# Chapter 5

## Trends in Apparent Per Capita Food Consumption

Every year the FAO compiles food balance sheets (FBS) for each of the 15 member states of ECOWAS. The chapter analyses data from these FBS over a 30 year period (1980 – 2009) to identify broad trends in apparent average per capita availability of calories, protein, and fat in these countries, as well as changes in the contribution of major food groups to diets in the region. These food groups include cereals, roots and tubers, animal products, pulses fruits and vegetables, vegetable oils, sugar and sweeteners, and alcoholic beverages. The analysis of these broad trends in per capita food availability sets the stage for more detailed analysis of food consumption by income group and urban/rural residence in Chapters 6 and 7.

### *5.1 Performance in terms of increasing macronutrient availability*

Food balance sheets (FBS) provide estimates of the amount of food available for human consumption at the retail level, not actual consumption. In this chapter, the figures derived from the FBS are referred to interchangeably as "per capita availability" and "apparent per capita consumption". Comparing FAO FBS for the 15 ECOWAS countries over the period 1980–2009 provides information on how well the West African food system has performed in terms of supplying macronutrients (calories, fat, and protein) to the population in these countries, as well as the changing contribution of different major food groups to the diet in the various countries.

The FBS estimates, however, need to be interpreted cautiously, as they are highly dependent on the quality of the data used in constructing the food balance sheets. Specifically, FBS estimates of per capita availability are derived by taking estimates of national production of various food products, adjusting them for imports and exports, changes in stocks, non-food use (such as animal feed and industrial uses), and wastage between harvest and the retail level (including processing losses). The net food availability at the retail level thus calculated is then divided by the estimated population, and then converted into various nutrients using a food composition table. Thus, the accuracy of the estimated national average per capita availability of various food items (and the nutrients derived from them) is a function of the accuracy of the data for each of the components that goes into the calculation. Given the weakness in many countries of the underlying data on several of these elements (e.g. regarding changes in stocks and population levels), one should at best use FBS data to identify broad patterns and trends in per capita food availability. Furthermore, as production statistics on non-cereal crops in West Africa have generally improved over the past 30 years, one needs to be cautious in interpreting FBS data that show apparent increases in the per capita availability of these products. It is not always apparent whether the figures reflect real increases in availability or more complete statistical enumeration of national production over time.[40]

Bearing these caveats in mind, analysis of per capita availability of calories, protein, and fat, based on data from FAO food balance sheets for the period 1980–2009 show general improvement in macronutrient availability over the period and some upgrading of dietary quality, but with significant variation across countries (Me-Nsope and Staatz, 2013). As shown in Appendix table A5.1 (p.142), four countries – Burkina Faso, Mali, Ghana and Nigeria – increased apparent per capita calorie availability by 50% or more between 1980–85, a period of drought and severe food shortage in the Sahel, and 2007–09. If true, this is a remarkable achievement

40 For more details on these caveats, see Farnsworth, 1961; and Me-Nsope and Staatz, 2013.

given the rapid population growth in these countries. These are also the four countries that, according to the FBS, had the lowest per capita calorie availability at the beginning of the period; by the end of the period, the FBS for Ghana, Nigeria, and Burkina Faso recorded the highest per capita calorie availability of any countries in the region, and Mali was above the regional mean.

All the remaining countries, except Benin, Côte d'Ivoire and Liberia, increased their estimated per capita calorie availabilities on the order of 6 to 15%. Benin experienced a 29% increase in calculated per capita calorie availability. In Côte d'Ivoire, estimated per capita calorie availability fell by 7% over the 30-year period, while in Liberia it fell by 11%, although it has begun to recover during the post-war period starting in 2004. Ironically, according to the FBS, Côte d'Ivoire and Liberia had the highest estimated per capita calorie availability of all countries in the ECOWAS region at the beginning of the period (1980-82).

Turning to estimated per capita protein availability (Appendix Tables A5.2 through A5.4), a slightly more complex story emerges when one takes into account not only total per capita protein availability but also its source. In general, proteins from animal sources have a more complete mix of the essential amino acids required by human beings; thus, the percentage of total protein coming from animal sources is a rough indicator of protein quality.[41] In terms of changes in estimated per capita availability of total protein between 1980-85 and 2004-2009, the same four countries – Burkina Faso, Mali, Ghana and Nigeria – showed the greatest increases, on the order of 40 to 50%. Yet the bulk of the increase came from vegetal sources. Given that basic staples such as cereals contain 10 to 12% protein, it follows that a 40 to 50% increase in calorie availability (the bulk of it from such staples) would lead to a proportionate increase in total protein availability. In Mali and Burkina Faso, only 11 to 12% of the increase in total per capita protein availability came from animal sources. For Ghana, the figure was 20%, indicating some upgrading of diet quality, while in Nigeria, the estimated per capita availability of animal protein actually fell by 10%, with all the increase in total per capita protein availability attributable to plant sources. For Nigeria, however, part of the increase came from higher per capita availability of pulses – particularly cowpeas – which are a high-quality source of protein. The picture that emerges for Burkina, Mali, and Nigeria is thus one of, on average, people eating more food as incomes increased, but giving first priority to increasing total calorie intake, with little upgrading in terms of increasing animal protein consumption.

A very different picture emerges for Cape Verde, the ECOWAS country with the highest per capita income. While total per capita protein availability increased by only 6% between 1980-85 and 2004-09, there was a large substitution of animal protein, whose per capita availability increased by 54%, for protein from vegetal sources, which saw a decline of 14%. In Cape Verde, diets became more animal-based as incomes rose.

For the remaining ten countries in the region, estimated total per capita protein availability increased in six countries (Niger, The Gambia, Benin, Guinea, Sierra Leone and Togo) by proportions ranging from 5% to 29%, with relatively little or no increase in per capita availability of animal proteins. In the remaining four countries (Guinea Bissau, Senegal, Côte d'Ivoire and Liberia), total estimated per capita protein availability fell by between 1% (in Guinea Bissau) and 25% (in Liberia). In Senegal, however, there was a modest increase in per capita animal protein availability, indicating some modest upgrading of protein quality in the context of falling overall per capita availability.

## 5.2 Starchy staples

The trade data reviewed in Chapter 4 pointed to the increased consumption of rice and wheat in the region, resulting in burgeoning imports of these two cereals. While consumption of these two internationally traded staples has certainly increased, when one examines FBS data that also

41 It is only a very rough indicator, however. The quality of protein (in terms of amino-acid mix) from plant (and to a lesser degree, animal) sources varies widely, and by combining certain plant sources of food (for example rice and beans), one can obtain protein quality rivalling that from animal sources. Most protein coming solely from cereals, however, is more limited in one or more essential amino acids than are most animal proteins; the bulk of proteins in the diets of many West Africans come from cereals.

includes domestically produced starchy staples, a more complex picture emerges of how average per capita apparent consumption is changing. The patterns vary across countries (Table 5.1), but key elements of this evolution include rice, wheat, millet and sorghum, and maize.[42]

### 5.2.2 Rice

Concerns about growing rice consumption and imports have been at the centre of food policy debates in West Africa for the past 20 years. Historically, rice has been the most important staple in Guinea Bissau, Senegal, Sierra Leone, and Guinea and the second most important staple (after cassava) in Liberia. Rice's appeal as a "fast food" that is easier to prepare in urban settings, along with expansion of production in a few countries like Mali, have led to increases since the 1980s in apparent per capita consumption of rice in all the ECOWAS countries where it is not the dominant staple, with the exception of Côte d'Ivoire and The Gambia, where per capita availability stagnated.[43] The most dramatic increases were in Cape Verde, where apparent annual per capita consumption increased by 31 kg between 1980-85 and 2004-09; Mali (also a 31 kg increase), Guinea (25 kg increase), Benin (23 kg increase), and Ghana (19 kg increase). In Nigeria, annual per capita availability increased by 5 kg/capita over the period.[44] Thus, rice's relative importance as a starchy staple has been increasing in many countries, and, since much of it is imported, the value of rice imports has swelled by almost 10% (Chapter 4). Table 5.1 shows that significant differences remain in apparent per capita rice consumption across the region, ranging from 96 kg in Guinea to only 16 kg in Niger.

### 5.2.2 Wheat

Per capita apparent consumption of wheat (which is largely consumed in the forms of bread, pasta, and noodles) increased in 10 of the 15 ECOWAS countries over the period 1980-85 to 2004-09, stagnating or slightly falling in Benin, Cape Verde, Côte d'Ivoire, Niger and Togo. Despite annual growth rates around 2% in many countries, the absolute increases in per capita terms were modest – for example, an increase of 5 kg over 30 years for Nigeria – given the relatively low initial consumption levels. The largest per capita increases were in Senegal (12 kg), Ghana (10 kg), and The Gambia (8 kg). Yet, as in case of rice, uneven apparent per capita consumption levels across the region suggest scope for significant growth, especially in view of the popularity of wheat-based products as convenience foods in urban areas (see Chapter 7).

Because virtually all of West Africa's wheat is imported, these increases in apparent per capita consumption, combined with strong population growth, translated into burgeoning wheat imports over the period. Yet the relative contribution of wheat in the diet, compared to other starchy staples, remained very modest.

### 5.2.3 Millet and sorghum

Apparent per capita consumption of millet and sorghum has been stable or declining from the early 1980s through 2009 in almost all countries in the region where these cereals are important staples. Since total apparent per capita consumption of starchy staples has been increasing in almost all countries, the relative importance of millet and sorghum as staples has declined in the region. They remain overwhelmingly dominant only in Niger. Even though they are still very important sources of calories in Mali, Burkina Faso, Senegal and The Gambia, they are losing ground relative to other starchy staples.

### 5.2.4 Maize

For maize, the picture is more diverse. Apparent per capita consumption of maize increased markedly over the period 1980-85 to 2004-09 in 6 of the 15 ECOWAS states (Burkina Faso, Mali, Senegal, Nigeria, Ghana, and Togo). In Burkina Faso, Senegal, Nigeria and Togo, the increases were greater than the per capita increases in rice availability. Togo, Benin, Burkina Faso and Ghana had the highest per capita apparent consumption levels during 2005-09, between 35 and 66 kg. Maize is

42 More detailed information by country is available in Me-Nsope and Staatz, 2013.
43 Per capita availability of rice also fell in Liberia during the period, with imported wheat increasingly substituting for rice during the years of civil war.
44 Given the importance of unrecorded trade between Benin and Nigeria, it is possible that some of the increase in recorded per capita availability in Benin actually represented rice transhipped to Nigeria.

*Table 5.1 Per capita apparent consumption of cereals[a] and CAGR[b]*

| | Rice | | Wheat | | Maize | | Millet | | Sorghum | |
|---|---|---|---|---|---|---|---|---|---|---|
| Country | kg/year | CAGR | kg/year | CAGR | kg/year | CAGR | kg/year | CAGR | kg/year | CAGR |
| Benin | 32 | 5.2% | 7 | -2.0% | 58 | 0.2% | 3 | 3.3% | 15 | -0.4% |
| Burkina Faso | 19 | 2.3% | 7 | 2.3% | 47 | 4.5% | 69 | 1.3% | 88 | 1.0% |
| Cape Verde | 50 | 3.9% | 41 | -0.2% | 34 | -4.0% | 0 | n.c. | 0 | n.c. |
| Côte d'Ivoire | 59 | -0.1% | 16 | -1.2% | 20 | -1.5% | 1 | 0.0% | 1 | -0.5% |
| The Gambia | 49 | -2.1% | 24 | 2.0% | 11 | 0.6% | 58 | 2.6% | 15 | 1.1% |
| Ghana | 26 | 5.6% | 17 | 2.6% | 35 | 0.7% | 6 | -0.6% | 10 | 0.7% |
| Guinea | 96 | 1.3% | 13 | 1.1% | 10 | -1.9% | 1 | -8.3% | 1 | -8.3% |
| Guinea Bissau | 85 | 0.1% | 13 | 3.1% | 18 | 1.0% | 18 | 1.2% | 10 | -2.9% |
| Liberia | 73 | -2.0% | 27 | 4.9% | 1 | n.c. | 0 | n.c. | 0 | n.c. |
| Mali | 55 | 3.4% | 9 | 1.3% | 29 | 3.5% | 63 | 0.7% | 44 | 0.3% |
| Niger | 16 | 2.0% | 5 | -1.0% | 3 | 1.2% | 139 | 0.0% | 41 | 0.0% |
| Nigeria | 22 | 1.5% | 20 | 1.1% | 25 | 4.7% | 36 | 1.3% | 41 | 0.6% |
| Senegal | 72 | 0.3% | 32 | 1.9% | 28 | 2.6% | 27 | -2.8% | 9 | -3.8% |
| Sierra Leone | 89 | -0.3% | 13 | 2.1% | 4 | 0.6% | 4 | -0.5% | 3 | 0.8% |
| Togo | 22 | 3.6% | 10 | -0.6% | 66 | 1.8% | 6 | -2.9% | 22 | -0.4% |

Source: Calculated from FAOSTAT, food balance sheet data
[a] Per capita cereal consumption average of 2005–2009
[b] CAGR = compound annual growth rate in per capita cereal consumption. Calculated for 1980-1984 to 2005-2009.
n.c. = rate of growth not calculated, as zero/insignificant per capita availability reported in first period.

not a significant staple in three countries (Niger, Liberia, and Sierra Leone), and in the remaining six countries, per capita availability stagnated or declined slightly, with the exception of Cape Verde, where it fell sharply as part of a strong transformation of the diet towards a more "Western" pattern, apparently fuelled by strong income growth, urbanization, and declining national maize production.

### 5.2.5 Cassava

The level of apparent per capita consumption of cassava has been growing, in some cases dramatically, especially along the humid coast. The highest apparent per capita consumption levels were recorded in Ghana, Liberia and Benin, followed by Nigeria, Togo, Côte d'Ivoire, and Guinea (all above 100 kg). While apparent per capita consumption stagnated in several of these countries over the period 1980-82 to 2007-09, it increased by 35% in Nigeria, 68% in Ghana and 25% in Benin. Moreover, cassava became more heavily consumed in several countries where it was not the predominant staple in the 1980s, with the largest increases occurring in Sierra Leone (where per capita availability jumped from 29 kg/year to 68 kg/year between 1980-82 and 2007-09), Guinea Bissau, Senegal, and Guinea.

### 5.2.6 Yams

While yams are an important staple in fewer countries, their apparent per capita consumption has grown more strongly than cassava in these countries. Yams remains the most important staple, in volume terms, in Côte d'Ivoire and the second most important staple in Ghana, Nigeria, Benin, and Togo. Moreover, the per capita availability of yams over the period 1980-82 to 2007-09 has grown much faster in Ghana, Nigeria, and Togo than has that of either rice or wheat. For example, during this period, apparent per capita consumption of yams increased by 87 kg/person/year in Ghana, compared with only 19 kg/person/year for rice and 8 kg/person/year for wheat. For Nigeria, the corresponding figures were a 61 kg/person/year increase for yams compared to 6 kg/person/year for rice and 5 kg/person/year for wheat.

*Table 5.2 Per capita apparent consumption of roots and tubers[a] and CAGR[b]*

| | Cassava | | Yams | | Sweet potatoes | | Irish potatoes | | Other Roots and Tubers | |
|---|---|---|---|---|---|---|---|---|---|---|
| Country | (kg/yr) | CAGR | (kg/yr) | CAGR | (kg/yr) | CAGR | (kg/yr) | CAGR | (kg/yr) | CAGR |
| Benin | 142 | 0.8% | 139 | 2.1% | 7 | -0.8% | 0 | n.c. | 0 | n.c. |
| Burkina Faso | 0 | -9.0% | 3 | -4.7% | 4 | 0.5% | 0 | n.c. | 0 | n.c. |
| Cape Verde | 8 | 0.6% | 0 | n.c. | 9 | -0.4% | 29 | 4.0% | 0 | n.c. |
| Côte d'Ivoire | 106 | -0.1% | 187 | 0.1% | 2 | 2.3% | 1 | -1.2% | 0 | n.c. |
| The Gambia | 5 | -2.1% | 0 | n.c. | 0 | n.c. | 5 | 9.2% | 0 | n.c. |
| Ghana | 209 | 2.1% | 123 | 3.2% | 4 | n.c. | 0 | n.c. | 56 | 0.6% |
| Guinea | 101 | 1.3% | 2 | -6.2% | 18 | 1.6% | 0 | n.c. | 0 | n.c. |
| Guinea Bissau | 27 | 9.9% | 0 | n.c. | 0 | n.c. | 0 | n.c. | 46 | 0.0% |
| Liberia | 147 | 0.3% | 6 | -1.0% | 5 | -1.3% | 0 | n.c. | 7 | 0.0% |
| Mali | 2 | n.c. | 5 | 3.7% | 15 | 11.3% | 6 | n.c. | 0 | n.c. |
| Niger | 9 | -4.4% | 0 | n.c. | 3 | -2.0% | 0 | n.c. | 0 | n.c. |
| Nigeria | 113 | 1.5% | 79 | 5.2% | 15 | 11.3% | 4 | n.c. | 0 | n.c. |
| Senegal | 18 | 6.6% | 0 | n.c. | 3 | 3.8% | 6 | 3.2% | 0 | n.c. |
| Sierra Leone | 66 | 3.2% | 0 | n.c. | 5 | 2.1% | 0 | n.c. | 0 | n.c. |
| Togo | 109 | -1.1% | 80 | -1.1% | 0 | n.c. | 0 | n.c. | 2 | -2.2% |

Source: Calculated from FAOSTAT food balance sheet data
[a] Per capita cereal consumption average of 2005–2009
[b] CAGR = compound annual growth rate in per capita cereal consumption. Calculated for 1980-1984 to 2005-2009.
n.c. = rate of growth not calculated, as zero/insignificant per capita availability reported in first period.

### 5.2.7 Irish potatoes

Data from focus group discussions presented in Chapter 7 suggest that in countries with rising per capita incomes and rapid urbanization there may have been an increase in the per capita consumption of Irish potatoes, particularly in the form of chips (French fries) as part of the rise of fast food outlets. The food balance sheet data provides weak evidence of this. Irish potato annual per capita availability did increase dramatically in Cape Verde (by 18 kg over the period 1980-85 to 2004-09) as part of the structural transformation of that country's diet in response to rapid income growth, urbanization, and declining national maize production, but in most other countries increases, if they occurred, were modest. Surprisingly, food balance sheets for Ghana show Irish potato availability per capita at less than 1 kg/capita/year in recent years. Whether this reflects reality or a weakness in the underlying statistics on potato production and trade in Ghana is unclear, but it is at odds with data discussed in Chapter 7 suggesting increased urban consumption of potatoes.

### 5.2.8 Sweet potatoes

Sweet potatoes, which receive little attention from agricultural research systems and policy makers in the region, make modest contributions to starchy staple calories in several countries, and per capita use did not change in most of them. In both Nigeria and Mali, however, FBS data indicate an increase in apparent annual per capita consumption of 15 kg over the period 1980-85 to 2004-09 and an increase of 6 kg in Guinea. These increases may reflect a growing shift to root and tuber crops, which have a higher yield per ha of calories than cereals, as population pressure increased in these countries.

### 5.2.9 Share of total starchy staple calories

Calculating the share of the different staples in the total calories derived from starchy staples (Table 5.3) reveals the following overall trends:

- In most countries (10 out of 15), the share of total starchy staple calories coming from rice has increased. The countries with a declining

share of rice already had a high level of apparent per capita consumption during the early 1980s (Guinea, Guinea Bissau) or were affected by prolonged periods of Civil War (Liberia, Sierra Leone). The absolute level of apparent rice consumption in Nigeria increased over this period, but its share of total starchy staple calories declined slightly because apparent per capita consumption of maize, yams and cassava grew even faster. In countries where rice had a low share in total calorie consumption during the early 1980s, this share has increased. Among these countries, Cape Verde had the strongest increase (from 13% to 40% of total calorie availability from starchy staples), while the share more than doubled in Benin, Togo and Ghana. Niger, Burkina Faso and Côte d'Ivoire witnessed more modest increases. Overall, however, rice's share in total apparent calorie consumption from starchy staples increased more modestly than would be suggested by just looking at the import statistics.

- Wheat's share in apparent calorie consumption from starchy staples has increased in nine countries and remained stable in four, decreasing only in two countries. However, growth has been more modest than in case of rice, except for Senegal, Liberia and The Gambia. In all countries except Cape Verde, wheat contributes 10% or less to total calorie availability from starchy staples.

- Surprisingly, the share of roots and tubers in total calorie consumption from starchy staples increased in ten countries and declined only in five. Their growing importance is particularly noticeable in some large traditional consumers such as Nigeria, Côte d'Ivoire, and Sierra Leone, but also in non-traditional consumers such as Senegal and Mali. Roots' and tubers' share of total starchy staple calories is highest in Ghana (58%), followed by Côte d'Ivoire (50%) and Benin (45%). In Nigeria, it has increased from 23% to 30%. Although apparent per capita consumption of roots and tubers has increased in a few of the Sahelian countries, their contribution to total starchy staple calories remains under 5% in these countries.

- Maize's share varies, increasing in eight countries and declining in two. Its importance has increased most vigorously in the Sahelian countries, except Niger, and in Nigeria and Togo. It declined strongly in Cape Verde (from 59% to 24%) and, in a less dramatic fashion, in Ghana, Benin and Côte d'Ivoire.

- The strongest decline across the region has been in the relative share of millet and sorghum. This decline has been particularly noticeable in countries where millet and sorghum are important staples (e.g. Burkina Faso, Mali, Nigeria and Senegal), with the exception of Niger and The Gambia, where it increased. Nevertheless, sorghum and millet are still the dominant sources of calories in the inland Sahelian countries and remain important in The Gambia and Nigeria.

## *5.3 High quality protein sources*

Table 5.4 reveals huge differences in apparent per capita consumption levels of different animal protein sources and pulses across the region. Apparent per capita red meat consumption is highest in the inland Sahelian countries, Cape Verde, Guinea Bissau and Côte d'Ivoire, more than twice as high as in most of the coastal countries. Apparent per capita poultry meat consumption is highest in Cape Verde, followed by Benin. Despite high annual average growth rates across the region, apparent per capita consumption levels of poultry meat are still low compared to red meat and fish in most countries. For example, while per capita poultry availability has grown on average by 8% per annum over a 25 year period in Ghana, it only reached 4.5 kg per capita, despite massive increases in poultry imports. Figures are low compared with a 28.5kg per capita availability of fish and seafood. Apparent per capita egg consumption, which has grown less vigorously, has remained low, with Cape Verde (4 kg) and Nigeria (3 kg) being the region's top per capita egg consumers. Apparent annual per capita milk consumption has grown most strongly in Ghana (3.4%) followed by Cape Verde (2.1%) and Togo (1.3%). Most countries, however, experienced only modest growth, and several even saw declines

***Table 5.3*** *Share of selected starchy staples in calorie availability from starchy staples*

1980-84 and 2005-09

| | Roots and tubers | | Maize | | Rice | | Wheat | | Other Cereals | |
|---|---|---|---|---|---|---|---|---|---|---|
| Country | 1980-84 | 2005-09 | 1980-84 | 2005-09 | 1980-84 | 2005-09 | 1980-84 | 2005-09 | 1980-84 | 2005-09 |
| Benin | 44 | 45 | 32 | 26 | 7 | 18 | 7 | 3 | 10 | 8 |
| Burkina Faso | 4 | 1 | 11 | 21 | 7 | 9 | 2 | 3 | 76 | 65 |
| Cape Verde | 5 | 8 | 59 | 24 | 13 | 40 | 23 | 27 | 0 | 0 |
| Côte d'Ivoire | 46 | 50 | 14 | 10 | 30 | 32 | 9 | 7 | 1 | 1 |
| The Gambia | 2 | 1 | 6 | 7 | 59 | 36 | 8 | 14 | 24 | 40 |
| Ghana | 57 | 58 | 21 | 13 | 5 | 13 | 6 | 7 | 11 | 7 |
| Guinea | 23 | 22 | 10 | 5 | 49 | 61 | 5 | 7 | 13 | 5 |
| Guinea Bissau | 10 | 14 | 9 | 10 | 57 | 55 | 3 | 6 | 21 | 16 |
| Liberia | 26 | 33 | 0 | 0 | 70 | 52 | 3 | 15 | 0 | 0 |
| Mali | 1 | 4 | 9 | 30 | 21 | 30 | 4 | 4 | 66 | 48 |
| Niger | 6 | 2 | 1 | 2 | 6 | 10 | 3 | 3 | 83 | 84 |
| Nigeria | 22 | 30 | 6 | 13 | 15 | 12 | 10 | 9 | 46 | 30 |
| Senegal | 1 | 5 | 8 | 16 | 45 | 48 | 10 | 16 | 36 | 16 |
| Sierra Leone | 9 | 17 | 3 | 3 | 79 | 68 | 5 | 8 | 4 | 4 |
| Togo | 45 | 34 | 23 | 33 | 6 | 13 | 7 | 5 | 19 | 14 |

Source: Calculated from data in Me-Nsope and Staatz, 2013

***Table 5.4*** *Per capita availability of high quality protein sources*

Availability (2005-09) and CAGRa (1980-84–2005-09)

| | Domestic Red Meat | | Poultry | | Other Meat | | Fish & Seafood | | Eggs | | Milk (dry equiv.) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Country | (kg/yr) | CAGR[a] | (kg/yr) | CAGR | (kg/yr) | CAGR | (kg/yr) | CAGR | (kg/yr) | CAGR | (kg/yr) | CAGR |
| Benin | 5.2 | -1.5% | 11.1 | 3.1% | 0.8 | -2.6% | 8.5 | -1.0% | 1.0 | -2.7% | 0.9 | 0.5% |
| Burkina Faso | 12.9 | 2.8% | 2.2 | 1.5% | 0.6 | -1.6% | 1.8 | 0.6% | 2.0 | 2.8% | 1.7 | -1.4% |
| Cape Verde | 24.9 | 5.0% | 14.6 | 11.1% | 0.2 | n.c | 13.0 | -3.5% | 4.0 | 5.7% | 11.6 | 2.1% |
| Côte d'Ivoire | 11.4 | -0.4% | 1.5 | -1.8% | 7.9 | -0.9% | 13.5 | -0.9% | 1.0 | 0.0% | 0.8 | -3.7% |
| The Gambia | 5.1 | -1.7% | 3.9 | 7.1% | 0.9 | -2.2% | 26.0 | 1.8% | 2.0 | 2.8% | 2.7 | -0.4% |
| Ghana | 8.2 | 0.7% | 4.5 | 8.0% | 4.6 | -1.7% | 28.5 | 1.2% | 1.0 | 2.8% | 0.8 | 3.4% |
| Guinea | 7.0 | 2.3% | 1.1 | 4.5% | 0.6 | -1.5% | 10.5 | 1.4% | 2.0 | 2.8% | 1.4 | 0.8% |
| Guinea Bissau | 13.2 | 0.0% | 1.6 | 5.2% | 0.0 | n.c | 1.5 | -2.0% | 0.7 | 3.0% | 1.6 | -0.2% |
| Liberia | 3.3 | -0.8% | 4.4 | 4.0% | 2.3 | -4.1% | 5.0 | -4.0% | 2.0 | 1.2% | 0.4 | -4.6% |
| Mali | 15.0 | 0.9% | 3.0 | 1.7% | 2.9 | -0.3% | 8.5 | 0.0% | 0.4 | -1.8% | 6.0 | 0.5% |
| Niger | 20.0 | 0.6% | 0.8 | -2.1% | 3.3 | 0.7% | 3.0 | 4.7% | 0.3 | -2.4% | 5.4 | 0.0% |
| Nigeria | 6.2 | -0.5% | 1.6 | -0.4% | 0.9 | -1.3% | 11.0 | -0.5% | 3.5 | 0.6% | 0.8 | -1.6% |
| Senegal | 10.7 | 0.5% | 3.3 | 2.8% | 1.3 | -0.2% | 25.5 | 0.6% | 2.0 | 2.8% | 3.1 | -1.1% |
| Sierra Leone | 2.4 | -0.4% | 2.9 | 1.9% | 1.8 | 4.5% | 26.0 | 1.2% | 1.5 | 1.6% | 0.5 | -3.6% |
| Togo | 4.4 | -0.2% | 4.5 | 3.0% | 0.8 | -1.8% | 7.0 | -1.6% | 1.0 | 2.8% | 0.6 | 1.3% |

Source: Calculated from FAOSTAT, food balance sheet data
n.c. = rate of growth not calculated, as zero/insignificant per capita availability reported in first period.
[a] compound annual growth rate

in per capita apparent consumption of milk. Pulses are important sources of high quality proteins in the Sahelian countries and Cape Verde but also in Nigeria, Benin and Sierra Leone (Table 5.5). Per capita apparent consumption of other meat, including bushmeat and pig meat, declined in most countries. Fish and seafood remains the most important high quality protein source in the coastal countries, with differing trends across countries.

Given the important differences in patterns of apparent per capita protein consumption across the region, the following paragraphs discuss the main trends by groups of countries.

### 5.3.1 Inland Sahelian countries: red meat and beans

Per capita animal protein availability has grown by between 10% and 43% in Burkina Faso, Mali, and Niger over the past 30 years. In these countries, the main animal protein sources are beef, mutton and goat meat. In Mali and Niger, milk and dairy products (associated with large pastoral populations) are also important animal protein sources, as are fish in Mali. Over the period 1980-85 to 2004-09, apparent per capita consumption of beef doubled in Burkina Faso (to 7.5 kg/year), increased by 37% in Mali (to 8.6 kg/year) and grew 56% in Niger (to 13.5 kg/year). Mutton and goat meat availability per capita also increased in Burkina and Mali (to 3.1 kg/capita and 6.2 kg/capita, respectively), but fell by 23% in Niger. Apparent per capita poultry consumption increased by 50% in both Burkina and Mali (to 2.2 kg and 2.9 kg, respectively) while "other meat" (which includes bushmeat) fell. Yet meats and milk are not the only high quality protein products consumed in these countries. Pulses (mainly cowpeas) are very important in the diets of all three countries, with the per capita availability of pulses exceeding that of red meat in Burkina and in Niger (Table 5.5). At nearly 30 kg per year, annual per capita pulse availability in Niger was by far the highest of any country in the region. Moreover, apparent per capita pulse consumption increased substantially in all three countries over the period 1980-85 to 2005-09, with the increases ranging from 37% in Burkina to 113% in Mali. In these low-income countries, cowpeas and other pulses serve as "poor people's meat", so it is likely that as incomes grew, even among the poor, households shifted to pulses as a first step in increasing their high quality protein intake.

***Table 5.5*** *Per capita pulse availability*

Availability (2005-09) and CAGRa (1980-84–2005-09)

| | Pulses | |
|---|---|---|
| Country | (kg/yr) | CAGR[a] |
| Benin | 14.5 | 3.3% |
| Burkina Faso | 13.0 | 1.3% |
| Cape Verde | 9.5 | -1.2% |
| Côte d'Ivoire | 2.1 | 4.1% |
| The Gambia | 2.3 | -3.0% |
| Ghana | 0.8 | -0.8% |
| Guinea | 6.0 | -0.6% |
| Guinea Bissau | 2.2 | 0.2% |
| Liberia | 2.8 | 3.0% |
| Mali | 8.5 | 3.1% |
| Niger | 29.5 | 1.5% |
| Nigeria | 9.5 | 3.5% |
| Senegal | 4.7 | 0.6% |
| Sierra Leone | 12.5 | 1.8% |
| Togo | 6.0 | -1.1% |

Source: Calculated from FAOSTAT, food balance sheet data
[a] Compound annual growth rate (CAGR) in pulse availability calculated between 1980-84 and 2005-09.

### 5.3.2 Coastal Sahelian countries: diverse patterns of change

The coastal Sahelian countries include Cape Verde, Senegal, The Gambia and Guinea Bissau. In all these countries except Guinea Bissau, fish and seafood were the largest sources of animal protein in the 1980s. The countries have followed very different patterns of apparent consumption of animal protein since then. The most dramatic changes have taken place in Cape Verde, where apparent fish consumption per capita fell by nearly 60% between 1980-85 to 2004-09 (from 31 kg/year to 13 kg/per year) and was substituted by a dramatic increase in apparent per capita consumption of pig meat (up from 5.3 kg/year to 20 kg/year) and poultry (from 1 kg/year to 14.6 kg/year). Egg and milk consumption also grew rapidly and pulse consumption fell as Cape Verde shifted to

a diet more characteristic of industrialized countries. In contrast, both The Gambia and Senegal increased per capita availability of fish which averaged 26 kg/ capita in The Gambia in 2005-09 and 25 kg/capita in Senegal and far outstripped all other protein sources in terms of volume. In both Senegal and The Gambia, there were large percentage increases in the per capita availability of poultry meat during the period (up 455% in The Gambia and 101% in Senegal), but absolute levels remain low. By 2005-09, per capita availability of poultry meat averaged 3.9 kg in The Gambia and 3.3 kg in Senegal. In Guinea Bissau, the largest source of animal protein by far was, and remains, pig meat. Over the period, there was a modest decline (1 kg per capita, or 14%) in apparent per capita pork consumption, which was offset by increases in per capita availability of beef and poultry.

### 5.3.3 Countries of the humid coast: less fish, more poultry

The eight countries of the humid coast include the economic powerhouses of Nigeria, Ghana, and Côte d'Ivoire, along with Benin, Guinea, Liberia, Sierra Leone, and Togo. In the early 1980s, fish was by far the most important source of animal protein in all eight of these countries. By 2004-09, per capita fish availability had fallen in five of the eight countries (Benin, Côte d'Ivoire, Liberia, Nigeria, and Togo) by between 21% (in Côte d'Ivoire) and 64% (in Liberia). In Nigeria, the decline was 10%. In contrast, Ghana, which had the most robust economic growth of the group, saw its annual per capita fish and seafood availability increase by 36% between 1980-85 and 2004-09, growing from 21 kg/person to 29 kg/person. In all countries where per capita fish availability rose, it was due to an increasing proportion of sea fish (partly reflecting imported frozen fish) relative to freshwater fish in the diet. "Other meat", which includes bushmeat, declined in six of the eight countries, likely reflecting the loss of wildlife habitat. While fish remained the most important animal protein source in six of the eight countries, its relative importance declined in most countries, as apparent per capita consumption of other animal protein sources increased. The most dramatic and widespread of these was the increase in per capita poultry meat availability as a result of the increase in poultry imports discussed in Chapter 4. For example, annual apparent per capita poultry meat consumption in Ghana increased by 570% between 1980-85 to 2004-09, rising from just over 0.6 kg to 4.5 kg. Increases of over 100% (often from initially low levels) also occurred in Benin, Guinea, Liberia, and Sierra Leone.

Nigeria, on the other hand, which imposed periodic bans on the import of frozen poultry to protect domestic producers, recorded an 8% decline in poultry meat availability per capita according to the FBS data. However, the very large reported per capita increases in poultry availability per capita in Benin (rising from 5.2 kg in 1980-85 to 11.1 kg in 2005-09) may in part reflect poultry meat that was clandestinely re-exported to Nigeria. As noted earlier, recorded per capita availability of animal protein actually fell in Nigeria from 1980-85 to 2005-09. This included a 62% decline in per capita beef availability (falling from over 5 kg/ person to 2 kg) and a 31% decline in apparent consumption of "other meat." These declines were partially offset by a more than doubling of mutton and goat meat (to 2.8 kg/person), pig meat (which increased from 0.5 kg to 1.4 kg/person) and a 50% increase in per capita availability of eggs. Fish, however, remained the most important single source of animal protein in the country. Nigeria also expanded its apparent per capita consumption of pulses (mainly cowpeas) by over 100% during this period, as did Benin, substituting a lower cost vegetal source of high quality protein for declining per capita red meat availability.

## *5.4 Fruits and vegetables*

Statistics on horticultural products in West Africa are notoriously weak, so figures on the evolution of fruit and vegetable availability from the food balance sheets need to be interpreted cautiously. With this caveat in mind, the following patterns emerge from the FBS (Table 5.6).

### 5.4.1 Fruits

Table 5.6 shows that apparent annual per capita consumption of fruits historically has been much

***Table 5.6*** *Per capita apparent consumption of fruits and vegetables*

Consumption (2005-09) and CAGRa (1980-85–2005-09)

| | Fruits | | Vegetables | |
|---|---|---|---|---|
| Country | (kg/yr) | CAGR[a] | (kg/yr) | CAGR[a] |
| Benin | 34 | -0.2% | 48 | 1.0% |
| Burkina Faso | 5 | -1.9% | 16 | -1.3% |
| Cape Verde | 64 | 2.9% | 57 | 9.1% |
| Côte d'Ivoire | 76 | -1.1% | 36 | -0.4% |
| The Gambia | 5 | 0.0% | 33 | 4.3% |
| Ghana | 147 | 2.2% | 34 | 2.4% |
| Guinea | 104 | -0.5% | 53 | -1.6% |
| Guinea Bissau | 30 | -1.5% | 28 | 1.6% |
| Liberia | 47 | -0.7% | 24 | -1.2% |
| Mali | 29 | 2.2% | 50 | 0.2% |
| Niger | 14 | 2.7% | 50 | 4.1% |
| Nigeria | 61 | -0.1% | 60 | 1.8% |
| Senegal | 16 | 1.0% | 60 | 5.3% |
| Sierra Leone | 36 | -0.1% | 47 | 0.0% |
| Togo | 8 | -1.6% | 27 | 0.5% |

Source: Calculated from FAOSTAT, food balance sheet data
[a] CAGR = compound annual growth rate

higher in the countries of the humid coast (ranging from around 40 to over 100 kg/capita in the 1980s) than in either the inland Sahelian countries (from 6 to 18 kg/capita during the same period) or the coastal Sahelian states (on the order of 20 to 30 kg/capita). The sole exception to this pattern was Guinea Bissau (classified here as a coastal Sahelian state), whose per capita availability of fruit resembled more that of the humid coastal states. During the period 1980-85 to 2004-09, apparent per capita fruit consumption increased in five countries – Cape Verde, Mali, Ghana, Niger, and Senegal. It stagnated in three countries (The Gambia, Nigeria, and Sierra Leone) and declined in the remaining seven ECOWAS states.

Two variables stand out in the pattern of change in apparent per capita fruit consumption. First, income growth matters. The two countries with the most dramatic increases in apparent per capita consumption, both in absolute and percentage terms - Cape Verde at 106% and Ghana at 72% - were also the countries that had the most rapid increases in per capita income over the period.[45] On the other hand, five of the seven countries where apparent per capita fruit consumption declined were among the countries with the poorest trends in economic performance (Côte d'Ivoire, Liberia, Guinea Bissau, Guinea and Togo), often associated with civil conflict. The two exceptions to this pattern were Benin and Burkina Faso, but in each of these countries, the absolute decline was only about 2 kg/person. In three countries (Nigeria, Sierra Leone, and The Gambia), apparent per capita consumption remained unchanged. In Nigeria, the figure held steady at the relatively high level of approximately 60 kg; in Sierra Leone, the corresponding figure was 36 kg, while The Gambia maintained apparent fruit consumption at the very low level of 6 kg/capita.

The second generality that emerges from the data is that in four out of the five countries where apparent per capita fruit consumption increased (Cape Verde, Mali, Niger and Senegal), initial levels in the 1980s were low by regional standards. This suggests that with significant income growth in these types of Sahelian countries, demand for fruit could expand rapidly. The budget-consumption studies reviewed in Chapter 6 support this hypothesis.

### 5.4.2 Vegetables

Table 5.6 indicates that apparent per capita consumption of vegetables increased more broadly across the region than did that of fruit over the period 1980-85 to 2004-09. Per capita availability rose in nine of the countries, held steady (less than 5% change) in two, and fell in only four. The four countries that experienced declines (Côte d'Ivoire, Guinea, Liberia and Burkina Faso) were also countries that experienced declines in apparent per capita fruit consumption. The most spectacular growth was in Cape Verde, where apparent per capita annual consumption of vegetables increased by 777% over the period, growing from 5 kg/capita early in the period to 61 kg/capita at the end. Ghana expanded apparent per capita vegetable consumption by 79%,

45 Niger, which had very modest per capita income growth over the period, also registered strong percentage growth in per capita fruit availability (93%), but the absolute gain was modest, as it started from a very low initial base of 7 kg/capita in 1980-85.

and Nigeria by 55%. But not all countries that showed rapid expansion in apparent per capita vegetable consumption were among the countries showing the fastest per capita income growth. Three Sahelian countries that had relatively low levels of per capita vegetable availability in the 1980s increased that figure by over 100% over the 30 year period: Senegal (264%), The Gambia (187%), and Niger (170%). This finding illustrates that changes in consumption patterns are driven by more than just income growth; factors such as shifts in the population's location within the country and availability of local production (e.g. growth of horticultural production during the dry season to raise rural incomes) may also be important drivers of consumption.

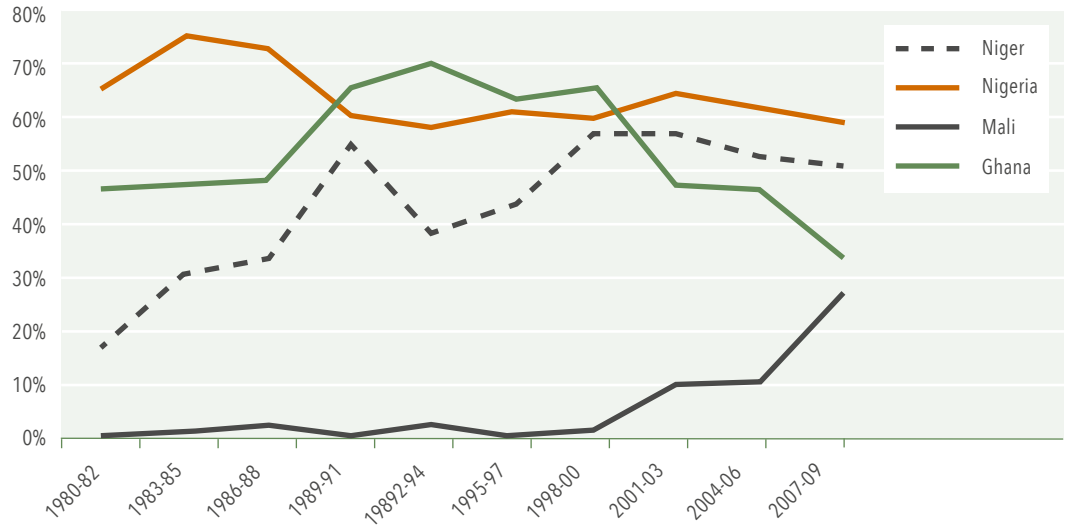
## 5.5 Vegetable oil

While some of the increased per capita availability of fat in most countries over the past 30 years was due to more animal fat in the diet, a large part reflected expanded per capita availability of vegetable oil. Recorded per capita availability of vegetable oil grew in all countries of the region except Benin and Sierra Leone between 1980-85 and 2005-09. Four of the countries that recorded the largest percentage gains were Sahelian (Burkina Faso at 71%; Niger, 50%; Mali, 45%; and The Gambia, 65%), while three were on the humid coast (Ghana, 55%; Nigeria, 50%; and Togo, 63%). The composition of vegetable oil consumption also changed (Figure 5.1). Along the humid coast, palm oil and palm kernel oil are the dominant oils, but their share of total vegetable oil has declined modestly in most countries, as the total apparent per capita consumption of other vegetable oils increased. In contrast, palm oil and palm kernel oil availability per capita, driven by inexpensive imports from Asia, has increased in the inland Sahelian countries, where other oils (groundnut, cottonseed) have traditionally been important.

The rapid rise in apparent per capita vegetable oil consumption across the region reflects a strong effort by consumers to improve what were often fat-deficient diets. If the current trends continue, future demand for vegetable oils in the region will continue to burgeon, raising challenges both to the agrifood system and public health as diets in some places move from fat-deficient to fat-surplus.

***Figure 5.1*** *Share of palm & palm kernel oil in total vegetable oil availability*

1980-82 to 2007-09




Source: Calculated from FAOSTAT, food balance sheet data

## 5.6 Sugar and sweeteners

Like vegetable oils, there were widespread increases in per capita availability of sugar and sweeteners across the region. Annual per capita quantities increased, often dramatically, between 1980-85 and 2005-09 in 10 of the 15 ECOWAS states, stagnated in 3 (Sierra Leone, Côte d'Ivoire, and Nigeria), and declined modestly in Togo and Senegal. Particularly dramatic increases occurred in Ghana (425%), Benin (400%), Guinea Bissau (217%), Mali (213%) and Cape Verde (66%). The increases reflect both direct consumption of sugar (e.g. with tea) as well as increased consumption of sugar and other sweeteners incorporated into various processed foods and beverages. The growth in sugar consumption is a common phenomenon as incomes increase in low-income countries, and if these trends continue, one can anticipate continued strong demand for sugar. Like the strong demand for vegetable oil, this offers opportunities for West African producers, but also raises concerns about future public health, such as increasing problems of diabetes and obesity.

## 5.7 Alcoholic beverages

The FAOSTAT food balance sheets show that in 10 of the 15 ECOWAS countries, annual per capita availability of alcoholic beverages, mainly beer, exceeded 10 litres/person.[46] Among these countries, average per capita availability per year over the period 2007-09 ranged from 13 litres in Togo to 67 litres in Nigeria. Over the period 1980-85 to 2004-09, apparent per capita consumption of alcoholic beverages increased in seven of these ten countries, by rates ranging from 6% (in Sierra Leone, which at the beginning of the period had one of the highest levels in the region, at 47 litres) to 200% in Cape Verde (where it grew from 13 litres to 39 litres). If such growth trends continue, this may open new markets for import substitution of the grains used by West African breweries. Nigerian breweries, for example, have substituted substantial quantities of locally grown sorghum for imported grains, and in 2011, SAB-Miller, the largest brewing company in the world, introduced a cassava beer in Mozambique. SAB-Miller is a major player in Nigeria, brewing most of its beer using locally produced sorghum, and it recently introduced cassava beer in Ghana and is considering doing so in Nigeria (Adeyemi, 2012; Olowa *et al.*, 2012).

46 The 10 countries are Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, The Gambia, Ghana, Guinea-Bissau, Nigeria, Sierra Leone, and Togo. The FAOSTAT food balance sheets provide estimates of beverage availability in terms of kg. For ease of exposition, figures are reported here in litres rather than kg, assuming that these beverages have approximately the same density as water (1 kg/litre).

## 5.8 Summary of key findings and policy implications

The trends in availability of per capita supplies of calories, protein, and fat, as revealed by the food balance sheet analysis, are striking. They show that on average, many West African countries have done a remarkable job over a 30-year period in improving per capita food supplies through a combination of own production and imports. Particularly strong growth came in countries that have experienced solid economic growth in recent years such as Ghana, Nigeria, Cape Verde, Burkina Faso and Mali. In contrast, nations that have suffered civil disruption, such as Liberia, Sierra Leone, and Côte d'Ivoire, stagnated in their apparent per capita consumption of these macronutrients. Regarding the per capita availability of different food groups, the picture that emerges is threefold: (1) a growing per capita availability of most food commodities in most countries, (2) a diversity of dietary patterns across the region (e.g., inland Sahelian versus coastal countries), and (3) increased diversification of dietary pattern within countries, albeit at different velocities.

Broad trends across the region include the increased per capita availability of starchy staples, meat and fish, sugar and sweeteners, vegetable oils, and alcoholic beverages. Per capita availability of individual food commodities and subgroups, however, vary significantly among countries. Traditionally, diets in Sahelian inland areas were mainly based on sorghum and millet, red meat and pulses, whereas in coastal countries, roots and tubers, maize and fish were predominant. While these basic differences still hold, food availability patterns at the national level have become increasingly diverse. Both the

relative importance of major food groups (cereals, roots and tubers, and livestock products) and individual food commodities within these groups have evolved. The trends towards dietary diversification at the national level is particularly marked in coastal countries but can also be observed in inland Sahelian countries.

*Concerning starchy staples*, one broad trend has been a strong increase of apparent rice and wheat consumption in most countries of the region. Per capita availability of rice is much higher than that of wheat in almost all countries, but the level of apparent consumption of both cereals varies widely by country. These differences suggest scope for continued significant growth of demand for both cereals, particularly in countries where per capita consumption levels are still low. The popularity of rice and wheat-based products as convenience foods in urban areas will also contribute to this growth (see Chapter 7). A second trend has been the declining importance of millet and sorghum as staples throughout the subregion, except in Niger. Concerning maize, the picture has been more varied, with per capita apparent consumption increasing in the Sahel and in some coastal countries while declining in others. Apparent per capita consumption of cassava has been growing, in some cases dramatically, especially along the humid coast (e.g. in Nigeria, Ghana, and Benin). Moreover, per capita cassava availability also grew in several countries where it was not the predominant staple in the 1980s, such as Sierra Leone, Guinea Bissau, Senegal, and Guinea. While yams are an important staple in fewer countries, their per capita availability has grown even more strongly than that of cassava in those countries that consume the most yams.

The above analysis indicates that trends in per capita starchy staple availability have been more diverse than simply rice and wheat substituting for traditional staples, as the trade data reviewed in Chapter 4 might suggest. Apparent per capita consumption of maize, yams and cassava has also grown strongly in several countries. The "rice and wheat" story is really a rice, wheat, cassava, yams, and maize story, with important variations among countries.

*Concerning high-quality protein*, two broad trends stand out: (1) growth in apparent per capita consumption of meat from ruminant livestock and pulses (mainly cowpeas) in the inland Sahelian countries, and (2) some substitution of poultry meat for fish along the coast. Moreover, there are still huge differences in apparent per capita consumption levels of different animal protein sources and pulses among countries. Apparent per capita red meat consumption is highest in the inland Sahelian countries, Cape Verde, Guinea Bissau and Côte d'Ivoire, more than twice as high as in most of the other coastal countries. Fish and seafood remains the most important high-quality protein source in the coastal countries, with differing trends across countries. For poultry meat, apparent per capita consumption is highest in Cape Verde, followed by Benin. Despite high annual average growth rates across the region, apparent per capita consumption levels of poultry meat are still low compared to red meat and fish in most countries. Pulses are important sources of high-quality proteins in the Sahelian countries and Cape Verde but also in Nigeria, Benin and Sierra Leone.

*Vegetable oil.* Per capita availability grew in all countries of the subregion except Benin and Sierra Leone between 1980-85 and 2005-09. Moreover, the composition of vegetable oil availability has changed, with a declining share of palm oil and palm kernel oil in the coastal countries and the opposite trend in the Sahelian countries. While increases in apparent per capita palm oil consumption in the Sahel appear to be driven by inexpensive palm oil imports from Asia, the diversification into other vegetable oils in the coastal countries might at least partially be due to the growing health concerns of consumers.

*The growth of per capita fruit and vegetable availability* has not been confined to countries with strong per capita income growth but is also apparent in Sahelian countries, albeit from low absolute levels. This finding illustrates that changes in dietary patterns are driven by more than just income growth; factors such as demographic shifts within the country and changes in local horticultural production systems may also be important drivers of consumption.

***Final remarks.*** The increased overall per capita availability and greater diversity of food is positive from a food security and nutrition point of view, although FBS data do not provide information on access and use at the household and intra-households levels. On the other hand, the strong growth in apparent consumption of sugar and sweeteners and vegetable oils, especially palm oil, raises questions for public health in the future, such as increasing problems of diabetes and obesity. Similar concerns apply to the increased consumption of alcoholic beverages.

The FBS data, however, provide only figures on changes in estimated national average per capita availability of different types of foods. Comparison of the trends among countries that have experienced strong economic growth (e.g. Cape Verde and Ghana) with those whose economies have stagnated or declined (e.g. Côte d'Ivoire and Liberia) give some hints into how changes in per capita income growth influences demand patterns; however, one needs to be cautious in interpreting such comparisons due to the many other possible conflating variables that could affect the results (e.g. disruption of supply chains due to civil strife, cultural preference for certain foods). Furthermore, the FBS data provide no information on how demand varies within a given country based on where a person lives (city or countryside), by income or by profession. For these types of information, which are critical in assessing how demand will evolve in the future, one needs to turn to other sources. Budget-consumption surveys (Chapter 6) and focus-group interviews with consumers and retailers whose business depends on understanding trends in consumer demand (Chapter 7) are two such sources of information to which we now turn.

## *Appendix to Chapter 5*

***Appendix Table*** *A5.1 Daily food energy availability by country*

1980-82 through 2007-09 (kcal/capita/day)

| | 1980 to 1982 | 1983 to 1985 | 1986 to 1988 | 1989 to 1991 | 1992 to 1994 | 1995 to 1997 | 1998 to 2000 | 2001 to 2003 | 2004 to 2006 | 2007 to 2009 | 1980-85–2004-09 (% chg. ) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Non-coastal Sahel | | | | | | | | | | | |
| Burkina Faso | 1745 | 1788 | 2256 | 2386 | 2544 | 2530 | 2495 | 2585 | 2656 | 2647 | 50.1% |
| Mali | 1590 | 1783 | 2109 | 2186 | 2172 | 2215 | 2319 | 2436 | 2539 | 2604 | 52.5% |
| Niger | 2067 | 2053 | 1998 | 2011 | 1878 | 1980 | 2145 | 2180 | 2256 | 2439 | 14.0% |
| Coastal Sahel | | | | | | | | | | | |
| Cape Verde | 2239 | 2412 | 2596 | 2357 | 2458 | 2360 | 2382 | 2381 | 2525 | 2631 | 10.9% |
| The Gambia | 1984 | 2214 | 2532 | 2486 | 2339 | 2245 | 2260 | 2268 | 2309 | 2501 | 14.6% |
| Guinea Bissau | 2049 | 2176 | 2228 | 2245 | 2286 | 2211 | 2159 | 2211 | 2264 | 2421 | 10.9% |
| Senegal | 2296 | 2281 | 2157 | 2187 | 2172 | 2137 | 2132 | 2164 | 2283 | 2432 | 3.0% |
| Coastal non-Sahel | | | | | | | | | | | |
| Benin | 1937 | 1973 | 1990 | 2238 | 2254 | 2322 | 2361 | 2428 | 2481 | 2567 | 29.1% |
| Côte d'Ivoire | 2846 | 2687 | 2581 | 2478 | 2423 | 2430 | 2447 | 2458 | 2498 | 2629 | -7.3% |
| Ghana | 1656 | 1825 | 2015 | 2052 | 2368 | 2483 | 2559 | 2664 | 2802 | 2909 | 64.1% |
| Guinea | 2295 | 2297 | 2379 | 2403 | 2473 | 2444 | 2421 | 2431 | 2501 | 2628 | 11.7% |
| Liberia | 2498 | 2412 | 2478 | 2297 | 2217 | 2167 | 2177 | 2062 | 2123 | 2243 | -11.1% |
| Nigeria | 1850 | 1756 | 1972 | 2192 | 2464 | 2532 | 2590 | 2555 | 2665 | 2741 | 49.9% |
| Sierra Leone | 2068 | 1942 | 1962 | 1949 | 1975 | 2057 | 2002 | 2012 | 2097 | 2158 | 6.1% |
| Togo | 1967 | 1879 | 1793 | 1921 | 1880 | 2013 | 2010 | 2054 | 2133 | 2297 | 15.2% |

Source: Me-Nsope and Staatz, 2013 (based on FAOSTAT, data)

***Appendix Table A5.2*** *Non-Coastal Sahel: Daily protein availability*

(gram/capita), 1980-82 to 2007-09

| | 1980 to 1982 | 1983 to 1985 | 1986 to 1988 | 1989 to 1991 | 1992 to 1994 | 1995 to 1997 | 1998 to 2000 | 2001 to 2003 | 2004 to 2006 | 2007 to 2009 | 1980-85 to 2004-09 (% chg.) | Total change (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Burkina Faso | | | | | | | | | | | | |
| Vegetal | 47 | 47 | 61 | 64 | 70 | 67 | 66 | 69 | 70 | 71 | 50.0% | 88.7% |
| Animal | 7 | 7 | 8 | 8 | 9 | 10 | 10 | 10 | 10 | 10 | 42.9% | 11.3% |
| Total | 54 | 54 | 69 | 72 | 79 | 77 | 76 | 79 | 80 | 81 | 49.1% | |
| Mali | | | | | | | | | | | | |
| Vegetal | 31 | 37 | 44 | 45 | 47 | 47 | 49 | 51 | 52 | 53 | 54.4% | 88.1% |
| Animal | 17 | 15 | 15 | 17 | 15 | 16 | 16 | 16 | 18 | 19 | 15.6% | 11.9% |
| Total | 48 | 52 | 59 | 62 | 62 | 63 | 65 | 67 | 70 | 72 | 42.0% | |
| Niger | | | | | | | | | | | | |
| Vegetal | 48 | 45 | 45 | 44 | 42 | 42 | 49 | 48 | 52 | 62 | 22.6% | 87.5% |
| Animal | 17 | 14 | 12 | 12 | 12 | 13 | 14 | 15 | 16 | 18 | 9.7% | 12.5% |
| **Total** | **65** | **59** | **57** | **56** | **54** | **55** | **63** | **63** | **68** | **80** | **19.4%** | |

Source: Me-Nsope and Staatz, 2013(based on FAOSTAT data).

***Appendix Table A5.3*** *Coastal Sahel: Daily protein availability*

(gram/capita), 1980-82 to 2007-09

| | 1980 to 1982 | 1983 to 1985 | 1986 to 1988 | 1989 to 1991 | 1992 to 1994 | 1995 to 1997 | 1998 to 2000 | 2001 to 2003 | 2004 to 2006 | 2007 to 2009 | 1980-85 to 2004-09 (% chg.) | Total change (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cape Verde | | | | | | | | | | | | |
| Vegetal | 45 | 48 | 55 | 45 | 39 | 37 | 39 | 37 | 39 | 41 | -14.0% | -162.5% |
| Animal | 20 | 19 | 16 | 17 | 22 | 22 | 24 | 25 | 28 | 32 | 53.8% | 262.5% |
| Total | 65 | 67 | 71 | 62 | 61 | 59 | 63 | 62 | 67 | 73 | 6.1% | |
| The Gambia | | | | | | | | | | | | |
| Vegetal | 37 | 39 | 43 | 41 | 39 | 37 | 38 | 40 | 40 | 45 | 11.8% | 60.0% |
| Animal | 11 | 12 | 12 | 13 | 11 | 12 | 13 | 14 | 14 | 15 | 26.1% | 40.0% |
| Total | 48 | 51 | 55 | 54 | 50 | 49 | 51 | 54 | 54 | 60 | 15.2% | |
| Guinea Bissau | | | | | | | | | | | | |
| Vegetal | 36 | 37 | 36 | 36 | 36 | 35 | 34 | 35 | 36 | 37 | 0.0% | 0.0% |
| Animal | 8 | 8 | 9 | 9 | 9 | 9 | 8 | 8 | 7 | 8 | -6.3% | 100.0% |
| Total | 44 | 45 | 45 | 45 | 45 | 44 | 42 | 43 | 43 | 45 | -1.1% | |
| Senegal | | | | | | | | | | | | |
| Vegetal | 50 | 49 | 49 | 48 | 42 | 41 | 42 | 37 | 41 | 44 | -14.1% | 127.3% |
| Animal | 15 | 16 | 18 | 18 | 20 | 17 | 17 | 16 | 17 | 17 | 9.7% | -27.3% |
| **Total** | **65** | **65** | **67** | **66** | **62** | **58** | **59** | **53** | **58** | **61** | **-8.5%** | |

Source: Me-Nsope and Staatz, 2013 (based on FAOSTAT data).

***Appendix Table A5.4*** *Coastal non-Sahel: Daily protein availability*

(gram/capita), 1980-82 to 2007-09

| | 1980 to 1982 | 1983 to 1985 | 1986 to 1988 | 1989 to 1991 | 1992 to 1994 | 1995 to 1997 | 1998 to 2000 | 2001 to 2003 | 2004 to 2006 | 2007 to 2009 | 1980-85 to 2004-09 (% chg.) | Total change (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benin | | | | | | | | | | | | |
| Vegetal | 36 | 37 | 40 | 45 | 45 | 46 | 47 | 48 | 49 | 52 | 38.4% | 103.7% |
| Animal | 10 | 10 | 9 | 8 | 9 | 8 | 9 | 10 | 9 | 10 | -5.0% | -3.7% |
| Total | 46 | 47 | 49 | 53 | 54 | 54 | 56 | 58 | 58 | 62 | 29.0% | |
| Côte d'Ivoire | | | | | | | | | | | | |
| Vegetal | 43 | 41 | 39 | 38 | 37 | 37 | 37 | 37 | 37 | 40 | -8.3% | 43.8% |
| Animal | 17 | 16 | 17 | 16 | 13 | 11 | 11 | 12 | 12 | 12 | -27.3% | 56.3% |
| Total | 60 | 57 | 56 | 54 | 50 | 48 | 48 | 49 | 49 | 52 | -13.7% | |
| Ghana | | | | | | | | | | | | |
| Vegetal | 26 | 28 | 31 | 31 | 37 | 38 | 39 | 41 | 42 | 43 | 57.4% | 79.5% |
| Animal | 12 | 13 | 14 | 14 | 14 | 14 | 15 | 14 | 16 | 17 | 32.0% | 20.5% |
| Total | 38 | 41 | 45 | 45 | 51 | 52 | 54 | 55 | 58 | 60 | 49.4% | |
| Guinea | | | | | | | | | | | | |
| Vegetal | 46 | 46 | 48 | 48 | 47 | 45 | 45 | 45 | 45 | 47 | 0.0% | 0.0% |
| Animal | 6 | 6 | 6 | 6 | 7 | 7 | 8 | 8 | 8 | 9 | 41.7% | 100.0% |
| Total | 52 | 52 | 54 | 54 | 54 | 52 | 53 | 53 | 53 | 56 | 4.8% | |
| Liberia | | | | | | | | | | | | |
| Vegetal | 38 | 36 | 36 | 34 | 31 | 34 | 33 | 28 | 29 | 32 | -17.6% | 54.2% |
| Animal | 11 | 12 | 11 | 8 | 7 | 7 | 7 | 5 | 6 | 6 | -47.8% | 45.8% |
| Total | 49 | 48 | 47 | 42 | 38 | 41 | 40 | 33 | 35 | 38 | -24.7% | |
| Nigeria | | | | | | | | | | | | |
| Vegetal | 32 | 33 | 39 | 43 | 46 | 49 | 51 | 50 | 53 | 55 | 66.2% | 104.9% |
| Animal | 11 | 8 | 7 | 7 | 6 | 7 | 7 | 8 | 8 | 9 | -10.5% | -4.9% |
| Total | 43 | 41 | 46 | 50 | 52 | 56 | 58 | 58 | 61 | 64 | 48.8% | |
| Sierra Leone | | | | | | | | | | | | |
| Vegetal | 33 | 32 | 33 | 33 | 34 | 36 | 37 | 38 | 40 | 40 | 23.1% | 75.0% |
| Animal | 10 | 8 | 7 | 7 | 7 | 7 | 7 | 9 | 12 | 11 | 27.8% | 25.0% |
| Total | 43 | 40 | 40 | 40 | 41 | 43 | 44 | 47 | 52 | 51 | 24.1% | |
| Togo | | | | | | | | | | | | |
| Vegetal | 39 | 38 | 36 | 38 | 39 | 41 | 40 | 41 | 42 | 46 | 14.3% | 110.0% |
| Animal | 7 | 7 | 8 | 8 | 7 | 8 | 7 | 6 | 6 | 7 | -7.1% | -10.0% |
| **Total** | **46** | **45** | **44** | **46** | **46** | **49** | **47** | **47** | **48** | **53** | **11.0%** | |

Source: Me-Nsope and Staatz, 2013 (based on FAOSTAT data).

***Appendix Table A5.5*** *Daily fat availability by country*

(gram/capita), 1980-82 to 2007-09

| | 1980 to 1982 | 1983 to 1985 | 1986 to 1988 | 1989 to 1991 | 1992 to 1994 | 1995 to 1997 | 1998 to 2000 | 2001 to 2003 | 2004 to 2006 | 2007 to 2009 | 1980-85 to 2004-09 (% chg.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Non-coastal Sahel | | | | | | | | | | | |
| Burkina Faso | 33 | 39 | 48 | 48 | 52 | 53 | 54 | 59 | 59 | 61 | 66.7% |
| Mali | 40 | 37 | 45 | 51 | 48 | 45 | 48 | 53 | 54 | 56 | 42.9% |
| Niger | 37 | 36 | 32 | 33 | 31 | 38 | 41 | 47 | 49 | 54 | 41.1% |
| Coastal Sahel | | | | | | | | | | | |
| Cape Verde | 55 | 65 | 69 | 66 | 81 | 79 | 70 | 69 | 73 | 79 | 26.7% |
| The Gambia | 45 | 48 | 51 | 55 | 65 | 60 | 71 | 73 | 74 | 67 | 51.6% |
| Guinea Bissau | 50 | 54 | 58 | 55 | 58 | 55 | 51 | 52 | 54 | 60 | 9.6% |
| Senegal | 61 | 59 | 51 | 51 | 67 | 62 | 63 | 64 | 65 | 69 | 11.7% |
| Coastal non-Sahel | | | | | | | | | | | |
| Benin | 48 | 49 | 40 | 41 | 41 | 40 | 46 | 51 | 53 | 47 | 3.1% |
| Côte d'Ivoire | 50 | 48 | 45 | 45 | 44 | 46 | 49 | 51 | 50 | 49 | 1.0% |
| Ghana | 36 | 37 | 40 | 37 | 38 | 35 | 39 | 39 | 45 | 50 | 30.1% |
| Guinea | 50 | 47 | 42 | 43 | 51 | 52 | 53 | 55 | 60 | 61 | 24.7% |
| Liberia | 47 | 54 | 48 | 46 | 62 | 64 | 58 | 55 | 57 | 55 | 10.9% |
| Nigeria | 49 | 44 | 48 | 53 | 59 | 58 | 60 | 62 | 66 | 67 | 43.0% |
| Sierra Leone | 61 | 56 | 59 | 56 | 58 | 60 | 48 | 48 | 55 | 55 | -6.0% |
| Togo | 29 | 30 | 32 | 39 | 39 | 43 | 39 | 46 | 47 | 50 | 64.4% |

Source: Me-Nsope and Staatz, 2013 (based on FAOSTAT data)