GoT	Government of Tanzania
GoZ	Revolutionary Government of Zanzibar
HFED	High Food Energy Deficiency
HSPH	Harvard School of Public Health
IFPRI	International Food Policy Research institute
IMF	International Monetary Fund
LDD	Low Diet Diversity
LSMS	Living Standards Measurement Survey
MDG	Millennium Development Goals
MKUKUTA	National Strategy for Growth and Reduction of Poverty
MKUZA	Zanzibar Strategy for Growth and Reduction of Poverty
MUHAS	Muhimbili University of Health and Allied Sciences
NBS	National Bureau of Statistics in Tanzania
NPS	Tanzania National Panel Survey
NSGRP	National Strategy for Growth and Reduction of Poverty II
PDI	Poor Dietary Intake
PRSP	Poverty Reduction Strategy Paper
TFNC	Tanzania Food and Nutrition Centre
WFP	World Food Programme
ZSGRP	Zanzibar Strategy for Growth and Reduction of Poverty
ZFSNP	Zanzibar Food Security and Nutrition Policy

Executive Summary

The 2012 Tanzania Food Security Assessment builds on the current knowledge base regarding the level of food security and vulnerability in Tanzania. The report's findings are based on household level data generated from the 2008-09 and 2010-11 Tanzania National Panel Surveys (NPS). The purpose of the study was to use household-level panel data generated by the NPS to track households' food security over the two-year period. In doing so, this assessment aims to provide meaningful baseline information about food insecurity in Tanzania.

The NPS interviewed a total of 3,265 households in phase 1 (October 2008 to September 2009) and 3,846 households in phase 2 (October 2010 to September 2011) across Tanzania. As it was a panel study, the same households were surveyed in both phases. In each phase, households provided information about their expenditures; food security; assets and livelihoods; nutrition; farming practices; and, impact of recent economic and other shocks. These data were used to construct a variety of indicators for measuring food security; these data are aligned to the eight geographic zones captured by the Demographic and Health Survey (DHS)¹.

This study focuses primarily on the food consumption dimension of food security. It considers those households which consume adequate food in terms of quantity and quality as food secure. At the national level, about 730,000 households were food insecure or vulnerable to food insecurity (8.3% of all households in 2010-11), of these, around 150,000 households (or 1.7% of all households) were considered chronically food insecure (having been food insecure in both phases of the survey)². This represents a slight decrease from the first phase (2008-09), in which 10% of households were classified food insecure.

The main findings presented in the report follow:

- Rural households are more exposed to food insecurity than urban households.
- Food insecurity is closely linked to poverty. Households below the poverty line are more likely to be food insecure than other households. Indeed, the zones with the highest prevalence of people living below the poverty line also exhibited the highest proportion of food insecure households.
- Overall, between the two survey phases, food energy intake per capita reduced slightly but the diversity of the diets consumed by Tanzanian households improved notably.
- Food shortages were more commonly reported by households situated in Tanzania's drought-prone bimodal rainfall zone (north and west) than those in the unimodal zone (south and east). Correspondingly, rural households in the bimodal rainfall

¹ Western, Northern, Central, Southern Highlands, Lake, Eastern, Southern, and Zanzibar.

² Food insecurity based on the *poor dietary intake* indicator used throughout this report.

zone were more likely than their unimodal counterparts to report shocks such as water shortages, food price rises and drought.

- The highest incidence of food insecurity was found among households whose income mostly came from money transfers, crop production and a combination of agricultural incomes.
- The more farming households depend on their own produce, the greater their vulnerability. Of households which derived more than 90% of their food energy from own-production, 22% were classified as food insecure (compared with 8.3% nationally).

Overall, Tanzania's food security situation appears to be improving. But food security gains are not matching national economic gains. The country's poor farming households need better livelihood support such as access to credit and training so they can improve their agricultural inputs and techniques, increase yields and alleviate their poverty. Small farmers reliant on own-produce for consumption should also be trained to cultivate a more diverse and nutritionally rich selection of crops.

The study found Zanzibar's food security status in 2010-11 to be largely similar to that of the country's rural population. However, unlike that of the overall rural population, the food security situation of households in the archipelago has improved notably since 2008-09. Findings from the self-assessment component of the survey suggest the island's residents consider themselves relatively more food secure than their mainland counterparts.

1.0 Background

1.1 What is food security?

"Food security defines a situation in which all people at all times have physical and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life" (FAO, 1996).

Food security depends upon four key factors



Availability: The presence of food through all forms of domestic production, commercial imports and food aid. Estimates of food availability might be aggregated at the regional, national, district or community level.

Access to food: Food access concerns a household's ability to acquire adequate amounts of food, through own home production and stocks, direct purchases, barter, gifts, borrowing and food aid.

Utilization of food: This refers to the ability of members of a household to make use of the food to which they have access. This includes an individual's ability to absorb and metabolize the nutrients, the ways in which food is stored, processed and prepared, how water and cooking fuel are used, as well as hygiene conditions. Utilisation can be impaired by illness or poor caring practices.

Stability: This recognizes that people's food security situation may change. Even if food intake is adequate today, people are still considered to be food insecure if they have periodic inadequate access to food that may deteriorate their nutritional status. Adverse weather conditions (drought, floods), political instability (social unrest), or economic factors (unemployment, rising food prices) may impact food security status.

In assessing the food security situation of Tanzanian households, this study focuses mainly on households' current food consumption. Households deemed to be consuming sufficient food energy from a wide range of food groups are considered food secure.

1.2 Tanzania and the food security context

Demography

In 2012, Tanzania's population was estimated to be around 44.9 million people (NBS, 2013). Most of the population reside in Tanzania's mainland (43.6 million) while about 1.3 million live in Zanzibar. Since 2002, Tanzania's population has increased by about 30% (from 34.5 million people). In this time, the greatest population increase occurred in Tanzania's largest city, Dar es Salaam, which grew from 2.5 to 4.4 million people. While Tanzania's young people -those aged under 15 years- accounted for 44% of the overall population in both 2002 and 2012, their share decreased in Zanzibar (from 44% to 38%).

Economic growth and improving access to services

In recent years, Tanzania has experienced rapid national economic growth, with Gross Domestic Product (GDP) growing at around 7% per year between 2005 and 2010 (IMF, *2011*). During this period, the large agriculture and manufacturing sectors –which, in 2010, accounted for 24.1% and 8.6% of GDP respectively- contributed the most to overall national growth, while the emerging gold-mining sector was the fastest growing industry.

The country's successful economic growth occurred despite numerous global and local challenges. During the five year period (2005-2010), Tanzania was impacted by severe drought in 2009, which adversely affected crop production, livestock and power generation. At the global level, the economy was also negatively impacted by high oil and food prices during 2007 and 2008 and the global financial and economic crises that occurred soon after. These global trends negatively affected the volume and prices of exports, the flow of capital and investment, and earnings from tourism.





¹Zones as defined in the 2010 Demographic and Health Survey.

Recent years have also been marked by significant improvements in the provision of public services including education, health, water, energy, telecommunications and infrastructure - particularly roads. Access to education has increased at all levels, with notable improvements in secondary school education rates. The number of secondary school students has increased from 524,325 in 2005 to 1,638,669 in 2010 (NSGRP, 2010).

Access to health services has also increased modestly in recent years, following the conception of the new Health Policy in 2007 and the designing of a Primary Health Service Development Programme (2007 - 2017). New health facilities - dispensaries, health centres and hospitals were constructed and the availability of equipment and medicines has been improved. Among the major objectives of the new policy and programme is to bring health care services closer to the people, at a distance of not more than five kilometres.

Two key areas of health policy for Tanzania are HIV/AIDS and malaria. Under the National HIV Policy Tanzania's government has made substantial progress in HIV and AIDS prevention, care, treatment, and impact mitigation (USAID, 2013). The prevalence of HIV positive Tanzanians has fallen from 5.7% of Tanzanians aged 15-49 in 2007-08 (6.6% of women and 4.6% of men) to 5.1% in 2011-12 (6.2% women and 3.8% men). Regarding malaria, the government's National Malaria Control Programme aims to reduce the burden caused by the disease throughout the country. One indicator of progress is that between the periods 2004-05 and 2011-12, the proportion of Tanzanian household members reporting sleeping under an insecticide-treated net (the night before being surveyed increased) from 15% to 68% (USAID, 2013).

There has also been notable achievement in improving road infrastructure but the task ahead remains enormous for a country spanning 945,000 sq. km. with 86,472 km of roads - of which only 6,700 km is paved (NSGRP, 2010). In the past five years prior to 2010, 2,200 km of road were upgraded from gravel to tarmac.

Agriculture and food security

Agriculture is the backbone of Tanzania's economy. The industry contributes almost a quarter of GDP (24.1%) and employs 70% of the active labour force (Economic Survey, 2011). More than half the country's total harvested land area is allocated to cereals, of which maize is the country's dominant staple food crop. Despite its favourable agroecological conditions, Tanzania is a net importer of wheat and rice. Maize yields are typically low (0.75 tons per hectare) and smallholder farmers rely on traditional technologies and produce mainly for subsistence (GoT, 2006). Wheat, on the other hand, is produced almost exclusively by large-scale commercial farmers in the Northern zone using modern inputs. Roots, such as cassava and potatoes, are also important food sources in Tanzania and account for almost 15 percent of harvested land. Root crop production grew annually by more than 4 percent between 2000–2007. However, vegetable production stagnated and that of pulses declined by more than 4 percent a year over the same period. In the Northern and Eastern zones fruit production has significantly increased making up for the lack of growth in the vegetable sector and oilseed has become a more important crop across the country (Thurlow, 2010).

Livestock and fisheries account for almost a third of agricultural GDP. In recent years growth in fisheries has kept pace with overall agricultural production, growing at 5.1 percent a year from 1998–2007. However, livestock has not performed as well as crop agriculture, growing at only 3.3 percent a year. Income from livestock and poultry are particularly important for the livelihoods of smallholder farmers and low income families in many parts of the country. Indeed, almost all households in rural areas participate in either crop or livestock activities, and earn on average two thirds of total income from the sector (Zezza, 2012).

Some of the fastest growth rates during 2000–2007 were for export-oriented crops. Traditional crops, such as cotton, sugarcane, and tobacco, grew at almost 10 per cent a year. Export agriculture therefore grew rapidly during 2000–2007, driven by the strong performance of a few regionally concentrated crops. However, the success achieved in increasing production and incomes for these crops, and rising agricultural income at a national level, has had little effect on the ability of poor households to produce and/or acquire food for personal consumption. Indeed, the 2009 CFSVA showed that food producers in Tanzania were overwhelmingly the most likely to be poor and food insecure. Therefore, there remains a strong need to focus more on tracking food insecure population (WFP, 2010).

Little change in household poverty and child malnutrition rates

Despite significant economic and agricultural growth over the past decade, along with improvements in health, education and other infrastructure, the rates of household poverty, and poor nutrition have not substantially decreased. Though there has been good economic performance during the period from 2000-2007, income inequality and overall poverty have not seen similar improvements. Specifically, income inequality did not change much during the period from 2000-2007 (Economic Survey, 2010), and the population living under the poverty line fell only slightly from 35.7% to 33.6% (NBS, 2009). Similarly, Tanzania's recent national growth has had little effect on households' access to food, and ability to acquire food. As an example, from 2000 to 2007, the share of the population living below the food poverty line -which represents the average cost of obtaining sufficient food

to meet per person calorie needs in the poorest 50% of households- decreased only very marginally, from 19% in 2000-01 to 17% in 2007³.

Tanzania's 2010 Demographic and Health Survey has reported that the rate of stunting has reduced slightly from 38 per cent of children under the age of five (2004-05) to 35%⁴ (2010), while the prevalence of children suffering from wasting increased slightly, from 3 per cent in 2004-05 to 4 per cent in 2010 (NBS, 2010).

Box 1.3 Technical note on survey methodology

The current report is based on data collected by the Tanzania National Bureau of Statistics (NBS) via the Tanzania National Panel Survey (NPS), a nationally representative survey aimed at measuring the living standards of Tanzania's population. NPS data were collected over two phases: October 2008 to October 2009 (phase 1) and October 2010 to September 2011 (phase 2). In the second phase, households were re-interviewed using very similar questionnaires. This enabled the tracking of households' progress against the key indicators.

The main objective of the NPS is to provide household level data to monitor poverty dynamics in Tanzania – in particular to track progress of the country's MKUKUTA poverty reduction strategy (NSGRP, 2010), and evaluate the impact of other major, national-level government policies.

A major focus of the NPS relates to household food consumption, production and expenditure. The information generated provides a strong base for assessing Tanzania's food security situation at the household level. Additionally, the survey's panel component enables an examination of the length of time for which households might face food insecurity.

Sampling

The survey sample was calculated to be sufficient to produce national estimates of poverty, agricultural production and other key indicators. In phase 1 the NPS had a sample of 3,265 households; phase 2 was increased to 3,846 households because split households – those in which some but not all members change address between phases- are followed, interviewed and eventually become part of the sample. However, the panel survey had very low attrition: 97% of year 1 households were successfully found in their original locations and interviewed in year 2. The sampling process enables estimates of key indicators to be produced for each of Tanzania's zones: North, Central, Eastern, South, Southern Highlands, Western, Lakes and Zanzibar (NBS, 2011).

The NPS was based on a stratified, multi-stage cluster sample design. The 2002 Population and Housing Census provided the sampling frame, which involves a list of all populated enumeration areas in the country. Explicitly, four analytical strata were incorporated into the sample design: Dar es Salam, other urban areas in mainland, rural areas in mainland and Zanzibar. In total 409 clusters were selected, each containing eight randomly selected households. Clusters were selected randomly within each stratum to form the primary sampling units; the probability of cluster selection was proportional to population size. Urban based clusters matched census enumeration areas, while rural clusters matched villages.

³ Household Budget Surveys (2000-01 and 2007).

⁴ For purpose of comparison to assess trends, reference population adjusted for 2010 data. Therefore, the 2010 stunting prevalence reported here does not match the official rate reported later in this report (42%, Section 2.6).

2. Food security status

This section explores Tanzania's overall food security status. It introduces the indicators used in the report to describe food insecurity and proceeds to report the performance of households against these indicators across Tanzania's eight administrative zones defined by NBS.

The main food security indicator used in this report is *poor dietary intake (PDI)*. This indicator identifies households that are highly deficient in terms of calorie consumption and have a low level of diversity in their diet (see box 2.1 for a more detailed description).

In 2010-11, around 730,000 households (or 8.3% of all households) in Tanzania were classified as having *poor dietary intake*. This represents a slight drop from 9.8% in 2008-09. Map 2-1 shows the prevalence of households with *poor dietary intake* between the two years.

The severity of food insecurity is considered highest for those households classified as having PDI in both phases of the survey (i.e. 2008-09 and 2010-11). This group is described as having **chronic PDI** and during the reported periods experienced a protracted duration of food insecurity. Around 150,000 households (or 1.7% of the total) suffered from **chronic PDI**. The zones with the highest rates of chronic food insecurity were Central (4.9%), Zanzibar (4.5%) and Lake (3.8%).



Map 2-1: Poor Dietary Intake (2008-09 and 2010-11)

In addition to *poor dietary intake*, this report uses a number of other indicators to measure food security. These indicators are concerned with the diversity of foods consumed, calorie intake, economic vulnerability and nutrition. A description of these indicators is included in the box below.

Box 2.1 Food security indicators

The focus of this report is to determine the food security situation of Tanzanian households using food consumption information generated by the NPS. Household food security is determined using a variety of standard and non-standard food security indicators. Standard measures, including *dietary diversity* and *coping strategies*, are typically utilised by agencies such as the World Food Programme (WFP) and Food and Agricultural Organisation (FAO). Other indicators have been constructed employing methods designed by the International Food Policy Research Institute (IFPRI) – such as *food energy deficiency*. Further indicators employed have not been used before: *poor dietary intake*, for instance, considers household food consumption both in terms of the calories consumed by the household and the diversity of the household's diet. Nutrition findings have been taken from the Tanzania Demographic and Health Survey (TDHS, 2000-2010). The table below describes briefly the main indicators used in this report. See annex (10.1) for a more detailed description of the methodology and assumptions used to estimate food security in this report.

Household indicator	Description
Food Energy Deficient	Households that consume less than their recommended daily intake of calories (based on age-sex composition of the household). <i>Highly food energy deficient</i> households are those experiencing a high calorie deficit (i.e. deficient by more than 300 calories daily per household member). <i>Chronic highly food energy deficient</i> households were classified as <i>highly food energy deficient</i> in both phases of the NPS.
Low diet diversity	Households that, over the course of the seven day reporting period, consumed foods from four or fewer of the seven food groups, namely: 1) cereals, roots and tubers; 2) pulses and legumes; 3) dairy products; 4) oils and fats; 5) meat, fish, eggs; 6) fruit; and, 7) vegetables.
Poor dietary intake	Households classified as both being <i>highly food energy deficient</i> and having <i>low diet diversity</i> . This indicator identifies those households that are lacking both sufficient calorie quantity and not consuming enough types of food. <i>Chronic poor dietary intake</i> households were classified as <i>having poor dietary intake</i> in both phases of the NPS.
Nutrition indicators	Stunting, wasting and underweight indicators assess the nutrition of 0-5 year olds in Tanzania. Findings were sourced from the Demographic and Health Surveys (DHS).
Very high food expenditures share	Households in which 75% or more of total household expenditures are directed to food. This indicator considers household food expenditure to include the cash-value of consumed foods which are produced at home. The value of a home-produced food item is determined by the household.
Reduced coping strategies index	An index which assigns all households a score based on the behaviours undertaken by the household to cope with food shortages experienced in the previous seven days. The index is based on the severity and frequency of the behaviours employed. The coping strategies considered by the index include: 1) relied on less preferred foods; 2) limiting portion size at meal times; 3) reducing the number of meals eaten in a day; 4) restricting consumption by adults for small children to eat; 5) borrowing food, or relating on help from a friend or relative.
¹ Methods involved in constr	ucting these and other indicators are explained in more detail in the annex (10.1).

Key indicators used in report¹

2.1 Food energy down, diet diversity up

In recent years, on average, the quantity of food consumed in Tanzanian households has decreased but diet quality has improved. Table 2-1 shows that, between 2008-09 and 2010-

11, the proportion of Tanzanian households classified as *highly food energy deficient* increased (from 24% to 29%). However, over the same period, the proportion of households classified as having *low diet diversity* decreased (from 25% to 18%). In terms of economic vulnerability, the proportion of households directing a *very high share of expenditures* to food decreased from 57% to 52%.

Zanzibar demonstrated particularly strong progress across the food insecurity indicators: the prevalence of *poor dietary intake* decreased from 17% to 10%; *high food energy deficiency* fell (46% to 41%) and *low diet diversity* dropped (26% to 17%).

Area	Poor Dietary Intake		Low diet	diversity	Highly food energy deficient		Very high food expenditures	
	2008-09	2010-11	2008-09	2010-11	2008-09	2010-11	2008-09	2010-11
Tanzania	9.8%	8.3%	25.1%	18.0%	23.7%	29.2%	56.9%	51.6%
Dar es Salam	1.0%	1.4%	4.2%	5.0%	13.5%	14.0%	15.0%	12.3%
Rest of urban	6.7%	4.2%	15.3%	9.8%	18.8%	22.2%	31.6%	32.5%
Rural	11.4%	10.5%	29.9%	21.6%	25.2%	33.1%	68.0%	62.6%
Zanzibar	16.8%	10.3%	25.8%	17.1%	45.6%	40.5%	58.0%	58.9%

Table 2-1: Selected food security indicators, by area (2008-09 and 2010-11)¹

¹Food security indicators presented in this table are described in the box on the previous page, and in Annex 10.1.

2.2 Less food energy, higher dependency on staple foods

In 2010-11, the members of *poor dietary intake* households consumed, on average, around 1,068 kilocalories daily. This level is alarmingly low compared with the average recommended calorie intake for residents living in *poor dietary intake* households, 1,919 kilocalories daily⁵. Graph 2-1 shows the difference between the daily energy intake of household members belonging to *poor dietary intake* households relative to those living in Tanzania's urban and rural zones.

⁵ Based on age and sex composition of *poor dietary intake* households.



Graph 2-1: Average daily kilocalorie intake per capita, selected households, 2008-09 and 2010-11

Tanzania's food insecure population typically consumed a very low amount of calories each day – much of which comes from staple foods. On average, *poor dietary intake* households get 80% of their food energy (around 850 calories daily) from staples (cereals, roots or tubers) compared with 70% (1290 calories) for the total population. *Poor dietary intake* households consumed far less meat, fish and eggs than non-PDI households. On average, the latter derived 6.1% or 120 calories from this food group, while for PDI households, only 2.9% of their food energy or 30 calories came from these protein rich foods. Graph 2-2 shows the average daily calorie intake of each food group of selected Tanzanian household groups. The graph accounts only for foods consumed at home.



Graph 2-2: Daily per capita energy intake by food groups, selected households, 2010-11

^{*}Does not include information related to foods consumed outside the home

2.3 Food energy deficiency



Graph 2-3: National Food Energy

In order to live a healthy and active life, people must consume sufficient food and the right kind of food. Food Energy Deficiency provides a snapshot of the population that does not consume enough calories. Households categorised as moderately food energy deficient consume less than WHO's recommended daily calorie intake (see Annex 10.1 B) given the household's age and sex composition. Highly food energy deficient households are those whose members, on average, had a daily deficit of 300 calories or more (from the WHO recommended intake, given the household's age-sex composition).

Graph 2-2 shows that more than half the households in Tanzania consumed enough calories, while 29% of the population remained highly food energy deficient. Graph 2-3 shows that the highest level of food energy deficiency existed in Zanzibar and the Central zone. In rural areas, 48% of the population was classified as food energy deficient compared to 31% in urban areas.

Between 2008/09 and 2010/11, food energy deficiency prevalence increased from 36% to 43% with the greatest increase occurring in rural areas: from 39% to 48% (Graph 2-4).

Graph 2-4: Food Energy Deficiency, by zone (2010-11)



Highly Food Energy Deficient

Graph 2-5: Food Energy Deficiency, 2008-09 versus 2010-11





Graph 2-6: National Diet Diversity

Three measures of **diet diversity** have been used to gauge micronutrient consumption in Tanzania. First, households that consume food items from four or fewer food groups (out of a possible seven¹) during the seven day recall period are considered to have *low diet diversity*. Second, households that get more than 75% of their calories from staple foods (cereals, roots and tubers) are classified as having a *very high staples diet*, and those households whose staple contribution to calorie intake is 65-75% are considered to have *high staples diets*. Both indicators are used to identify and describe those households not consuming sufficient micronutrients.

At the national level it can be seen that most households (82%) consumed food items from more than four food groups in the seven day reporting period. However, only 47% had diets consisting of a sufficient share of nonstaple based calories. Graph 2-6 shows the greatest propensity of low diet diversity households are found in the Southern, Central and Western zones. The Southern and Western zones were also among the areas most likely to consume very high staples diets, alongside Zanzibar and the Lake zone. In rural areas, 21% of households had a low diet diversity status and 37% had very high staples diets – much higher than urban households (9% and 15% respectively). Unlike energy intake, the prevalence of *low* diet diversity households has improved significantly since 2008/09 - particularly in rural areas and Zanzibar (see graph 2-7).

¹The seven food groups are: 1) cereals, roots and tubers; 2) pulses and legumes; 3) dairy products; 4) oils and fats; 5) meat, fish, eggs; 6) fruit; and, 7) vegetables.



Graph 2-7: Low Diet Diversity and Very High Staples, by zone

Graph 2-8: Low Diet Diversity, 2008-09 versus 2010-11

25.8%

17%

Zanzibar

2.5 Adequacy of overall consumption



Graph 2-8 combines the measures of Diet Diversity and Food Energy Sufficiency to determine the overall adequacy of the national diet. It shows that 63% of the households consumed a diet considered to be adequate in 2010-11. These households were not classified as being *highly food energy deficient* or having *low diet diversity*.

Around 21% of households were classified as highly food energy deficient alone, 8% as low diet diversity alone, and a further 8% were considered to have *poor dietary intake* – i.e. these households were both highly food energy *deficient* and had a *low diet diversity*. Between the two survey phases (2008/09 and 2010/11), poor dietary intake prevalence fell by 2%. During this period, the likelihood of being solely classified as a household with low diet diversity or being solely highly food energy deficient shifted from being about equal in 2008-09 to a situation in which the number of highly food energy deficient households was more than twice the number of low diet diversity households (graph 2-8).

Graph 2-9 demonstrates overall consumption by area and compares consumption between the two survey phases. Most zones experienced a slight improvement in the proportion of the population with an adequate diet, with only the Northern zone households falling (by 8%). In urban areas 76% of the population have an adequate diet, and in rural areas 57% of the population have an adequate diet.



Graph 2-10: Overall Dietary Intake, by zone 2010/11

2.6 Chronic vs. transitory food insecurity

Graph 2-11: Poor Dietary Intake, chronic and transitory, national



Graph 2-12: Poor Dietary Intake, chronic and transitory, by zone



Graph 2-13: High food energy deficiency, transitory and chronic



Comparing households' food consumption between 2008/09 and 2010/11 provides insight into which households are prone to experiencing chronic food insecurity. For instance, at a national level it can be seen that in 2010/11 8.3% of the population were considered to have poor dietary intake, i.e. they experienced both low diet diversity and were highly food energy deficient. This group included 1.7% of the population that were also classified as having PDI in 2008/09 - this suggests, for these households, a chronic state of food insecurity. The remaining 6.6% of households that experienced poor dietary intake only in 2010/11 are considered to be in a transitory state of food insecurity. Graphs 2-12 and 2-13 below provide an overview of chronic trends for the household indicators highly food energy deficient and low diet diversity.

Certain zones have a significantly greater rate of chronic food insecurity than others. For instance, Zanzibar, despite having a lower percentage of *poor dietary intake* households than the Southern zone in 2010-11 (10% and 13% respectively), had a higher rate of households with chronic *poor dietary intake*: 4.5% in Zanzibar compared with 2.1% in the Southern Zone. For Zanzibar, chronic *highly food energy deficient* households (at 23%) were more than twice as prevalent as in all other zones except Central (Graph 2-12).

For Tanzania's Central zone, which had the highest rate of chronic *poor dietary intake* (4.9%), there was a very high prevalence of chronic *low diet diversity* (15%) and *highly food energy deficiency* (20%).





2.7 Food and nutrition security status



Graph 2-15: Prevalence of stunting, children < 5

Graph 2-16: Prevalence of wasting, children < 5 years, 2010-11







Nutrition status forms an important part of a country's overall food security picture. Inadequate dietary intake can cause -or contribute to- a person's malnutrition. Other causes of malnutrition include: disease; inadequate maternal and child care; insufficient health services; and unhealthy living conditions.

This section presents nutrition findings generated by the 2010 Tanzania Demographic and Health Survey (DHS). The DHS collected nutrition information about children aged under five. Key indicators captured included weightfor-age (underweight), height-for-age (stunting), and weight-for-height (wasting). DHS definitions of these indicators are below:

Stunting reflects failure to receive adequate nutrition over a long period of time and is affected by recurrent and chronic illness; it represents long-term effects of malnutrition and is not sensitive to recent short term changes in dietary intake.

Wasting (or thinness) represents the failure to receive adequate nutrition in the period immediately preceding the survey and may be the result of inadequate food intake or a recent episode of illness causing loss of weight and the onset of malnutrition.

Underweight is a composite index of stunting and wasting. It takes into account both chronic and acute malnutrition.

Nationally, 42% of children under age five were stunted; 17% were severely stunted (Graph 2-14). Prevalence was higher among rural children: 45% compared with 32% of urban.

Wasting occurred in 4.8% of Tanzanian children; 1.2% of children were severely wasted (Graph 2-15).

Nutritional outcomes of the country's zones vary by indicator. The Central and Northern zones were among the zones with highest prevalence for all three indicators. While the prevalence of severe wasting in Zanzibar was at least double that of the other zones, the archipelago's young children were the least likely of all zones to be stunted.

Section 6.2 takes a more detailed look at Tanzania's nutrition status.

3. Seasonal consumption trends

In most developing countries, hunger plays a seasonal role. Tanzania is no exception. Food shortages reportedly peaked outside the main harvest periods. It was not uncommon for households to report times when there was not enough to eat. In the 12 months prior to second phase survey (2010/11), 20% of households faced at least one situation when there was not enough food to feed members. The zones most likely to report a food shortage were the Lake zone (26%), Western (25%), and Central (24%). The Southern Highlands and Zanzibar were least likely (11.5% and 7.1%).

Of households facing a food shortage, on average they were short of food for around 3.5 months in total. Reasons for food shortages were largely linked to weather: in 2010-11, 25% reported being severely affected by drought some time during the previous five years. This section looks at Tanzania's food security from a seasonal perspective.

3.1 Tanzania's dual rainfall regimes

Any seasonal analysis of Tanzania must consider the country's dual rainfall regimes. These regimes divide the country into two large areas known as the unimodal and bimodal zones (Map 3-1). Tanzania's **unimodal** zone, covering the country's south, central and west, experiences one long rainy season from December to April; planting takes place in November and harvesting in June and July. The **bimodal** zone – Tanzania's north, east, northern coast and north western - experiences a 'short rains' period from October to December and a 'long rains' period from March to May. Short rains harvesting occurs in late January and February and long rains harvesting in July/August.



Map 3-1: Rainfall regimes in Tanzania

Overall, households in the country's northern bimodal zone were more likely than unimodal households to experience a food shortage in the 12 months prior to the survey (23% vs 17%). Shocks experienced by the rural households help explain this difference: in 2010-11, drought was a shock more commonly reported by rural *bimodal* households than rural *unimodal* households: 37% to 23% respectively. Similarly, *bimodal* rural households were also more likely to report being severely affected by steep food price rises (56%) and water shortages (33%) than *unimodal* rural households (35% for food price rises and 20% water shortages).

Of the rural *bimodal* households that reported having experienced a food shortage, the main causes were attributed to poor rains and drought (51%), small land size (10%) and lack of farm inputs (7%). In contrast, their urban counterparts listed the main causes of their food shortages as no money (35%), drought (15%) and expensive food (18%). Table 3-1 shows the main causes for food shortages in *unimodal* rural and urban households, alongside other geographic areas.

	%	Among those that experienced food shortages								
	experiencing	Main cause of food shortages*								
	food	Months	Drought,		Small	Lack of				
	shortage in	with food	poor	Crop	land	farm	Expensive	No		
Area	past year	shortage	rains	pest	size	inputs	food	money	Other	Total
Tanzania	20%	3.5	38%	3%	8%	11%	12.2%	14%	13.4%	100%
Mainland	21%	3.5	38%	3%	8%	11%	12.2%	14%	13.6%	100%
Dar es Salam	17%	4.2	4%	1%	0%	3%	24.7%	42%	25.5%	100%
Bimodal	23%	3.5	40%	3%	8%	6%	10%	17%	15%	100%
rural	24%	3.4	51%	3%	10%	7%	7%	9%	13%	100%
urban	20%	3.7	15%	2%	5%	4%	18%	35%	22%	100%
Unimodal	17%	3.5	35%	4%	7%	18%	14%	11%	11%	100%
rural	18%	3.4	37%	5%	9%	18%	13%	9%	9%	100%
urban	16%	4.0	24%	2%	0%	15%	22%	18%	19%	100%
Zanzibar	7%	28	72%	7%	7%	3%	2.0%	9%	0.0%	100%

Table 3-1: Food shortages - duration and causes, by area, 2010-11

*prevalence of causes given as a proportion of all reported causes

3.2 Drought and reduced rainfall prompt food shortages

Tanzania's bimodal region experienced extreme drought conditions in the 2008-2009 season and greatly reduced rainfall in the 2010-11 season. Indeed, the 2009 drought in eastern Africa was described as one of the worst in living memory (IDRC, 2010). While primarily centred on Somalia, Djibouti, Ethiopia and Kenya, the drought greatly affected Northern Tanzania (which falls within the country's bimodal zone). The following series of graphs shows the impact of these weather events on food shortages throughout the year (Graphs 3-1 to 3-3). Tanzanian households experience food shortages most commonly between October-February. This period of heightened food shortage is most pronounced in unimodal households, reaching a shortage peak at the onset of the rainy season (9% reported food shortages during December-February) and dipping to a very low rate of reported shortages during harvest (2.3%, July-August). In contrast, for the reporting period, Tanzania's bimodal north experienced a more consistent – though much higher – rate of food shortages throughout the year. These households were most likely to experience food shortages during the short rains (8%, October-December), and their prevalence did not drop below 5% for any month.



Graph 3-1: Households experiencing food shortage in month, by rainfall regime

The increase in food shortages in bimodal zones at the end of the year is due to reduced rainfall and drought (described in above sections). While north eastern Tanzania normally experiences two rainy seasons each year, in 2009, the 'long rains' (which occur from March-May) were well below normal. By August 2009, many crops had failed and forage was reportedly exhausted in all but a few areas. Not so hard hit by recent weather events, the unimodal zone instead presented a food-stock situation more reflective of the seasonal pattern.

In both the bimodal and unimodal zones, little difference is observed in the food shortage prevalence between urban and rural households for most of the year (Graphs 3-2 and 3-3). This is counterintuitive: despite urban households' greater access to a wider variety of food sources, in many months they are more likely to suffer food shortages than their rural counterparts.

While rural and urban food shortages occur for different reasons at the household level, the reasons are intrinsically linked. Urban households are more likely to cite 'expensive foods' and 'no money' as main drivers of their food shortage; rural households most commonly cited 'drought and poor rains' as the cause.



Graph 3-2: Households experiencing food shortages by month, bimodal zone





Urban households tend to experience food shortages over a longer period of time than rural households: on average, of households reporting having experienced a food shortage, they reported it occurring for 4.2 months in Dar es Salam, 3.8 months in bimodal urban, and 4.0 months in unimodal urban. This compared with 3.4 months in both bimodal and unimodal rural regions.

4. Who are Tanzania's food insecure?

Tanzania's food insecure population are most likely living in poor rural families with loweducated household members. This section describes the characteristics of Tanzania's food insecure households. Food consumption is the primary consideration in determining a household's food security status. In this section *poor dietary intake* is used as the main indicator for assessing food insecurity. As mentioned earlier, *poor dietary intake* households are considered to have both *low diet diversity* and be *highly food energy deficient*, meaning household members are likely to be deficient in both food energy and nutrient diversity.

In 2010-11, poor dietary intake households were over-represented:

- In rural areas (87% of Tanzania's *poor dietary intake* households were in rural areas vs. 69% of all Tanzania's households);
- Among poor households (66% of *poor dietary intake* households fell below the poverty line vs. 18% of all households in Tanzania);
- Among households in which the head worked in the farming sector (82% of *poor dietary intake* household heads worked in farming vs 64% of all household heads);
- Among households in which the head was unemployed (8.0% of *poor dietary intake* household heads were unemployed vs. 5.4% of all household heads in Tanzania).

Across all zones, *poor dietary intake* prevalence was far greater in rural areas (graph 4-1). The highest *poor dietary intake* prevalence in rural areas occurred in the Central (20%), Southern (14.8%), and Lake (13.0%) zones. Urban prevalence was highest in the Central and Southern zones (8.1% and 6.8% respectively).



Graph 4-1: Poor dietary intake prevalence, rural and urban, by zone (2010-11)

4.1 The poor

Food insecurity is intrinsically linked to poverty. Tanzania's NPS uses a consumption based 'poverty line' to identify the country's poor population. The households deemed unable to adequately cover their own basic needs are considered poor. This is determined by identifying households with a per adult equivalent consumption value lower than the monetary value of a predetermined 'consumption bundle' believed adequate for basic consumption of a nutritious diet and key basic goods and services. The process behind designing the consumption bundle and the related poverty line was determined by the National Bureau of Statistics and is outlined in the annex.

Counting Tanzania's poor

While Tanzania's Household Budget Surveys (HBS) are the country's official source of poverty incidence, Tanzania's National Bureau of Statistics also has used the NPS to construct a national single poverty line. This enables us to consider Tanzania's poor population through a food-security lens. The poverty line represents the value –in local currency- of a standard consumption bundle of goods and services deemed adequate for an average adult to live satisfactorily. This consumption bundle comprises what has been determined as a person's basic needs.

In 2010-11, the **total poverty line** per adult equivalent per 28 days was 23,933 Tanzanian Shillings (TSh). This was calculated using prices during the period from October 2010 – September 2011.

The **food poverty line** is an estimate of the cost of consuming a daily intake of 2,200 kilocalories per adult equivalent. Foods selected for the 'food bundle' are based on consumption patterns and prices paid by the bottom 50% of the population in terms of real consumption. For 2010-11, it was set at 18,719 Tsh.

Further information about the poverty line is provided in Annex 10.1 H.

According to the 2010-11 NPS, 18% of Tanzania's population fell below the poverty line. Rural areas had a higher poverty incidence than urban areas: 22% to 5.2% respectively.

A more severe form of poverty is measured by the *food poverty line*. It identifies households whose total consumption value falls short of that required to purchase the minimum value of foods, given the household's number of adult equivalents. In 2010-11, 8% of Tanzanians were deemed to live below the *food poverty line*. Of these, 94% lived in rural areas.

Most food-insecure Tanzanians live below the poverty line. Two thirds of people living in *poor dietary intake* households were below the poverty line and 47% were below the *food poverty line*. From another perspective, Tanzania's poor population can be considered almost ten times more likely to belong to a *poor dietary intake* household compared with the non-poor population (30% to 3.4% respectively). Graph 4-2 shows individuals' poverty status by various household level food security indicators in 2010-11. It shows that almost half of poor Tanzanians belong to *poor dietary intake* households (44%) and that 15% of individuals living below the *food poverty line* in 2010-11 belonged to households

experiencing chronic *poor dietary intake*. Indeed, four out of five Tanzanians living in chronic *poor dietary intake* households (i.e. *poor dietary intake* in both 2008-09 and 2010-11) lived below the poverty line.



Graph 4-2: Household level food security indicators, by individual poverty status¹, 2010-11

 1 Food security indicators are presented here at the individual level – i.e. an individual's food security situation matches that of their household.

In 2010-11, the poorest geographic zones were also the least food secure. By zone, the highest rates of poverty were in the Central (27%), Western (25%) and Southern (23%) zones. Correspondingly, households in these three zones were the least likely to consume diets that were satisfactory in terms of both quality and quantity – Central (47% of households classified as having *poor dietary intake*), Western (61%), and Southern (52%).

The prevalence of poverty was higher in the unimodal rainfall zone than in the bimodal rainfall zone (21% to 15%). In both zones rural households were most poor. For unimodal households in rural areas, 26% fell below the poverty line and 14% fell below the *food poverty line*; for the bimodal counterparts, the prevalence rates were 19% and 9% respectively.

For those below the *food poverty line* in the unimodal region, 42% of households were classified as having *poor dietary intake*. One-quarter (24%) belonged to households which had experienced a food-shortage in the past 12 months. The big contributing factor to *poor dietary intake* was insufficient food energy– 80% lived in *highly food energy deficient* households.

For those below the *food poverty line* in the drought-affected bimodal region, almost half belonged to households classified as having a poor dietary intake (48%). More than half of these households (56%) reported experiencing a food shortage in the past 12 months, and 65% belonged to households with low diet diversity.

Links to expenditure

The extent to which households' economic situations are linked to food insecurity can be further inspected by using expenditure per capita⁶. In 2010-11, 24% of households in Tanzania's lowest expenditure quintile were classified as having *poor dietary intake*, while 5.9% had *poor dietary intake* in both years. Conversely, less than 1% of households in Tanzania's highest expenditure quintile had *poor dietary intake*.

Another way to show the importance of household expenditure to diet is by inspecting households' meal consumption by expenditure quintiles. In 2010-11, nationally, in households with children aged 5-13 years, 10.2% reported that the children had eaten 'no breakfast' on the day before being surveyed; for households with children under five years, 3.6% of the children had had no breakfast. As with the *poor dietary intake* indicator, this situation was most common in households belonging to the lowest expenditure quintile: of these, 20% of households with children aged 5-13 years, and 10% of households with children aged 0-4 years, had not eaten breakfast (see graph 4-3).



Graph 4-3: Prevalence of households in which children skipped breakfast, by expenditure quintile, and child age (2010-11)

^{*}Children in household reported as having eaten nothing for breakfast on day prior to interview.

Greater vulnerability for low expenditure households

Poorer households direct a higher share of their expenditures towards food than wealthier households. In 2010-11, 68% of households in the lowest expenditure quintile had a *very high food expenditure share* (75% or more of household expenditures went on food) compared with 20% in the highest quintile. However, this is a fall from 2008-09 when 76% of lowest quintile households had a *very high food expenditure share*, suggesting a decline in economic vulnerability – shown across all expenditure quintiles (see graph 4-4). It should be noted that this 'expenditure' includes the valuation of home-produced foods consumed during the period.

⁶ Also based on consumption aggregates, see Annex for more details.





More than a third of Tanzanian households (37%) had a very *high food expenditure share* in both survey phases (ie. *chronic very high food expenditure share*). Again, this was linked to expenditure quintiles: more than half (54%) of the lowest expenditure quintile had *chronic very high food expenditure share* compared with only 11% of top quintile households. Cropproducing households were also overrepresented: this group accounted for 58%⁷ of households with a *chronic high food expenditure share* (compared with 43% representation across Tanzanian households generally).

4.2 The poorly educated

Household heads who never attended school are more likely to live in food insecure households than their educated counterparts. In 2010-11, 15% of households with non-schooled heads experienced *poor dietary intake* compared with 6.2% of households whose head went to school. Those with non-schooled heads were also more likely to direct a very high share of household expenditures (>75%) to food compared with the latter group (70% compared with 46% respectively). Further, they were more likely to worry, in the seven days prior to being surveyed, about not having enough to eat (48% compared with 32%).

At the national level, 24% of household heads did not attend school; this rate was highest in the Central zone (37%) and Zanzibar (27%). Household expenditure was also linked to the education levels of household heads: 38% of the lowest expenditure quintile households had non-schooled heads compared with only 5.9% of the top quintile.

The schooling of children is linked to household food insecurity too. Households with school-aged children (6-14 years old) not attending school were more prone to food insecurity. In 2010-11, around 17% of households in which all school-aged children were

⁷ Based on households' livelihoods in phase 1 (2008-09).

not attending school had *poor dietary intake*. Of households with at least one but not all children attending school, 9.7% were classified as having *poor dietary intake*. And of households in which all school-aged kids attended school, 8% had *poor dietary intake*. Nationally, approximately 9.7% of households with school-aged children were not sending any kids to school, while 15.2% were sending at least one but not all kids to school.

Of households with school-aged children, the Central and Western regions had the highest rates of non-attendance with 22% and 13% respectively of households not sending any children to school, while 20% and 24% sent at least one but not all the household's kids to school.

Similarly, households with all children in school were less likely to devote a very high share of their expenditures to food (48%) than households with some or all children out of school (69% and 70% respectively).

4.3 Households with high number of dependents and those headed by women

Households with a large share of dependents are more prone to food insecurity. In 2010-11, the average household size in Tanzania was 4.9 and approximately 50% had five or more household members. The NPS found that the proportion of dependents to total household members (dependency ratio⁸) averaged 41%. Around 9.6% of households recorded a high dependency rate (more than 70%), peaking at 12.9% in the Southern Highlands (12.9%) and Northern regions (11.6%). Approximately 13.9% of households with high dependency rates were classified as having *poor dietary intake* compared with 7.8% of households without high dependency rates.

Female headed households accounted for around a quarter (26%) of all households nationally and were slightly more prone to experiencing food insecurity: in 2010-11, 11.4% of female headed households were classified as having a *poor dietary intake* compared with 7.2% of male headed households. In 2008-09 the proportion was 12.6% and 8.9% respectively. The proportion of female-headed households was highest in Northern (30%) and Southern (28%) regions.

4.4 Livelihoods and food security

By classifying Tanzania's population into livelihood groups we can better understand which sections of society are most affected by food insecurity. A livelihood group is a group of people or households that share a similar basic means of livelihood and lifestyles. This may refer to subsistence activities, main income activities, and social and cultural practices.

⁸ Dependency ratio is a measure of the portion of household members who are too young or too old to work (ie. below 15 years or above 65 years).

The current study categorises livelihoods by the main income generating activity. Seven basic income categories have been created in accordance with FAO methodology⁹ for constructing income activity categories. Based on households' share of income in 2008-09¹⁰, decisions were made to assign households into the following seven main livelihood groups:

Livelihood group	Description	% households
		in 2008-09
Crops production	Crop production (mainly) > 50% HH income from crops alone	43.2%
Livestock production	Livestock production (mainly) >50% HH income from livestock alone	6.1%
Agriculture - mixed	Agri-mix (mainly) > 50% income from combined agriculture wage,	8.4%
	livestock, crop production	
Non-agricultural	Non-agri wage (mainly) >50% income from non-agri wage	13.5%
wages		
Self employed	Self-employed in non-agri (mainly) > 50% of income	19.1%
Transfers	Private public transfers (mainly) > 50% from money transfers	5.6%
Non-agricultural mix	Non-agri mix (mainly) > 50% from different non-agri sources	2.5%
Other ¹	No income information; even distribution between agriculture and	1.5%
	non-agriculture incomes	

Table 4-1: Livelihood groups (2008-09)

¹These households provided no income information (1.0%), or they contained an even split between agriculture and non-agriculture incomes (0.5%).

At the national level, 57% of households were categorised into one of the agriculture-based livelihood groups, generating more than half their income from either crop production (43%), livestock production (6.1%), or either agricultural wages or a combination of the three (8.4% collectively). Most of these were rural households (94%).

The livelihood groups of urban and rural households differed widely. In rural areas, 74% of households were characterised by agriculture-based livelihoods, while in urban areas 42% of households were self-employed, 36% derived their main income from non-agricultural wages and only 13% were agriculture-based. Across the zones, agriculture-based livelihoods were most common in the Central (72% of all households), Lake (66%) and Southern Highlands (65%) zones. The Eastern zone –which contains Dar es Salam –had the highest proportion of households classified as self-employed (33%) and non-agriculture wages (30%). Zanzibar had the highest number of transfers-dependent households (10.1%), followed by the Northern and Central regions (8.0% and 7.8% respectively).

Men were more likely to head households across all the main livelihood categories except transfers-dependent households, 56% of which were headed by women. Of the other livelihoods, the prevalence of male-headed households ranged from 71% (non-agriculture mixed) to 85% (livestock production).

⁹ RIGA is a FAO project used to construct income aggregates for World Bank LSMS studies such as the current Tanzania National Panel Survey. Information at: http://www.fao.org/economic/riga/riga-database/en/

In 2008-09, transfers households (receiving more than 50% of their income from public or private transfers) formed the poorest livelihood group: 44% of these households belonged to the lowest expenditure quintile (see graph 4-5). Crop-producing households had the second lowest expenditures per capita: 28% fell into Tanzania's lowest quintile and 30% into the second lowest quintile.



Graph 4-5: Main livelihood groups by expenditure quintiles (2008-09)

The highest incidence of food insecurity was found in the transfers and crop-producing livelihood groups with approximately 13% of households in each group having a *poor dietary intake*. Their vulnerability is further highlighted by other indicators: around half of the households in these livelihood groups derived a very high share (>75%) of their calories from staple foods (cereals, roots and tubers), and over 70% spent a very high proportion (>75%) of their expenditures on food. Households belonging to non-agriculture based livelihood groups – self-employed and non-agricultural wages – were least likely to experience food insecurity: 5.7% and 3.8% respectively.

Graph 4-6 shows little variation between the food insecurity prevalence rates of cropproducing households, transfers-dependent households and agricultural-mixed households. Households getting most income from livestock were notably better off in terms of very high staples intake and poor dietary intake. Households generating most of their income from self-employment or non-agricultural earned wages were the most food secure.



Graph 4-6: Food insecurity prevalence by main livelihood groups (2008-09)

Zooming in on Tanzania's smallholder farmers¹

Tanzanian agriculture is dominated by smallholder farmers. In 2008-09, 57% of Tanzanian households were defined as having agricultural-based livelihoods (more than 50% of income from crops, livestock and/or agriculture wages). These households were more likely to experience food insecurity than those in the other main livelihoods. For example, 12.2% were classified as having a *poor dietary intake* – more than double the *poor dietary intake* prevalence of the two main non-agriculture livelihoods (non-agri wages and self-employment, 3.8% and 5.7% respectively). These farming households were also characterised by a higher dependency on staple foods and a greater share of expenses directed to food (see graph 4-6).

Farming households: uneducated heads, many occupants

On average, agricultural-based households consist of 5.4 members– with around 2.6 being of working age (15-60 years). Farming household heads are typically male (77%) and most never attended school (65%) or did not complete primary school (16%). Their main sources of cash income are sale of food crops (67%), sale of cash crops (12%), and wages or salaries in cash (5.7%).

Basic housing, limited assets, traditional farming

Almost all agricultural-based households are owner occupied (93%), but housing conditions are basic with walls most likely to consist of mud bricks (31%) or a combination of mud and stones or poles (28%); floors are mostly earth (85%) and roof material is most likely either grass, leaves or bamboo (48%), or metal sheets (45%). Nine out of ten of these households use lamp oil for lighting.

Tanzanian farmers own only the most basic household assets and agricultural inputs. Less than 1% of farmers own a fridge or freezer, a car, or a motorcycle. Bicycles, however, are a common form of transport (44%). Half own at least one head of livestock (50%) and most own poultry (69%) with an average of 11 birds. In terms of agricultural inputs, households ar more likely to employ traditional forms of equipment rather than modern machinery. In 2008-09, 92% owned a hoe and 10% a plough. But just 4.3% owned spray machines, 2.6% wheelbarrows and less than 1% harrows and harvesting threshes. For a deeper discussion about the challenges facing smallholder farmers see section 6.2.

Water from afar, food from home

The main sources of drinking water in the rainy season are rivers, lakes and ponds (38%) and wells without pumps (22%). In the dry season, this reliance increases slightly to 42% and 24% respectively. Indeed, households spend more time collecting drinking water in the dry season (70 minutes daily) than in the rainy season (38 minutes).

Farming households derived most of their food energy from their own production (62%) and the rest from purchases (35%) and gifts (2%). Reflecting their economic vulnerability, on average, around 71% of these households direct a very high share (more than 75%) of their household expenditures to food.

Shocks

The NPS asks households to report whether they were severely negatively affected by a variety of events in the previous five years. In 2008-09, farming households were found to be particular exposed to droughts and floods (32% reporting being affected severely), crop disease (34%), dying livestock (32%), falling crop prices (35%), rising food prices (64%), and agricultural input price rises (34%).

¹Figures used in this box are based on the 2008-09 National Panel Survey.
4.5 Households that are more reliant on own produce

Tanzania's agriculture based economy means much of the population consumes their own produce. In 2010-11, on average, 37% of households' food energy came from own production, while 60% was purchased from shops and markets (graph 4-7). The main source of food for households varied greatly by location. Urban households sourced most of their food energy from food purchases – Dar es Salam (97%), other urban areas (77%), and Zanzibar (87%). In contrast, rural households derived an average of 58% of their food energy from own-production (compared with 1% in Dar es Salam). Similarly, of the *poor dietary intake* households, 45% of food energy came from own-production. Additionally, *poor dietary intake* households were twice as likely as the general population to get food in the form of gifts, borrowing or other (8% compared with 4%).

An over-reliance on any one food source can adversely affect household food security. Households that produce much of what they eat will be more vulnerable if there is a drought or major pest damage, while, a household that buys all its food from shops is vulnerable to income and food price shocks. In 2010-11, 9.3% of households derived more than 90% of the food energy they consumed from own-production. Of these households, 22% were classified as having a *poor dietary intake* (compared with 8.3% nationally).



Graph 4-7: Source of calories, selected households (2010-11)

Food insecure farmers have smaller plots, more likely to grow sorghum and cassava

For *poor dietary intake* farming households, the average plot size was smaller (2.2 hectares) than for households not suffering from a *poor dietary intake* (2.8 hectares). Although maize was the most commonly grown crop in both *poor dietary intake* and *non-poor dietary intake* plots, the former group were more likely to grow cassava or sorghum as the main crop. In 2010-11, 21% of *poor dietary intake* farming-households cultivated cassava compared with 14% of plots owned by non-*poor dietary intake* households, and 6.9% cultivated sorghum compared with 3.2% of all other plots. Tolerant to drought conditions and productive in poor soils, cassava is a crop typically grown by poor farmers.

5.0 Living with food insecurity

To better understand what food insecurity means for Tanzanians, households were asked whether they exercised a set of coping strategies to manage food shortages. Specifically households were asked whether, in the previous seven days, they had resorted to:

- Relying on less preferred foods
- Limiting portion size at meal times
- Reducing the number of meals eaten in a day
- Restricting consumption by adults for small children to eat
- Borrowing food, or relying on help from a friend or relative

In 2010-11, in the week before the interview, 58% of Tanzanian households did not employ any of the above coping strategies. Of the 42% which did, the most used coping strategies were 'relying on less preferred food' (28% of households), 'reducing the number of meals eaten in a day' (21%), and limiting portion size at meal-times (14%).

The *reduced coping strategies index* (CSI) combines the use of the above five coping strategies into a single index. First, each of the five strategies is assigned a weight based on its severity⁵. Household CSI scores are then generated by multiplying the number of days (in the past week) each strategy was employed by its corresponding severity weight, and then summing together the totals. High CSI scores indicate either that coping strategies have been employed relatively often, or that the strategies employed are relatively more severe¹¹, or both.

Nationally, the CSI average score was 3.4. This marks a significant drop from Tanzania's CSI of 9.8 in December 2009-10¹². Of the rainfall areas, rural households in Tanzania's bimodal zone had the highest CSI (4.0). Within this area, the Lake and Western zones were worst off (4.7 and 4.2 respectively). Zanzibar and the Southern Highlands fared best (1.8 and 2.0).

As standard thresholds do not exist for the CSI score, country specific categories have been created to support the following analysis. All households that reported having used a coping strategy were divided into terciles based on their ranked CSI score. The final 'CSI groups' were then classified as: 1) no coping, 2) low coping, 3) medium coping, and 4) high coping.

¹¹ Severity weightings of coping strategies are: "Eating less-preferred/expensive foods", "limiting portion size at mealtime" and "reducing the number of meals per day" have a severity score of 1. "Borrowing food or relying on help of friends/relatives" and "restricting consumption by adults for small children to eat" have a severity score of 2 and 3 respectively.

¹² CFSVA Tanzania (2010).

5.1 Poor and rural households in bimodal zones are most likely to employ coping strategies

Half of all bimodal rural households resorted to at least one coping strategy in the seven days prior to interview (51%) while 18% had a high usage of coping strategies relative to other Tanzanian households (Graph 5-1). Graph 5-2 shows that households in the Lake and Western zones were most likely to have employed a coping strategy (59% and 51% respectively).

The frequency and severity of a household's coping strategies are also linked to the household's financial resources. In 2010-11, 26% of households below the poverty line employed a high level of coping strategies.







Graph 5-3 shows that as household expenditure increases, the likelihood of employing coping strategies falls. Indeed, households in the bottom expenditure quintile were three times more likely than those in the top quintile to have employed a high level of coping (23% to 8%).

5.0 100% 5.0 90% 4.5 80% 4.0 70% 3.5 ♦ 3.4 Percent of households 60% ♦ 3.0 3.0 Score 50% 2.5 ខ ♦ 2.1 40% 2.0 30% 1.5 high coping 20% 1.0 medium coping low coping 10% 0.5 no coping CSI Score 0% 0.0 1 lowest 2 3 4 5 highest **Expenditure quintile**

Graph 5-3: Level of coping by expenditure quintile, 2010-11

Like low expenditure households, food insecure households were also very likely to regulate their eating behaviour: 73% of *poor dietary intake* households employed at least one coping strategy and 29% had a high level of coping. The most common strategies employed by *poor dietary intake* households in the week before the interview were 'reducing the number

of meals in a day' (40% employed this strategy at least once and 14% employed it on more than five of the previous seven days), and 'relying on less preferred foods' (39% at least once; 10% on more than five days).

Almost one third (30%) of *poor dietary intake* households stated that - in the 12 months preceding the survey - they faced a situation in which there was not enough food to feed the household. Most *poor dietary intake* households that reported facing this situation (57%), said the main cause was 'inadequate household stocks due to drought/poor rains'. Other main reasons included 'inadequate household food stocks due to small land size' (9%), 'inadequate household food stocks due to lack of farm inputs' (9%) and 'food in the market was very expensive' (8%).

6. Key food security issues

6.1 Increased national wealth but limited food security gains for rural poor

Tanzania's significant recent economic growth (6.9% per year from 2001-2010) has not been matched by improvements in the living conditions of the country's poor population. During this period, the agricultural sector – in which most poor Tanzanians work – experienced steady but lower growth. To better understand the continuing impoverishment of Tanzania's poor and the underlying causes of food insecurity, a closer inspection of Tanzania's agriculture industry is required. This section aims to describe the reasons behind Tanzania's limited food security gains despites its significant economic growth.

Agriculture is the main livelihood source for most Tanzanian households. The industry accounts for 24.1% of Tanzania's GDP and employs 70% of the active labor force (Economic Survey, 2011). From 2000-2010 the agriculture sector's annual growth rate ranged between 3.1% and 5.9%. Despite this steady growth, over a similar period (from 2000-01 to 2007-08), the official national poverty rate¹³ fell just two percentage points from 35.7% to 33.6%; and by only one percentage point in rural areas: from 38.7% to 37.6% (NBS, 2009).

Tanzania's agriculture sector is vastly diverse. The country's different agro-ecological areas experience great variability in weather conditions – ranging from heavy rain seasons to extremely dry conditions. Crop production, which alone accounted for 18% of Tanzania's GDP in 2010, is centered on several key food crops - maize, cassava, rice, sweet potatoes, bananas, sorghum and sugar cane. In 2010, livestock production accounted for 4% of GDP (Economic Survey, 2011).

In terms of food security, both the 2009 CFSVA and the current study identify Tanzania's rural poor as those most exposed. Sustainable food security gains will require continued support for Tanzania's agriculture sector.

Overall national growth outstrips that of agricultural production

In terms of economic growth, the agricultural sector has not kept pace with overall national growth in recent years. In 2010 and 2009, the sector expanded by 4.2% and 3.2% respectively compared with overall real GDP growth rates of 7.0% and 6.0% for these years (Economic Survey, 2011). The growth experienced by the agricultural sector was attributed to improved irrigation and rural road infrastructure, and an increased use of fertilizers (GoT, 2011).

Nationally, production growth of the main food crops in Tanzania has been modest. Maize and sweet potato production has grown very little (around 1% and 5% respectively for 2007-2010), while the production of rice and sorghum fell during the same period. Cassava was one staple food crop experiencing steady growth for 2007-2010. Conversely, cash crops

 $^{^{\}rm 13}$ Official poverty rates determined by the 2000/01 and 2007 Household Budget Surveys.

production, has flourished in recent years with strong gains in sugar, tobacco, cashew nuts, coffee and tea. The growth has been attributed to an increased use of improved seedlings, good farming techniques, an expansion of farming areas and renewed farming on abandoned farms (GoT, 2011).

Small farmers: poor productivity, poor access

Agriculture in Tanzania is dominated by smallholder subsistence farming. Around 85% of farmers own fewer than four hectares of land – the average size of a cultivated farm plot being 2.6 hectares (NBS, 2012). Just one third of Tanzanian farmers sell some of their produced crops (34%). Most farmers cultivate four or more crops (53%) with maize being the main one (cultivated by 83% of all farming households). The majority of smallholder farmers in Tanzania do not employ many agricultural inputs to improve the quality and quantity of their produce. The potential gains from modern machinery, improved seed varieties, irrigation and fertilizer remain outside the economic and skills reach of most farmers.

The variety of productivity and market access challenges which contribute to smallholders' exposure to food insecurity are outlined below.

Lack of farm mechanization	High reliance on labour intensive farming tools severely limits the amount of land that can be cultivated, which, in turn, limits yields. The higher costs of mechanized equipment, and associated costs of maintenance and importing machine components, combined with a lack of servicing centres across the country, renders ownership, and even renting such equipment outside the realm of most farmers. In 2010-11, over 95% of rural households were still using hand hoes, making it the country's main cultivation tool. Farmers were far more likely to either <i>own</i> or <i>rent</i> an ox-drawn plough (9% and 18% respectively) than a mechanized tractor plough (0.2% and 2.8% respectively) (NBS, 2012).
Seeds and fertilizer	Use of agricultural inputs such as fertilizer and improved seed varieties is rare in Tanzania. In 2010-11, less than a third (32%) of farmers used fertilizer – 21% used organic fertilizers and 16.5% inorganic (NBS, 2012). Over the same period, only 17% of farmers sowed improved variety (IV) seeds, which are designed to enable crops to grow in adverse conditions – such as drought and pesticide/herbicide sprayings. If farmers used IV seeds in combination with inorganic fertilizer, they might expect to see higher productivity from their plots. For instance, when IV seeds and inorganic fertilizers were used for maize plots, average yields were 115% higher than plots without improved inputs (before controlling for other factors such as plot size and farmer education) (EPAR, 2012). These agricultural inputs remain largely inaccessible for most smallholder farmers due to cost.

Irrigation	Irrigation systems would be particularly useful in Tanzania's low rainfall areas, but only 4% of farmers use them. This translates to only 1.8% of Tanzania's cultivated land being irrigated. Those farmers who do irrigate mostly use traditional low-technology methods: 70% use furrow irrigation (controlled field flooding using hills) and 18% watering buckets. The country's very limited irrigation use makes farmers highly reliant on rainfall rendering them vulnerable to extreme weather conditions. Unfortunately, however, expensive basic equipment and limited knowledge about small- scale irrigation technologies keeps irrigation out of the economic reach of most farmers (NBS, 2012).
Farmer knowledge	Smallholder farmers lack opportunities to gain new skills and knowledge regarding improved agriculture technologies. Farmer groups and extension services are typical ways farmers can improve their access to technology, funding, crop processing and marketing. Tanzania's largest farmer group (MVIWATA) brings together smallholder farmers from the country's regions; it has approximately 1,000 groups in more than 80 districts. However, the 2010 MDG report identified a lack of qualified extension services and not enough incentives to retain providers (GoT, 2011).
Pre and post- harvest losses	Many smallholder farmers in Tanzania suffer from either pre-harvest or post-harvest crop losses. Overall, 9% reported post-harvest losses in 2010- 11 (down from 14% in 2008-09). In 2010-11, one third of farmers stored part of their production with two thirds of them using sacks or open drums. However, only 6% of farmers used methods capable of decreasing post- harvest losses such as modern storage structures and air-tight drums. Pre- harvest losses should also be considered: in 2008-09, on 30% of the country's maize plots, farmers reported harvesting less area than they planted, with more than half attributing the loss to drought. Additionally, pre-harvest losses, which were reported by farmers on 34% of plots, were attributed to wild animals, theft and insects. These joint findings suggest harvests may improve with both better storage facilities and improved varieties of drought and pest resistant seeds.
Credit	Lack of access to credit for smallholders is a major barrier to increased productivity and income. If in place, well-established lending and credit systems could enable smallholders to purchase key agricultural inputs such as fertilizer and pesticide. However, formalized financial lenders remain very restricted in Tanzania; indeed, in 2010-11, only 2.2% of farmers reported receiving credit for the purchase of agriculture inputs.

6.2 Food security and nutrition

Food security is closely linked to nutrition. Children living in households that do not consume enough of the right foods are particularly vulnerable to undernutrition. It follows that children with poor nutrition are exposed to many serious long-term health problems, including reductions in physical, cognitive and mental development.

Undernutrition increases children's vulnerability to severe diseases. It has been identified as the underlying contributing factor in over one third of all child deaths (WHO, 2012). In Tanzania, the under-five mortality rate is 81 per 1,000 live births¹⁴ (NBS, 2011), which means one in 12 Tanzanian children die before their fifth birthday. Children who survive but have suffered undernutrition in their early years will have a diminished ability to grow and this is likely to impair their ability to attain their mental and/or physical potential and therefore their ability to work, locking them into the poverty they inherited. For example, farmers who have once suffered from undernutrition have lifelong consequences and are less productive and therefore have a reduced earning potential - as physical strength is critical for their livelihoods.

Nutrition has a new-found prominence on Tanzania's national agenda. In 2011, the government released the National Nutrition Strategy (NNS) as the principal guiding document on nutrition for the period 2011 to 2016 (GoT, 2011). The goal of the strategy is for all Tanzanians to attain adequate nutritional status. Specifically, the NSS identifies the types of services that key sectors and agencies can deliver to ensure proper nutrition is achieved throughout the country.

The major focus of the NNS is on women of reproductive age and young infants. It considers 'the first 1000 days' – that is, pregnancy and the first two years of life - as the window of opportunity for fighting undernutrition. This early development period is crucial for preventing growth retardation, stunting and other serious, long-lasting harms caused by undernourishment including reduced intellectual capacity.

Nutrition in Tanzania

This section focuses on Tanzania's nutrition situation and gives particular attention to foodrelated causes and potential solutions. First, it identifies the regions that exhibit the highest malnutrition rates. Second, it describes the main causes of malnutrition in Tanzania. Third, it considers key strategies for improving Tanzania's overall nutrition status by increasing the production and consumption of nutritious foods. Given the purpose of this report, greater attention is placed on food-based strategies for improving nutrition, rather than the equally important health interventions, improved care giving practices and sanitation strategies.

Tanzania's children: four in ten too short for their age

This section presents the main nutrition findings from the 2010 Demographic and Health Survey (DHS). Overall, the DHS reported a downward trend (over the past 10-15 years) in the prevalence of stunting and underweight, while wasting levels have remained 'basically the same' over the past 10 years. However, in terms of all three indicators there is significant room for improvement in order to reach the NNS goal of all Tanzanians attaining an adequate nutritional status.

¹⁴ During the period 2006-2010.

The 2010 DHS measured three anthropometric indicators: stunting, wasting and underweight (see box on next page for an explanation of each). At the national level, four out of 10 children (42%) aged under five years were **stunted** (DHS, 2010). Children in rural areas were more likely to be stunted (45%) than their urban counterparts (32%). The Southern Highlands zone stood out as exhibiting very high rates of stunting across all its regions: Iringa (52%), Rukwa (50%), Mbeya (50%). Other regions reporting very high stunting prevalence included Dodoma (56%) and Lindi (54%). Stunting was observed to be more prevalent in poorer households and households in which the mother had little or no formal education.

Nationally, 5% of children were **wasted** and 1% severely wasted. Zanzibar had a higher prevalence of wasting than mainland Tanzania (12% vs. 4.6%). Nationally, 16% of children were **underweight**. Prevalence was higher for rural children (17%) than urban children (11%), and Zanzibar children were more likely to be underweight than their mainland counterparts (20% vs. 16%). In mainland Tanzania, Arusha (in the Northern zone) had the highest rate of underweight children (28%) and Mbeya – in the Southern Highlands – had the lowest (10%).

Understanding indicators measuring undernutrition

Stunting (low height for age) is a measure of chronic malnutrition characterized by a slowing in the growth of a child resulting in a failure to achieve the expected length or height when compared to a healthy, well-nourished child of the same age. Stunting is associated with a number of long-term factors such as deficiencies in nutrition (chronically inadequate levels of protein and energy and/or micronutrient deficiencies), frequent infections, and inappropriate feeding practices over a sustained period. It is not an accurate measurement of short-term changes in nutritional status.

Wasting (low weight for height) is a measurement of acute malnutrition characterized by considerable weight loss or failure to gain weight, resulting in a child having a weight substantially below what would be expected of a healthy child of the same length or height. Wasting indicates current malnutrition and can change quickly over time; even showing marked seasonal patterns associated with changes in food availability and disease prevalence.

Underweight (low weight for age) is a composite measurement of stunting and wasting as it is influenced by both – age and weight. Underweight is a good indicator for assessing changes in malnutrition over time, but care must be taken in interpreting this indicator because it reflects both chronic and acute malnutrition.

Causes of undernutrition

In Tanzania, the major nutrition problems faced by the population relate mainly to undernourishment - that is, people not consuming enough food energy (National Nutrition Strategy, 2011). The two *immediate* causes of undernutrition are 1) food intake, and 2)

disease. All other factors that influence a country's undernutrition status feed into these two causes. Tanzania's experience of the other factors - referred to by UNICEF as the underlying or basic causes of undernutrition - is outlined below.

- 1. Household food insecurity is an *underlying cause* of undernutrition. By definition, households with poor access to food lack the resources needed to produce or purchase sufficient nutritious food for its members.
- 2. Inadequate maternal and child caring practices are an underlying cause of undernutrition in households. Tanzania's 2010 DHS found that only 50 percent of infants under 6 months are exclusively breastfed as recommended by the World Health Organization's (WHO). Furthermore parents were asked how they feed their children, with respect to the established WHO Infant and Young Child Feeding (IYCF) practices¹⁵. In Tanzania, just 21% of all children aged 6-23 months were found to be fed in accordance with IYCF practices; urban children were slightly more likely than rural children to meet the standards (24% to 21% respectively).

Children in the Central and Western zones were least likely to follow a feeding regime in line with the IYCF minimum standards (8% and 15% of children respectively). At the regional level, children most likely not to follow IYCF practices lived in Kigoma (only 5% met minimum standards), Dodoma (7%), Singida (8%) and Lindi (8%); conversely, children most closely adhering to the IYCF were in Ruvuma and Manyara (59% and 53% respectively).

- 3. An **unhealthy household environment** is an *underlying cause* of undernutrition. Poor sanitation is closely linked to preventable diseases including diarrhoea, dysentery and cholera. This includes poor access to clean, safe water and sanitation, as well as the quality of shelter. In 2010-11, 13% of Tanzanian households were without basic sanitation facilities (i.e. flush toilets or pit latrines) i.e. 17% of rural households and 4% of urban (NBS, 2012). In the 2010-11 rainy season, only 43% of households in Tanzania had access to safe drinking water.¹⁶ Again the situation was worse for rural households than urban - the respective prevalence of access to safe drinking water was 32% in rural vs. 66% in urban (NBS, 2012).
- 4. The *underlying causes* outlined above are all driven by broader macro-level influences related to the availability of resources in-country (human, structural and financial), and how they are used within the various systems (political, legal and cultural). UNICEF refers to these influences as *basic causes*. While an in-depth assessment of these systemic factors is beyond this report's scope, the key ones are noted below:

¹⁵ The IYCF guidelines were created by WHO to establish minimum standards with respect to breastfeeding status, dietary diversity (i.e. number of food groups consumed), and feeding frequency (i.e. number of times the child is fed) ¹⁶ Safe drinking water: piped into the dwelling, private or public standpipe or tap, and protected wells.

- a. Tanzania's agricultural system lacks crop diversity especially at the smallholder level;
- b. Limited capacity at institutional level to provide extension services to farmers and to conduct research and training in nutrition and food technology;
- c. Low level of literacy particularly among women and girls limits their access to information about nutritional concepts and caring practices;
- d. Rural communities' vulnerability to natural disasters and other shocks which can affect their nutritional status (i.e. drought, flood, pests), and inadequate early warning preparedness and response systems;
- e. Poor access to health services and a lack of a comprehensive social protection system.

Addressing undernutrition: a food security perspective

Tanzania's government and partners must pursue strategies focused on increasing the quantity - and improving the quality - of foods available to its undernourished population. This section highlights key opportunities to reduce undernutrition in Tanzania.

The agriculture sector should be central to efforts aimed at improving nutrition in Tanzania. It is likely to be an effective vehicle for deploying a variety of nutrition interventions because most of the country's poor live in rural areas, where health conditions and health services are worse. And many rural households get most of their food from their own production.

The NNS aims to augment food access and thereby increase food security for farming households by improving conditions for household food production, harvest and post-harvest handling, storage and preservation, food processing and preparation, animal husbandry and fishery. It also aims to establish services in which farming households are introduced to readily available, accessible and affordable farming technologies.

The NSS also identifies as critical the need to establish formal and informal lending institutions that will facilitate the acquisition of credit as well as effective extension services to help improve agricultural and livestock rearing practices. Additionally, it sets out to encourage key community members to promote proper management and sustainable utilisation of natural resources. This will include actions to reduce food losses during harvest and post-harvest periods. For instance, farming households must improve preservation methods and food storage structures.

Similarly, food processing and preparation techniques need to be geared towards retaining more of the nutritional quality of foods, and extending food shelf-life to ensure greater consistency in availability. For non-farming households, income-generating activities are needed so members can afford to purchase healthy foods. Once food is available at the

household level - for farming and non-farming households alike – to ensure all household members are well nourished, equitable distribution of food among members must occur.

Nutrition interventions: food based strategies

The following strategies, closely linked to the agriculture sector, aim to help small farmers grow a wider variety of foods and nutritionally enhanced staple crops.

Crop and livestock diversification

The dietary intake of Tanzania's rural population lacks adequate nutritious components. In 2010-11, Tanzanian rural households derived, on average, 58% of their consumed calories from their own production. This high dependency on home-produced foods increases the likelihood of diets that lack nutritional diversity. Indeed, 30% of rural households were classified as having *low diet diversity*¹⁷ and 49% had a *very high staples intake*¹⁸ (compared with 4% and 8% respectively in Dar es Salam, for instance).

Livestock programmes - in which rural households are given dairy cattle, goats and chickens - improve households' direct access to animal food products. Nutrition improves as milk and egg consumption increases; earning potential also improves as households can sell items not consumed. The Heifer International Organisation, which is established in all 21 of Tanzania's regions, is a leading example of how livestock gifts help the nutrition situation of rural households.

Increasing small-scale horticulture production has the potential to boost micronutrient intake and increase income earning potential. However, Tanzania currently lacks capacity in fruit processing and farmer-supply chains; this has led to large post-harvest losses. To encourage small farmers to diversify their crops, investment is needed in fruit and vegetable production, processing and marketing. In parallel, widespread education campaigns should be undertaken about the importance of micronutrients in child development and the roles fruit and vegetables play in providing these nutrients.

Fortification

Food fortification is the process of adding nutrients to food and condiments. By adding nutrients to commonly consumed foods, much of a population's diet can be quickly improved. For instance, the iodization of salt is a successful example. Opportunities exist to enrich foods such as maize, wheat flour, sugar, oil and salt with important nutrients such as iron, vitamin A and zinc.

 $^{^{\}rm 17}$ Consumed four or fewer groups of food during the seven day reporting period.

 $^{^{18}}$ Staple foods contributed more than 75% of household calories.

Fortification initiatives in Tanzania started more than a decade ago, but much has been achieved in the last few years including the appropriate selection of food vehicles, establishments of the fortification standards (March 2011) and gazetting the fortification regulations and legislation (July 2011) which make fortification of wheat, maize flour and vegetable oil mandatory. As of early April 2013, large scale industries have been fortifying wheat and oil with iron, zinc, folate, and vitamin B12 in wheat flour and vitamin A in edible oil. The efforts underway should be expanded and the nutritional impact properly assessed. Capacity building of food processors is needed for them to adopt fortification methods for the small-scale processors dominant in rural areas.

Clear advantages of the strategy include its cost-effectiveness, and that it does not discriminate by household consumption patterns (i.e. foods selected for fortification will be commonly consumed by all households). One drawback is that households fully dependent on consuming their own produce will not benefit, and these households are likely to be among those whose diets most lack micronutrients. For them, home-based fortification interventions are required, and planned under the NSS. This would require widespread distribution of nutrient powders to community level millers and the marketing of nutrient sprinkles. These high-dosed nutrient powders are added directly to food by the household.

Biofortification

Biofortification refers to breeding crops in a way that increases their nutritional value – either by conventional selective breeding, or genetic engineering. Unlike standard fortification, the biofortification process adds nutrients to the foods as they grow rather than during the processing phase. Regular consumption of staple foods enriched with key micro-nutrients such as iron, zinc, and vitamin A, can considerably reduce micronutrient deficiencies in staple dominated diets.

Biofortification is a generally underdeveloped technology in Tanzania but evidence emerging from other countries – including Mozambique and Uganda – is that biofortification techniques can have a positive impact on a population's nutritional status (IFPRI, 2011). Currently there is a big initiative to scale up production of orange fleshed sweet potatoes which are very rich in vitamins A and D. Many areas in Tanzania are now growing these potatoes.

Non-food based strategies

Changing behaviour via nutrition campaigns

Education campaigns about nutrition in Tanzania must match the wide variety of information needs and audiences. Such programmes should cover nutrition topics as

wide-ranging as which foods to eat; food preparation; sharing foods across household members; growing food. Additionally, informing and educating adolescent girls and women about breast feeding and appropriate complementary feeding of young children is likely to help reduce child malnutrition.

The scope of agricultural extension services in Tanzania should be broadened to incorporate nutrition. In addition to generating knowledge and skills related to maximising crop harvests, agricultural extension personnel should integrate nutrition-based advice into their role (for example, encouraging smallholder famers to embrace crop diversification).

Nutrition supplements

Supplement preparations containing high doses of nutrients can work to treat the diseases that cause and aggravate nutrient deficiencies. In practice, they are an immediate and effective way to prevent severe undernutrition. However, while such supplements work to address acute nutritional and health conditions, they are not a sustainable solution for widespread undernutrition. Supplement programmes require established delivery channels, such as through the health system, and regular treatment and monitoring of patients, especially for nutrient supplements that have to be taken weekly such as iron and zinc, or those that are toxic in high quantities such as vitamin A. They should be considered useful for treating symptoms of undernutrition in a short-term programmatic manner.

7.0 Linking food security outcomes to policy

The findings presented in this report describe a country in need of targeted action to defeat food insecurity. The NPS results found that between two survey phases, the national prevalence of food insecurity – in terms of *poor dietary intake* - remained at around the same level. In 2010-11, nearly one in five households had *low diet diversity* and one in three was *highly food energy deficient*; and, in the week prior to the survey, 42% of households employed at least one coping strategy to manage a food shortage situation. This level of household vulnerability to food insecurity requires concerted and sustained cross-sectorial action. Gaining government support and policy momentum behind the task of eliminating food insecurity is not the problem; instead, the difficultly seems to lie in implementing effectual activities that will reduce food insecurity.

The Government of Tanzania and the Revolutionary Government of Zanzibar have identified achieving food security as a key policy objective at all levels of the national planning hierarchy. At the highest level of government policy, the Tanzania Development Vision (TDV) 2025 –driven by Tanzania and Zanzibar's Growth and Poverty Reduction Strategies (MKUKUTA/MKUZA)– positions the goal of attaining food security as central to national development.

More specifically, commitment to agricultural growth and improving nutrition -two areas identified by this report as crucial to Tanzania's attainment of food security- has been demonstrated in the form of a range of policies endorsed by the government, private sector and civil society.

The key role agricultural growth is expected to play in reducing food insecurity is reflected across a number of key national strategies. Three strategic statements form the foundation of Tanzania's current commitment to this sector: the government's 2006-2015 Agricultural Sector Development Strategy (ASDS); the public-private *Kilimo Kwanza* (Agriculture First) for Tanzania Mainland; and the Agricultural Transformation Initiative (ATI) for Zanzibar. Together these documents aim to create an enabling and conducive environment for improving the productivity and profitability of the agricultural sector. Guided by these strategic documents, planned operational interventions are set out in the sector's major development programmes -the Agricultural Sector Development Program (ASDP) for Tanzania Mainland; the Agricultural Sector Plan (ASP) for Zanzibar; and Tanzania's Comprehensive Africa Agriculture Development Programme (CAADP). Such interventions revolve around enabling farmers to have better access and use of agricultural knowledge, technologies, marketing systems and infrastructure, and to promote private investment in an improved policy environment.

In recent years, nutrition has gained prominence on Tanzania's policy agenda. The country's two overarching strategic papers are the National Nutrition Strategy (NNS) for Tanzania Mainland and the Zanzibar Food Security and Nutrition Policy (ZFSNP). The overarching goal is for all Tanzanians to attain adequate nutritional status. The strategies outline the priority areas for intervention and identify the involvement required from specific sectors and agencies. Government partners are in support of interventions such as feeding practice support for mothers, food fortification, and micronutrient supplementation. Two key partner initiatives include the Scaling up Nutrition (SUN) and Feed the Future programmes.

Tanzania's comprehensive policy infrastructure and environment appears satisfactory for generating and tackling food insecurity. But Tanzania requires a comprehensive and coordinated cross-sector approach to rolling out food security interventions. To this end, in 2011, the government of Tanzania launched the Tanzania Agriculture and Food Security Investment Plan (TAFSIP). TAFSIP is described as a sector-wide approach to coordinate and harmonise the resources needed to accelerate implementation of existing initiatives and to launch new ones that address national, regional and sectoral development priorities.

Recommendations:

For the consideration of Government and partners -notably WFP- the following section contains broad recommendations designed to protect and strengthen those households most vulnerable to food insecurity.

1. Strengthen existing programmes to boost agricultural productivity by focusing assistance on the supply side of the value chain.

While more than half of Tanzanian households derive most of their income from agricultural related activities, the farming methods employed are tremendously basic. This report describes smallholders' dependency on labour intensive tools; their low levels of improved seed variety use, and almost no irrigation systems. The situation is worsened by the very little credit accessible to farmers to purchase agricultural inputs. Additionally, farmers lack core farming skills and knowledge. These factors all compound to create the entrenched situation of Tanzania's farming households experiencing a particularly great vulnerability to food insecurity.

The roll out of agricultural development activities focusing primarily on bolstering small farmers' capacity to satisfactorily feed themselves and to generate a sustainable income is required. Food security and commercialisation for these farms requires improved supply channels for key farming inputs and input voucher schemes. To realise productivity potential across the country, these schemes must be wide-reaching and targeted to the areas of most need. TAFSIP identifies the delivery of affordable agronomic packages -consisting of improved seeds, fertilisers, weed and pest control

and improved harvest and post-harvest management- as key to boosting smallholder farmer productivity. Also, schemes to provide irrigation solutions at the community and smallholder farmer level should be accelerated. The introduction of such productivityenhancing technologies must be accompanied by sufficient and comprehensive training and extension services.

2. Invest in activities to address undernutrition and improve child care practices.

The level of undernutrition in Tanzania has reduced over the past 10-15 years but remains too high. This study identifies Tanzania's high child stunting prevalence and poor feeding practices as areas both requiring urgent action. It also found it common amongst Tanzanians to live in unhealthy home environments in which access to clean water is low; and, many remain without basic sanitation facilities. High levels of low diet diversity and high reliance on staple foods highlight the need for increased education about, and access to, foods containing micronutrients.

NNS represents increased attention to, and understanding about, the severity of undernutrition in Tanzania from government and development partners. This study endorses the objectives described in the strategic document. In terms of activities specifically geared towards improving household food security, key activities must include: the promotion of crop diversification in smallholder farmer households; fortification of basic food items including maize flour, sugar, cooking oil and wheat flour; exploration of biofortification possibilities; scale-up of supplementation in critical areas. Efficiency gains should be realised by equipping agricultural extension service workers with the skills to provide household-level nutritional advice –for instance, on food preparation, crop diversification and child care practices.

3. Focus food security specific policies and interventions on household livelihoods and income generation.

While the majority of Tanzanian households are classified as having agriculture-based livelihoods, implementing policies that pursue agricultural growth and improved nutrition will not alone ensure food security at the household level. Indeed, this study found that the 6% of households whose main income came from transfer payments were, of the livelihood groups, the most food insecure. Similarly, although many rural households get most foods from own-production, many households rely completely on food-purchases and are more exposed to factors that affect food-supply.

Food security interventions that support a variety of different livelihoods need to be designed. They should aim to remove the structural constraints that impede household earning potential. The pro-poor public investment and empowerment arrangements

described by MKUKUTA II needs to be activated. Income generating opportunities must be realised across the different sectors. For instance the improving of storage and milling capacities at community and household level in rural areas, improved connectivity by roads and mobile services, increased availability of micro-credit institutions in urban areas.

4. Reinforce disaster preparedness and response measures with focus on household coping and resilience.

Tanzania is prone to natural and human-made hazards including drought, agricultural pests, floods, and earthquakes that cause food insecurity. This report found that rural households experiencing food shortages were most likely to attribute it to drought and poor rains. The report identifies rural households in the drought stricken bimodal rainfall region as having the most severe experience in terms of coping strategies employed.

Opportunities are emerging to establish systematic disaster preparedness and response measures to reduce future drought and other shocks. The United Nations Development Assistance Plan identifies the need for greater capacity within line ministries to ensure better coordination and rapid response when disaster strikes (UNDAP, 2011). Also, specifically important to food security in disaster periods, is developing a strategy regarding the resupply of strategic emergency warehouses.

5. Conduct studies into Tanzania's food security situation at lower geographic levels.

To better identify normally food insecure areas and vulnerable groups, district level data is needed. While representative at national and zone levels, the drawback of the current study is that it cannot describe the food security situation at lower geographic levels. Richer information is critical for the planning, implementing and tracking of interventions at the Local Government Area levels. Future studies should seek representativeness at lower level geographic levels; if conducted on a small-scale, studies should focus in on areas known to be particularly vulnerable to food insecurity. Enhancing research activities in this way will drive the targeting of food-based interventions such as school feeding, food for work and cash for work.

6. Scale up safety net schemes for wider coverage

Despite numerous policies and activities being developed and delivered for addressing food security, nearly one in ten households are classified as having *poor dietary intake*. These households are in need of immediate relief. Several safety net programmes have

been initiated by the government and partners. Scaling up these programmes will bring greater relief to those in need.

Tanzania's current range of safety net programs aimed at bolstering food security provides a strong base upon which to scale up activities. The activities described below should be evaluated closely to determine how successfully they could be expanded to ensure wider coverage.

In recent times, during periods of acute food shortages, the government has provided hand-outs –via price subsidized food rations and free food from emergency reserves- to the most vulnerable households. Complementary intervention on non-food items such as provision of seeds has also been instrumental in recovery of the households engaged in farming. One additional recent government initiative involved restocking the households in pastoralist areas which lost their animals due to severe drought; however, this is not currently a common safety net scheme in Tanzania.

WFP provides lunch and snacks to pupils through school-feeding programmes; however, this is no longer considered a WFP activity alone. Across Tanzania, community mobilization and involvement of the parents have enabled implementation of community-based school feeding programmes. Further, some non-government organizations such as Project Concern International (PCI) are among partners working with local governments to provide school meals in selected districts. Supplementary feeding programmes administered by community nutrition officers via community health centres.

WFP is currently piloting a cash and voucher scheme which targets lactating and pregnant women and provides cash transfers accompanied with information on how best to ensure food diversity in their households. Additionally, with support from WFP and other partners, Local Government Authorities (LGAs) have been implementing food-for-work activities in the most drought prone and food insecure areas. Under food-forwork, a range of activities are initiated by the community themselves including afforestation activities such as tree planting. Maintenance for infrastructure such as rural roads and irrigation canals are the activities most supported by WFP.

8.0 Food Security profile - summary tables

		Diet Quantity			Diet Quality		Vulne	erability
– Population group	Daily energy consumed per capita (Kcals) ¹	Percent households moderately food energy deficient	Percent HHs Highly food energy deficient	Percent households with low Diet Diversity ²	Percent households with 'very high' proportion of food energy from staple foods ³	Poor dietary intake ⁴	Percent households with 'very high' proportion of household expenditures on food ⁵	Percent households reporting being severely affected negatively by large food price increases in past 5 years
National	2,093	14%	29%	18%	30%	8.3%	52%	51%
Dar es Salam	3,114	3%	14%	5%	6%	1.4%	12%	28%
Rest of urban	2,325	14%	22%	10%	19%	4.2%	33%	51%
Rural	1,944	15%	33%	22%	37%	10.5%	63%	54%
Zone								
Western	2,040	16%	29%	21%	38%	9.5%	58%	51%
Northern	2,047	15%	29%	11%	20%	6.1%	51%	45%
Central	1,686	10%	46%	24%	29%	17.0%	55%	64%
Southern Highlands	2,063	16%	27%	18%	28%	6.2%	56%	65%
Lake	2,030	17%	29%	21%	37%	10.7%	56%	41%
Eastern	2,674	8%	21%	6%	17%	2.0%	31%	46%
Southern	2,016	15%	32%	31%	47%	12.8%	59%	55%
Zanzibar	1,728	19%	41%	17%	45%	10.3%	59%	55%
Expenditure quintile								
1 (lowest)	1,387	18%	58%	39%	57%	24.2%	68%	53%
2	1,805	22%	34%	18%	37%	8.7%	65%	57%
3	2,197	16%	20%	11%	27%	1.9%	55%	53%
4	2,654	8%	13%	7%	17%	2.1%	41%	49%
5 (highest)	3,501	3%	13%	2%	4%	0.4%	20%	43%
Occupation group								
Self employed - farming	1,919	16%	34%	22%	38%	10.8%	64%	55%
Self employed- other	2,438	12%	19%	7%	19%	3.2%	26%	43%
Wage employed - private	2,639	9%	21%	9%	12%	3.1%	31%	46%
Wage employed - non-private	2,788	12%	12%	1%	9%	0.4%	11%	45%
Unemployed/not active	2,042	10%	39%	24%	32%	12.4%	48%	48%
Male-headed household	2,114	14%	29%	16%	30%	7.2%	50%	52%
Female-headed household	2,031	14%	29%	24%	31%	11.4%	55%	50%

Table 8.01: Food security profile for Tanzania, 2010-11 (Phase 2)

1) Food Energy Deficient households are those which, given the age sex composition of household members, do not meet the daily recommended energy intake. Light physical activity is assumed.

2) low diet diversity accounts for households with 4 or less food groups consumed during one week period. 7 food groups are considered: (1) cereals, roots, and tubers; (2) pulses and legumes; (3) dairy products; (4) meats, fish and seafood, and eggs; (5) oils and fats; (6) fruits; and (7) vegetables.

3) Very High: Staple foods contribute more than 75% of household calorie intake (staples comprise of cereals, roots and tubers).

4) Households classified as Poor Dietary Intake are classified as both 1) Highly Food Energy Deficient and 2) Low Diet Diversity

5) Very high: more than 75% of household essential expenditures on food

-		Diet Quantity			Diet Quality		Vulne	erability
– Population group	Daily energy consumed per capita (Kcals) ¹	Percent households moderately food energy deficient	Percent HHs Highly food energy deficient	Percent households with low Diet Diversity ²	Percent households with 'very high' proportion of food energy from staple foods ³	Poor dietary intake⁴	Percent households with 'very high' proportion of household expenditures on food ⁵	Percent households reporting being severely affected negatively by large food price increases in past 5 years
National	2,242	13%	24%	25%	38%	10%	57%	66%
Dar es Salam	3,033	6%	13%	4%	8%	1%	15%	84%
Rest of urban	2,486	12%	19%	15%	27%	7%	32%	65%
Rural	2,141	14%	25%	30%	45%	11%	68%	64%
Zone								
Western	2,215	14%	23%	27%	46%	11%	65%	69%
Northern	2,286	16%	17%	14%	21%	5%	54%	57%
Central	1,915	5%	37%	32%	50%	16%	64%	75%
Southern Highlands	2,412	13%	17%	28%	42%	6%	59%	60%
Lake	2,075	13%	30%	30%	44%	14%	58%	56%
Eastern	2,669	8%	17%	16%	25%	6%	36%	78%
Southern	2,090	17%	29%	37%	50%	15%	70%	74%
Zanzibar	1,662	16%	46%	26%	36%	17%	58%	59%
Expenditure quintile								
1 (lowest)	1,541	18%	50%	53%	61%	27.0%	76%	64%
2	1,971	18%	26%	30%	52%	10.1%	71%	65%
3	2,294	13%	17%	21%	40%	5.5%	59%	63%
4	2,794	8%	10%	10%	20%	2.4%	45%	68%
5 (highest)	3,536	2%	9%	4%	8%	0.3%	22%	71%
Occupation group								
Self employed - farming	2,103	14%	27%	31%	46%	12%	68%	64%
Self employed- other	2,616	10%	17%	11%	21%	4%	29%	68%
Wage employed - private	2,631	8%	17%	10%	15%	5%	30%	74%
Wage employed - non-private	2,971	10%	10%	2%	17%	0%	14%	70%
Unemployed/not active	2,335	15%	19%	27%	32%	6%	55%	56%
Male-headed household	2,248	12%	24%	22%	37%	9%	55%	62%
Female-headed household	2,218	13%	23%	33%	41%	13%	64%	67%

Table 8.02: Food security profile for Tanzania, 2008-09 (Phase 1)

1) Food Energy Deficient households are those which, given the age sex composition of household members, do not meet the daily recommended energy intake. Light physical activity is assumed.

2) low diet diversity accounts for households with 4 or less food groups consumed during one week period. 7 food groups are considered: (1) cereals, roots, and tubers; (2) pulses and legumes; (3) dairy products; (4) meats, fish and seafood, and eggs; (5) oils and fats; (6) fruits; and (7) vegetables.

3) Very High: Staple foods contribute more than 75% of household calorie intake (staples comprise of cereals, roots and tubers).

4) Households classified as Poor Dietary Intake are classified as both 1) Highly Food Energy Deficient and 2) Low Diet Diversity

5) Very high: more than 75% of household essential expenditures on food

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10.0 Annex

10.1 Methods

A) Kilocalorie consumption

In this study, household –and per capita- calorie intake was estimated using the 7-day food diary module in the National Panel Survey. The methodology adheres closely to the procedure detailed in the IFPRI guidelines, *Measuring Food Security Using Household Expenditure Surveys* (Smith, 2007). The procedure taken to estimate kilocalorie consumption can be divided into the following steps:

- (1) All reported quantities are converted to grams or millilitres. Food reported in non-metric quantities (i.e. pieces) were converted to grams using conversion values from the 'Tanzania Food Composition Tables' jointly prepared by the Harvard School of Public Health; Tanzania Food and Nutrition Centre; and, Muhimbili University of Health and Allied Sciences (Lukmanji, 2008).
- (2) Reported metric intakes are adjusted to reflect the 'standard' edible proportions of each food item (for instance, a banana minus its peel is 64% its

original weight; this is the edible proportion). Standard edible proportions for food items are taken from the FAO Food Security Statistics Module (FSSM) composition table for Tanzania. The total edible quantity (in grams and millilitres) is generated for every food item within each household. This are separated into three food source categories: *Purchased; Produced; and, Other (ie. gifts, borrowed etc.)*.

- (3) Calorie values are assigned to each food item listed in the reporting diary. These are taken from the *`Tanzania Food Composition Tables'*.
- (4) *Calorie cost* is determined for each household. This is the number of calories consumed per Tanzanian Shilling (TSH). To calculate this, the *summed calorie intake* (of all *purchased* food items) is divided by the corresponding *summed food item prices*.
- (5) Calorie intake is estimated for 'meals consumed outside the home' by first converting the reported values (in TSH) into metric quantities. This estimation process requires aligning household expenditure information for 'outside' foods with 'at home' foods. For each household, the reported TSH value of each 'outside' food is multiplied by the *national* 'grams/mls intake per TSH' of the corresponding 'at home' food. This generates an estimate of 'outside home' quantity consumption for each of the 'outside home' food groups listed in the questionnaire. Calories consumed are then estimated by assigning calorie content information to each food group using the 'Tanzania Food Composition Tables'.

The estimation procedure outlined above cannot be applied for two of the categories for 'meals consumed outside the home'; in these cases the category descriptions are too broad. Specifically, the groups 'breakfast, lunch, or dinner', and 'barbecued meat, chips, roast bananas and other snacks', unsatisfactorily explain which foods have been consumed. In these cases, calorific intake is estimated by multiplying the reported TSH value by the household's overall calorie cost (see step 4 above).

- (6) Non-present household members are excluded from the count of household members (or *household size*). These members are identified as those who, during the 7 day reporting period, reportedly did not eat any meals or food 'at home' or 'outside the household'.
- (7) Consumption outliers are treated at the individual level. This requires, for each household, a calculation of the quantity consumed of each food item person. This is given for each food item by dividing: *quantity consumed* by *household size*. In each of the 8 geographic zones, the 'median weekly quantity consumed, per capita' is determined for all food items. Zero quantities are excluded from the median calculation for each food item.

Per capita quantities consumed (in grams/mls) found to be three standard deviations above median consumption are flagged as outliers and inspected. Around 0.5% of quantities were deemed to be outliers. Outlying quantities are replaced with the mean consumption intake for the food item, based on household's zone.

(8) To calculate 'Total household kilocalories' a number of steps are required. First, the 'at home' calories intake is determined for the revised consumption quantities (using the Tanzania food composition tables). Second, 'outside home' calories are added to the total amount of 'at home' calories. Third, the number of 'guest meals' is used to determine and exclude 'calories consumed by guests' from the 'Total household kilocalories'. If not undertaken, calories consumed by guests would be assigned to household members, thus overestimating their food energy intake.

Guest calories are estimated by dividing the 'reported number of guest meals' in household during the 7 day reporting period by 'the number of total household meals'. Total household meals are estimated by: 'household size' x 21. (The '21' comprises 7 days of 3 meals - breakfast, lunch and dinner). The estimate of 'calories per meal' is determined by dividing the total household kilocalories -including 'at home' and 'outside' calories consumedby the household's total number of meals. Then the calories from all guest meals are excluded from the 'total household kilocalories'.

(9) The 'total household kilocalories' are then used to derive the 'Kilocalories per capita' and 'daily kilocalories per capita'.

B) Food energy deficiency (FED) and High food energy deficiency

In this study, a household is considered *food energy deficient* if it acquired insufficient food for consumption over the seven day reporting period to meet the energy requirements of all of its members. Energy requirements for households are based on the WHO recommended kilocalorie intake table (FAO, 2004). These calorie recommendations are based on individual age, sex and physical activity. Households are assessed to be *food energy deficient* when the combined daily caloric recommendation for its members was not achieved. Without access to physical activity information, it was assumed to be light for all individuals.

The indicator *High food energy deficiency* identifies those households with a more serious food deficit from the energy requirement–specifically, at least 300 calories on average per household member per day.

Kilocalories per			Kilocalories			
Age group (years)	da	ay	Age group (years)	per day	Age group (years)	per day
Infants and young			Older children and		Older children and	
children	Boys	Girls	adolescents	Boys	adolescents	Girls
<1	650	600	6-7	1,350	6-7	1,225
1-2	950	850	7-8	1,450	7-8	1,325
2-3	1,125	1,050	8-9	1,550	8-9	1,450
3-4	1,250	1,150	9-10	1,675	9-10	1,575
4-5	1,350	1,250	10-11	1,825	10-11	1,700
5-6	1,475	1,325	11-12	2,000	11-12	1,825
			12-13	2,175	12-13	1,925
			13-14	2,350	13-14	2,025
			14-15	2,550	14-15	2,075
			15-16	2,700	15-16	2,125
			16-17	2,825	16-17	2,125
			17-18	2,900	17-18	2,125
			Adults	Men	Adults	Women
			18-30	2,550	18-30	2,025
			30-60	2,500	30-60	1,980
			>60	2,075	>60	1,775

World Health Organisation: Daily Energy recommendations

Source: In line with the IFPRI methodology for estimating kilocalories, the values for infants are the mean of the 12 monthly values reported in the '*Human Energy Requirements: Report of a joint FAO/WHO/UNU Expert Consultation*' (2004), Table 3.2. The values for older children and adolescents are taken from Tables 4.5 and 4.6. The values are derived from Tables 5.4-5.9 using the midpoint of the light physical activity range given in Table 5.3 and the second interpolation method given on page 40. The values for adults assume a weight of 65 kilograms for males and a weight of 55 kilograms for females. All values are rounded to the nearest 25 kilocalories.

C) Diet Diversity

Each food item reported in the household food diary belongs to one of seven food groups: 1) cereals, roots and tubers, 2) pulses and legumes, 3) dairy products, 4) oils and fats, 5) meat, fish, eggs 6) fruit and 7) vegetables. Households which consumed 4 or fewer of these food items during the week-long reporting period were classified as having *Low Diet Diversity*.

Households in which more than 50% of the food-based expenditures (measured in Tanzanian Shillings) were consumed outside of the house were not able to be classified as having *low diet diversity*. The reason is that accurate information about food items consumed by these households existed for less than half the households' food expenditures. If these households were included, many wealthy households which simply consume most of their foods outside the house would be deemed food insecure. In total, 9.0% of all households were excluded from consideration. Of the excluded households, 81% were in the top two expenditure quintiles.

D) Very high staples intake

The classification *very high staples* intake captures households in which more than 75% of their consumed calories came from the staples food group. IFPRI identifies these households as having very poor diet quality.

As with *low diet diversity* households, those households in which more than 50% of the food-based expenditures (measured in Tanzanian Shillings) were consumed outside of the house were not eligible to be classified as having *very high staples intake* due to insufficient information.

E) Poor Dietary Intake

Combining the food consumption household-level indicators *high food energy deficiency* and *low diet diversity* we can examine which households are experiencing serious dietary constraints in both the food quantity and quality dimensions.

Specifically, households classified as having a 'poor dietary intake' are those which have both a) *High Food Energy Deficiency*-that is a daily deficit of 300 calories per household member; and, b) *Low Diet Diversity*- consuming 4 or less food items over the past 7 days. In these households the food security situation is assessed to be severe.

The rationale behind this indicator's construction is that, independently, each indicator does not provide conclusive results about a household's food security. Households which consume less than the recommended calorie intake may contain household members on diet–who are consuming nutrients sufficient to form a healthy diet. Similarly, households with low dietary diversity, though consuming 4 or less food groups in a week, could be acquiring abundant quantities of the nutritionally richest food groups. By combining the indicators in

the *Poor Dietary Intake* indicator, households are identified which are lacking both in terms of diet quantity and diet quality.

F) Coping Strategies Index (CSI)

The Coping Strategies Index is a standard WFP indicator used in food security analysis. Its main objective is to measure the frequency and severity of negative coping behaviours employed by households when they do not have enough to eat. In the current survey, household heads who stated that they had worried, in the past 7 days, that their household would not have enough food, were then asked how many days they employed one of the standard five coping strategies. The five coping strategies and their severity weights are:

- Relying on less preferred foods (1.0);
- Limiting portion size at meal times (2.0);
- Reducing the number of meals eaten in a day (1.0);
- Restricting consumption by adults for small children to eat (3.0); and,
- Borrowing food, or relating on help from a friend or relative (4.0).

Based on the frequency reported and the severity weight of the coping strategy used, households CSI scores are calculated. Standard thresholds for describing CSI scores do not exist. For the descriptive analysis, households that reported having used a coping strategy were divided into terciles based on their ranked CSI. The CSI groups are therefore described as *no coping*, *low coping*, *medium coping* and *high coping*.

G) Livelihood groups

Livelihood groups are created using 2008-09 NPS income data, which was prepared under the auspices of FAO's 'Rural Income Generating Activities (RIGA) *Project'*. The data provides income aggregates by activity type for households in NPS download the 2008-09 (available for here: http://www.fao.org/economic/riga/riga-database/en/). Usina these data, households are grouped into livelihoods based on the share of income earned from their various activities. The livelihood groups are defined as follows:

Livelihood group	Description	%
		households
		in 2008-09
Crops production	Crops production accounted for more than 50% of all	43.2%
	household income.	
Livestock	Livestock production accounted for more than 50% of all	6.1%
production	household income.	
Agriculture - mixed	Households not classified into either of the two above	8.4%
	categories, but which got more than 50% of income from a	
	mixture of agricultural activities. That is, more than half of the	
	household's income came collectively from 1) agriculture	
	wages 2) livestock, and 3) crops production.	
Non-agricultural	Wages received from non-agriculture based employment	13.5%
wages	accounted for more than 50% of all household income.	
Self employed	Self-employment in non-agricultural field accounted for more	19.1%
	than 50% of all household income.	

Transfers	Private and public transfers accounted for more than 50% of all	5.6%
	household income.	
Non-agricultural	Households not classified into one of the three above	2.5%
mix	categories, but which got more than 50% of income from a	
	mixture of agricultural activities. That is, more than half of the	
	household's income came collectively from 1) Non-agricultural	
	wages 2) Self-employed, and 3) Transfers.	

About 1.5% of the population did not fall into above categories; these are households which provided no income information (1.0%) and households containing an even split between agriculture and non-agriculture incomes (0.5%). These households were not included in the livelihood analysis.

H) Sampling design

Sample design information is taken from the NPS Business Information Document (available online:

http://microdata.worldbank.org/index.php/catalog/1050/technicaldocuments). The original sample size of 3,265 households was designed to be representative at the national, urban/rural, and major agro-ecological zones. The total sample size was 3,265 households in 409 Enumeration Areas (2,063 households in rural areas and 1,202 urban areas).

As the NPS is a panel survey, the second round of the fieldwork revisited all households originally interviewed during round one. If a household moved from its original location, the members were interviewed in their new location. If that location was within one hour of the original location, the field team did the interview at the time of their visit to the enumeration area. If the household had located more than an hour from the original location, details of the new location were recorded on specialised forms, and the information passed to a dedicated tracking team for follow-up.

If a member of the original household had split form their original location to form or join a new household, information was recorded on the current whereabouts of this member. All adult former household members (those over the age of 15) were tracked to their new location. Similar to the protocol for the re-located households, if the new household is within one hour of the original location, the new household was interviewed by the main field team at the time of the visit to the enumeration area. For those that have moved more than one hour away, their information was passed to the dedicated tracking team for follow-up. Once the tracking targets have been found, teams are required to interview them and any new members of the household.

The total sample size for the second round of the NPS has a total sample size of 3,846 households. This represents 3,168 round-one households, a re-interview rate of over 97%. In addition, of the 10,420 eligible adults (over age 15 in 2010), 9,338 were re-interviewed, a re-interview rate of approximately 90 per cent.

I) Poverty line

While Tanzania's Household Budget Surveys (HBS) are the country's official source of poverty incidence, the NPS enables us to consider Tanzania's poor population through a food-security lens. The poverty analysis based on the NPS uses the same methodology as the HBS and is deemed to provide reliable and consistent poverty estimates (NBS, 2012).

The poverty line enables a population to be split into two sub-groups for analysis: poor and non-poor. The measure is determined by estimating the monetary cost of a minimum level of standard of living for an individual. Those people whose consumption does not exceed that predetermined value are considered poor. In 2010-11, the total poverty line per adult equivalent per 28 days was 23,933 Tanzanian Shillings (TSh). This was calculated using prices during the period from October 2010 – September 2011.

The food poverty line is an estimate of the cost of consuming a daily intake of 2,200 kilocalories per adult equivalent. Foods selected for the 'food bundle' are based on consumption patterns and prices paid by the bottom 50% of the population in terms of real consumption. For 2010-11, it was estimated to be 18,719 Tsh.

A more detailed description of the methodology underpinning the NPS poverty line is available in Appendix A of the Tanzania National Panel Survey Report (NBS, 2012).

J) Expenditure per capita

This indicator is generated by dividing a household's total expenditure for the reporting period by the number of present members within the household. In this instance, the definition of expenditure includes the estimated value of food items which were consumed but not purchased - for example, the estimated value of own-produced foods for consumption.

K) Very high food expenditures share

This household-level indicator is a measure of economic vulnerability. It is based on the percentage of total household expenditures devoted to food. Households which direct 75% or more of total expenses to food are considered to have a very high food expenditure share. The threshold corresponds with IFPRI's classification of households with a 'very high' expenditure on food (IFPRI, 2007).

While this indicator is based on actual household expenditures it also accounts for the value of non-purchased food items which were consumed within the reference period. For instance, the value of foods which were produced by the household for own consumption within the reporting period were considered food expenditures.

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	2008-09	2010-11
National	2,242	2,093
Urban	2,627	2,538
Rural	2,131	1,938
Zone:		
Western	2,215	2,040
Northern	2,286	2,047
Central	1,915	1,686
Southern Highlands	2,412	2,063
Lake	2,075	2,030
Eastern	2,669	2,674
Southern	2,090	2,016
Zanzibar	1.662	1.728

Table 1 Average daily kilocalorie intake, per capita

Table 2Moderately and highly food energy deficient (FED) households

	2008-09			2010	-11
	Moderate FED	High FED		Moderate FED	High FED
National	12.6%	23.7%		14.0%	29.2%
Urban	10.4%	17.9%		11.1%	20.2%
Rural	13.4%	25.7%		15.2%	33.2%
Zone					
Western	14.5%	23.2%		15.5%	29.1%
Northern	16.0%	17.0%		14.7%	29.2%
Central	4.7%	36.9%		9.6%	46.4%
Southern Highlands	12.7%	16.9%		16.0%	26.5%
Lake	13.2%	30.0%		16.7%	28.8%
Eastern	8.2%	17.1%		8.2%	20.8%
Southern	17.0%	28.5%		15.1%	31.7%
Zanzibar	15.8%	45.6%		19.0%	40.5%

	2008-00	2010-11
	2008-09	2010-11
National	9.8%	8.3%
Urban	5.0%	3.4%
Rural	11.6%	10.5%
Zone		
Western	10.7%	9.5%
Northern	5.4%	6.1%
Central	15.6%	17.0%
Southern Highlands	5.9%	6.2%
Lake	14.2%	10.7%
Eastern	5.8%	2.0%
Southern	14.5%	12.8%
Zanzibar	16.8%	10.3%

Table 3 Poor dietary intake, % households

Table 4 Chronic poor dietary intake, % households

National	1.7%
Urban	0.4%
Rural	2.3%
Zone	
Western	1.1%
Northern	1.0%
Central	4.9%
Southern Highlands	0.2%
Lake	3.8%
Eastern	0.3%
Southern	2.1%
Zanzibar	4.5%

		Low	Medium	High
	No coping	coping	coping	coping
National	57.6%	15.8%	12.1%	14.5%
Urban	61.6%	14.9%	10.6%	13.0%
Rural	55.9%	16.2%	12.8%	15.2%
Zone				
Western	49.0%	17.4%	15.1%	18.5%
Northern	58.3%	18.8%	11.0%	11.8%
Central	63.7%	9.0%	11.5%	15.8%
Southern Highlands	71.0%	13.2%	7.9%	7.9%
Lake	40.8%	21.9%	15.5%	21.8%
Eastern	62.5%	13.7%	11.4%	12.5%
Southern	59.7%	13.4%	12.4%	14.5%
Zanzibar	74.0%	10.2%	9.3%	6.5%

Table 5Coping strategy severity groups, 2010-11

Table 6Coping strategies employed

	reduced					borrowed		went a
	the		limited	limited	restricted	food, or	had no	whole day
	number	relied on	the	portion	consumption	relied on	food of	and night
	of meals	less	variety	size at	by adults for	help from	any kind in	without
	eaten in	preferred	of food	meal	small children	friends or	the	eating
	a day	foods	eaten	times	to eat	relatives	household	anything
National	22.5%	30.4%	17.0%	14.2%	5.8%	11.3%	7.7%	3.3%
Urban	20.9%	29.2%	19.4%	15.2%	4.2%	9.6%	6.6%	3.1%
Rural	23.3%	30.9%	15.9%	13.7%	6.5%	12.1%	8.1%	3.4%
Zone								
Western	30.3%	39.7%	23.4%	17.0%	7.6%	15.1%	15.1%	4.5%
Northern	16.3%	25.1%	11.2%	10.7%	3.6%	15.9%	4.5%	1.3%
Central	26.3%	20.8%	12.9%	16.2%	4.1%	6.5%	1.2%	1.2%
Southern Highlands	15.9%	18.7%	8.5%	7.4%	3.5%	5.4%	3.0%	2.3%
Lake	26.5%	48.0%	26.0%	20.3%	8.9%	16.0%	14.0%	7.2%
Eastern	21.3%	28.1%	18.8%	14.8%	6.7%	8.9%	6.0%	2.2%
Southern	25.3%	28.3%	15.7%	12.4%	4.9%	9.3%	6.3%	3.6%
Zanzibar	10.0%	16.3%	11.7%	13.0%	4.1%	2.7%	2.2%	1.1%

able 7Very high food expenditure sha					
		2008-09	2010-11		
	National	56.9%	51.6%		
	Urban	26.1%	27.0%		
	Rural	67.8%	62.5%		
	Zone				
	Western	64.6%	57.5%		
	Northern	54.3%	51.5%		
	Central	64.3%	54.9%		
	Southern Highlands	59.4%	55.8%		
	Lake	58.5%	56.2%		
	Eastern	36.4%	30.7%		
	Southern	70.3%	59.0%		
	Zanzibar	58.0%	58.9%		

Table 7Very high food expenditure share

Table 8Low diet diversity prevalence, and average number food groups
consumed

	2008-09		2010-11	
		Average		Average
		number		number
		food		food
	% Low	groups	% Low	groups
	Diet	consumed	Diet	consumed
	Diversity	in week	Diversity	in week
National	25.1%	5.17	18.0%	5.32
Urban	11.8%	5.50	8.6%	5.43
Rural	29.8%	5.05	21.4%	5.27
Zone				
Western	27.2%	5.07	21.5%	5.23
Northern	13.6%	5.67	10.5%	5.75
Central	31.9%	4.93	24.1%	5.27
Southern Highlands	27.8%	5.07	18.0%	5.35
Lake	30.3%	5.11	21.2%	5.28
Eastern	15.8%	5.31	6.1%	5.38
Southern	36.8%	4.72	30.9%	4.88
Zanzibar	25.8%	5.20	17.1%	5.19

Table 9Chronic low diet diversity

National	8.2%
Urban	3.6%
Rural	10.2%
Zone	
Western	9.2%
Northern	2.7%
Central	12.0%
Southern Highlands	8.8%
Lake	11.5%
Eastern	2.7%
Southern	15.1%
Zanzibar	8.0%

*Households which registered *low diet diversity* in both survey phases.

Table 10Very high share of food from staples

	2008-09	2010-11
National	38.2%	30.4%
Urban	20.8%	15.3%
Rural	44.4%	37.1%
Zone		
Western	46.0%	37.7%
Northern	21.4%	20.3%
Central	50.0%	29.1%
Southern Highlands	41.7%	28.5%
Lake	44.3%	36.7%
Eastern	25.3%	17.2%
Southern	49.5%	46.8%
Zanzibar	35.9%	45.2%
Table 11

Chronic very high staples intake*

National	17.7%
Urban	8.1%
Rural	22.0%
Zone	
Western	23.9%
Northern	6.9%
Central	21.5%
Southern Highlands	15.2%
Lake	24.6%
Eastern	8.9%
Southern	29.2%
Zanzibar	18.2%

*Households which registered *very high staples intake* in both survey phases.

Table 12Living below the poverty line, 2010-11*

National	17.8%
Urban	5.2%
Rural	22.3%
Zone	
Western	24.9%
Northern	14.2%
Central	26.9%
Southern Highlands	16.2%
Lake	20.1%
Eastern	4.5%
Southern	23.3%
Zanzibar	12.3%

*Poverty estimates generated using National Panel Survey.

	2008-09	2010-11
National	61.2%	62.8%
Urban	75.4%	76.3%
Rural	56.1%	56.8%
Zone		
Western	60.4%	61.0%
Northern	74.8%	66.9%
Central	47.3%	47.1%
Southern Highlands	61.2%	63.0%
Lake	53.9%	62.2%
Eastern	72.9%	76.3%
Southern	49.2%	51.9%
Zanzibar	45.4%	53.6%

Table 13 Households with adequate food consumption

Table 14Households experiencing food shortage in past year

	2010-11
National	20.3%
Urban	18.3%
Rural	21.2%
Zone	
Western	24.9%
Northern	22.7%
Central	23.7%
Southern Highlands	11.5%
Lake	25.7%
Eastern	17.7%
Southern	19.3%
Zanzibar	7.1%

Table 15Household heads which did not attend school

National	23.9%
Urban	13.0%
Rural	28.8%
Zone	
Western	26.8%
Northern	24.3%
Central	37.0%
Southern Highlands	22.3%
Lake	22.5%
Eastern	14.7%
Southern	27.3%
Zanzibar	27.3%

Table 16 School attendance of school-aged children

		Some of	None of
	All of household's	nousenoia s	None of
	childron in school	but not all	childron in school
National	75.0%	15.2%	9.7%
Urban	89.5%	6.5%	4.1%
Rural	70.1%	18.2%	11.7%
Zone			
Western	62.9%	23.7%	13.4%
Northern	80.2%	13.1%	6.7%
Central	57.4%	20.3%	22.3%
Southern Highlands	82.5%	11.6%	5.9%
Lake	75.1%	15.7%	9.2%
Eastern	79.8%	11.2%	9.0%
Southern	81.5%	11.9%	6.6%
Zanzibar	82.7%	11.4%	5.9%

Table 17Source of calories

	Source of calories					
	Food	Other (gifts,				
	purchases	production	borrowing, etc.)			
National	59.7%	36.5%	3.7%			
Urban	86.8%	10.3%	2.9%			
Rural	38.4%	57.5%	4.1%			
Zone						
Western	42.4%	54.4%	3.2%			
Northern	59.9%	36.3%	3.8%			
Central	33.8%	63.7%	2.4%			
Southern Highlands	40.4%	56.2%	3.4%			
Lake	46.6%	50.6%	2.8%			
Eastern	88.6%	9.2%	2.3%			
Southern	39.5%	53.0%	7.5%			
Zanzibar	86.6%	8.9%	4.5%			

Table 18 Expenditure quintiles

	2008-09					2010-11				
	quintile 1				quintile 5	quintile 1				quintile 5
	(lowest)	quintile 2	quintile 3	quintile 4	(highest)	(lowest)	quintile 2	quintile 3	quintile 4	(highest)
National	22.1%	22.0%	20.8%	19.5%	15.7%	23.4%	21.0%	19.7%	19.0%	17.0%
Urban	7.5%	9.5%	17.1%	27.9%	38.1%	6.8%	13.6%	16.7%	25.8%	37.1%
Rural	27.2%	26.5%	22.1%	16.5%	7.7%	30.7%	24.3%	21.0%	16.0%	8.1%
Zone										
Western	33.9%	25.8%	16.9%	14.8%	8.6%	31.3%	20.9%	18.3%	18.9%	10.6%
Northern	15.9%	20.3%	23.5%	24.0%	16.3%	20.9%	22.8%	24.5%	18.5%	13.3%
Central	34.0%	27.8%	17.2%	15.0%	6.0%	40.2%	19.9%	18.6%	14.3%	7.0%
Southern Highlands	19.9%	26.3%	25.6%	19.2%	9.1%	23.4%	25.4%	20.0%	19.1%	12.1%
Lake	24.3%	22.4%	20.9%	19.4%	13.0%	26.7%	21.5%	18.9%	17.3%	15.7%
Eastern	8.5%	11.5%	16.7%	23.9%	39.4%	6.2%	13.0%	15.5%	24.2%	41.1%
Southern	25.9%	24.4%	24.3%	16.2%	9.3%	27.0%	25.6%	21.1%	15.8%	10.5%
Zanzibar	23.8%	21.4%	22.1%	19.6%	13.0%	15.1%	22.0%	25.9%	22.8%	14.2%