Part I

Transformation of Agrifood Systems in West Africa: Drivers and Trends

This part of the report examines the economic, technological and social forces driving Agricultural growth and structural change in the agrifood system in West Africa; how Agricultural production and food supply in the region have responded to those drivers; and the role that Agricultural trade has played over the past 30 years both in terms of export performance and of the region's growing reliance on food imports.

Chapter 2 begins Part I by describing the five major forces driving structural change in West African Agriculture: (1) demographic changes; (2) the region's uneven but ongoing structural transformation of its economy; (3) variations in income growth and its distribution (including changes in poverty rates, the rise of the middle class, and the evolving nature of food insecurity in the region); (4) continuing economic and political vulnerability due to recurring natural and human-created crises, environmental pressures including climate change, and price volatility; and (5) globalization and technological change. The chapter highlights region-wide trends in these driving forces as well as the wide variation within them across the 15 countries of ECOWAS. The challenge of price volatility, which has long plagued West African Agriculture but which has become especially acute since 2008, is further explored in Focus Section A, which immediately follows Chapter 2.

Chapter 3 then examines how West African Agri-culture has responded, in terms of increased production and productivity growth, to the driving forces discussed in Chapter 2. It begins by briefly describing the region's diverse production base, and then goes on to examine region-wide trends in production of Agricultural commodities over the past 30 years. The chapter next analyses whether the production growth has been driven primarily by growth in resource productivity or simply through expansion of production using existing technologies. The picture that emerges from this analysis is of a very mixed response to the rising demand for West African Agricultural products described in Chapter 2. The chapter then goes on to discuss the major factors, ranging from limited market access of many farmers in the region to a weak policy environment, that have contributed to this mixed supply response.

Chapter 4 next analyses West Africa's Agricultural trade performance, both with the rest of the world and within the ECOWAS region, over the past 30 years in the context of the drivers discussed in Chapter 2 and the mixed domestic supply response discussed in Chapter 3. Chapter 4 highlights the highly variable degree to which different ECOWAS countries are dependent on Agricultural exports and imports. For the region as a whole, agricultural goods account for less than 20% of total merchandise trade; this low share is due largely to the importance of mineral and oil exports of countries like Nigeria and the consequent capacity to import a wide range of both Agricultural and non-Agricultural products. Yet for some countries agricultural exports and imports dominate their trade balances. Chapter 4 highlights the changing composition of food imports into the region and the region's growing dependence on imports of certain key food commodities such as rice, wheat, dairy products and poultry. The chapter next

examines agricultural export performance over the past 30 years, including analysis of the changing composition of exports, the commodities for which West Africa's comparative advantage appears to be improving and those for which it is falling. The chapter concludes with a discussion of the strategically important but poorly documented role of intra-regional Agricultural trade, highlighting the key products traded intra-regionally and the potential and the constraints to expanding that trade.

Part I thus sets out the basic picture of the forces driving Agricultural performance in the region and how West African Agriculture has responded to those forces. This sets the stage for more detailed analyses in Part II of how demands for Agricultural products are changing in the region and, in Part III, how retailers, agroprocessors, and specific value chains are responding to those changing demands.

Chapter 2

Drivers of Structural Change in West African Agriculture

This chapter sets the scene for subsequent chapters by describing the main drivers and trends that have been shaping the evolution of food demand and consumption and will continue to do so in the future, as well as the structure and performance of West African Agriculture. At first glance, some of these drivers may appear to affect primarily demand for agricultural products, while others influence the supply. Upon closer analysis, however, most affect both. For example, population and income growth both clearly increase the demand for food in the region, but they also strongly influence the supply of labour and capital to West African farmers and agroprocessors. The chapter examines the overall trends for the region of these different drivers and highlights the very large variation across the 15 countries of ECOWAS with respect to many of them.[8]

The chapter analyses five major drivers:

- Demographic change, including rapid population growth, urbanisation and the changing geographical distribution of people within the region;
- The region's on-going but uneven structural transformation of its economy;
- Income growth and changes in its distribution, including a discussion of poverty rates, food security, and the growth of the middle class;
- Continuing vulnerability of overall economic and political progress to due to the recurrence of natural and human-created crises in the region, growing pressure on the region's natural resources, climate change and price volatility; and
- Globalisation and technological change, including the involvement of new global actors in the West African economy, the information revolution and the biotechnology revolution.

2.1 Demographic trends

Demographic changes have been characterised by rapid population growth, high urbanization rates and increasingly unequal population distribution.

2.1.1 Rapid population growth

West Africa's population has been growing fast and this trend is projected to continue until the middle of the century. Over the last thirty years, West Africa's population more than doubled, growing by 2.7% annually. In absolute terms, this translates into an increase from 139 million inhabitants in 1980 to 301 million in 2010. This growth is projected to continue through mid-century, albeit at a declining rate, and the regional population is expected to reach 388 million by 2020, 490 million by 2030 and 736 million people by 2050 (UNDESA, 2011). Growth rates vary widely by country, ranging from 1% per annum for Cape Verde, which is far along on its demographic transition and has heavy outmigration, to 4.5% in Liberia, which is

8 Although this chapter analyses the trends in these key drivers, it does not use these to construct scenarios of alternative possible growth paths for West African economies. For such an analysis, see AfDB, 2011a.

Table 2.1 *Past and projected population estimates of ECOWAS member states*

Country	1950	1990	2010	2020	2030	2050	Share of ECOWAS Total in 2010	2005-10 Growth Rate
	(millions of inhabitants)							(%)
Benin	2.3	4.8	8.8	11.5	14.6	21.7	2.9	3.0
Burkina Faso	4.3	9.3	16.5	22.1	29.1	46.7	5.5	3.0
Cape Verde	0.2	0.3	0.5	0.5	0.6	0.6	0.2	1.0
Côte d'Ivoire	2.6	12.5	19.7	24.5	29.8	40.7	6.6	1.8
The Gambia	0.3	1.0	1.7	2.2	2.8	4.0	0.6	2.8
Ghana	5.0	14.8	24.4	30.3	36.5	49.1	8.1	2.4
Guinea	3.1	5.8	10.0	12.8	15.9	23.0	3.3	2.0
Guinea-Bissau	0.5	1.0	1.5	1.9	2.3	3.2	0.5	2.0
Liberia	0.9	2.1	4.0	5.2	6.5	9.7	1.3	4.5
Mali	4.6	8.7	15.4	20.5	26.8	42.1	5.1	3.1
Niger	2.5	7.8	15.5	22.1	30.8	55.4	5.2	3.5
Nigeria	37.9	97.6	158.4	203.9	257.8	389.6	52.7	2.5
Senegal	2.4	7.2	12.4	16.0	20.0	28.6	4.1	2.7
Sierra Leone	1.9	4.0	5.9	7.2	8.5	11.1	2.0	2.6
Togo	1.4	3.7	6.0	7.3	8.7	11.1	2.0	2.2
ECOWAS Total	**69.8**	**180.5**	**300.8**	**388.1**	**490.9**	**736.8**	**100.0**	**2.6**

Source: UNDESA, 2011.

experiencing a return of people who left the country during the civil war. Table 2.1 shows the trends by country and the dominance of Nigeria in West Africa's overall population.

West Africa also has a predominantly young population with 44% of the population below the age of 15. This age structure implies a huge need for job creation in the coming years, as the 80 million young people between the ages of 5 and 14 will enter the labour market over the next decade.[9] In an era of globalization, with increasing exposure to digital media, rural youth are becoming more aspirational and finding traditional farming, characterized by drudgery, low incomes and high risks, less attractive. They increasingly flock into towns seeking employment in the informal services sector. Likewise, a predominantly young population will accelerate new lifestyle trends and changing consumption patterns, spreading from metropolitan areas into the hinterland.

9 Population figures are from UNFPA (2013)

2.1.2 Urbanization

West Africa's population is rapidly urbanising. Between 1980 and 2010, urban populations grew 4.5% annually, against 1.8% in rural areas. This trend is expected to continue between 2011 and 2050, with urban population growth projected at 3.7% per annum compared to only 0.5% in rural areas (UNDESA, 2011). Already by 2020, half of the projected 388 million people residing in West Africa will live in urban areas, and urbanization it is expected to reach 65% by 2050 (UNFPA, 2010).

While urbanization increases at a fast pace across the region, there are considerable differences between countries in their current urbanization levels, ranging from 61% in Cape Verde to 17% in Niger (Table 2.2).

Several authors have questioned the accuracy of official demographic and urbanization statistics (Hitimana *et al.*, 2009b; Hitimana *et al.*, 2009c;

Table 2.2 *Urbanization rate estimates, 1990 – 2050*

	1990	2010	2020	2030	2050
Country			(%)		
Benin	34.5	44.3	50.7	56.5	66.7
Burkina Faso	13.8	25.7	34.0	41.5	55.2
Cape Verde	44.1	61.8	68.7	73.4	79.5
Côte d'Ivoire	39.3	50.6	57.5	63.1	72.1
The Gambia	38.3	56.7	61.6	65.8	73.3
Ghana	36.4	51.2	57.5	62.8	72.3
Guinea	28.0	35.0	40.2	46.2	58.4
Guinea-Bissau	28.1	43.2	49.7	54.7	63.1
Liberia	40.9	47.8	51.8	56.4	66.1
Mali	23.3	34.3	40.8	47.1	59.2
Niger	15.4	17.6	20.6	25.3	37.1
Nigeria	35.3	49.0	55.0	60.8	71.3
Senegal	38.9	42.3	45.7	50.8	61.4
Sierra Leone	33.0	38.9	43.0	48.2	59.5
Togo	28.6	37.5	42.5	47.9	59.3
ECOWAS[a]	**31.9**	**42.4**	**47.9**	**53.4**	**63.6**
West Africa[b]	**33.2**	**44.3**	**49.9**	**55.4**	**65.7**

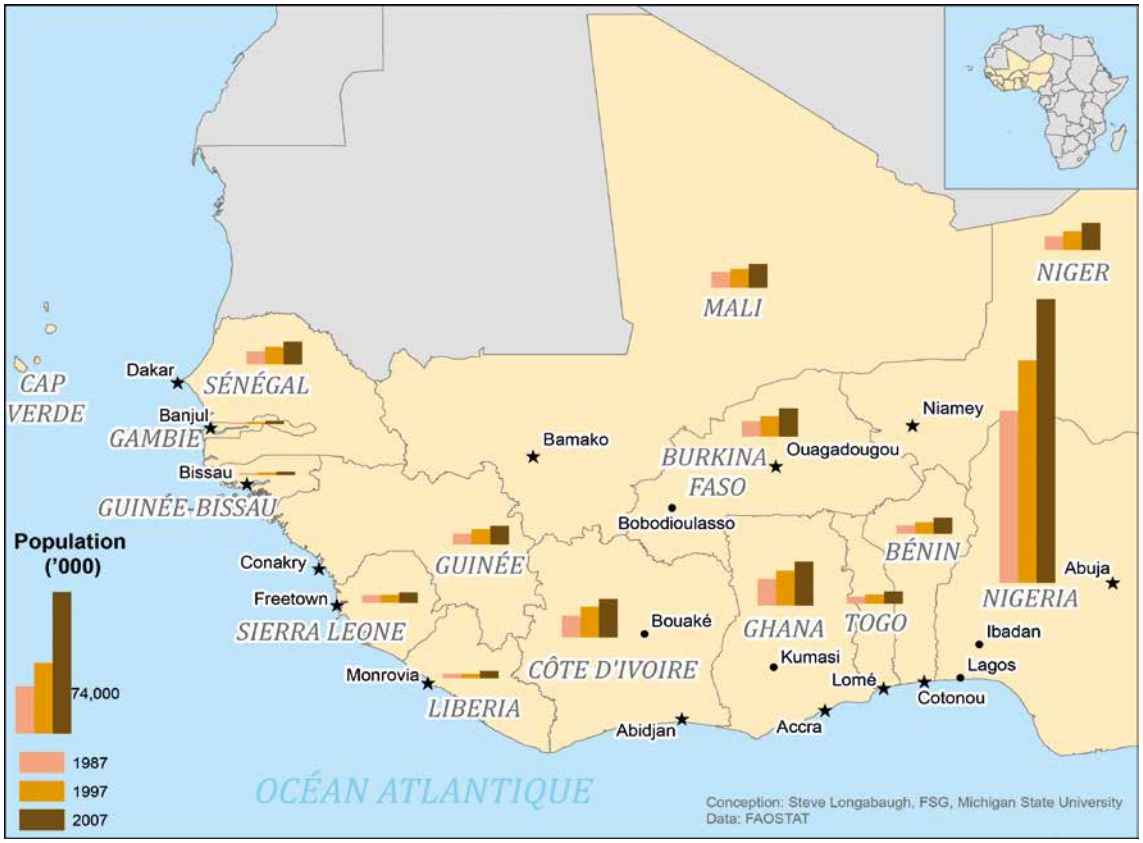
Source: UNDESA, 2011.
[a] Simple average, ECOWAS
[b] Weighted average, West Africa (incl. Mauritania and St. Helena)

Denis and Moriconi-Ebrard, 2008). Moreover, lack of harmonization of definitions of urban populations makes cross-country comparisons and regional aggregation problematic (ibid.). These differences are illustrated by the OECD's Africapolis study, which took an approach different from that of the UN for estimating the urban population in West Africa by combining population census data with satellite images. Applying a threshold of 10 000 inhabitants as the lower boundary for urban agglomerations, the study estimated the entire urban population of West Africa in 2000 at 74.5 million, 18.4 million below the United Nations data based on national statistics.

Data inconsistencies notwithstanding, two overall urbanization patterns stand out throughout the region. First is the primacy of national metropolitan areas over secondary cities and towns. Approximately 40% of the urban population resides in the main metropolitan areas, which on average had about 6.3 times the size of the next largest agglomerations in 2000 (Denis and Moriconi-Ebrard; 2008; Hitimana, *et al.*, 2009c). Second is the proliferation of small towns at the lower boundary of urbanization, whose urban status is not always been recognised politically and statistically. Approximately two-thirds of all agglomerations are in the range between 10 000 and 50 000 inhabitants, totalling about one-fifth of the urban population. New urban settlements are emerging in rural areas, in proximity to large cities and along major highways and transport corridors. As a result, the average distance between urban centres of over 10 000 inhabitants has declined from 111 km in 1950 to 33 km in 2010. While the small towns are the main interface with the rural economy, the metropolitan areas are the main interface with global markets. As will be seen in Chapter 6, in recent years there has been a spread of urban food habits into rural areas (e.g. expanded consumption of wheat and rice products), and these secondary towns are likely an important source of the new foods to rural residents.

Differences in the distribution of the urban population can also be observed between small and

Figure 2.1 *Population growth patterns in West Africa*



Source: Longabaugh, 2012; Data: FAOSTAT

large countries. Small countries tend to show the strongest dichotomy between metropolitan areas and small towns and cities. Large countries such as Côte d'Ivoire, Ghana and especially Nigeria have several large secondary agglomerations and intermediate cities.

Urbanization rates tend to be higher in countries that have experienced stronger economic growth, a correlation also found by the World Development Report 2009 (World Bank, 2009b). However, the direction of causality is not entirely clear. Urbanization can be seen both as a consequence of, and an engine for, economic growth (Allen *et al.*, 2009).[10]

Moreover, the type of urbanization can affect outcomes in terms of overall growth and poverty reduction. Recent evidence based on the analysis of cross-country data sets and long-term panel data from Tanzania suggests that migration into secondary towns has a much larger effect on poverty reduction than migration into metropolitan areas, but a somewhat lower impact on overall economic growth (Christiaensen *et al.*, 2013). Several factors explain the higher incidence of urbanization into secondary and rural towns on poverty reduction, such as the higher likelihood of finding employment (given higher demand for unskilled and semi-skilled labour), lower migration costs and the ability to maintain and exploit closer social ties with the areas of origin. This is consistent with the literature on the positive role of rural nonfarm activities in poverty reduction. Rural towns, which mediate the flow of inputs, goods and services between rural hinterlands and large urban centres are seen as the most effective generators of nonfarm

10 Only three countries showed fast increases in their urbanisation rates despite sluggish or negative growth between 1970 and 2000: Liberia, Sierra Leone and Niger. For the first two countries this is mainly attributable to the armed conflict, while Niger had a far lower urbanisation rate at the end of the colonial period than the other countries in the region (Allen, et al., 2009)

employment for the poor (Haggblade *et al.*, 2007; Lanjouw and Murgai, 2009).

2.1.3 Regional distribution and population densities

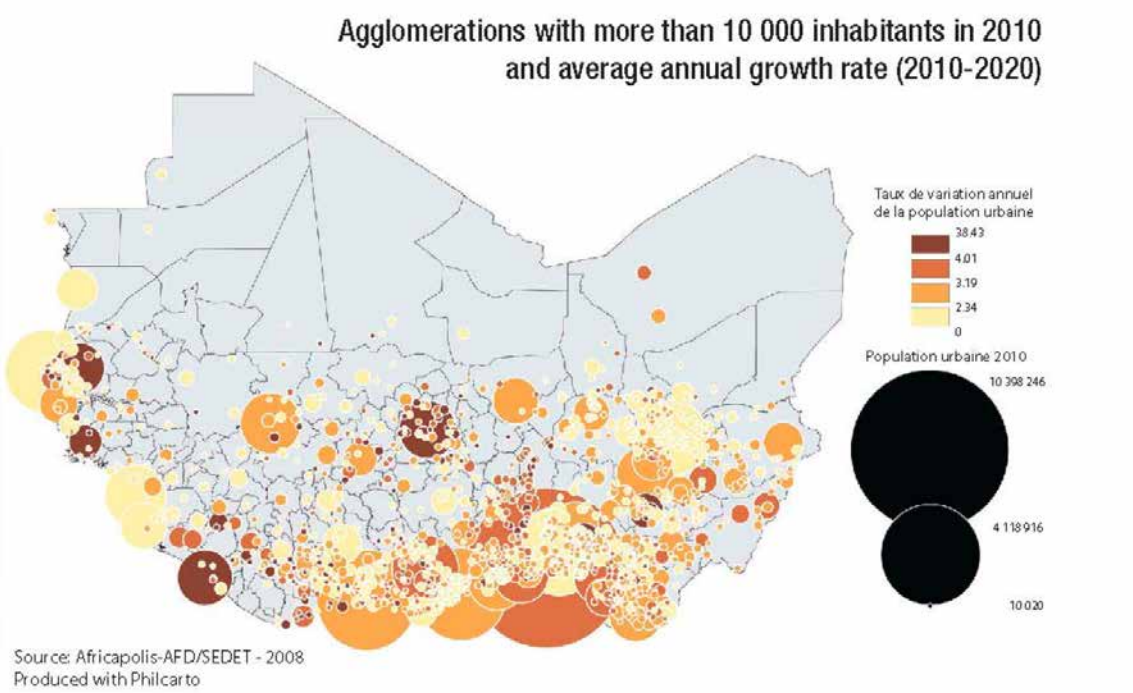
From a demographic standpoint, West Africa is made up of one giant country, six moderate-sized countries, and eight small ones. Nigeria alone, at 158 million, boasts 53% of the total, with two other countries, Ghana and Côte d'Ivoire, accounting for an additional 15%. Hence, these three non-LDCs include two-thirds of the population of the region. West Africa's population is heavily concentrated along the humid coast, and growth, in absolute terms, is concentrated in the coastal states. Population distribution and migration patterns have been strongly influenced by agroclimatic conditions, land availability and variable economic opportunities among countries in the region. Three-quarters of the West African population live in humid and sub-humid zones, 20% in the semi-arid zone (Sahel) and 5% in the arid zone (ECOWAS *et al.*, 2007). Population densities in coastal countries are 6 to 15 times greater than those in the Sahelian countries, making the development of transportation, communication, and marketing infrastructure much cheaper per person served than in the regions farther north.

Intra-region migration has been characterised by high rates of rural-to-urban migration, movements of people from Sahelian to Sudano-Sahelian zones and from these areas to both rural and urban areas of wealthier coastal countries (e.g. Malian and Burkinabé migration to Côte d'Ivoire). Given current migration patterns, by 2020 a high density urban band will have formed running along the breadth of the coastal area of the Gulf of Guinea (Figure 2.2). In 2005, coastal cities accounted for 38% of the entire urban population of the region, compared with 28% in 1950 (Denis and Moriconi-Ebrard, 2008).

2.2 Lagging structural transformation

The demographic changes just described are part of a broader structural transformation of West African economies that is proceeding at an uneven pace.

Figure 2.2 *Projected urban growth rates in West Africa, 2010-2020*



Source: Hitimana, *et al.*, 2009b

Structural transformation is a defining feature of the development process. Typically, it is characterised by four interrelated processes: (1) a declining share of agriculture in GDP (even though the absolute size of the agricultural sector continues to grow), (2) the rise of a modern industrial and service economy, (3) rapid urbanization as people migrate from rural to urban areas, and (4) demographic transition from high to low rates of births and deaths (Timmer, 2012).

2.2.1 Slow sectoral transformation

In West Africa, the structural transformation has been incomplete, with the four interrelated processes occurring at different velocities: while urbanization is progressing fast, there has been little change in the sectoral distribution of the economy, and only three countries (Cape Verde, Côte d'Ivoire and Ghana) are well along in their demographic transitions to lower birth rates. Despite the strong economic growth over the past two decades, official statistics on the sectoral distribution of the GDP show relatively little variation since the 1980s (Table 2.3). The share of agriculture in GDP has declined in countries with high GDP per capita and high growth rates such as Cape Verde, Ghana and Nigeria. In a number of countries, however, agriculture's share of GDP even increased during since the 1980s. However, with the exception of Burkina Faso, these countries had small populations, slow economic growth and were conflict-ridden (Guinea-Bissau, Liberia, Sierra Leone and Niger). More importantly, the share of the industrial sector in GDP only increased in 7 of the 15 countries between the 1980s and the 2000s and remains, on average, at 23%. Within the sector, the main growth drivers have been extractive industries – mining and oil – which are capital-intensive but generate little employment. Manufacturing, which has been the key driver of growth and structural transformation in Asia, has underperformed in West Africa. According to UNIDO and UNCATD (2011), the share of manufacturing in GDP declined from 13% in 1972 to 5% in 2008 for the region as a whole.

Table 2.3 *Average shares of agriculture, industry and services sectors in overall GDP*

1980-1989 and 2000-2009 (%)

	Agriculture		Industry		Services	
Country	1980-89	2000-09	1980-89	2000-09	1980-89	2000-09
Benin	33.8	33.7	14.0	13.7	52.2	52.6
Burkina Faso	29.8	33.8	21.0	22.1	49.2	44.1
Cape Verde	16.6	9.0	19.0	17.5	64.4	73.6
Côte d'Ivoire	27.1	24.2	20.8	24.5	52.0	51.3
The Gambia	34.0	31.1	13.7	14.1	52.3	54.8
Ghana	52.5	36.3	13.8	24.8	33.6	38.9
Guinea	24.0	22.8	33.6	39.1	42.3	38.1
Guinea-Bissau	48.6	55.0	15.7	13.0	35.7	32.0
Liberia	35.8	66.6	27.8	13.5	36.4	19.8
Mali	44.4	37.4	14.8	24.3	40.8	38.1
Niger	38.6	39.3	19.8	17.2	41.6	43.5
Nigeria	–	37.2	–	39.2	–	23.6
Senegal	22.0	16.4	20.7	33.6	57.3	60.0
Sierra Leone	40.0	49.9	15.9	24.4	44.2	25.7
Togo	31.8	39.3	22.0	20.4	46.2	40.3
ECOWAS[a]	**–**	**35.5**	**–**	**22.8**	**–**	**42.4**

Source: World Bank (2011a) Africa Development Indicators

[a] Simple average; data not available for Nigeria in earlier period, so no ECOWAS average for that period.

According to official statistics, the services sector continues to dominate the economy, accounting for 42% of GDP on average during 2000-09 for the ECOWAS countries, followed by agriculture (36%) and industry (23%). The share of the services sector is higher than that seen in other developing regions, taking into account differences in per capita income, and agriculture's share is lower. For example, the average share of the services sector in West Africa is only slightly lower than in Latin America, which has an average per capita income that is nearly eight times higher. Agriculture's share of GDP is only slightly above that of East Asia, the Middle East, and North Africa, although the latter regions have per capita incomes that are three times higher than that of sub-Saharan African countries (Badiane, 2012).

2.2.2 Growth of the informal economy

While the growth of the services sector has been driven to some extent by the recent dynamism in finance, telecommunications and tourism, the dominant trend has been the growth of the informal economy. An important part of the structural transformation in West Africa is a shift of labour from agriculture into the urban and rural informal service economy. In addition, downsizing of government institutions and privatization of parastatals during structural adjustment in the 1980s and 1990s contributed to reducing the formal services sector. Likewise, trade liberalization led to a collapse of some manufacturing enterprises nurtured during industrialization strategies of the 1960s and 1970s. Many of the retrenched employees found a living in the informal economy, including in agriculture.

The figures in Table 2.3 need to be interpreted cautiously because the growth of the informal economy and associated sectoral transformations are not fully captured in official statistics. While agricultural output including subsistence production is usually reflected in national accounts, this is not the case of informal activities in other sectors. As a result, the share of farming in overall GDP tends to be overestimated, whereas important parts of the rural and urban non-agricultural economy are not properly reflected. The latter include informal agricultural trade, cottage food processing and food services which are often primarily carried out by women (see Chapter 9). If the informal sector is defined as including economic activities that do not comply with the obligations to register, keep accounts and pay taxes (Hitimana *et al.*, 2009a), most of West African Agriculture is part of the informal economy. Estimates of the contribution of the informal economy (including Agriculture) to the GDP range from 43% (Côte d'Ivoire) to 77% (Niger) (Hitimana *et al.*, 2011).

Official employment statistics also do not capture the informal economy and are therefore misleading. Especially the share of the agricultural sector in total employment tends to be overestimated. This is partially due to the seasonal nature of most farming activities, particularly under rainfed conditions, forcing farm households to engage in multiple activities, sometimes also on a seasonal basis. Failure to adjust properly for seasonal employment overstates the employment generated by agriculture while at the same time underestimating agricultural labour productivity.[11] Moreover, the majority of non-agricultural activities in rural areas, especially in food processing, trade and catering, are undertaken by women. Still, rural household members often classify themselves as farmers and are reflected as such in surveys and censuses (Allen, *et al.*, 2009; Broutin and Bricas, 2006).

Likewise, not all agricultural producers are rural, as there are an important number of urban households engaged in farming, including vegetable gardening and livestock production on the outskirts of towns and cities. In a number of West African countries, according to official statistics, the agricultural population is far bigger than the rural population.

2.2.3 A growing share of net food buyers

An important implication of this economic and demographic transformation is the shifting relation between net food buyers and net food sellers. By

11 For example, in its 2009 report on trends in agriculture and household living conditions, the Senegalese Ministry of Agriculture estimated the full-time equivalent of agricultural employment at 1.6 million full-time jobs, less than half of the previous official estimate of the agricultural population of 3.4 million in (Hitimana, et al., 2009b).

and large, the urban population is made up of net food buyers whereas in rural areas the situation is becoming increasingly diverse. While data are not available for all the ECOWAS countries, there seems to be a general pattern in many African countries that fewer than half of all smallholders are net sellers of starchy staples (grains, roots and tubers). For example, surveys in Ethiopia, Kenya, Mali, Mozambique, Rwanda, Senegal, Somalia, Tanzania, Zambia, and Zimbabwe between the mid-1980s and 2002 found that in no country were more than half of the smallholders net sellers of staples; the modal figure is closer to one-third. Depending on the country, from 5% to 40% of the smallholders neither bought nor sold staples (Christiaensen and Demery, 2006; Jayne *et al.*, 2006; UNDESA, 2011; Weber *et al.*, 1988).[12] Data from household surveys in Ghana, Nigeria, Malawi and Madagascar found similar patterns, with the amount of land owned being the strongest correlate of net sales position (Zezza *et al.*, 2006).

Two policy implications result: (1) improving food marketing systems needs to address not only strengthening links between rural and urban areas but also rural-to-rural marketing, as many net buyers of staples live in rural areas; and (2) higher food prices do not unambiguously help all rural people, at least in the short run, as many are net buyers of food.

2.3 Trends in income growth and distribution

Economic growth, income levels, and distribution of purchasing power are further powerful drivers shaping demand for agrifood products and structure and evolution of the agrifood system. Despite strong overall economic growth and progress in poverty reduction and food security over the past two decades, important differences between and within countries remain.

12 The figures showing the larger percentages of net sellers were from surveys in more grain-surplus areas that were conducted in the 1980s; while the figures showing smaller percentages were nationally representative studies that took place more recently. Thus, it is most likely that in most of these countries, only about a third of smallholders are net sellers of staples. See for details Staatz and Dembélé, 2007.

2.3.1 Increasing overall economic growth and income

Overall, economic growth has markedly improved over the last 20 years. As shown in Table 2.4, ten out of fourteen countries for which data are available recorded improved GDP growth rates during the 1990s compared with the previous decade. During the first decade of the twenty-first century, all countries except Liberia experienced economic growth, and seven of them had an average GDP growth rate in real terms above 5%. Even in per capita terms, growth has markedly improved, with the majority of countries experiencing positive per capita growth rates. Whereas only 2 of the 13 ECOWAS countries for which data were available during the period 1980-89 experienced growth in per capita GDP, by 2000-09, 11 out of 15 showed a positive trend, and 14 out of 15 had stronger performance than in the 1980s. Top performers during the most recent decade included Cape Verde, Burkina Faso, Ghana, Mali, Nigeria and Sierra Leone (which has been rapidly recovering from war in the 1990s). The impact of civil strife is clearly visible in the figures for various years for Liberia, Sierra Leone, Côte d'Ivoire, and Guinea-Bissau.

The recent strong economic growth has mainly been driven by the primary sector (extractive industries and agriculture) and improved commodity prices. Nevertheless, the economic and political reforms implemented over the last 25 years are bearing fruit in the services sectors as well. Due to improvements in economic management, governance and macroeconomic and sectoral policies (analysed in Chapter 11), other subsectors such as financial services, telecommunications and tourism are beginning to make important contributions to growth. The resurgence has also benefited from increased capital inflows, especially foreign direct investment, aid and debt relief (UNECA, 2012). West African economies also showed remarkable resilience in the face of the global recession following the 2008 financial crisis. Annual real GDP growth hit a nadir of 2.8% in 2009 but by 2011 had rebounded to 6.1% and 6.0% in 2012 and 2013 (West African Subregional Office UNECA, 2013).

Table 2.4 *ECOWAS GDP growth rates and share of regional GDP*

1980-2009 (%)

	2010 GDP/ Capita[a]	Real GDP Ave. Annual Growth Rate			Real GDP/capita Ave. Annual Growth Rate			Share of total sub-regional GDP in 2009
Country		1980-89	1990-99	2000-09	1980-89	1990-99	2000-09	
Benin	1 576	2.7	4.7	4.0	–0.4	1.3	0.6	2.2%
Burkina Faso	1 247	4.0	5.5	5.4	1.4	2.8	1.9	2.9%
Cape Verde	3 954	6.3	5.9	6.4	–	3.4	4.8	0.5%
Côte d'Ivoire	1 885	0.7	3.5	0.8	–3.2	–0.3	–1.3	7.5%
The Gambia	1 400	3.5	2.7	5.2	–0.2	–0.8	2.1	0.3%
Ghana	1 625	2.6	4.3	5.8	–1.1	1.6	3.5	10.3%
Guinea	1 083	–	4.4	3.0	–	1.0	1.0	1.5%
Guinea-Bissau	1 177	3.8	1.4	1.0	2.8	–1.6	–1.4	0.3%
Liberia	416	–3.3	0.2	0.0	–6.7	–1.9	–3.5	0.3%
Mali	1 057	0.5	3.9	5.3	–1.0	2.1	2.8	3.0%
Niger	723	–0.4	2.4	4.3	–2.8	–1.2	0.5	1.8%
Nigeria	2 363	0.8	2.4	6.6	–2.4	0.0	4.0	63.5%
Senegal	1 917	2.7	2.8	4.3	0.0	0.3	1.6	4.2%
Sierra Leone	821	0.5	–5.3	9.5	–1.7	–5.7	5.8	0.6%
Togo	991	1.5	3.6	2.5	–2.3	–0.4	–0.1	1.0%

Source World Bank (2011a) Africa Development Indicators.
[a]GDP per Capita in 2013 US$ (PPP)

Like population, the region's total economic output is heavily concentrated in a few countries (Table 2.4). Despite the overall positive economic performance, income levels, as measured by GDP per capita, vary widely across the zone, with Cape Verde, Nigeria, Côte d'Ivoire, Senegal and Ghana having the highest levels of per capita purchasing power. Nigeria alone accounted for almost two-thirds of the regional GDP in 2009. The three largest economies (Nigeria, Ghana, and Côte d'Ivoire) account for over 81% of the total GDP of ECOWAS. Hence, their economic health is critical to the region. Their economic weight even exceeds their share in the total regional population, which amounted to 67% in 2010 (see Table 2.1). A further group of countries – Senegal, Mali, Burkina Faso, Benin, Niger, Guinea and Togo–each contributes between 1% and 5% to regional GDP. The contribution of the remaining countries – Sierra Leone, The Gambia, Cape Verde, Liberia and Guinea-Bissau – to regional GDP is miniscule, below 1% each.

This huge diversity in demographic and economic terms poses important challenges for the regional integration process. While economic integration is crucial for the smallest and landlocked economies in order for them to benefit from economies of scale, it is less urgent for the larger countries, especially Nigeria.

2.3.2 Poverty has fallen by various degrees

Overall, the consistent economic growth over several years in most West African countries has led to reduced poverty levels. In general, there is a broad correlation between economic growth and poverty reduction, and countries with little or negative GDP growth per capita also experienced worsening poverty levels. Countries such as Ghana, Burkina Faso and Cape Verde that showed a consistent growth record over a longer period have seen the greatest reductions in poverty.

However, the quality of growth clearly matters. The impact of overall economic growth in a

given country on poverty reduction can be muted by income inequalities, due in part to differing economic potentials of various areas within the country. Available Gini coefficient estimates for the ECOWAS countries between 2003 and 2008 (Table 2.5) range between a low of 0.36 (relatively even income distribution) for Guinea Bissau and a high of 0.53 (relatively concentrated distribution) in Liberia.[13] These figures compare with scores internationally that range from approximately 0.23 (Sweden) to 0.70 (Namibia), with the EU coefficient averaging 0.31, the United States scoring around 0.45 and two-thirds of Southeast Asian countries (ASEAN) ranging between 0.30 and 0.40.

Income distribution trends vary between countries. As discussed in more detail in Chapter 7, Nigeria's poverty rate has fluctuated sharply over the past 30 years, and the Gini ratio increased from 0.43 in 2004 to 0.45 in 2010 (NBS, 2012b). ReSAKSS (Taondyandé and Yade, 2012b) calculated changes in Gini ratios over time for four countries (Burkina Faso, Côte d'Ivoire, Ghana, and Mali) for which budget-consumption studies are available for various periods ranging from 1989 through 2009. Income distribution (as proxied by consumption expenditures per person) became more equal in Burkina Faso (between 1994 and 2009), remained unchanged in Côte d'Ivoire (between 1993 and 2008), and became more unequal in Ghana (between 1992 and 2006) and Mali (between 1989 and 2006). In Burkina, the reduction in income inequality came about largely through a reduction in the gap between urban and rural incomes, as urban inequality actually increased during the period. In Ghana and Mali, the increase in income inequality nationally was driven by increasing income inequality in urban areas and between urban and rural areas for both countries and by increasing rural income inequality in Ghana. These contrasting patterns of income distribution illustrate that the gains from economic growth are captured by different segments of the population in different countries; who gains is likely linked, in part, to domestic policy choices. These differences in income distribution will, as we shall see, have important implications for the types of demand facing the agrifood system in each country.

Available data show a wide variation in poverty levels across countries (Table 2.5), with poverty rates much lower in Cape Verde, Côte d'Ivoire, Ghana and Senegal than in the other countries in the region. Table 2.5 shows headcount poverty measures calculated with two different standards: (1) the percentage of the population having purchasing-power parity less than US$1.25 and US$2, which allows comparisons among countries; and (2) the percentage of the population in rural and urban areas in each country falling below the national poverty line as defined in that country's poverty reduction strategy plan. According to estimates of poverty headcount ratios expressed in purchasing-power parities, more than half of the entire regional population lives on less than US$1.25 per day, and three-quarters has less than US$2 per capita at their disposal. Rates of extreme poverty (as measured by the US$1.25 per capita poverty line) are declining in most but not all countries in ECOWAS. Of the 11 countries for which data are available for multiple years between 1985 and 2008, the US$1.25 poverty headcount ratio declined in eight (Burkina Faso, The Gambia, Ghana, Guinea, Mali, Niger, Senegal and Sierra Leone), stayed the same in one country (Guinea Bissau), and increased in two (Nigeria and Côte d'Ivoire).[14] Côte d'Ivoire's increase in its poverty rate occurred as per capita incomes were falling throughout the country, whereas the poverty rate in Nigeria increased during the 1990s (a period of economic stagnation in average per capita GDP growth), and has declined slightly since then.

The figures with respect to national poverty lines show that poverty remains heavily concentrated in rural areas, with poverty rates two to three times higher in rural areas than in urban areas. Budget-consumption studies of seven countries (Burkina Faso, Côte d'Ivoire, Ghana, Mali, Niger, Senegal, and Togo) carried out between 2006 and 2009 found that average total expenditures per

13 A Gini coefficient of 0 means that the poorest 20% of households earn 20% of national income, the poorest 50% earn 50% and so on. A Gini of 100 means that one household earns 100% of national income. The accuracy of Gini calculations depend on reliable fiscal data, and thus the figures must be interpreted cautiously.

14 Calculated from data in World Bank, 2011a Africa Development Indicators.

Table 2.5 *Poverty headcount ratios and Gini coefficients for West African countries*

	Poverty headcount ratio[a]			Percentage of pop. below the national poverty line[b]				Gini Coefficient
Country	Year[c]	$1.25 day	$2.00 day	Year[c]	% rural	% urban	% national	
Benin	2003	47.3	75.3	2002	46.0	29.0	39.0	38.6
Burkina Faso	2003	56.5	81.2	2002	52.4	19.2	46.4	39.6
Cape Verde	2001	20.6	57.7	2006	44.3	13.2	26.6	50.4
Côte d'Ivoire	2008	23.8	46.3	2007	54.2	29.4	42.7	41.5
The Gambia	2003	34.3	56.7	2002	67.8	39.6	58.0	47.3
Ghana	2006	30.0	53.6	2005	39.2	10.8	28.5	42.8
Guinea	2007	43.3	69.6	2006	63.0	30.5	53.0	39.4
Guinea Bissau	2002	48.8	77.9	2001	69.1	51.6	64.7	35.5
Liberia	2007	83.7	94.8	2006	67.7	55.1	63.8	52.6
Mali	2006	51.4	77.1	2005	57.6	25.5	47.4	39.0
Niger	2007	43.1	75.9	2006	63.9	36.7	59.5	34.0
Nigeria	2004	64.4	83.9	2003	63.8	43.1	54.7	42.9
Senegal	2005	33.5	60.3	2004	61.9	35.1	50.8	39.2
Sierra Leone	2003	53.4	76.1	2002	78.5	47.0	66.4	42.5
Togo	2006	38.7	69.3	2005	74.3	36.8	61.7	34.4
Total		**53.8**	**75.4**					**42.7**

Source: World Bank (2011a) Africa Development Indicators.
[a] Purchasing Power Parity (PPP), percent of population.
[b] National poverty lines for rural, urban, and total populations as defined in national Poverty Reduction Strategy Plans (PRSPs).
[c] Selected years between 2003 and 2008.

capita (a proxy for per capita income) in urban areas were from 78% higher than those in rural areas – in Burkina Faso – to 148% higher – in Mali (Taondyandé and Yade, 2012b). Some of the countries that have had the most rapid economic growth in recent years (e.g. Cape Verde, Ghana, and Burkina Faso) have poverty rates that are much lower in urban areas than in rural areas, suggesting that a higher percentage of the urban poor have been lifted out of poverty by this growth than have the rural poor. In contrast, countries that have had sluggish growth and civil disruption (e.g. Sierra Leone, Liberia and Guinea Bissau) have high poverty rates in both urban and rural areas.

2.3.3 An emerging middle class

In the context of Africa's economic rebound, the growth of the middle class has sparked the interest of policy makers and the private sector, including foreign investors. In between the traditional elites and the vast majority of the poor, there is an emerging middle class, mainly in urban areas. This middle class is increasingly recognised by domestic and international companies as a growing market for food and non-food products. Understanding the features of West African middle classes and their food purchasing behaviour is therefore key from a market development perspective aimed at enabling domestic and regional producers to capture a larger share of this market and more successfully compete with imports.

Developing an accurate picture of the key features and size of the middle class is challenging. Like poverty, "middle class" is a multidimensional term that can be defined by various socio-economic variables such as income, expenditure, asset ownership, education levels and professional affiliation, along with less tangible features such as attitudes, aspirations and lifestyles. Middle class households are more likely to have salaried jobs or small businesses and widespread ownership of assets such as refrigerators and mobile phones. They tend to value education, have fewer children and spend more on nutrition and children's schooling. In general,

the values of the middle class tend to align with a desire for greater market competition, better governance, gender equality, and more investment in education, science and technology in their respective countries (AfDB, 2011b).

Defining the middle class and measuring its size along different dimensions is challenged by the dearth of in-depth demographic and socio-economic data.[15] This section draws on some recent evidence on the size of West Africa's middle classes from a study conducted by the African Development Bank based on data from the World Bank's povcal.net database. It further synthezises information on the size and evolution of middle classes in five West African countries for which ReSAKSS analysed survey data (Taondyandé and Yade, 2012b). Some additional characterization of urban middle classes in Ghana and Nigeria is provided in Chapter 7 to set the scene for discussing changing food demand and consumption trends in Accra and Lagos.

The African Development Bank defines three subgroups as comprising the African middle class: (1) the "floating class", defined as people having a daily per capita expenditure, in purchasing power parity (PPP) in 2005 prices, of US$2-4; (2) the lower-middle class, with daily per capita expenditure of US$4-10; and (3) the upper-middle class, with daily per capita expenditures of US$10-20 (AfDB, 2011a). The floating class is a fragile group that is just above the poverty line and can easily fall back into poverty given an economic shock. Nonetheless, as an emerging class, this group is likely to begin to upgrade and diversify its diet, putting new and different demands of the food system. Assuming an average household size of five, the resulting monthly expenditures of the floating class would be in the range between US$300 and US$600 per month. The upper boundaries for the lower- and upper-middle class households would be US$1 500 and US$3 000 per month, respectively.

15 Household surveys tend to underestimate expenditures and assets levels due to under-reporting, and this bias tends to increase with higher income levels.

Table 2.6 *The West African middle class in 2008*

	Floating class[a] population		Lower middle[b] population		Upper middle[c] population		Total population	
Countries	(%)	(millions)	(%)	(millions)	(%)	(millions)	(%)	(millions)
Benin	6.9	0.6	5.9	0.5	4.8	0.4	17.7	1.5
Burkina Faso	10.2	1.6	2.3	0.3	0.9	0.1	13.3	2
Cape Verde	29.7	0.1	11.7	0.1	5	0	46.4	0.2
Côte d'Ivoire	18.2	3.8	11.8	2.4	7.1	1.5	37.1	7.7
The Gambia	22	0.4	12.3	0.2	3.7	0.1	37.9	0.6
Ghana	26.8	6.3	13.5	3.2	6.2	1.5	46.6	10.9
Guinea	6.3	0.6	2.8	0.3	1.5	0.1	10.6	1.0
Guinea Bissau	10.2	0.2	6.4	0.1	1.2	0	17.8	0.3
Liberia	2.9	0.1	1.2	0	0.7	0	4.8	0.2
Mali	17	2.2	4.9	0.6	3.2	0.4	25.1	3.2
Niger	8.7	1.3	3.3	0.5	2	0.3	14	2.1
Nigeria	12.9	19.5	6.2	9.3	3.8	5.7	22.8	34.5
Senegal	23.9	2.9	7.3	0.9	4.5	0.6	35.7	4.4
Sierra Leone	11.4	0.6	4.6	0.3	2.6	0.1	18.6	1.0
Togo	11.6	0.7	7.3	0.5	1.6	0.1	20.4	1.3
ECOWAS	**14.3**	**40.9**	**6.7**	**19.2**	**3.8**	**10.9**	**24.7**	**70.9**

Source: Adapted from AfDB, 2011b

[a] Floating class defined as daily per capita expenditure, in purchasing power parity (PPP) in 2005 prices, of between US$2 and US$4.

[b] Lower-middle class defined as daily per capita expenditure, in purchasing power parity (PPP) in 2005 prices, of between US$4 and US$10.

[c] Upper-middle class defined as daily per capita expenditure, in purchasing power parity (PPP) in 2005 prices, of between US$ 10 and US$ 20.

Table 2.7 *The state of undernutrition in the ECOWAS zone, 1992–2008*

Country	Population	Number of people undernourished					Progress towards WFS[a] target[c]	Proportion undernourished					Progress towards MDG[b] target[c]
	2006-08	1990-92	1995-97	2000-02	2006-08	Change so far		1990-92	1995-97	2000-02	2006-08	Change so far	
	(millions)	(millions)				(%)		(%)				(%)	
Benin	8.1	1.0	1.0	1.0	1.0	–0.3	■ (rd)	20	18	15	12	–41	■ (gr)
Burkina Faso	15.1	1.2	1.2	1.4	1.2	–3.0	■ (yl)	14	12	12	8	–40	■ (gr)
Côte d'Ivoire	18.7	1.9	2.6	2.9	2.9	50.9	■ (rd)	15	17	17	14	–2	■ (rd)
The Gambia	1.6	0.1	0.3	0.3	0.3	143.9	■ (rd)	14	23	21	19	41	■ (rd)
Ghana	22.7	4.3	2.3	1.9	1.1	–74.0	■ (yl)	28	13	9	5	–83	■ (gr)
Guinea	9.4	1.3	1.5	1.7	1.6	23.5	■ (rd)	20	19	20	16	–18	■ (rd)
Liberia	3.5	0.6	0.7	1.1	1.1	85.0	■ (rd)	30	32	36	32	7	■ (rd)
Mali	14.0	2.4	2.5	1.9	1.5	–38.1	■ (gr)	27	25	18	12	–56	■ (gr)
Niger	14.0	3.0	3.5	3.1	2.3	–22.2	■ (yl)	37	37	27	16	–55	■ (gr)
Nigeria	147.0	16.3	10.9	11.9	9.4	–42.3	■ (gr)	16	10	9	6	–61	■ (gr)
Senegal	11.5	1.7	2.3	2.6	2.3	32.4	■ (rd)	22	26	26	19	–14	■ (yl)
Sierra Leone	5.5	1.8	1.6	1.9	1.9	3.6	■ (rd)	45	39	43	35	–22	■ (yl)
Togo	5.7	1.7	1.7	1.9	1.9	7.6	■ (rd)	43	36	36	30	–31	■ (rd)
ECOWAS[d]	**276.6**	**37.3**	**32.1**	**33.6**	**28.5**	**-23.6**		**20.3**	**15.3**	**14.2**	**10.3**	**-49.2**	

Sources: FAO State of Food Insecurity 2011, http://www.fao.org/publications/sofi/en/. Population data from UN World Population Prospects 2010, http://esa.un.org/unpd/wpp/Excel-Data/population.html.

[a] World Food Summit (WFS) target: between 1990 and 2015 halve the number of malnourished people in the population

[b] Millennium Development Goal (MDG) target: between 1990 and 2015 halve the proportion of people who suffer from malnutrition

[c] Key to WFS and MDG progress:

■ (gr)	Target already met or expected to be met by 2015
■ (yl)	Progress insufficient to reach the target if prevailing trends persist
■ (rd)	No progress, or deterioration

[d] ECOWAS totals minus Cape Verde and Guinea Bissau

Table 2.6 shows that in 2008, just over 70 million West Africans, almost a quarter of the total population, belonged to the middle class. However, the largest share – 40 million (58% of the total) – were in the floating class, those with incomes just above the poverty line, with the remaining 30 million in the middle and upper-middle classes. These latter groups–those spending over US$4 per day – would, if all in a single country, constitute the second most populous country in ECOWAS.

The West African middle-class population is mainly concentrated in the three largest countries: half lives in Nigeria, with an additional 27% in Ghana and Côte d'Ivoire. However, when ranked by the middle class's shares in the national population the order looks different. Ghana has the highest share of middle-class persons in its total population (47%), followed by Cape Verde (46%), Côte d'Ivoire (37%), Senegal (36%) and Nigeria (22%). The combined share of lower- and upper-middle classes accounted for 20% of the population in Ghana and 19% in Côte d'Ivoire, followed by Cape Verde (17%), The Gambia (16%), Senegal (12%) and Nigeria (10%). Hence, while Nigeria has by far the largest middle class in the region, its share of the national population is comparatively small, mirroring the highly unequal income distribution in the country.

The analysis of budget-consumption studies by ReSAKSS (Taondyandé and Yade, 2012b) also examined changes in the proportion of the population falling in the middle class over time in

Burkina Faso, Côte d'Ivoire, Ghana and Mali. In two of the countries, Burkina Faso and Ghana, the proportion of the population in the middle class expanded substantially over the past 15 years, with the absolute size of the middle class growing at an average annual rate of 10% (albeit from a small base) in Burkina Faso between 1994 and 2009 and by nearly 7% per year in Ghana between 1992 and 2006. In contrast, the size of the middle class stagnated in Mali between 1989 and 2006 (growing at 2.5% per year in urban areas but falling by 2.4% per year in rural areas). In Côte d'Ivoire, the middle class fell by 0.4% per year between 1992 and 2006. As in Mali, there was a modest expansion of the middle class in urban areas (by 0.8% per year) that was offset by a larger decrease in the size of the middle class in rural areas (by 2.0% per year).

The differing trajectories of middle classes among countries and the large share of the floating class just above the poverty level show that the size of the middle-class and its growth remain fragile. They chiefly depend on the level and quality of economic growth and the absence of civil conflicts. Nigeria is an example of the fragility of middle-class growth. Even though time series data were not available for this study, available evidence suggests that a much larger middle-class population existed during the 1970s following the first oil boom. While the recent sustained economic growth likely increased the middle class in absolute terms, its relative size has decreased, as witnessed by the latest national poverty surveys (see Chapter 7).

2.3.4 Food security has been gradually increasing

Food security statistics show a decline of food insecurity levels in the region, both in the absolute numbers and the percentage of the population that is undernourished (Table 2.7). According to FAO's 2012 State of Food Insecurity (SOFI) report (FAO, 2012b), the proportion of undernourished people in the total population halved from 20% to 10% between 1990 and the 2006-08, with the number of undernourished persons declining from 37.3 million to 28.5 during the same period.[16] Undernutrition rates in West Africa are generally lower than those in Eastern, Southern, or Central Africa. However, Table 2.7 also reveals very uneven progress across West African countries in reducing undernutrition, with Ghana, Nigeria, Mali and Niger making strong progress, while Liberia, The Gambia, Senegal, and Sierra Leone doing much worse. Furthermore, even though the rate of undernutrition declined in 11 of the 13 countries for which SOFI reported data (increasing only in The Gambia and Liberia), because of population growth, the absolute number of the undernourished increased in seven countries (Côte d'Ivoire, The Gambia, Guinea, Liberia, Senegal, Sierra Leone, and Togo). Although average food availability per person has been increasing during this period, the access and quality dimensions of food security remain important challenges.

In addition to a lack of basic calories, millions also suffer from micronutrient deficiencies (so-called "hidden hunger") especially of iron, vitamin A, iodine and zinc. These micronutrient deficiencies, particularly among women and children, are often prevalent in rural areas and are in part linked to cultural habits that direct more of the nutrient-dense foods to men. In urban areas, however, they are also in part driven by a shift in eating habits as city dwellers transition to a diet with higher amounts of sugar, fat, and refined carbohydrates (see Part II). While rates of undernutrition have fallen over the past 30 years, problems of obesity and overweight are beginning to emerge as a growing public health concern, particularly in urban areas (Box 2.1).

16 It is important to note that these undernourishment figures are largely based on the availability of food in the region and therefore do not account for issues related to access to food – both intra-country and intra-household. Therefore in actuality food insecurity in the region could be much higher. Furthermore these numbers do not reflect the nutritional status of individuals, particularly the high prevalence of stunted children throughout the region.

Box 2.1 The double burden of malnutrition in West Africa

Despite the preoccupying figures on undernourishment shown in Table 2.7, problems of over-nutrition (obesity and overweight) are also growing in West Africa and are increasingly recognized as public health threats.[1] The need to simultaneously address problems of under-nutrition and over-nutrition, both related to changing dietary patterns in the region, is often referred to as West Africa's "double burden of malnutrition."

The prevalence of obesity in the region is currently estimated at between 6.6% and 10% of the total population, with the rates over twice as high in urban areas as in rural areas and much higher for women than for men. Between 2000 and 2004, almost 50% of the West Africa urban population was overweight or obese (Abubakari, *et al.*, 2008; FAO, 2013b). WHO data indicate that a staggering 44% of all women in Sierra Leone (including rural as well as urban areas) are either overweight or obese (WHO, 2008-2013).

Contributing factors to these trends include more sedentary lifestyles in urban areas and unhealthy diets increasingly dominated by various forms of indigenous as well as Westernized fast food, as urban populations are ever more time-starved and seek quick meal solutions (see Chapter 7). These foods are typically more energy-dense and less diverse than traditional West African diets and include processed foodstuffs high in sugar, salt, and fat. One of the objectives of food processing is to extend its shelf life, but this often involves removing nutrients such as essential fatty acids that limit the foods' lifespans. The result is a diet with increasing amounts of calories but fewer other nutrients ("empty calories.")

As a consequence of these changes, West Africa faces a growing epidemic of non-communicable, diet-related diseases, including diabetes, hypertension and cardiovascular diseases. The overall prevalence of diabetes in Western African countries is estimated to have increased over the last decades by 30 percent. Figures are even more striking for urban Nigeria and Cameroon, where the prevalence of diabetes rose by more than 300 percent between 1985 and 2000 (Abubakari *et al.*, 2008).

The potential costs of these various forms of malnutrition to West Africa, in terms of premature deaths, disability, and lost productivity, are huge. One way of measuring the social and economic costs of these diseases is through a metric called "disability-adjusted life years (DALYs)". One DALY represents the loss of the equivalent of one full year of healthy life compared to an ideal situation where everyone lives into old age, free of disease and disability. The costs of under-nutrition remain by far the highest of all nutritional problems in West Africa, accounting for a loss of 383 DALYs per 1000 people in 2010, compared to only 14 DALYs per 1000 due to obesity and overweight. But the trend in the social costs due to under-nutrition is sharply downward, having fallen by 60% since 1990 (from 947 DALYs per 1000 people in that year). In contrast, the cost of obesity and overweight is increasing, having more than doubled (from 6 DALYs per 1000 in 1990) (FAO, 2013b). Moreover, the diseases related to over-nutrition are chronic and take time to build up over time, so as the population continues to urbanise and ages, the costs will likely increase rapidly. West African governments may be soon obliged to divert human and financial resources from combating undernourishment and stunting, which may be less visible as they are mainly confined to rural settings, to fighting these consequences of over-nutrition, particularly in urban areas.

West African urban consumers are increasingly aware of these problems of over-nutrition, and Chapter 7 discusses their concerns and policy options to deal with the challenge.

1 Obesity and overweight are measured by the body-weight index (BMI), defined as a person's weight in kg divided by the square of her height (in metres). Obesity is defined as a BMI>30, while a person is overweight if the BMI exceeds 25.

2.4 Overall economic and political progress has remained fragile

2.4.1 Recurrent crises

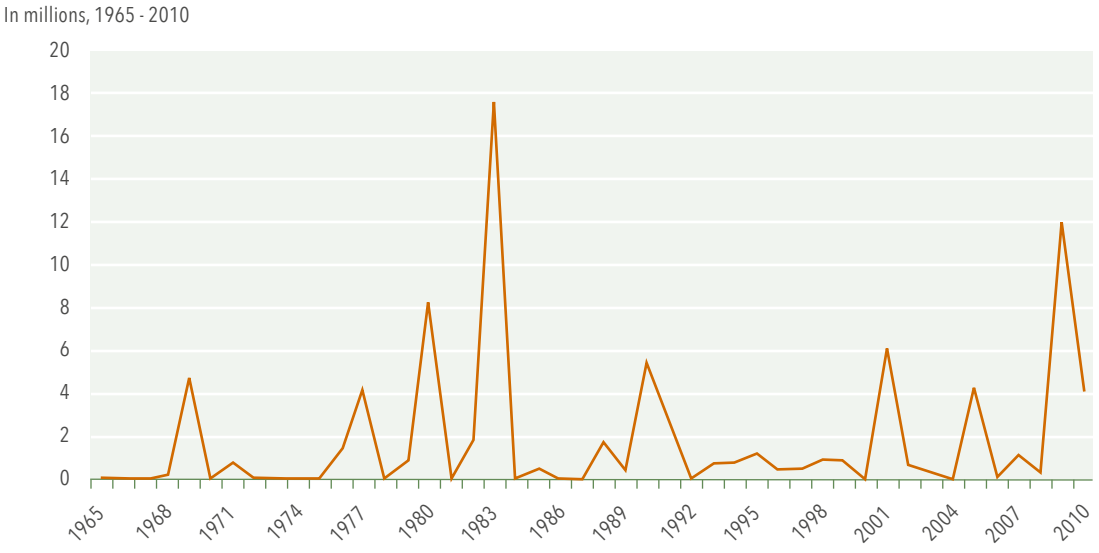
Despite the generally positive trends in terms of per capita income and food availability in West Africa and a trend since the 1990s towards more democratic and open political systems, the region has faced numerous natural and human-created disasters over the past 50 years. These have led to severe food shortages and destruction of productive capacity in various countries[17] Often, instability spills across borders, disrupting regional trade and raising risks to investments in neighbouring countries (as exemplified by the costs imposed on Mali and Burkina Faso by the loss of access to the port of Abidjan during the Ivorian conflict). The persistent vulnerability to natural and human-caused disasters is evidenced by recurrent food crises in the Sahel; the civil wars in Sierra Leone, Côte d'Ivoire and Liberia; and terrorist attacks by non-state actors in Nigeria and Mali. A combination of population pressure, deteriorating environmental conditions and unequal spatial development are likely to perpetuate the region's vulnerability to conflicts and disasters.

17 As Josserand (2011) notes, distinguishing clearly between natural and human-caused disasters is frequently difficult, as natural and human factors often interact to create or worsen a food crisis.

Figure 2.3 shows the number of people affected by natural disasters in Western Africa between 1965 and 2010. These disasters were primarily droughts (concentrated in the Sahelian countries) and floods (predominantly in the coastal states), with the droughts affecting many more people than the floods. As shown in Figure 2.3, the natural disasters occurred irregularly and with highly variable magnitudes. West African countries, particularly in the CILSS member states, have become increasingly adept at managing and mitigating localized natural disasters through improved market-information and early-warning systems and the development of various types of social safety nets. These tools, however, proved less adapted to dealing with periods of global food shortages and spiking prices, as occurred in 2007/08, 2010, and 2012 (see Focus Section A).

Since the 1980s, the frequency of natural disasters has declined relative to human-created crises that are linked primarily to civil unrest (e.g. in

Figure 2.3 *Number of people affected by natural disasters in West Africa*[a]



Source: OFDA/CRED database of natural disasters, University of Louvain, as presented in Josserand, 2011
[a] Figures include ECOWAS countries plus Chad and Mauritania.

Liberia, Sierra Leone, Côte d'Ivoire and, most recently, in Mali). Some of these crises have been of extremely long duration. For example, during the 30 years between 1981 and 2010, FAO/GIEWS reported that Sierra Leone spent 23 years in emergency and Liberia 22 years (Josserand, 2011). In terms of the number of people affected and the severity of the deprivation, the countries most severely hurt by such conflict-driven crises have been, in order of magnitude, Nigeria (due to the civil war of the 1960s), Liberia, Sierra Leone, Côte d'Ivoire, and Guinea-Bissau (ibid.)

The repeated natural and human-created crises have had several important impacts on the development of agrifood systems in West Africa:

- In the absence of risk management tools such as crop insurance, droughts and crop failures frequently lead to farmers being forced to sell off assets to survive; as a result, even when production conditions return to their "normal" state, production frequently recovers only slowly.

- Faced with the risk of natural disasters, farmers place a priority on resilience and risk management at the farm level, often through diversification of their farm and non-farm enterprises. The gain in stability from diversification comes at the expense of losses in efficiency, both at the farm level and in the marketing system that would occur with greater on-farm specialization.

- The instability of local food production due to weather crises increases the incentives facing food processors and retailers to turn to imports rather than local production in order to ensure stable supplies.

- Wars and civil unrest lead to destruction of productive assets and infrastructure, loss of the rule of law, destruction of human capital and the flight of both financial and human capital abroad. Because of the economic interdependence of West African states, crises in one country frequently spill over onto its neighbours.

- Both natural and human-made crises call for emergency relief efforts, such as the widespread distribution of food aid. If poorly designed, such safety-net efforts can undermine incentives for local food production and trade.

Given the inevitability of future natural disasters and the increasing conflict that these may generate over access to increasingly scarce agricultural resources (especially in the context of climate change), strengthening conflict resolution arrangements will need to be an important component of Agricultural development strategies. It will also be critical to design social safety nets in a way that reinforces rather than works against incentives for investment in the broader agrifood system. Both of these imperatives are analysed in Part IV.

2.4.2 Growing pressure on natural resources

Population growth can induce agricultural intensification by improving rural-urban linkages, generating additional demand for food and lowering transaction costs in provision of inputs and support services. In practice, however, West Africa's growing labour-to-land ratio and livestock-to-land ratio have in many cases increased the pressure on the natural resource base. For the region as a whole, the average arable land per rural resident is just 0.5 ha. Approximately 20% of the rural population lives in areas with even higher population densities (Johnson *et al.*, 2008). These higher population densities, particularly in non-irrigated areas, contribute to reduced fallows and a fragmentation of farm sizes into holdings that do not allow sustaining a livelihood, let alone producing a marketable surplus. Population pressure is particularly high in areas with the largest production potential and along major waterways and transport corridors. Consequences can include land fragmentation in highly populated areas with good market access and the expansion of the agricultural frontier and overuse of natural resources in less populated areas.

In more fragile agro-ecological systems, such as in the Sudano-Sahelian zones, population pressure contributes to an overuse of natural resources by reducing fallow periods, expanding crop production

into less suitable areas and enhancing the number of livestock. The expansion of crop farming and livestock numbers has put traditional systems of land management increasingly under stress, with growing conflicts between agriculturalists and pastoralists. The results of these trends have been increased soil mining, loss of vegetative cover leading to wind erosion and silting of lakes and streams, deforestation, and loss of biodiversity[18]. West African soils are generally older than in many other areas of the world (for example, areas with more recent volcanic activity) and are subject to heavy leaching of nutrients. Net soil nutrient losses in 14 of the 15 ECOWAS countries for which data are available varied between 41 kg/ha/year in Senegal to 73 kg/ha/year in Guinea Bissau in 2002/04 (Morris *et al.*, 2007b). Like the rest of the continent, West Africa is losing forest cover due to agricultural expansion, cutting of firewood and the expansion of commercial logging. Africa's rate of deforestation is double that of other regions of the world (ibid.).

The stress on land management systems is accentuated by insecure land tenure in many parts of West Africa, which reduces incentives to invest in land improvement and hinders consolidation of very small plots. Rising global agricultural prices since 2008 have also increased the interest in outside investors in obtaining land in West Africa, and ambiguity in the assignment and enforcement of land rights creates situations where farmers can lose their land without compensation (see Focus Section D on land tenure and water rights in Part IV). Conflicts over land use are on the rise – for example between farmers and herders – and unless the situation improves, are likely to continue to grow as resource degradation induces widespread migration (including across borders) with environmental refugees seeking more productive areas to pursue their livelihoods. A key challenge facing the region is thus how to transition from a situation of resource degradation to one of sustainable agricultural intensification (Box 2.2).

18 In West Africa, these various phenomena are often discussed as different components of "desertification", a term used in the region to cover a broad array of natural resource degradation and climate change effects and not just the southward movement of the Sahara Desert. For details, see ECOWAS, et al. (2012).

2.4.3 Climate change

The vulnerability of West African farming and livestock production systems to weather conditions is being exacerbated by climate change. Climate change is likely to have the most damaging impact in semiarid and arid regions in the Sahel.

From the 1930s to the 1950s there was a period of unusually high rainfall, followed by an extended drought that lasted for much of the 1960s to 1990s. During this period, temperatures rose by around 1°C (Jalloh *et al.*, 2013). Mean annual rainfall and runoff dropped by as much as 30 per cent, with devastating effects on local populations and livelihoods. Since the mid-1990s, better average rainfall conditions have returned, in particular in the continental Sahel (Niger, Northern Nigeria and Chad). These conditions, however, have been accompanied by greater inter-annual rainfall variability.

There is still a fair amount of uncertainty in rainfall-related climate projections for West Africa. Perhaps more than elsewhere, analyses of this region have remained inadequate and the conclusions arrived at by climate projections and their consequences are too uncertain for an effective anticipation of the risks and opportunities linked to climate change (SWAC, 2009). The complicated and uncertain measurement of the climate's future impacts on the region calls for prudence in their analysis (CILSS *et al.*, 2008). The IPCC reports that in the twenty-first century, global warming is expected to be more intense in Africa than in the rest of the world. The average rise in temperature between 1980/99 and 2080/99 is projected to be between 3 and 4°C for the continent as a whole, one-and-a-half times greater than at the global level. The increase would be less marked in coastal and equatorial areas (+3°C), and the highest increase would take place in the Western Sahara region (+4°C) (Pachauri and Reisinger, 2007). Generally, there seems to be consensus on increases in average annual temperatures, although the changes may be unevenly distributed across the region. Temperature increases have not been observed across all areas in West Africa in the last decades. Despite the uncertainty about the capacity of climate models for West Africa and

Box 2.2 From resource degradation to sustainable intensification

Addressing the problems of agricultural resource degradation and declining land productivity in West Africa will require a more sophisticated approach than simply trying to duplicate the Asian Green Revolution model based on improved seeds, expanded irrigation and greatly increased use of mineral fertilizers. Given the diversity of West African agro-ecologies, the weak infrastructure base (including for irrigation) and the challenges of climate change, there have been growing calls to move towards more locally tailored approaches of sustainable agricultural intensification. Although there is no universally agreed-upon definition of sustainable intensification, several common elements emerge in most discussions of the approach:[1]

1. ***Moving beyond an emphasis on just increasing the use of mineral fertilizer to a focus on improving soil health.*** Critical elements of the soil-health approach include combining mineral fertilizers, organic matter, and cultivation techniques such as minimum tillage and intercropping that improve water retention and soil biota. The approach also seeks to improve the efficiency of fertilizer use through better matching of fertilizer formulations to the specific nutrient needs of individual farmers' soils and crops and by improving the timing and placement of applications through techniques such as micro-dosing.

2. ***Moving from one-size-fits-all extension recommendations to differentiated approaches based on West Africa's wide range of farming systems.*** This movement from "best bets" to "best fits" (Fairhurst 2012) involves moving away from blanket recommendations such as the call to raise average mineral fertilizer use in the region to 50 kg/ha towards more targeted solutions to different farming systems that cover a range of productivity, socio-economic and environmental benefits to producers and society at large. Often these approaches involve better integration of livestock and cropping within farming systems.

3. ***An emphasis on plant protection that goes beyond pesticides and herbicides towards integrated pest management.*** This approach emphasises that a healthy agro-ecosystem (including maintaining populations of helpful insects and natural predators of agricultural pests) is a farmers' first line of defence against crop damage.

4. ***Improving crop productivity and robustness to environmental shocks by tailoring germplasm to specific environments and soil conditions*** through a programme of breeding that aims to exploit and maintain the genetic diversity of African crops. The programme is seen as drawing on a range of breeding techniques, including traditional plant breeding, cell and tissue culture, marker-assisted selection, and genetic engineering (although not all proponents of sustainable intensification agree upon the latter).

5. ***Shifting from an emphasis just on expanding irrigation to a focus on improved soil and water management***, including in rainfed areas through cultivation techniques aimed at water conservation, harvesting and retention. In irrigated systems, there is an increased emphasis on improving the efficiency of water use, for example through reducing water losses.

6. ***Developing a supportive policy environment*** that creates incentives for actors to adopt sustainable intensification practices. Examples include more realistic pricing of irrigation water to discourage its waste, improving farmers' access to credit for agricultural equipment that they can use to build

1 See FAO (2011b); The Montpellier Panel (2013); Garnett and Godfray (2012); and Fairhurst (2012).

water-conserving tied ridges and small retention barriers, and movement away from untargeted fertilizer subsidies towards more targeted, voucher-based and limited "smart-subsidy" approaches (see Focus Section C in Part IV).

West Africa boasts some examples of localized success with these sustainable intensification approaches, particularly in the Sahel in restoring highly degraded land, fostering reforestation and raising depleted water tables (Botoni and Reij, 2009; Kabore and Reij, 2004). Other approaches, such as maize-legume intercropping (with the legumes fixing nitrogen and helping suppress weeds early in the growth of the maize) also hold promise, as does the progress in developing drought-resistant maize varieties through genetic engineering.

Fostering the broader adoption of sustainable intensification in West Africa will require addressing two major challenges:

7. These techniques are much more knowledge- and management-intensive to develop, diffuse and use than are one-size-fits-all approaches. Developing and diffusing locally tailored sustainable agricultural intensification will require substantial investment in strengthening knowledge and capacity throughout the agrifood system. Agricultural research systems must work with farmers and other actors, such as input dealers, to develop sustainable solutions; farmer organizations and extension personnel must promote such approaches and acquire indigenous knowledge from farmers that can contribute to improving the proposed solutions; and farmers must learn how to use the new technologies and management tools.

8. There is broad scope for learning across the region, sharing successes and learning from failures, as sustainable intensification approaches are adapted to the region's varying agro-ecologies. At the same time, there is need for better coordination among the many organizations promoting different versions of sustainable intensification within the region. Currently, there are over 40 subregional organizations working in the area of natural resource management and rural development. The efforts are frequently poorly connected, with each organization aiming to ensure its own survival and its legitimacy by developing its own programmes rather than devising ways to complement the others (ECOWAS *et al.*, 2012). ECOWAS, through its regional CAADP programme and its collaboration with CILSS and CORAF, which have been a long-time leaders in promoting regional collaboration on issues of natural resource management and agricultural research, have clear roles to play in promoting greater coherence and collaboration in this area.

the lack of consensus among the various climatic scenarios with regard to changes in precipitation, the IPCC predicts a reduction of average annual rainfall on the order of 10 to 20%. Though there is no consensus among the regional climate models on changes in average rainfall in the region, there is agreement that climate variability (in temperature and rainfall) will likely increase.

In addition to decreases in rainfall, the IPCC report (Pachauri and Reisinger, 2007) anticipates a fall in the ground water levels, following their reduction in recharge, as well as a decrease in the number and size of ponds and watering points. Furthermore, a reduction in the yield of the major crops is expected (e.g. maize, sorghum, rice, and cowpeas) and in cereal production in particular. Brown and Crawford (2008) estimate that temperatures would increase by 2.5°C to 3°C by 2100 and yields of maize would decrease by 6.9% by 2020, but the yield of millet, a more drought-tolerant crop, would not be affected.

One likely consequence of climate change will be increased migration in the region, both within and across countries, as populations in particularly

stressed areas seek other locations to earn their livelihoods. In the context of insecure tenure rights to land and water resources (e.g. for fishing), this potential migration of environmental refugees may further contribute to the recurrent crises discussed earlier in this chapter.

2.5 Globalization and technological change

A number of forces related to the globalising economy and rapid technological change are shaping the evolution of the structure of West African Agriculture. While not an exhaustive list, three of the most powerful ones are the involvement of new global actors in the West African economy, the information revolution and the biotechnology revolution.

2.5.1 Globalization and the involvement of new global actors

Economic reforms since the mid-1980s, combined with other sectoral reforms (discussed in Chapter 11) have led to greater openness of West Africa to international markets at a time when the process of globalization has been accelerating around the world. The development of more sophisticated value chains engaged in global sourcing of products for upscale markets offers new export opportunities for West African farmers and processors, but only if they can meet the firms' minimum order quantities and stringent quality standards.[19] Consumer concerns in importing countries of the North about product safety, environmental quality, and labour conditions have led to strict demands for traceability and compliance with production standards (such as the demands to certify that cocoa was not produced using child labour). At the same time, such demands are also emerging from West Africa's growing middle class (see Chapter 7).

The greater openness of West African markets to imports of processed foods from abroad (e.g. frozen chicken parts and milk powder), often at very low prices, has also threatened the competitiveness of some domestic industries, as discussed in Part III. This competition has led to pressure from West African farmer groups and some processors for increased import protection, under the banner of promoting food sovereignty.

Since the early 2000s, an expanded set of actors, particularly China and India (Broadman *et al.*, 2007), but also Brazil and the African diaspora, has emerged as major sources of demand for African exports and of investment and technical assistance in farming and agroprocessing (sometimes tied to export). The growing relationship between West Africa and these new actors offers new potential to expand and diversify West African Agricultural production and markets, but also has raised concerns in the region about competition (e.g. between Asian and West African trading firms) and control of resources within the sector.

The new actors have also emerged as important providers of imports of agricultural machinery and of light manufactured goods. The expanded availability of inexpensive light manufactured goods (e.g. synthetic textiles and cheap plastic sandals) may have been a boon for West African consumers, but it has stifled local production of competing products and raises questions about whether an Agricultural-led growth strategy in West Africa would have as strong growth linkages (via induced demand for locally produced manufactured goods) as did the Green Revolution in Asia.

2.5.2 Information technology revolution

The rapid spread of modern information and communication technology, especially cell phones, has had a profound effect on Agricultural development in the region. Traders' use of cell phones has improved market integration (Aker, 2010; Aker and Mbiti, 2010), and their increasing availability in rural areas offers new opportunities for their inclusion as a tool for agricultural extension programmes.

19 "Quality@quantity" is a phrase used in agribusiness to describe the requirement of large-scale buyers of agricultural products for consistent quality of products at a volume high enough to allow the buyer to capture economies of scale (Perakis, 2009). As is discussed in Part III, assuring quality@quantity has been an on-going challenge for West African producers and wholesalers who sell both to the export market and domestic processors. Failure to ensure quality@quantity in export markets turns outside buyers away from West African products or leads them to offer steep price discounts. Failure to ensure quality@quantity to West African processors (e.g. feed millers) often leads them to turn to imported raw materials, thereby increasing West Africa's import dependence.

The spread of cell-phone-based mobile banking and the increased ease of remittances from migrants to their families in rural areas thanks to money transfer services, that rely on modern telecommunications, have the potential to improve both, rural finance and the ability of rural households, to respond rapidly to food crises. As the experience of the Arab Spring demonstrated, the spread of such technology also facilitates the mobilization of groups discontented with current government policies, including food policies.

2.5.3 The Biotechnology revolution

The biotechnology revolution, including the development of transgenic varieties, offers opportunities for increasing yields (e.g. through the development of more drought-resistant maize), improving nutrient content, and reducing pesticide use. But there is a strong debate in many West African countries about the desirability of adopting genetically modified organisms (amplified by groups from outside of West Africa on both sides of the issue). Among the concerns raised are safety to humans and the environment, potential loss of local intellectual property rights over indigenous varieties to international firms, and fears of domination of input markets by multinationals. ECOWAS countries and development partners in the region have varying policies with respect to genetically modified organisms (GMOs). The governments of Burkina Faso and Nigeria, for example, have called for GMOs to be part of a diversified strategy to increase agricultural production, as has the African Development Bank. Other countries in the region, however, either oppose the introduction of GMOs or have not taken any official position with regard to the issue.

2.6 Summary of main findings

West Africa is in the midst of a structural transformation of its society, economy and physical environment. Driven by a 2.6% population growth rate, rapid urbanization that will result in over half of West Africans living in cities by 2050, growth and changing distribution of income, expansion of non-farm sectors of the economy, globalization, increased stress on the natural resource base and climate change, this transformation has profound implications for West African Agriculture. Regional averages with respect to all these changes, however, obscure large variation among the 15 countries of the ECOWAS zone. Agricultural and economic growth rates have varied widely across the region, with the impact of civil strife in countries like Liberia, Sierra Leone, and Côte d'Ivoire clearly visible in their poorer performance relative to economic "stars" like Ghana and Cape Verde. Three countries – Nigeria, Côte d'Ivoire and Ghana – account for three-fourths of West Africa's population and 80% of its GDP, so the health of these economies has profound impacts on the rest of the region. Increased regional integration allows the smaller economies of the other ECOWAS countries to benefit from growth in the "big three", but it also makes them vulnerable to disruption in these economies, as evidenced by the impact of the Ivorian crisis on Côte d'Ivoire's neighbours.

A number of forces are influencing the transformation of West African Agriculture through their effects on the demands facing West African producers and the capacity of the agrifood system to respond to those demands. Key among those forces are the following:

- Rapid population growth, with West Africa's total population projected to more than double between 2010 and 2050, from 301 million to 734 million.
- Rapid urbanization, both in large cities (particularly along the coast) and emerging secondary towns throughout the region, which is associated with lifestyle changes including changes in food consumption patterns that are analysed in Part II of this report.
- An on-going but very uneven structural transformation of West African economies, with large numbers of the population employed in low-productivity jobs in the informal services sector.
- Per capita income growth and changes in its distribution, including expansion of the West

African middle class, which now accounts for about 25% of the total population. The proportion of the population in the middle class differs by country, as both the pace of economic growth and how that growth has been shared among different segments of the population varies widely by country.

- Coupled with the emerging middle class, a growing mass market of people still living under the poverty line for whom the price of food is a critical determinant of their real incomes.

- In spite of a trend towards generally higher incomes in the region, highly disruptive recurrent natural and human-created disasters persist in various countries. These range from droughts and floods to civil wars and terrorist attacks, and their effects often spill across borders. Such disasters frequently require strong emergency relief efforts and may divert resources from longer term Agricultural development. If not carefully coordinated with Agricultural policies, these efforts (such as the untargeted distribution of food aid) can also undermine incentives for longer-term Agricultural growth.

- Growing stress on the natural resource base due to population pressure and climate change.

- New opportunities and threats brought about by globalization, including new export opportunities but also strongly increased competition from overseas suppliers in some West African markets. Globalization has also led to the emergence of new international actors (e.g. from Asia, Latin America and the African diaspora) as potential investors and as sources of demand for West African products, and the need to deal with increasingly volatile international commodity prices in recent years.

- New opportunities created by the information and biotechnology revolutions to link West African producers to new sources of demand (and potentially finance through mobile banking) and to respond to the evolving demand with new, more adapted products.

Subsequent chapters in this report analyse the impact of these forces on West African Agriculture and their implications for Agricultural policy in the region.

Chapter 3

Production Response

This chapter briefly reviews how West African Agriculture has responded, in terms of increased production and productivity growth, to the driving forces discussed in Chapter 2. The chapter begins with a description of the region's diverse agricultural production base, which has strongly influenced the region's ability to respond to growing demands for its Agricultural products. The chapter then examines region-wide trends in production of agricultural commodities over the past 30 years, as reported in FAOSTAT. In order to see whether the production increases resulted from simply devoting more resources to agricultural production using existing technologies or from greater productivity, the chapter then turns to an analysis of trends in land, labour and total factor productivity in West African agriculture over the past 30 to 40 years.

The analysis in these first three sections of the chapter demonstrate that production response in West Africa, while vigorous with respect to some products and countries, has been weak and inconsistent in others. The chapter then goes on to discuss the main factors that have led to this mixed supply response, ranging from limited market access in many areas to weak Agricultural research and extension systems in many countries. The limited supply response of West African agriculture has contributed to growing food imports into the region, which are described in Chapter 4. The present chapter thus sets the stage for more disaggregated analysis based on trade data in Chapter 4 and the analysis by specific value chains and agroprocessing industries in Part III.

3.1 A highly diverse agricultural production base

The region's production response to the forces discussed in Chapter 2 is strongly conditioned by West Africa's highly diverse agro-ecological conditions and its vulnerability to weather shocks.

3.1.1 Diversity of agro-ecologic conditions

West Africa is a diverse region characterised by a wide variety of ecosystems and an equally high number of production systems. The region extends from the Sahara Desert in the north, with a typical rainfall of less than 100 mm per year, through the Sahelian transition zones (200-600 mm per year) and the Sudanian savannahs to the rainy forests of the coastal zones of the Gulf of Guinea and Southern Nigeria, which have over 2 000 mm of rainfall per year. Agricultural activities range from nomadic pastoralism in the far north through agropastoral systems based in the Sahel, a mixed cereal-root crop system in the Sudanian savannah areas (the so-called "Middle Belt"), root-crop and tree-crop systems in higher rainfall areas farther south, to the sub-humid and coastal-artisanal fishing system along the Atlantic. There is a five-fold increase in crop output per ha as one moves from the agropastoral systems of the Sahel (approximately US$240/ha) to the tree-crop systems of the south (US$1 125/ha) (Benin *et al.*, 2011). Overall, roughly a third of West Africa's land area is devoted to agricultural uses, of which only one third is used for crop production and the remainder serves as rangeland and pastures.

Crop production is concentrated in areas with favourable combinations of agro-ecologic conditions, population densities, infrastructure and market access. Water availability plays an overarching role in determining production potential. Most crop production takes place in the humid and semi-humid areas. The humid zones along the coast are suitable for the production of roots, tubers, tree crops such as rubber, coffee, cocoa and oil palm, but also leg-

umes, maize and pineapples. Tick-borne diseases and trypanosomiasis, however, severely limit cattle production along the humid coast. The Middle Belt has a more diverse production potential due to its climatic and soil conditions. Crops grown include millet, sorghum, maize, oilseeds (sesame, shea and groundnuts), cashew nuts, cotton, cassava, mango, citrus fruits and beans. Its abundant pasture resources support widespread production of livestock, including cattle, goats and sheep.

In the arid and semi-arid areas of the Sahel, livestock production is more important than crop production, which is mainly confined by water availability and concentrated along rivers, irrigated areas and lowland areas. The Sahelian zone has a long tradition of livestock production based on extensive transhumant systems adapted to seasonal rainfall patterns. Crops grown include millet, sorghum, irrigated and rainfed rice, legumes (especially cowpeas), onions and groundnuts (Blein *et al.*, 2008). There has been an increasing convergence of production in the Sudanian zone, with roots, tubers and maize moving north from their traditional production zones in the south, and Sahelian products such as legumes, sorghum, millet and cattle moving south from their traditional production zones in the north.

3.1.2 High vulnerability to weather conditions

West Africa in general, and the Sahelian region in particular, is characterised by some of the most variable climates on the planet, and this variability increases as one moves north through the sub-humid and semi-arid zones. The semi-arid regions are particularly vulnerable to climatic variability such as droughts and flooding. Most crop production in West Africa is rainfed; hence production levels and pasture conditions are susceptible to fluctuations in precipitation, particularly in the Sahel. Only 10% of the total cropland in ECOWAS and 2% of the cropland in the Sahel is irrigated. Moreover, about half of the population lives in areas with a growing period of fewer than 6 six months. These areas represent slightly more than half of the total cropland (Johnson, *et al.*, 2008). Hence, West African agriculture continues to be characterised by high inter-annual production variability and a low level of intensification. Between 1965 and 2012, annual aggregate coarse grain production recorded nine instances of negative growth in one year followed by double-digit growth the following year; three of these instances have occurred since 2007 (FAOSTAT, 2013).

The irrigation potential of the region varies widely between agro-ecological zones due to the very unequal distribution of rainfall. The Everett dry zone (Burkina Faso, Cape Verde, Mali, Niger, and Senegal) receives less than a quarter of the total rainfall of West Africa for an area accounting for roughly 60% of the whole region. The irrigation potential of this zone is about 16% of the regional potential. Over three-quarters of total rainfall (77%) is accounted for by the humid and semi-humid areas, and Nigeria and Ghana have the highest irrigation potential, accounting for 26% and 21%, respectively (Blein, *et al.*, 2008).

Only 10% of the potentially irrigable lands are equipped for irrigation, with the agricultural water-managed area ranging from 29% of the cultivated area in Sierra Leone to less than 1% in Benin, Ghana and Togo (Sirte, 2008). On the other hand, 86% of inventoried water withdrawals[20] are used for agriculture, a value higher than the global agricultural water withdrawal (70%). Agricultural water use ranges from 71% in the Gulf of Guinea to 95% in the Sudano-Sahelian zone. Growing urbanization and economic diversification will lead to increased competition over the use of available water resources between agriculture and other sectors.

3.2 Trends in regional agricultural production

The performance of the agricultural sector in West Africa over the last three decades has been characterised by strong output growth. Production volumes of most crops, both for domestic and export markets, has grown vigorously since 1980, often outpacing population growth. In value terms

20 Water withdrawal refers to the gross quantity of water withdrawn annually for a given use.

(based on 2012 production), aggregate agricultural production is dominated by yams and cassava, followed by paddy rice, groundnuts, cattle meat, and cocoa beans (Table 3.1). These are followed by four staples (millet, maize, cowpeas and sorghum). With the exception of cocoa, the top items in terms of value of production are all food commodities, destined overwhelmingly for local and regional consumption.

Table 3.2 shows growth rates of major crops between the 1980 and the first decade of the 21st century and production volumes for three-years average from 1987-89 to 2007-09. Cashew nuts show the highest average annual growth rate over the entire period (16%) – albeit from low initial levels – followed by roots and tubers (6.4%), cowpeas (6.3%) and cotton (5.7%). Cereal production increased at 3.9% per annum, outpacing the region's population growth during the period 1980-2009. This increase of cereal output has been mainly driven by maize, which grew annually by 5.8%, resulting in a five-fold cumulative increase. Moreover, the average annual share of maize in total cereal production rose from approximately 14% in the 1980s to 26 % in 2000-09. Production levels of rice, sorghum and millet grew slower and are about two and a half times higher than in the early 1980s. Vegetable production grew by 4.2% per annum. Growth in vegetable production has been particularly strong in the urban periphery of small towns as well as in irrigated perimeters in the Sahel (Blein, *et al.*, 2008).

Growth of livestock production has been slower. Meat and milk production did not grow in line

Table 3.1 *ECOWAS Agricultural production by value*

Millions of 2004-06 US$, 2007-2011

Commodity	2007	2009	2011
Yams	11 147	11 081	13 332
Cassava	6 529	6 104	7 952
Rice, paddy	2 202	2 910	3 282
Groundnuts, with shell	2 202	2 802	2 551
Indigenous Cattle Meat	2 413	2 439	2 503
Cocoa beans	2 400	2 525	2 901
Millet	2 544	2 096	2 383[a]
Maize	1 681	2 085	2 337
Cowpeas, dry	1 468	1 287	1 336
Sorghum	2 028	1 555	1 741
Citrus fruit	1 661	1 887	1 891
Plantains	1 713	1 729	1 750
Vegetables, fresh	1 196	1 127	1 443
Cashew nuts, with shell	1 015	1 238	1 359
Indigenous Goat Meat	1 087	1 185	1 260
Cotton lint	897	827	924
Indigenous Sheep Meat	794	869	962
Taro (cocoyam)	1 450	994	1 000
Indigenous Chicken Meat	690	754	845
Indigenous Pig Meat	836	835	716
Indigenous Sheep Meat	497	526	562
Coffee, green	253	226	196

Source: FAOSTAT, 2011
[a]Figure refers to 2010

Table 3.2 *Volume and growth rates of main crops*

By three-year averages, 1987-2009

	Volume			Annual Average Growth Rate (AAGR)				AAGR per capita
	1987-89	1997-99	2007-09	1980-89	1990-99	2000-09	1980-09	1980-09
Crop	(1 000 metric tonnes)			(%)				(%)
Total Cereals	29 137	37 642	54 875	8.2	2.7	5.6	3.9	1.2
Millet	8 212	10 549	15 897	6.0	2.8	5.7	3.5	0.8
Rice, paddy	5 310	6 959	10 091	6.5	2.1	5.7	3.7	1.0
Sorghum	7 919	10 517	14 363	5.6	4.5	4.3	3.4	0.7
Maize	7 417	9 259	13 986	18.4	1.1	7.0	5.7	2.9
Roots and Tubers	38 349	88 140	124 495	4.8	6.0	3.9	6.4	3.6
Yams	13 470	34 287	47 862	4.7	5.6	3.8	6.9	4.1
Cassava	22 521	46 207	64 387	4.7	5.1	4.1	5.7	2.9
Oil palm fruit	9 358	11 758	13 449	1.0	2.2	1.3	1.9	-0.8
Groundnuts, w. shell	2 628	4 588	6 633	4.3	7.8	4.0	5.0	2.3
Fruit (excl. Melons)	10 536	15 500	18 803	2.1	4.2	2.1	2.9	0.2
Sugar cane	4 347	4 449	5 816	0.5	-0.2	2.2	1.0	-1.6
Coffee (green)	291	371	192	-1.4	2.1	-7.3	-1.1	-3.6
Cow peas, dry	1 480	2 964	4 728	6.2	5.9	6.5	6.3	3.6
Cocoa beans	1 262	1 883	2 604	5.8	5.0	3.3	4.6	1.9
Cashew nuts, w. shell	59	394	1 137	9.0	22.9	7.0	16.0	13.0
Vegetables & Melons	7 208	11 804	15 779	4.2	5.2	3.3	4.2	1.5
Cotton lint	415	872	650	12.5	7.0	-3.6	5.7	2.9

Source: FAOSTAT

Table 3.3 *Volume and growth rates of main livestock products, by three-year averages*

	Volume			Average Annual Growth Rate (AAGR)				AAGR per capita
	1987-89	1997-99	2007-09	1980-89	1990-99	2000-09	1980-09	1980-09
Livestock Product	(metric tons)			(%)				(%)
Total Meat	1 740	2 254	3 166	1.3	3.0	3.4	2.6	-0.1
Cattle meat	540	727	989	-2.3	3.9	3.8	1.7	-0.9
Goat meat	207	321	462	3.5	5.0	3.0	4.3	1.6
Sheep meat	133	215	322	1.6	5.7	3.2	4.3	1.6
Game meat	303	325	392	1.5	0.4	1.3	1.3	-1.3
Poultry meat	295	338	513	4.1	1.3	4.9	2.8	0.1
Pig meat	165	222	338	9.0	3.1	3.9	4.8	2.0
Eggs Primary	366	542	776	3.4	1.6	3.4	3.7	1.0
Total Milk	1 575	2 070	2 971	-0.4	2.5	3.8	2.5	-0.2

Source: FAOSTAT

with demand, with annual growth rates averaging 2.6 and 2.5% during the period 1980-2009, albeit with marked inter-annual fluctuations (Table 3.3). Although cattle herds in Sahelian countries were restocked after the droughts of the 1970 and 1980s, the overall increase of cattle numbers has been modest. In contrast, the number of small ruminants, which have shorter production cycles, grew faster. Pig meat production grew at 4.8% annually, followed by sheep and goat meat. Poultry production

grew only at 2.8%, although egg production averaged 3.7% growth per year.

On a per capita basis, maize, starchy roots and cowpeas exhibited strong growth (3% per year and above), whereas oil crops and vegetables showed a more modest annual growth rate of 1 to 2%. Per capita production of millet, sorghum, rice and fruits increased annually by less than 1%, while that of meat, milk and sugar cane actually declined on an annual basis over the last thirty years. Concerning livestock products, pig, sheep and goat meat achieved annual average growth rates per capita of 2% and 1.6%, whereas cattle meat and milk production declined on a per capita basis. Hence, while the per capita production of basic food staples has shown the highest increase, crop and livestock products with the most dynamic markets, such as meat, dairy products, rice and vegetable oils, showed a weaker performance and were not able to meet increasing demand. As will be seen in Chapter 4, the gap was met by increasing imports of these commodities.

Despite the growth shown in Table 3.2, however, it has not been rapid enough to allow most West African countries to meet their poverty reduction goals. A computation based on IFPRI's multi-market model revealed that West African agriculture would have to generate and sustain an annual GDP growth rate of 6.8% between 2004 and 2015 in order to achieve Millennium Development Goal (MDG) 1's target of reducing extreme poverty by 50% between 2000 and 2015 (Johnson, *et al.*, 2008).

3.3 Trends in agricultural productivity

Agricultural productivity refers to the agricultural output produced for a given level of inputs. While output levels can generally be increased by raising the amount of input use, lower unit costs of production and improved economic competitiveness require improvements in productivity. There are two types of productivity indicators: those of partial factor productivity, which measure output per unit of a given input, such as land or labour; and those of total factor productivity, which attempt to measure the value of output divided by the value of all inputs used in its production. Because of data limitations, most studies in West Africa have focused on measures of partial factor productivity, particularly yields per ha. As discussed below, however, more recent studies (particularly by ReSAKSS) have attempted to measure total factor productivity.

3.3.1 Yields per hectare

Agricultural growth in the region has been driven largely by area expansion, whereas land productivity increases have been modest, with yields remaining well below global benchmarks (Table 3.4). Nonetheless, in the most recent period shown in Table 3.4 (2008-2012), there have been some modest increases in region-wide yields, particularly for some of the staple crops. These increases may reflect greater access of farmers to fertilizers and improved seed as a result of major agricultural intensification efforts launched in response to the 2008 spike in world food prices and the more favourable price incentives they faced during this period. It should also be borne in mind that the figures in Table 3.4 are broad averages across many different production systems in West Africa and, as noted below, in particular settings throughout the region where production conditions are more favourable, yields are substantially higher than these region-wide averages.

This caveat notwithstanding, as shown in Figure 3.2 on page 77, West Africa's agricultural growth (like that of most of sub-Saharan Africa) over the past 30 years has been driven overwhelming by area expansion, in sharp contrast to other regions of the world, where yield increases have been the main drivers of output expansion. For instance, the area planted to cereals increased by 3.9% per annum while growth in yields increased by less than 1.0% between 1980 and 2009 (see Figure 3.2 on page 77). Within this general pattern of extensification, the share of roots, tubers and pulses in the total area under food crop production increased (53%) while cereals witnessed a 7% drop over the last three decades.

The land productivity challenges facing West Africa are pronounced. With the exception of maize,

for which average yields grew annually by 2.2% between 1980 and 2009, yields of other food crops increased only modestly or even stagnated (annual growth rates ranging from 0.0 to 1.3%). The performances of the cattle and poultry sub-sectors, measured in terms of output per animal, have even been worse over the last 30 years, with average yields declining for beef (-0.9%) and stagnating for poultry and dairy sectors (Table 3.4).

With the production initiatives launched in the wake of the 2008 food crisis, cereal yields in the region have begun to increase beyond those shown in Table 3.4, but still lag other areas of the world. Cereal yields averaged 1 152 kg/ha in West Africa in 2008-12 compared to 1 435 kg/ha in East Africa, 1 883 in North Africa and 3 044 in Southern Africa. Average rice (paddy) yields (which include both irrigated and rainfed systems) are also markedly lower in West Africa (2 009 kg/ha) than in East Africa (2 436 kg/ha), North Africa (9 507 kg/ha), and Southern Africa (2 616 kg/ha). Average rice yields in South-Eastern Asia (4 136 kg/ha) and Southern Asia (3 512 kg/ha) are also much higher than the West African average, reflecting the much higher proportion of production produced under irrigation in these regions than in West Africa. Contrary to cereals, average cassava yields in West Africa are higher (at 12 338 kg/ha) than in other regions of Africa, yet substantially lower than levels in South-Eastern Asia (where yields are 52% higher than in West Africa) and South Asia (167% higher).[21]

These regional averages also mask wide variations in intra-regional performance. For example, while yields of Nigerian and Guinean rice declined between 1980 and 2009, average paddy

21 All figures are calculated from FAOSTAT data.

Table 3.4 *Average yields for selected commodities in West Africa and other regions (1990–2012)*

	Western Africa			Sub-Saharan Africa			South-Eastern Asia		
	1990-99	2000-2009	2008-12	1990-99	2000-2009	2008-12	1990-99	2000-2009	2008-12
Commodity	Yield (kg/ha)			Yield (kg/ha)			Yield (kg/ha)		
Wheat	1.902	1.359	1.699	1.781	2.176	2.405	940	1.441	1.776
Rice, paddy	1.640	1.672	2.009	2.153	2.372	2.523	3.242	3.836	4.136
Maize	1.258	1.556	1.715	1.543	1.774	1.983	2.119	3.086	3.813
Millet	700	845	736	651	763	690	668	812	913
Sorghum	838	938	980	808	910	952	1.266	976	1.065
Total Cereals	954	1.102	1.186	1.199	1.372	1.517	3.013	3.677	4.045
Beef and Buffalo Meat[a]	128	123	123	143	151	158	185	197	196
Poultry Meat[a]	0,9	0,9	0,9	1,1	1,2	1,2	1,1	1,1	1,1
Cows milk[b]	217	220	231	455	497	503	667	896	892
Pulses	336	434	500	504	568	633	804	950	1.179
Yams	10.593	10.543	11.277	10.219	10.295	10.824	4.693	4.844	5.172
Cassava	10.023	10.653	12.338	8.244	9.225	10.324	12.318	16.365	18.805
Oilcrops	316	352	362	262	284	303	1.246	1.904	2.195
Oil palm fruit	3.282	3.230	3.261	3.694	3.712	3.863	17.814	18.914	18.868
Cocoa beans	478	475	469	454	461	458	765	688	509
Coffee, green	296	308	258	434	425	431	734	850	958
Sugar cane	45.125	40.062	37.080	62.215	65.506	64.232	59.489	63.763	68.247
Seed cotton	958	1.016	1.083	978	955	978	738	705	1.112

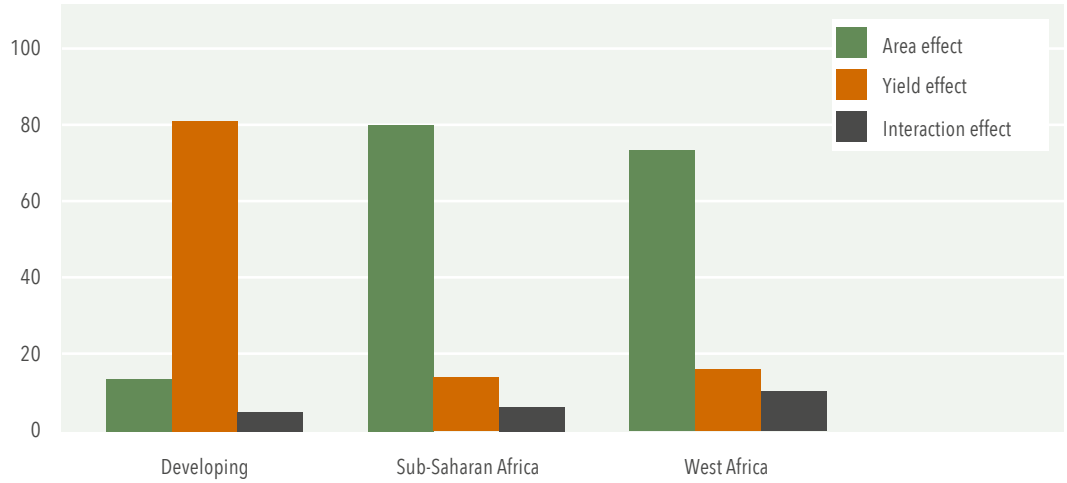
Source: FAOSTAT,
[a] Yield = Carcass Weight (kg/animal);
[b] Kg/animal/year

yields in the other big rice producing countries of Côte d'Ivoire, Mali and Sierra Leone increased substantially; these figures conceal even more pronounced productivity success stories in certain irrigated perimeters in these countries (e.g. Office du Niger in Mali). Similarly, cassava yields have increased much more sharply in Nigeria and Ghana over the past 20 years (in response to the spread of improved varieties developed by IITA) than in several other coastal countries such as Sierra Leone and Liberia; and until the mid-2000s, the performance of the cotton sector in Francophone West Africa was much stronger than in the Anglophone countries (see Chapter 10 for details).

Table 3.5 displays examples of striking differences in country-wide average yields in 2008–10 for selected crops. For certain crops, yields may vary by up to a factor of five, reflecting vast differ-

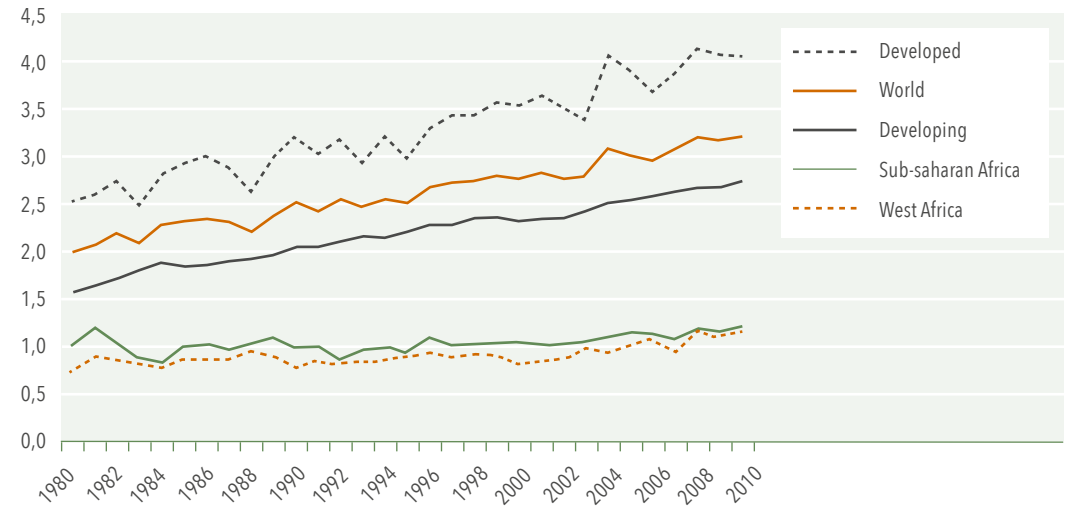
Figure 3.1 *Contribution of area and yield to output growth*

1980-89 to 2000-09 (%)



Source: Konandreas, 2012a.

Figure 3.2 *Trends in cereal yields (mt/ha)*



Source: Konandreas, 2012a

Table 3.5 *Country-average yields for selected crops in West Africa, 2008–2010*

	Cassava	Cowpeas	Groundnuts	Maize	Sorghum	Rice, paddy	Sugar Cane	Oil Palm Fruit
Country	(mt/ha)							
Benin	13.9	–	0.9	1.3	1.1	3.7	100.0	10.3
Burkina Faso	1.5	0.5	0.8	1.5	1.0	2.3	19.0	7.1
Cape Verde	12.9	–	–	0.3	–	–	74.5	10.0
Côte d'Ivoire	7.0	–	1.1	2.0	0.7	1.8	–	5.7
Ghana	14.3	–	1.4	1.8	1.3	2.5	25.4	8.4
Guinea	7.9	–	1.4	1.2	1.2	1.8	53.4	10.2
Guinea-Bissau	11.6	0.2	1.5	0.9	1.0	1.9	27.3	–
Liberia	7.8	–	0.9	–	–	1.3	10.2	–
Mali	16.4	0.4	0.8	2.7	1.1	3.7	73.9	–
Niger	16.1	0.3	0.5	0.8	0.4	1.6	49.4	–
Nigeria	11.9	0.8	1.1	2.1	1.1	1.8	19.4	2.7
Senegal	7.8	0.4	1.0	1.6	1.0	3.7	115.7	10.8
Sierra Leone	5.2	–	0.8	0.9	1.0	1.7	69.7	8.0
The Gambia	3.3	–	0.9	1.2	1.1	1.1	–	2.7
Togo	6.2	–	0.7	1.2	1.1	2.4	–	8.5

Source: FAOSTAT

ences in agro-ecologic zones, production systems, access to inputs, and varieties. These disparities across countries also suggest that there is substantial scope for improving yields in low-performing areas by learning successful approaches from neighbouring countries.

A more aggregate measure of land productivity is given by the value of agricultural output per ha rather than the physical yield of individual commodities. Table 3.6 presents data on the average annual growth rate of land and labour productivity from 1980 through 2010 for different regions of Africa, as measured in value terms. The West African regional figures are strongly influenced by the performance of Nigeria over this period.

Three observations emerge from Table 3.6. First, land productivity in West Africa appears to have grown faster over time than labour productivity. As discussed below, however, this may be an artefact of an overestimation of the size of the agricultural labour force. Second, over the entire period 1980-2010, land productivity (in value terms) has grown more quickly than the Africa-wide average and has exceeded the rate of growth of all other subregions of Africa except Central Africa. Third, the most rapid increase in land (and labour) productivity

Table 3.6 *Average annual growth rates of land and labour productivity for Africa*

	1980-1990		1990-2000		2000-2010		1980-2010	
Region	land	labour	land	labour	land	labour	land	labour
Central Africa	1.7	0	3.5	2.6	4	2.8	2.6	1.6
Eastern Africa	2.1	1.2	0.7	2.4	2.4	0.3	1.5	1.3
Northern Africa	1.1	3.3	1.4	1.6	1.7	3.3	1.4	2.7
Southern Africa	2.5	3.3	3	0.8	0.1	2.3	1.7	1.8
Western Africa	1.3	-1.6	3.1	1.9	2.1	1.2	2.3	0.9
Africa	2.0-	3.1	1.0	1.2	2.2	3.0	1.6	2.3

Source: Benin, *et al.*, 2011

occurred during the decade of the 1990s. This was the era of structural adjustment, when devaluations of local currencies and changes in relative prices induced farmers to expand production of export crops and shift into more high-value products (see Chapter 11).

3.3.2 Labour productivity

In contrast to trends in land productivity, Table 3.6 indicates that labour productivity over the 30-year period 1980-2010 grew more slowly in West Africa than in any of the other regions of Africa. This slow growth rate over the entire period was in part a function of falling labour productivity in the 1980s. The same forces of changing relative prices and shifts in the mix of farm-level production that likely explained the jump in land productivity in the 1990s are likely also behind the increase in labour productivity in that period. In the most recent decade, the rate of growth of labour productivity for the region slowed a bit from the 1990s but exceeded that of East Africa (Benin, *et al.*, 2011).

Labour productivity, however, may have grown more than is generally acknowledged because of a significant but poorly measured shift by rural populations into non-agricultural activities. Josserand reports that based on data from sample surveys in several West African countries, it appears that the ratio of the total population not primarily engaged in farming to the farm population increased from 0.42 in 1970 to 1.17 in 2010. This shift implies that each farm worker is feeding more than twice as many non-farm people as 40 years ago, even when one takes into account the increased food imports discussed in Chapter 4. Some of this increase in food production per worker results from a shift in area planted from export crops to food crops (especially roots and tubers), but some is also undoubtedly due to an increase in farm-level labour productivity (Josserand, 2011).

3.3.3 Total factor productivity

Total factor productivity (TFP) in agriculture, a measure of the value of all agricultural outputs divided by the value of all inputs used in production, can change for two reasons. First, the efficiency with which existing inputs are used can change by reallocating them among different products (e.g. from low-value outputs to high-value outputs). Even if the mix and physical volume of production stays the same, if output prices rise faster than input prices, this will also translate into an increase in efficiency, as the formerly lower-value outputs now have a higher value. Second, technical change (e.g. the introduction of new crop varieties) can increase the amount of output produced by a given set of inputs.

Table 3.7 presents estimated annual average rates of change of TFP for different regions of Sub-Saharan Africa over the period 1961-2005, decomposed into its two parts: gains due to efficiency and gains due to technical change. Several messages emerge from the table. First, in contrast to all the other regions of sub-Saharan Africa, over the long period from 1961 to 2005 (the last year for which data are available), TFP declined in West Africa, driven by a decline in the efficiency with which resources were used. The West Africa results were very much driven by the performance of Nigeria, where the decline in efficiency averaged over 1% per year. For the period as a whole there was a very modest (0.23%) annual gain in technical efficiency, but this was not large enough to offset the decline in the efficiency of resource use. Second, the long-term average obscures very different patterns in each of the sub-periods shown in the table. After modest increases in TFP in the 1960s, driven by technical change, there were huge declines in the efficiency of resource use, both in the subregion as a whole and even more so in Nigeria, during the 1970s (the period before structural adjustment). This was followed by modest but growing TFP growth from the 1980s through 2000, which continued at about 2% per year from 2000 through 2005. Third, in the period since 1980, the overwhelming source of TFP growth in the subregion has been increases in the efficiency of resource use. Technical change, such as would emanate from national and regional systems of agricultural research, contributed extremely little to total factor productivity growth for the region since the 1970s.

Table 3.7 *Percentage change in total factor productivity, efficiency and technical change*

Total Factor Productivity = TFP; efficiency = Eff; and technical change = Tech; annual average in %, 1961-2005

	1961-1970			1970-1980			1980-1990			1990-2000			2000-2005			1961-2005		
Region	TFP	Eff	Tech	TFP	Eff	Tech	TFP	Eff	Tech	TFP	Eff	Tech	TFP	Eff	Tech	TFP	Eff	Tech
Central Africa	-1.67	-1.75	0.08	-1.28	-1.28	0.00	0.29	0.29	0.00	2.34	1.65	0.69	3.02	2.91	0.10	0.20	0.02	0.18
Eastern Africa	-3.49	-3.88	0.42	1.41	1.41	0.00	0.42	0.42	0.00	1.28	1.27	0.01	2.45	2.38	0.07	0.40	0.34	0.06
Southern Africa	-0.28	-1.48	1.23	0.54	0.13	0.42	1.94	1.02	0.94	3.71	2.24	1.54	1.79	-1.53	3.46	1.39	0.27	1.15
Western Africa	0.62	-0.51	1.13	-6.61	-6.62	0.00	0.51	0.51	0.00	2.94	2.89	0.05	2.06	1.98	0.08	-0.70	-0.93	0.23
Nigeria	0.97	-0.22	1.20	-7.47	-7.47	0.00	0.26	0.26	0.00	3.09	3.09	0.00	1.88	1.88	0.00	-0.92	-1.15	0.23
Sub-Saharan Africa[a]	-0.01	-1.02	1.02	-4.36	-4.40	0.04	0.58	0.48	0.11	2.59	2.37	0.25	2.20	1.70	0.52	-0.28	-0.59	0.32

Source: Benin, *et al.*, 2011
[a]29 countries for which data are available

Looking at geographical patterns of TFP, a 2008 ReSAKSS study indicated that coastal countries achieved 2.1% productivity growth per year between 1985 and 2002, whereas Sahelian countries experienced a decline of 0.29% during the same period. The top performers in this period were Nigeria, Ghana and Benin (Johnson, *et al.*, 2008).

More recent analysis for 11 ECOWAS countries for which data are available through 2005 shows that eight countries (Benin, Burkina Faso, Ghana, Guinea, Mali, Nigeria, Sierra Leone and Togo) had positive TFP growth over the more recent period 2000-2005, with six of them achieving annual rates of growth of 2% or more (Benin, *et al.*, 2011). The top performers were Sierra Leone, which was just recovering from civil war (with an annual average growth rate of nearly 10%), Burkina Faso, and Mali. For all countries except Benin, the vast majority of the increase came from improvements in efficiency, with technical change contributing very little. Three countries, The Gambia, Senegal, and Côte d'Ivoire, had negative growth rates for TFP during this period, due entirely to declines in efficiency of resource use.[22]

While technical change appears to have contributed very little to gains in total factor productivity over the past 20 years in West Africa, this does not imply that agricultural research systems have made no contribution in the region. To the extent that research has led to new varieties and/or agronomic practices that have stabilized yields that would have otherwise declined in the face of falling rainfall, there have been important contributions, although these would not be reflected in the TFP calculations.

3.4 Reasons why supply response has lagged the growth of demand

The mixed overall performance of West African Agriculture with respect to increasing agricultural production and productivity is due to a host of structural problems, many of which have been further aggravated by inappropriate policies. These structural problems include (1) the limited market access of many producers in the region, a function of weak infrastructure; (2) the low availability and poor reliability of electrical energy, both in urban and rural areas, which limits value-added activities and manufacture of agricultural implements; (3) the high risks and uncertainties facing actors in the Agricultural sector and limited means of reducing and managing those risks; (4) poor access to improved technologies and inputs; (5) weak systems of Agricultural research, development, and advisory services; (6) similarly weak systems of Agricultural education that are necessary to develop the human capital for 21st Century West African Agriculture; (7) systems of financing that are poorly adapted to the challenges facing actors in the agrifood system; and (8) a poor overall business environment in many countries.

22 Senegal had a slightly positive rate of growth of technical-change-induced TFP during this period, but it was more than offset by declines in efficiency, resulting in a net annual average decline of TFP of a little under 2%.

These structural problems affect the profitability and risks of investments in agriculture and related upstream and downstream segments, hence reducing the incentives facing individual farmers and other value-chain actors to undertake such investments. While many constraints and possible solutions are value-chain specific (see Part III), this section discusses generic constraints cutting across most subsectors and stages of agricultural value chains.

3.4.1 Market access constraints

Limited market access is a key disincentive for producers to increase production and adopt productivity-enhancing technologies, as it directly affects the prices producers receive for their outputs and pay for their inputs. Market access is conditioned by the geographic distance between producers and consumers and by the availability and quality of connecting infrastructures. As the population urbanises and as consumption patterns increasingly shift towards more perishable and higher-value products (see Part II), the state of the connecting systems – roads, communication and market infrastructure and transport – becomes critical, especially since a growing share of the population is located close to the coastal areas which tend to be better connected to the ports than to the hinterland. Physical market access constraints facing domestic rural producers include long distances and travel times, poor road conditions or missing roads, low transport volumes, especially in rural areas, and high transport costs. High costs of and limited access to transport not only affect farmers and traders but also providers of services such as finance, extension, and veterinary medicine. Hence, the road and transport sectors play a key role for agricultural growth.

Limited physical market access and high transport costs. West Africa's quality of transport services, as measured by the Logistics Performance Index, is lower than in other African regions and in the rest of the world (AfDB, 2011c). Transporting agricultural goods to the region's cities and ports, or raw materials to agroprocessors, is essentially done by road. Waterways, despite being widespread, are not well developed for transport, while rail transport has fallen into disuse in most countries with the exception of the Dakar – Mali and the Abidjan-Ouagadougou routes (the latter having been disrupted during the Ivorian crisis).

While important investments have been made in recent years, especially on the main international corridors and main trunk roads, road density in West Africa remains low compared to other developing regions. A World Bank study estimates that 75% of farmers in sub-Saharan Africa are located more than four hours away from the nearest market by motorised transport, compared to 45% in Asia (Sebastian, 2007). Moreover, rural communities continue to have by far the lowest accessibility to all-season roads in the developing world. Infrastructure-related market access constraints are exacerbated by limited availability of transport vehicles and low traffic volumes, especially in remote rural areas.

The low road density needs to be interpreted in the context of the vastness of the territory and low population densities. Measured against income (and, hence, ability to pay for maintenance), even current levels of road density seem rather high (World Bank, 2008). In some countries the asset value of the road network exceeds 30% of GDP (Foster, 2008). Road density differs among countries, however, being much higher in densely-populated areas and more developed countries such as Ghana and Nigeria, compared with the large Sahelian countries and the small, conflict-ridden countries along the coast.

Transport prices in West Africa are much higher than in other developing regions and constitute major constraints to agricultural competitiveness in general, and for smallholder market access in particular. Transport costs are a function of the state of transport infrastructure (roads, ports), costs of vehicles and fuel, wages of transport operators, and the policies and institutions governing the transport and road sectors. While investments in transport infrastructure (roads, port, bridges, etc.) are important preconditions for reducing travel time and vehicle operating costs, this does not necessarily translate into lower transport prices. Recent studies found that road infrastructure along major

international trade corridors is in fair to good condition and no longer is the primary reason for high transport costs (World Bank, 2012a). While costs to transport operators are similar to other developing regions, truck freight rates continue to be much higher (Teravaninthorn and Raballand, 2009). Moreover, trucking times are slowed down by frequent checkpoints and long queuing times at borders and ports.

The trucking environment and market structure in West Africa are characterised by strong market regulation through freight bureaus and shippers' councils, reducing competition. As a result, there are few large, modern trucking companies and fewer new trucks. Hence, road governance and structural issues in the transport sector are the reasons for persistently high transport prices (view Chapter 12 for further discussion). However, road sector interventions so far have focused mainly on constructing and improving hardware, with far less attention given to institutional and governance structures. Even though addressing the latter is likely to produce quick wins for transport users and the whole economy, reforms will have to confront vested interests and are politically more difficult (World Bank, 2009b; World Bank, 2010). Still, there is a risk that, unless transport sector reforms are addressed more vigorously, further investments in road infrastructure will not lead to better services and lower prices for transport users and hence fall short on delivering their full economic benefits to West African societies.

Transport costs remain especially high for producers in rural areas. Transport prices per ton kilometre from farmgate to primary collection markets tend to be three to five times higher than those from secondary (often rural wholesale) markets to wholesale markets located in the countries´ capitals. Hence, 45% of average transport charges accrue during the first 28% of the transport distance (World Bank, 2009a). Hence, the "first kilometre" tends to be the biggest hurdle to connect small rural producers to markets. Here, poor or missing road infrastructure is still the heart of the problem.

However, the challenge of expanding and maintaining the rural road network is huge and requires strategic choices. One way of doing so is to strategically align rural road investments with agricultural development programmes at the national level in order to prioritise those roads likely to have the largest effect on agricultural productivity and market access. This may entail focusing on areas that are still within reach of major urban markets or trunk roads, and where all-year rural roads alleviate a key constraint to market access. Moreover, the type of road needs to be matched with volumes of production likely to be transported. In many rural communities, production volumes may be well below the threshold needed to justify the use of the truck, and simpler roads targeted at two wheeled vehicles or animal-drawn carts may be more suitable. Moreover, financing and technical capacity for road maintenance at local levels remain important challenges. Given the limited revenue-generating capacity of local governments, sufficient budget transfers from the central level need to be ensured. Dedicated road funds with clear responsibilities to co-finance rural road maintenance could be one possibility to ensure adequate, steady funding. Countries such as Mali have also instituted toll systems on some main highways, although such systems are less practical for rural roads.

Market infrastructure gaps. Physical market infrastructure is important for efficient product aggregation and post-harvest handling, including storage, sorting, grading and packaging of agricultural produce. In West Africa, marketing infrastructure is generally insufficient to cope with the burgeoning demand and supply of agricultural produce as more and more consumers rely on the market for their food. This applies to wholesale and retail markets, cold storage and abattoirs. This infrastructure gap tends to be largest in rural areas. As a result, buyers face high transaction costs for product aggregation, quality control, and sorting into batches of homogenous quality. Quality deterioration and spoilage is a further serious problem, especially of perishable products such as fruits, vegetables and animal products, in absence of cold chains. Moreover, poor hygienic conditions in markets and improper sewage systems can cause threats to human health as well as environmental hazards. Urban retail and wholesale markets can rarely cope with rapid urban

growth, and infrastructure facilities are often grossly inadequate (see Chapter 8).

As in case of roads, investments in market infrastructure need to be complemented by investments in "market software", i.e. the policies and institutions governing market infrastructure, as well as the broader marketing functions. These include improvements in (1) planning, governance and management of markets, (2) market and price information systems, and (3) grades and standards in line with consumer demands and food safety regulations.

In many subsectors, value chains are characterised by poor transmission of incentives from consumers and agroprocessors to farmers concerning demands for specific product qualities, particularly regarding cleanliness, safety and consistency of supply. In order to enhance the value addition, farmers and other upstream actors need better information about market segmentation at the consumer level concerning qualities and prices. Moreover, price differentiation at the consumer level needs to be passed on to farmers. Without higher prices for improved qualities, farmers have no incentives to carry out necessary investments or change their farming practices.

The weak transmission of information regarding the willingness of consumers and processors to pay for different product qualities is due to:

- Lack of grades and standards that reflect the nature of demand in the market.
- The low volume of marketed surplus per farm, which makes product segregation by quality costly for traders; hence, products of differing qualities are frequently pooled in the marketing system, which dilutes any incentive to award producers of high-quality products.
- Traders and agroprocessors located in larger towns and cities frequently lacking information about product availability in the hinterland. Hence, they find it easier to import.
- Meeting market demands in terms of quality, quantity and consistency of supply often requires specialized investments and skills that are beyond the reach of many smallholders and traders.

Some value chains (e.g. cotton and cocoa) require capturing important economies of scale in marketing – in order to meet minimum order sizes by overseas buyers – and in acquisition of inputs at lower prices for farmers and ensuring tight vertical coordination in order to be competitive in international markets. West African countries have had difficulties over the past 50 years designing institutional arrangements that coordinate these value chains and are both transparent and accountable to stakeholders (see Chapter 10).

Market information systems in West Africa. Actors throughout the agrifood system obtain market information in a myriad of ways, from word-of-mouth to cell phones to formal market information systems. In the wake of the market liberalizations that swept the region as part of structural adjustment in the 1980s and early 1990s, many governments in West Africa established formal market information systems (MIS). The purposes were initially three-fold: (1) to permit governments and donors to monitor the impacts of market reforms initiated under structural adjustment and the effects on prices of food aid distributions, (2) to level the playing field among different actors in the markets – especially between farmers and traders – in terms of their ability to bargain for prices; and (3) to promote better spatial integration of markets. The public MIS typically collect information through a network of enumerators and diffuse their reports through radio, television, printed media, and in a few cases, by SMS – often on a weekly basis. Regionally, the publicly funded MIS in 10 West African countries are organized into a regional network (RESIMAO – Réseau des systèmes d'information des marches en Afrique de l'ouest), which facilitates sharing of market information across countries, development of improved market monitoring and diffusion techniques and staff development.[23] ECOWAS is helping to support the network as part of the ECOWAP/CAADP programme described in Chapter 11.

23 http://www.resimao.net

The publicly funded MIS – sometimes referred to as "first generation MIS" (David-Benz *et al.*, 2012) – focus primarily on food crops, agricultural inputs and, in some cases, livestock. They have been complemented over the past 10 years by a growing array of other MIS organized by farmer organizations (e.g. in the cocoa value chain in Côte d'Ivoire), NGO's, donor-funded projects, and private companies. Notable among the latter is Esoko-Ghana, which provides clients with market information via SMS and web-access. These "second generation" MIS attempt to address some of the shortcomings of the publicly funded MIS in terms of timeliness of information collection and diffusion, range of product coverage, and more precise description of the product qualities to which the prices refer.

While the spread of MIS throughout the region has improved information available to many actors in the system, problems persist. In the absence of well-defined grades and standards, it is not always clear what the reported prices represent. Many of the MIS report prices that may be up to a week old, which are of limited use for buyers and sellers of perishable products. Many buyers and sellers of such products, as well as larger-scale sellers of staple products, rely increasingly on cell phones to obtain timely market information from colleagues in different markets. Often, the MIS provide information only on prices and market supply conditions, but market actors frequently have need for a wider range of information, such as availability and cost of transport services, location and availability of credit services, access to advisory information, etc. Some of the second-generation cell-phone based systems are attempting to provide this broader range of services. While some of the MIS conduct medium-term market outlook studies, their capacity for short-term price forecasting (which is a critical need for sellers of perishable products) remains very limited. Nonetheless, the public MIS continue to play an important role in helping inform governments of market conditions, which is often a critical input into decisions regarding import and export regulations and possible needs for food aid (Kizito, 2011). They also provide important information to smaller farmers in more remote areas, even as larger and more commercial farmers turn to other sources of market information.

3.4.2 Electrical energy

Similar to other regions in sub-Saharan Africa, West Africa's largest infrastructure deficit is in the electrical power sector. This deficit is particularly constraining to the development of agroprocessing. A World Bank study on African infrastructure (World Bank, 2010) states that the 48 countries (with a combined population of 800 million) generate roughly the same amount of electrical power as Spain (with a population of 45 million). Africa has fallen back vis-à-vis other developing regions. While sub-Saharan Africa had almost three times as much power generating capacity per million inhabitants as South Asia in 1970, the situation had inverted by 2000.

Electrical energy costs in Africa are higher than in other developing regions. Many countries rely on small diesel generators, resulting in costs several times higher than those faced by countries with large scale power systems, which are typically hydro-electric-based (World Bank, 2008). High costs are combined with unreliable service, characterised by frequent power outages. This forces agroprocessing firms either to face frequent product losses when power goes out while goods are on the production line or invest in their own generators. The latter, however, drives up their costs of production, frequently undercutting firms´ competitiveness relative to imports.

West Africa's energy generation potential is concentrated mainly in Nigeria (oil and gas), Guinea (hydropower), Côte d'Ivoire (oil and gas), Ghana (oil and gas), Niger (uranium), Benin and Togo (hydropower), and in the shared water basins of the Gambia, Senegal and Volta Rivers. ECOWAS has taken the lead in recent years in promoting a region-wide power grid aimed at facilitating the sale of electricity across borders and allowing the capturing of regional economies of scale in power generation.

3.4.3 High risks

Actors throughout the West African agrifood system face high production risks (due to weather and pests) and price risk (due to volatile markets), and often lack adequate tools to deal with these risks. Their main tool is diversification of their activities, which limits productivity gains from specialization. These risks are compounded by insecurity of land tenure, which discourages long-term investments that could increase productivity. Key among the factors generating these risks are the following:

Low reliance on irrigation to mitigate weather risks. As discussed in section 3.1, the region is highly vulnerable to erratic weather conditions, particularly drought in the Sahelian areas, but has only 10% of its total cropland under irrigation. The expansion of irrigated area has been slower in sub-Saharan Africa compared to other developing regions. Donor investments in agriculture or water infrastructure declined sharply between the 1970s and the mid-1990s as donor attention shifted away from agriculture (World Bank, 2010). There have been major efforts since the mid-2000s to expand irrigated area in some of the Sahelian countries, and national CAADP investment plans of many ECOWAS countries devote substantial resources to expanding irrigation infrastructure (see Chapter 11). Yet the expansion of irrigation in the region hinges upon the ability to contain costs. Physical suitability for irrigation does not necessarily entail economic viability, which is highly sensitive to initial investment, land and water productivity of the crops grown and access to markets and support services. Africa has a legacy of poorly managed and maintained irrigation schemes and investment costs were often much higher than in other developing regions. Best-practice experiences in Africa show that well-designed and implemented irrigation projects can lead to costs no more than USD 3 000 per ha for large-scale irrigation schemes (water distribution component) and USD 2 000 for small-scale irrigation schemes. Large-scale irrigation schemes are only viable, however, if the costs of dam construction can be recovered from hydropower use and irrigation only bears the costs of the water distribution infrastructure (World Bank, 2010). In view of the high costs of irrigation development, there might be some scope for public-private partnerships, as called for in some of the expansion plans for Mali's Office du Niger. However, experiences are yet limited and too recent to draw lessons from the suitability of different management and financing arrangements.

Price volatility. While volatility originating in international markets has been a particular concern following the 2008 price spikes, the main sources of price volatility are often domestic (view focus section A for further details). Erratic climate conditions lead to strong fluctuations in production, which, in combination with weak spatial market integration and overall low production levels result in strong price volatility. These endogenous sources of price volatility undermine smallholders' incentives to invest and commercialize. Weak storage systems and unpredictable government market interventions further contribute to price volatility. Strong price fluctuations also pose threats to contracting relationships between farmers and potential buyers, such as agroprocessors. On the one hand, these buyers have difficulties in fixing prices ex ante in the absence of hedging or other price risk management instruments. On the other hand, risks of contract breach by both parties increase with price volatility, especially in an environment with poor contract enforceability.

Limited access to modern risk management instruments. West African farmers and other value chain actors generally lack access to modern risk management products and services such as agricultural insurance or instruments to manage price risks. This is aggravated by limited access to modern inputs which could help stabilize yield risks, such as plant protectants and veterinary drugs and services, as discussed below. In the absence of such products and services, farmers' main response to the various risks and uncertainties is to diversify their limited resources into many different activities. The resulting scales of operation are often too small for adopting improved technologies and lead to higher per unit marketing costs.

Land access and tenure security. Population growth, climate change and degrading soil quality are exerting growing pressures on land, water and forest resources, with several consequences:

- ***Land fragmentation*** due to declining per capita availability of cultivable land, especially in areas with high population densities, good agricultural potential and market access. The resulting farms are often too small to feed the families that cultivate them, let alone commercialize;

- ***Increasing demand for communal land from outside investors***, both domestic and foreign investors, triggered by the promise of future demand growth and increased profitability in agriculture;

- ***Land conversion and reallocation of water rights***, due to rapid urbanization and expansion of roads and other infrastructure. This not only affects agricultural production directly, especially in high potential areas with access to markets and services, but also poses threads to existing holders of rights to these resources if not properly protected.

As a result of the above forces, tenure systems, property rights to natural resources and the rules for exchanging and protecting these rights are increasingly under stress. Current tenure systems are characterised by legal pluralism, whereby customary tenure systems co-exist and often overlap with statutory systems. Such a situation provides little security for rights holders under each system and constrains an orderly transfer of property rights. Insecure land tenure and water rights undermine incentives to invest in land improvements, irrigation and other fixed assets by existing land users. They also constrain the ability of agroprocessors to acquire land in an orderly and consensual way in order to invest in new processing plants or nucleus farms (typically core components of outgrower schemes). Moreover, conflicts over land and water destroy social capital, especially in areas with the highest production and market potentials (see Focus Section D in Part IV). Finally, the lack of recognized land records precludes local governments from establishing land taxes that could provide the fiscal basis for provision of many of the critical supporting services needed by rural communities, such as primary education, health, and extension.

3.4.4 Access to technology and inputs

Low and inconsistent use of improved inputs such as seeds, fertilizer, pesticides and veterinary drugs remains the single most important factor explaining low productivity in West Africa. Analysis of total factor productivity (TFP) growth over the period 1985-2005, discussed above, showed that technological change accounted for only 1.5% of all TFP growth; the remainder came from efficiency gains due to reallocation of resources to higher value activities, for example as farmers changed crop mixes in response to changing relative prices that resulted from liberalization and as output prices rose faster than input prices (Benin, *et al.*, 2011). Over the long term, however, productivity gains will need to be driven more by technological change, as the scope for improvements in allocative efficiency will decline as the "easy gains" in response to economic reforms are exhausted and as political pressures rise to limit the increases in output prices for food.

Improved inputs not only play an important role in increasing yields but also in stabilising yields and managing production risks. Improved seeds can enhance tolerance to drought, pests and diseases. Lack of access to farm power and mechanization at critical stages during the growing cycle can lead to significant yield penalties. Inadequate mechanization of post-harvest operations such as threshing, drying and cleaning can cause high product losses and quality deterioration. Low fertilizer use not only depresses current yield levels but also contributes to declining yields in the future, as soil nutrients are mined continually (see Chapter 2).

While fragmentary and often outdated, existing data suggest very low levels of modern input use in West Africa, even compared to other African regions.

Uneven access to inputs, technologies and support services between men and women constrains produc-

tivity growth. Cutting across the discussion below of all the factors limiting productivity growth of West African Agriculture are gender considerations. Social conventions in many countries restrict women's access to factors of production and services such as improved land and credit that are critical to productivity growth. Extension services often are predominantly staffed by men, and extension messages may not be oriented to women's concerns. These restrictions not only bias the benefits of growth away from women; they also reduce overall productivity growth by limiting the growth-enhancing resources available to women, who represent a large proportion of the actors in the agrifood system.

Fertilizer. Average fertilizer use per ha is extremely low, even if compared to other parts of Africa, let alone other developing regions (Table 3.8). Over the period 2003-2009, fertilizer nutrient use per ha of crop land in West Africa averaged, on a nation-wide basis, less than 7 kg, ranging from a low of less than 1 kg in Niger and Guinea to a high of 16.5 kg in Mali, where its use is concentrated in the irrigated Office du Niger rice zone and the rainfed cotton zone. West Africa's average fertilizer use per kg was just over half that of Eastern Africa and 15% that of Southern Africa. The West African average of under 7 kg/ha is in stark contrast with a world average of over 100 kg/ha and a regional high of 370 kg/ha in East Asia. The region's already meagre fertilizer use fell starting in 2007 when world fertilizer prices shot up rapidly, in spite of the expansion of fertilizer subsidies in several West African countries.

Seeds. The use of improved seeds is marginal, especially for food crops. Seed coming from commercial seed systems provided only 3% of the millet seed used in Senegal and 2% of that used in Niger in 1997, and the availability of improved maize seed met only one-fifth of the potential demand in Ghana and one-tenth of the potential demand in Nigeria (Niangado, 2010).[24] However,

24 Potential demand was conservatively estimated at 20% of the total area planted to the crop.

Table 3.8 *Fertilizer nutrient consumption, kg/ha, 2003-09*[a]

Country/Region	2003	2004	2005	2006	2007	2008	2009	Average 2003-09
Burkina Faso	10.8	11.8	15.2	12.5	9.4	9.0	9.1	11.1
Côte d'Ivoire	12.6	11.4	7.1	9.0	9.8	7.4	6.3	9.1
The Gambia	9.1	7.4	9.5	9.1	7.9	4.0	6.7	7.7
Ghana	4.4	7.8	3.5	12.0	10.6	9.1	12.4	8.5
Guinea	0.6	0.8	0.7	0.7	1.0	1.0	0.5	0.8
Mali	–	–	15.4	17.2	30.5	12.0	7.5	16.5
Niger	0.3	0.2	0.4	0.5	0.4	0.2	0.4	0.3
Nigeria	6.2	4.4	6.8	9.2	3.8	7.1	2.0	5.6
Senegal	10.6	12.3	9.6	2.2	2.0	2.3	4.9	6.2
Togo	7.1	3.2	8.3	4.7	6.0	0.2	0.9	4.3
ECOWAS average[b]	**6.6**	**8.3**	**6.5**	**8.0**	**6.2**	**6.0**	**3.8**	**6.5**
Eastern Africa	10.8	10.7	11.4	12.3	13.6	14.3	13.3	12.3
Southern Africa	43.6	46.8	36.3	46.3	45.3	42.2	41.9	43.2
Southern Asia	99.0	109.1	119.2	126.4	127.5	133.3	149.5	123.4
Eastern Asia	327.4	296.4	360.7	379.3	412.4	393.5	425.6	370.8
Southeast Asia	97.2	101.8	91.3	93.2	102.9	101.5	100.8	98.4
South America	111.7	118.5	100.2	105.3	129.1	115.9	90.6	110.2
World Average	**99.0**	**99.2**	**103.2**	**107.1**	**112.9**	**105.9**	**108.8**	**105.2**

Source: Calculated from FAOSTAT data.
[a] Total fertilizer nutrients expressed in terms of kg of N, P2O5 and K2O. Hectares = arable land + land under permanent crops.
[b] Average for 10 ECOWAS countries for which data are available. 2003 and 2004 averages exclude Mali

in some cases, systematic use of improved seeds and planting materials has resulted in significant yield increases. Examples include improved rice varieties in the Office du Niger zone in Mali, improved maize seeds in Ghana and stem cuttings of improved cassava varieties in Nigeria.

Farm power and mechanization. Despite the dearth of recent and comprehensive data on mechanization in West Africa, available evidence points to low levels of tractor- and engine-based mechanization. Even animal traction remains underutilized. Furthermore, with the collapse of government-sponsored medium-term credit programmes in many countries following structural adjustment, renewal of existing equipment has slowed and new farmers find it increasingly difficult to purchase new equipment. Mechanization levels of post-harvest operations and irrigation also remain low. The reliance on hand tools and human power not only causes drudgery for farm operators, especially for women, but also creates a strong disincentive for youth to enter and stay in agriculture. It also poses serious limitations to the land area that can be cultivated by a single farm family. Apart from pockets of commercial farming in the region, most progress in farm mechanization has been made in the cotton-based farming systems where financing for equipment could be easily deducted from cotton sales within single-channel marketing outlets.

Input supply and the private sector. While the use of productivity-enhancing inputs has traditionally been very limited, their availability and quality further declined following the abolition of marketing boards and the withdrawal of governments from input and service provision during structural adjustment. The production and distribution of certified seed had been largely a government undertaking up through the mid-1980s, when structural adjustment programmes led most governments to abandon this activity. Many countries operated mechanization centres providing tractor hiring services, albeit at low levels of operational efficiency and financial sustainability. Governments were also heavily involved in the importation and distribution of fertilizer at subsidised costs in order to compensate partially for the disincentives facing farmers due to overvalued exchange rates and high levels of direct taxation (see Chapter 11). Structural adjustment led to an abrupt disengagement of the state in agricultural input provision, and the private sector was expected to take over these functions. However, the private sector has been slow to fill the void due to a number of specific features of agricultural input markets affecting both demand and supply (see Focus Section C in Part IV).

Many of the factors constraining the development of private-sector-based input markets are generic to agribusiness. These include limited access to finance, high distribution costs in servicing a highly scattered demand due to poor infrastructure and high transport costs, and a generally weak business enabling environment. Other constraints are linked to the specific features of agricultural inputs, such as the difficulty of judging their quality through simple visual inspection and their profitability depending on weather conditions and output prices. From the farmers' perspective, investing in expensive improved inputs is very risky in an environment of volatile weather and market conditions and uncertain quality of the inputs, even in cases where access to finance is available. In turn, from an input supplier's or machinery dealer's perspective, lack of an established demand discourages investments in new outlets in rural areas and stocking a broader range of products. So far, the adoption of modern inputs and technologies has developed mainly in tightly coordinated value chains, often through interlocked transactions where, in addition to overcoming constraints to input supply and finance, market risks are limited and advisory services are available.

As a result of these constraints, fertilizer supply systems are underdeveloped in the region and prices, especially in the interior, are higher than in other parts of the world. Port charges and inland transport costs are the single largest cost item, accounting for 20 to 40% of farmgate costs. Domestic production of fertilizer is extremely limited. No country in the region produces substantial amounts of nitrogen-based fertilizers, although in 2013 Nigeria announced expansion of two private-sector production facilities. As of late 2013, Nigeria, in spite of its substantial energy resources and large market, continued to import the bulk of its fertiliz-

er.[25] Several countries in the region have phosphate deposits, and five countries (Burkina Faso, Côte d'Ivoire, Mali, Nigeria and Senegal) have fertilizer blending plants. Throughout the region, a general observation is that the fertilizer industry tends to be oligopolistic at the import level, but much more competitive at the wholesale and retail levels. Tendering processes that are sometimes limited to a few firms reduce competition and provide opportunities for collusion and corruption, leading to further price increases. Moreover, farmers often complain about the unreliable quality of fertilizers available in the market due to the lack of enforced standards for fertilizer combined with the ease of adulterating the product.

The legal and regulatory framework also constrains the availability of improved seeds. Certification plays a crucial role in enhancing confidence in the quality of seeds offered. However, seed policies are often outdated, unduly rigid, and difficult to implement. Procedures for the release of new varieties were designed to meet the needs of public research institutes, and seed certification was primarily an internal quality control mechanism for those institutes. Current requirements lead to long delays in the introduction of new varieties (World Bank, 2012b). Moreover, in the past, each West African country developed its own seed regulatory regime, which makes sourcing seeds from neighbouring countries complicated, lengthy, and expensive (World Bank, 2012a).

Erratic and poorly designed policy interventions in recent years in seed and fertilizer markets have contributed further to slowing down the development of robust private-sector based supply chains. While fertilizer subsidies may be warranted in the early stages of market development and to induce small farmers to begin using fertilizer, they only address one part of the fertilizer profitability calculation – the price of the input. Moreover, as discussed in Focus Section C, the way in which subsidies are administered has a huge effect on their cost-effectiveness. Large programmes of untargeted subsidies can drain resources from programmes of rural infrastructure development and sustainable intensification (see Box 2.2, p. 65). A combination of agricultural research to develop more fertilizer-responsive varieties and reduced transport costs, which both boosts output prices to farmers and reduces their input costs, would offer a more sustainable way of encouraging fertilizer use. This approach could be combined with increased government actions to ensure input quality and to support the development of professional agrodealer networks.

3.4.5 Research and development

Globally, there is ample evidence on the high returns of public spending in agricultural research and development (R&D), compared to other types of spending (FAO, 2012). The power of public research and development has been demonstrated by emerging economies such as Brazil, China and Thailand. Apart from hybrid seeds, the private sector has limited incentives to invest in research in Africa. Given the need for adaptation to local agro-ecologic and soil conditions, importing technologies works less well in agriculture than in other industries. The comparatively large number of main staple crops, the diversity of farming systems and small markets make technology development in West Africa more challenging than in other regions (World Bank, 2013b).

Recent data on private-sector agricultural research and development in West Africa are lacking. In most countries private-sector agricultural R&D appears to be very limited and is concentrated primarily in a few cash crops, such as cocoa, oil palm and cotton (Lucas, 2012). The private-sector's share of total agricultural research in West Africa in 2000 was estimated at less than 1% (Beintema and Stads, 2006). There are, however, two exceptions. In Côte d'Ivoire, much of the agricultural research is carried out by the Centre National de Recherche Agricole (CNRA), a public-private partnership. The bulk of CNRA's funding comes from marketing levies assessed on cash crops, collected through producer and interprofessional organizations, hence the private sector. The other example is Senegal, where government structures dominate the research on food crops

25 The government of Nigeria set up two state-run fertilizer companies, the Federal Super phosphate Fertilizer Company (FSFC) (established 1976) and the National Fertilizer Company of Nigeria (NAFCON), established in 1988, but by 1999 both had quit producing significant quantities of fertilizer. NAFCON was sold to the private-sector firm NOTORE in 2005, and by mid-2009 it began producing urea. While its production is expanding, the vast bulk of Nigeria's urea continues to be imported. For details, see Kwa, 2011 and http://www.notore.com/index.php/about/index.

but where private companies have been major innovators in cash-crops, such as cotton and groundnuts, as well as horticulture and fisheries. Private-sector organizations have also been innovative in food processing, storage and packaging and helping Senegalese exporters meet the tight standards to export into the European market (Stads, 2011).

Given the importance of research and development for improving productivity, NEPAD has established a budget target for countries to spend 1% of their agricultural GDP on research and development in agriculture. In 2008, none of the ten ECOWAS countries for which data are available met this target. Ghana was the highest, at 0.9%, while the average for the ten countries was 0.5%. Nigeria was below the average, at 0.42% but, as discussed below, probably benefitted from scale economies in research unavailable to the smaller countries. Strikingly, public agricultural research expenditures as a percentage of agricultural GDP have fallen sharply from the early 1990s, when the average in Africa across the countries for which data are available was at the 1% level.[26] (ASTI, 2013). Gauging researcher numbers against economically active farming populations (research intensity), only Mali and Nigeria are amongst the top ten countries in Africa with more than 100 researchers per million of economically active agricultural population; the average across countries for West Africa was 69, having fallen from 84 in 1991 (ibid.).

Although the number of researchers in West African public agricultural research systems grew strongly during the 1970s (at 4.5% per year) and the 1980s (3.8% per year), it slowed to just 1.3% per year during the 1990s, following structural adjustment. Low salaries and other disincentives have depleted human resources, and scientific personnel are ageing (World Bank, 2013b). Since 2000, a number of national governments have stepped up their allocations to agricultural research, but overall investment levels in most countries are still below the levels required to sustain agricultural R&D needs.

The ASTI data shows an increase of aggregate public spending for agricultural R&D by 32% in the 13 ECOWAS countries for which data are available between 2001 and 2008, and growth in researcher numbers also accelerated. However, trends in spending levels varied widely by country. In Mali, expenditures in real terms declined by 31% between 2001 and 2008, whereas in Ghana they more than doubled (ASTI, 2013). Looking at a longer time span, comparing average annual real government expenditures on agricultural R&D during the 2001-2008 period with the period 1991-1998 reveals that, of the 11 countries for which data are available, only Benin, Ghana and Nigeria increased their average expenditures. In terms of numbers of researchers, the picture is equally heterogeneous. Despite the overall positive trends since 2001, especially in the larger countries, strong increases in R&D spending in some cases largely reflect salary increases from previously low levels rather than expanding research activities or greater investment in equipment and infrastructure. These increases were necessary, as national research institutions were facing increasing difficulties in attracting and maintaining highly-qualified staff (Stads, 2011).

One of the major challenges in many countries is a rapidly ageing pool of scientists close to retirement. This is in part due to a prolonged period of hiring freezes in many research organizations, especially following structural adjustment. Moreover, in many countries, salary and retirement packages and conditions of service remain poor. As a result, research agencies have difficulty retaining staff once they attain higher degrees and can attract offers of better remuneration and conditions in higher education or the private sector. Attracting and retaining staff is an even more serious problem in countries with small research capacities.

Despite growth in R&D capacity across the region, average levels of staff qualifications deteriorated somewhat. During the 1970s and 1980s, many countries received considerable financial support for staff training, often as part of large World Bank funded projects or through contributions from bilateral donors. By the late 1990s, most donors had either cut or eliminated their funding

26 The decline began in 1997 and continued until 2002, at which point it plateaued through 2008, the last year for which data are available.

for graduate training. More recently, this trend has been reversed by new multi-and bilateral projects. However, reliance on outside funding from donors and development banks carries its own problems as funding tends to be unstable. Over the period 2001-2008, over 98% of the budget of the national agricultural research institutes (NARIs) in Nigeria came from the national budget, and for Sierra Leone, the figure was 93%. Other countries covering the bulk of the NARI funding from the national budget included The Gambia, Niger, and Togo. In contrast, the NARIs of Benin, Burkina Faso, Guinea and Mali all received at least 50% of their funding from donors and development banks, and often faced sharp drops in funding once externally funded projects ended.

There are important economies of scale in R&D limiting the efficiency and effectiveness of small and fragmented research systems, especially in small countries. Evidence points to low returns to public spending on R&D in small African countries because they lack a critical mass of research capacity (Fuglie and Rada 2011). In West Africa, R&D systems are also fragmented. The recent growth of researcher numbers has done little to change this situation, since much of it has taken place in the higher education sector, through the establishment of new higher education units involved in agricultural research. Nevertheless, individual capacity of most systems, in terms of full-time researchers, remains limited. Of the 12 ECOWAS countries for which data are available, in 2008, 4 of them had NARIs with fewer than 100 full-time equivalent researchers (FTEs), an additional 4 had between 100 and 200 FTEs, and 2 had between 200 and 300. Nigeria, on the other hand, had over 2 000 FTEs and thus was likely to have a critical mass in several key areas. The low numbers in most West African NARIs highlights the importance of regional research initiatives to help small countries take advantage of economies of scale and collaborative synergies. Regional approaches to research partnered along similar agro-ecologic and soil conditions hold the promise of overcoming problems resulting from small markets and limited budgets in these countries. Important progress in this direction has been made by regional research institutions such as CORAF and CILSS/INSAH. A recent example is CORAF's West Africa Productivity Programme (WAAP). The programme, which covers 10 countries in West Africa, aims to generate and disseminate improved agricultural technologies by fostering regional research networks in which different NARIs become centres of excellence for the region in R&D for key strategic commodities (e.g., Ghana for roots and tubers, Senegal for certain rainfed cereals and Mali for rice) (Stads, 2011).

3.4.6 Extension and advisory services[27]

Extension and farmer advisory services in West Africa are characterised by a plurality of approaches and actors. This is in contrast with the situation in the late 1980s through the mid-1990s, when the World-Bank promoted Training and Visit (T&V) system was dominant in many of the public extension systems in the region. Disappointment with the high cost and limited effectiveness of the T&V system, however, led to its widespread abandonment. This abandonment, combined by a general retreat of donor organizations from support of agriculture in the 1990s (see Chapter 11), led to shrinking funding for public extension systems and experimentation in many countries in the region with a number of different approaches. No widespread consensus has emerged about which methods work best, and many actors express the view that extension systems in the region are broken and that further experimentation is needed to come up with new models. The effectiveness of extension systems, however, is highly dependent on the productivity of the agricultural research system (and hence having useful technologies and practices to extend) and the state of infrastructure in the country, which conditions the ability of extension agents to reach their clients. The low levels of literacy in many countries also raise the cost of carrying out extension activities, as much of the information has to be delivered in oral form rather than in more cost-effective written formats. On a regional level, there is no central repository of information on agricultural technologies and practices upon which extension services can draw, although in 2005-06 the

27 This section draws on material in Simpson, 2006 and Agricultural and Extension Services Worldwide, 2013.

Institut du Sahel of CILSS developed an on-line technology database system capable of providing such a repository.

Currently, in addition to generally underfunded public extension systems, farmer advisory services in West Africa are provided by many NGOs, farmer organizations, donor-funded projects, and, in a few cases, private firms and state-run companies (primarily for export crops). The role of the private sector is likely to grow with the expansion of outgrower schemes in the region. Private agro-input dealers also sometimes provide advice on use of their products, but the quality of that advice is highly variable. Currently, ECOWAS is working with IFDC on efforts to upgrade the quality of knowledge of these agrodealers and strengthen their ability to give unbiased and accurate information to farmers. The involvement of the region's agricultural universities in extension is generally weak.

The degree of involvement of non-state actors in extension varies by countries; for example, NGOs seem to be less involved in providing extension services in Nigeria than in many other countries in the subregion. There is little coordination of programmes across actors providing these advisory services in most countries, although Ghana has created a "Private Sector Extension Unit" within its Ministry of Food and Agriculture to regulate the extension activities of NGOs, faith-based organizations and private companies (Agricultural and Extension Services Worldwide, 2013). While most advisory service providers emphasize "participatory methods of extension", there is no universal agreement on what that term means, so approaches vary – although farmer field schools are becoming increasingly seen as an effective approach for reaching small, resource-poor farmers.

The scale of operations of the different advisory service providers varies widely. The non-state providers typically have small numbers of agents, but often more operating funds per agent, while the public services are much larger but often with few operating resources. For example, in 2009, various NGOs and farmer organizations in Guinea employed between 5 and 40 extension agents each, while the national extension service had 1 446 staff members. (ibid.) This diversity in size suggests that if there are productive innovations to diffuse, the national systems likely have greater potential to scale up the innovations than do the NGOs. Thus, there might be scope for specialization, with the non-state providers doing pilot testing of different approaches and the state-run organizations involved in scaling-up. Increasing use of modern communication and information technologies may also help in scaling up innovations, although challenges remain in how to transmit key information to illiterate farmers via cell phones and similar technologies.

Another striking characteristic of extension systems in the region is the generally low level of training of many of the agents. This limits their ability to transmit information about more sophisticated techniques, such as integrated pest management, that are increasingly needed in the region. Although many of the crash agricultural production programmes launched in the region in 2008 in the wake of the world food crisis involved hiring new public-sector extension staff, this expansion was often accompanied by only limited training of the new staff members. Strengthening the human capital in both the state and non-state advisory systems will be critical to improving the ability of West African farmers to respond to the growing and changing demands for their products.

3.4.7 Weak systems of Agricultural education

The weak human capital base at all levels of the food system hinder agro-industrial growth. The weak base ranges from low levels of literacy at the farm level in many countries (for example, Mali has one of the lowest levels of female literacy in the world) to inadequate numbers of well-trained personnel in skills such as food science and technology, packaging, and marketing – all critical needs for agro-industry. These weaknesses include:

- ***Basic literacy.*** Adult literacy rates in most of the ECOWAS countries are low, frequently under 50%, particularly for women. High rates

of illiteracy mean that information on new technologies and institutional arrangements needed to move farming from a hand-hoe era to a modern era all have to be transmitted in oral form, which greatly increases the cost of extension efforts and undoubtedly results in poorer retention of knowledge.

- ***Primary and secondary education***. The curriculum content of primary and secondary schools in most countries is not oriented towards applications of concepts (e.g. in mathematics and biology) to either farming or agro-industry.

- ***Vocational education***. Technical training in the skills needed to carry out many of the jobs in a modern agrifood system, from irrigation technician to operator of sophisticated food processing machinery, is a weak link in most West African educational systems. Yet a modern Agriculture will require large numbers of such technicians if it is to grow.

- ***University education***. The undergraduate curricula of most faculties of agriculture in the region focus heavily on topics related to on-farm production (e.g. agronomy and animal science), with relatively little attention to fields critical in downstream areas of the agrifood system, such as food science, packaging and logistics. Crucial elements in developing the needed skills will include encouraging private- as well as public educational institutions and building more productive links between the private sector and educational institutions (e.g. through internship programmes and advisory boards with heavy participation from the private sector) so that the curriculum evolves with the changing skill sets demanded by the job market.

3.4.8 Limited access to and high costs of finance

The aforementioned high risks and transaction costs render the provision of financial services to farmers and other agricultural value-chain actors risky and costly. In addition to the limited availability of risk-management instruments, widespread collateral constraints, problems of contract enforcement and a poor loan repayment culture reduce the appetite of the financial sector to venture into Agricultural finance. Efforts to circumvent the underlying structural problems through public agricultural development banks and subsidised credit lines have proved unsustainably costly and inefficient. Some of the dynamic decentralized financial networks in the region have been successful in providing finance to farmers and other value-chain stakeholders, even though meeting only a fraction of the demand. Agribusinesses, traders and input suppliers also play an increasing role in value-chain financing, either by directly providing financing to farmers or buying agents or by facilitating bank financing to them through establishing firm purchasing contracts. Tight coordination and links between value-chain actors reduces risks and transaction costs and acts as an in-built collateral substitute, whereby a successful track record of repeat transactions is often more important than the existence of formal contracts. Historically, agricultural finance has been more successful in organised export value chains such as cotton. In a liberalized environment, side-selling is a constant threat and more easy to control where product characteristics such as bulkiness or perishability reduce side-selling options or where buyers serve niche markets. Other value-chain finance instruments such as warehouse receipt financing, receivables financing, and leasing are of growing importance. Additional financial services such as savings and payment services are critically important, and their future growth may be fostered by the potential rapid expansion of cell-phone-based banking and money-transfer services in the region.

Globally, there is also a growing number of investment finance organizations looking at opportunities in agribusiness. These funds range from fully commercial equity ventures to impact investors with a double or triple bottom line.[28] However, given West Africa's difficult business environment, finding suitable companies able and willing to accept equity investors has remained challenging.

3.4.9 Poor business enabling environment

28 "Double and triple bottom line" refer to a broader set of objectives. Rather than maximizing financial returns, impact investors place greater emphasis on social and environmental impacts of their investments given decent financial returns.

The slow and uneven entry of the private sector into Agricultural value chains and related services is also due to West Africa's poor business climate relative to other regions of the world. Weak contract enforcement and high transaction costs discourage investment and raise costs and risks for agroprocessors who rely on national markets for their raw materials. For example, of the 183 countries included in the World Bank's 2012 Ease of Doing Business rankings, only one of the 15 ECOWAS countries – Ghana, at no. 60 – ranked in the top third. One additional country (Cape Verde, at 119) barely made it into the top two-thirds, while the remaining 13 ECOWAS member states clustered in the bottom third – from Nigeria, at 133, to Guinea, at 179 (World Bank, 2012b).

3.5 Conclusions regarding production response

West Africa's performance in terms of production performance over the past 30 years has been mixed. Production has kept up with or slightly exceeded population growth for many key staples, through expansion of cultivated area, modest yield improvements, and improvement in labour productivity as rural workers have diversified more into non-farm activities. In certain areas such as oilseed and palm oil production, however, performance has been more dismal. Agricultural productivity performance has been strikingly variable across countries, however, reflecting large differences in agro-ecological and institutional environments but also suggesting the scope for as-yet under-exploited sharing of successes across countries.

Factors constraining production from responding more robustly to the growing and rapidly changing demand include constrained access of producers and processors, particularly in the inland areas, to the burgeoning urban markets due to poor transport infrastructure; rules governing the trucking industry that drive up transport costs; inadequate wholesale and retail market infrastructure, which increase costs of product aggregation, quality control and carrying out trade; and in some countries, weak systems of market information. In addition, unreliable electrical supplies have driven up agroprocessors' costs and have particularly constrained the growth of markets for perishables by limiting the expansion of cold chains. A host factors ranging from unpredictable rainfall to insecure land tenure raise risks throughout the agrifood system and discourage investments in productivity-enhancing improvements. A number of structural problems plague the markets for critical inputs such as improved seeds, fertilizer and farm equipment, often linked to the small size of most national markets for these inputs. Access to these improved technologies is further hindered by financial systems that are poorly adapted to the needs of the agrifood system. Development and diffusion of new agricultural technologies and practices has been slowed because agricultural research systems and advisory services faced funding cuts for many years and are now only beginning to recover. Weak systems of agricultural education, from the primary school level to post-graduate university programmes, have failed to provide most students with the skills needed for a 21st Century, private-sector- driven Agriculture. Finally, the overall ease-of-doing business climate in West Africa generally remains low by international standards, discouraging both domestic and foreign investment in innovations that could raise agrifood system productivity. Part III of this report examines in more detail how West African retailers, agroprocessors and individual value chains have coped with these constraints, while Part IV and the concluding chapter analyze policy options to address them.

Chapter 4

Trade Response

This chapter analyses the trade performance of West Africa at the regional level and highlights important commonalities and differences among West African countries.[29] Trade analysis is a useful complement to the analysis of production data, both because trade contributes to overall Agricultural growth and because trade data, at least for overseas trade, tend to be more reliable than production data and hence serve as a useful cross-check on the trends described in Chapter 3. For example, West African Agriculture's share in world exports and imports are a rough indication of the region's overall competitiveness in the production of different commodities.

The chapter begins by examining Agriculture's role in contributing to the region's overall trade balance and foreign exchange earnings. It then moves on to examine the trade balance for both Agriculture and food in total before examining the region's self-sufficiency ratios for key agricultural commodities. The self-sufficiency ratios compare domestic consumption with imports of given commodities. An increasing self-sufficiency ratio means that domestic consumption is increasingly met by domestic production, a proxy for competitiveness (unless it is driven by higher protection or subsidies). In contrast, declining self-sufficiency ratios imply that production did not fully meet increasing demand, pointing towards lower competitiveness. However, for certain products where countries of the region have no comparative advantage, a declining self-sufficiency ratio can also indicate an increased capacity to import. Finally, the chapter examines the evolution of food imports and how they mirror changes in consumption trends and the regional capacity for value addition.

After examining the import picture in detail, the chapter then turns to the region's performance in terms of agricultural exports. This analysis highlights the changing composition of West African exports and their contribution to export earnings, the trends and dynamics of individual export commodities over time and the changing competitive position of different West African agricultural exports compared to those from the rest of the world since the mid-1990s. The chapter then discusses the importance of intra-regional trade and examines the increasing demand for higher-quality products and better traceability both in overseas and regional markets.

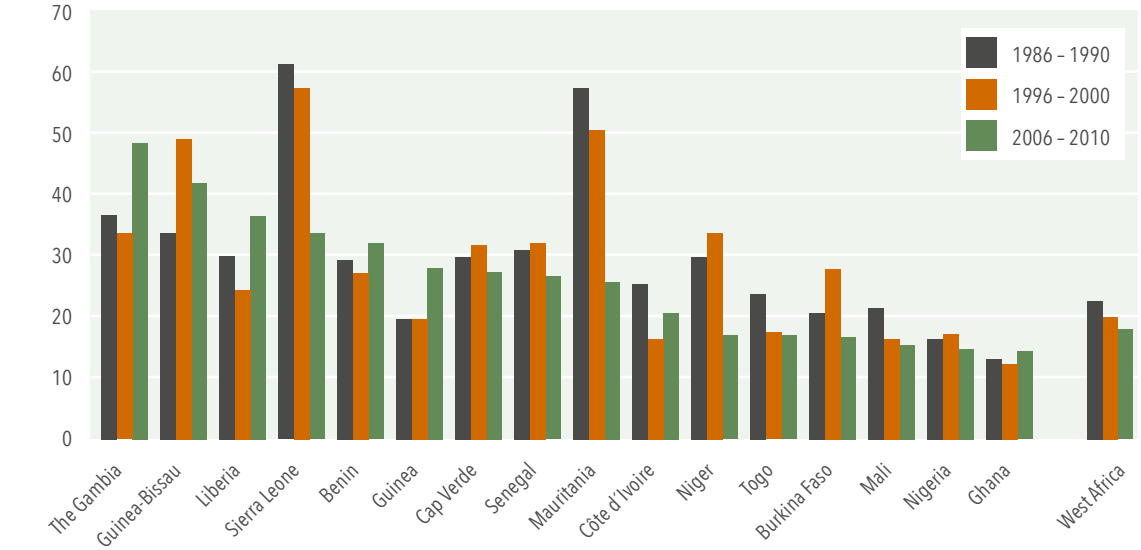
4.1 Agriculture's role in West Africa's merchandise trade

Although West Africa's agricultural trade with that of the rest of the world has been growing over the past decade, agriculture's share of the region's total merchandise trade has declined. On the import side, this has been due to growing imports of industrial and non-agricultural consumer goods, while on the export side it has resulted from the growth of mineral, petroleum and forestry exports. The share of agricultural imports in total merchandise imports stood at 23% in 1986-90, and since then it declined to 20% in 1996-2000 and further to 18% in 2006-10. Much sharper declines have occurred in the share of agricultural exports in total merchandise exports of the region, which declined from 24% in 1986-90 to below 10% in 2006-10.

While the importance of agricultural products in the external trade of the region as a whole has declined, this overall trend hides considerable variation among countries. In the case of imports (Figure 4.1), agricultural products accounted for at least 25% of merchandise imports for half of the countries in recent years (2006-10). For all West African countries, food products represent the lion's share of total agricultural imports.

29 This chapter draws heavily on Konandreas, 2012a, b.

Figure 4.1 *Share of agricultural products in total merchandise imports (%)*



Source: Based on FAOSTAT data.

Differences between countries are much more pronounced regarding the contribution of agricultural exports in total merchandise exports. While for the region as a whole these products account for only 10% of merchandise exports (2006-10), this is due to the weight of some large mineral and petroleum-exporting countries, particularly Nigeria, in that aggregate. For 10 out of 16 West African countries (the ECOWAS states plus Mauritania), the share of agricultural products represented over 25% of merchandise exports in recent years.[30] For seven of these countries, the share was in excess of 40%, reaching 75% in the case of The Gambia (Figure 4.2).

Unlike the regional aggregate, there are also some countries for which the contribution of agricultural products in total merchandise exports has been increasing over time. These include The Gambia, Liberia, Benin and Guinea. For some of these countries, however, food products are not always the dominant part of agricultural exports (in contrast to the pattern for imports). The countries with strong non-food agricultural exports include Liberia (where rubber is a major export), Benin (cotton), Côte d'Ivoire (rubber), Burkina Faso (cotton) and Mali (cotton).

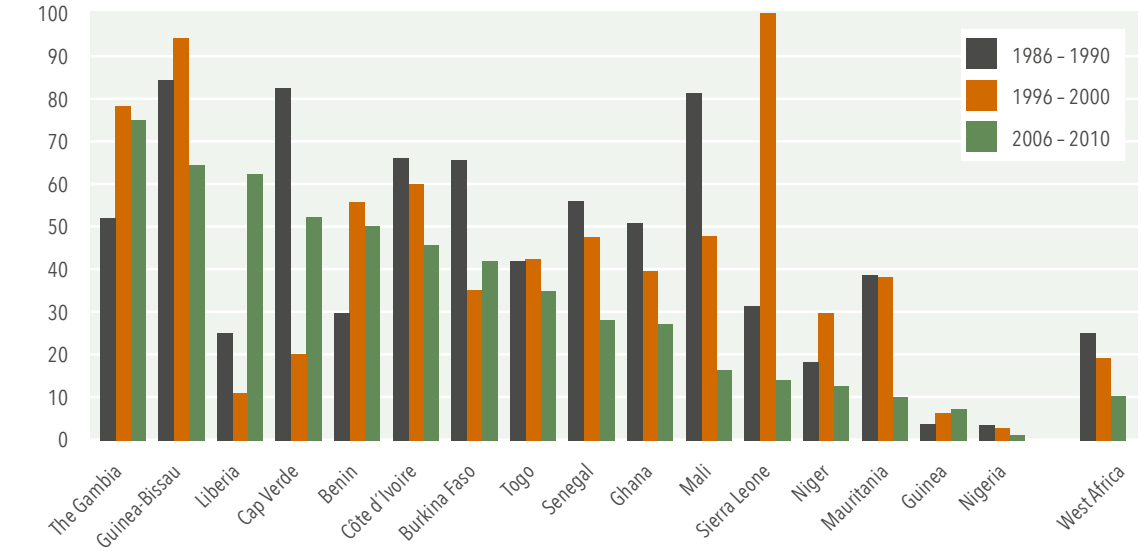
30 Even though Mauritania has not been a member of ECOWAS since 2000, it is included in this analysis given its strong trade links with the rest of the region.

4.2 Aggregate trade balances: merchandise, agriculture and food

Total merchandise trade has been consistently positive for the region as a whole. Beginning in the early 2000s revenues from merchandise exports saw an exponential increase. This increase followed increased exploitation of non-agricultural resources (petroleum, minerals and forestry products), in part driven by the world commodity boom. A correspondingly strong growth in imports of all products ensued (Figure 4.3).

Together with the overall positive balance in total merchandise trade, the agricultural trade balance was also positive through the 1990s and remained on average marginally positive up to about 2005. This position has now been reversed, with agricultural imports exceeding agricultural exports by about US$2.5 billion in recent years, largely on account of high growth of food imports (Figure 4.4). It is clear that the huge increase in agricultural (including food) imports coincided with the enormous increase in net merchandise exports of the region in recent years (Figure 4.5). Therefore, to a large degree the worsening agricultural and food trade balance reflects an increasing capacity to import due to growing non-agricultural revenues and not

Figure 4.2 *Share of agricultural products in total merchandise exports (%)*

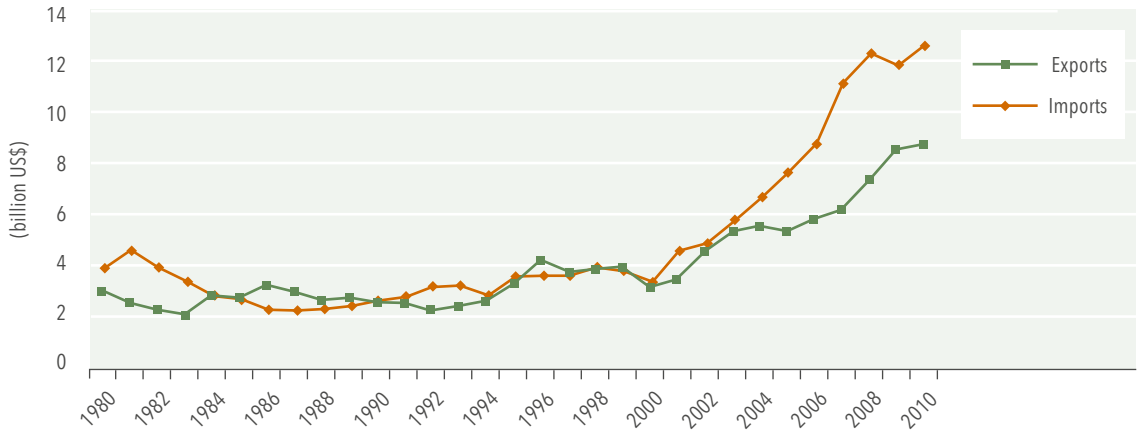


Source: Based on FAOSTAT data.

Figure 4.3 *Total merchandise trade of West Africa with the rest of the world.*

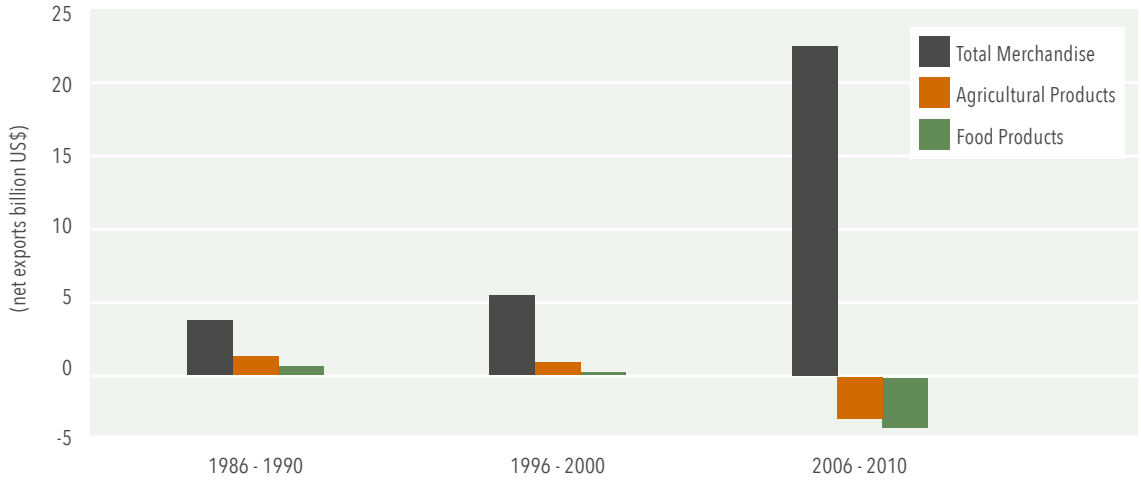
Source: Based on FAOSTAT data.

Figure 4.4 *Food trade balance of West Africa with the rest of the world.*



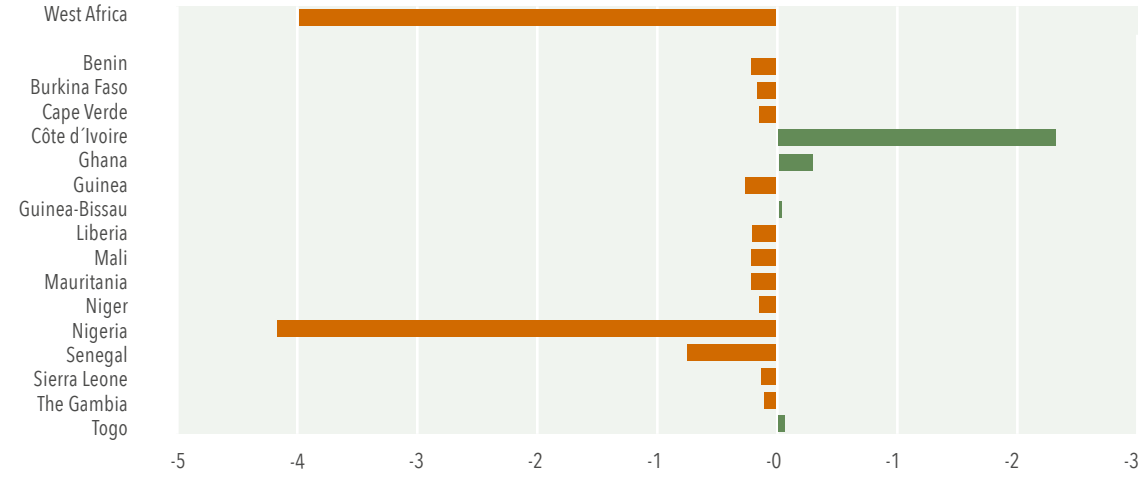
Source: Based on FAOSTAT data.

Figure 4.5 *Trade balances over time of West Africa with the rest of the world*



Source: Based on FAOSTAT data.

Figure 4.6 *Food trade balance (net exports), 2006 – 2010 (million US$)*



Source: Based on FAOSTAT data.

necessarily declining agricultural performance of West Africa. [31]

The regional aggregate trade balance obscures huge variation among countries. In reality, while the merchandise trade balance of the region as a whole is indeed strongly positive, only two countries, Nigeria and Côte d'Ivoire, enjoy that position. Regarding agricultural trade balances, the overall regional trade deficit is shared by most of the countries of the region. Nigeria has by far the largest agricultural trade deficit, while a positive agricultural trade balance is enjoyed by only four countries: Côte d'Ivoire, Ghana, Burkina Faso and Togo, with Côte d'Ivoire in a dominant position due to its huge cocoa exports. Within agricultural products, food trade imbalances are even more pronounced than those of agricultural products overall (Figure 4.6). The net trade deficit for food products for the region as a whole averaged US$4 billion in 2006-10 compared to an aggregate for agricultural products of US$2.7 billion during the same period. Four countries remain in a positive net trade position with respect to food in 2006-10: Côte d'Ivoire, Ghana, Guinea Bissau and Togo.

31 This view is reinforced by data on per capita food availability reviewed in Chapter 5, which show growing food availability per person in most countries during this period.

4.3 Imports: composition, trends and import dependency

4.3.1 Composition

Most agricultural imports, close to 90% in recent years, are food products, compared to just above 80% during most of the 1990s. All food commodity sectors, with the exception of fruits and vegetables, are responsible for the increasing food trade deficit (Appendix Figure A4.1). Cereals are by far the leading item in the food import basket, accounting for 41% of the value of food imports in the most recent period (2006-10), followed by vegetable oils (13%), fish (11%), dairy products (9%) and sugar (9%). Together these five commodity groups account for 83% of food items imported by the region (Figure 4.7).

The composition of food imports has changed somewhat over time. Cereals have remained steadily at the top of the list, as have fish, dairy products and sugar. Vegetable oils, however, have increased sharply, from seventh place in 1986-90 (4% of food imports) to second place in 2006-10 (13% of food imports). As discussed in Chapter 5, during this period West Africans were sharply increasing their consumption of fats and oils.

4.3.2 Geographical concentration of imports

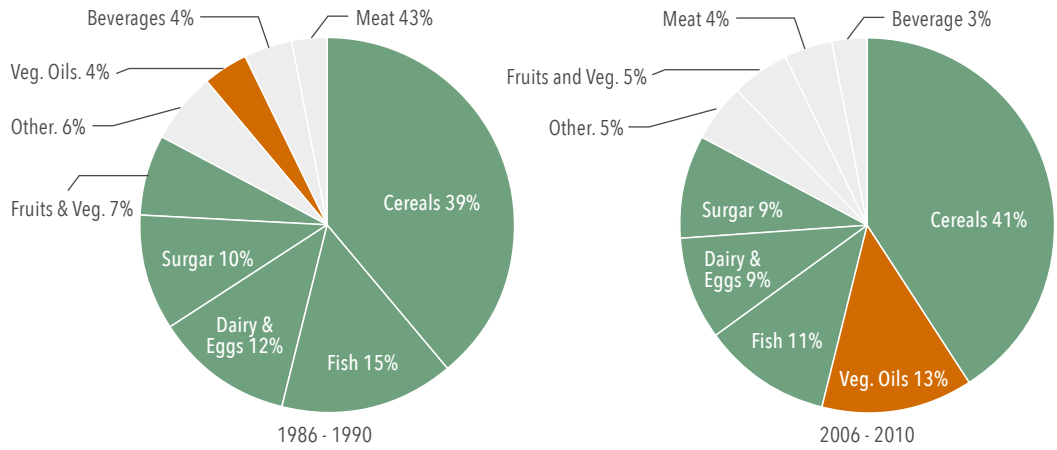
The imports of agricultural products are highly concentrated in a few countries (Table 4.1). Nigeria is by far the largest importer, followed by Côte d'Ivoire, Ghana and Senegal. This geographical concentration of imports follows very closely the population concentration of the countries in the region.[32]

The same geographical concentration of imports is observed for individual commodity groups. Five countries (Benin, Côte d'Ivoire, Ghana, Nigeria and Senegal) account for the bulk of imports (Figure 4.8). The commodity with the highest geographical concentration of imports is fish, where these five countries account for nearly 97% of the region's imports in 2006-10. As noted elsewhere in this study, there is evidence that many of Benin's imports are subsequently re-exported to Nigeria.

What is also evident is the substantial increase in this geographical concentration of imports over time for most commodity groups. For example, in the case of vegetable oils, these five countries accounted for 47% of the region's imports in 1986-90,

32 Overall for all the countries of the region, the correlation coefficient between country population shares and shares of agricultural imports was 0.97 in the 2006-10 period (and 0.99 for merchandise imports).

Figure 4.7 *Composition of food imports into West Africa over time*



Source: Based on FAOSTAT data.

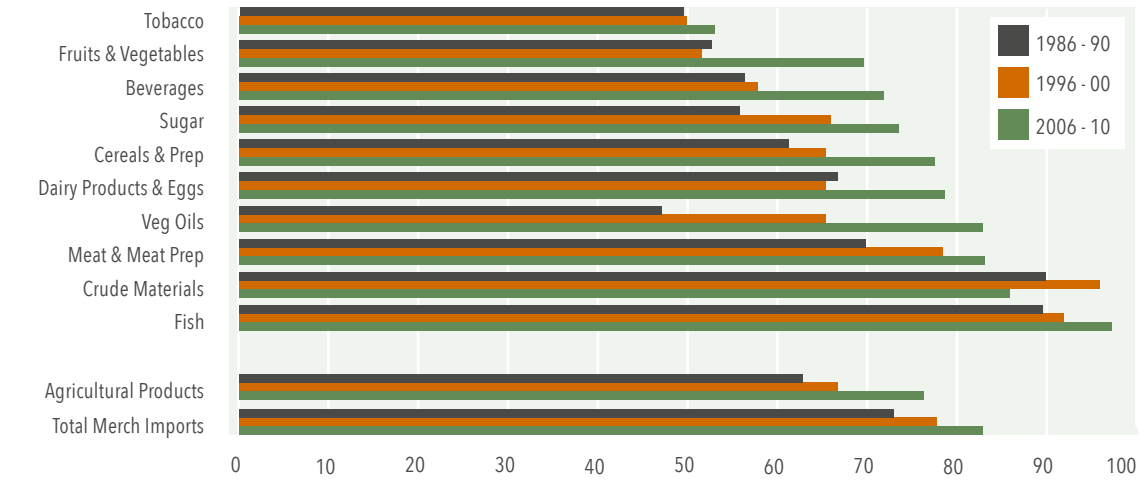
Table 4.1 *Country shares in total regional imports (%)*

	Total Merchandise Imports			Agricultural Imports		
	1986-90	1996-00	2006-10	1986-90	1996-00	2006-10
Benin	2.5	3.1	2.4	3.2	4.2	4.4
Burkina Faso	3.9	3.4	2.5	3.5	4.7	2.4
Cape Verde	1.0	1.2	1.0	1.3	1.8	1.5
Côte d'Ivoire	17.1	17.5	9.9	19.1	14.4	11.4
Ghana	8.4	11.6	12.1	5.0	7.3	9.8
Guinea	4.6	4.4	1.8	4.0	4.3	2.8
Guinea Bissau	0.5	0.3	0.3	0.8	0.7	0.6
Liberia	2.2	1.7	0.8	2.9	2.0	1.7
Mali	4.3	3.8	3.4	4.1	3.1	3.0
Mauritania	1.9	1.7	2.3	4.7	4.2	3.3
Niger	2.9	1.9	2.4	3.9	3.2	2.3
Nigeria	35.8	37.9	51.1	26.2	32.2	42.4
Senegal	9.0	7.0	6.8	12.3	11.1	10.1
Sierra Leone	1.3	1.1	0.8	3.4	3.1	1.4
The Gambia	1.1	1.1	0.4	1.8	1.8	1.1
Togo	3.7	2.3	2.0	3.9	2.0	1.9
West Africa	100.0	100.0	100.0	100.0	100.0	100.0

Source: Based on FAOSTAT data.

Figure 4.8 *Shares of regional imports of top five importing countries*[a]

Benin, Côte d'Ivoire, Ghana, Nigeria and Senegal



Source: Based on FAOSTAT data.

[a] The term Crude Materials includes raw commodities used as inputs for processing into food and other processed commodities. Raw commodities include, for example, soybeans, cotton, cottonseed, natural rubber, and hides and skins

and their share increased to 83% in 2006-10. Rapid economic growth, demographic changes and changes in consumption habits are the likely contributing factors to these trends.

In all commodity groups except meat and meat preparations, Nigeria is by far the largest importer. For some products (vegetable oils, fish, dairy, sugar), it accounts for 50% or more of the region's imports in recent years (2006-10).

4.3.3 Trends and dynamics of individual commodities

The value of total agricultural imports has grown at a rate of 11.5% from 1996-00 to 2006-10, about the same rate at which total merchandise imports of the region have grown. These aggregate rates are more than double the rates experienced during the previous decade (1986-90 to 1996-00), reflecting demographic changes in the region as a whole and growing capacity to import in some countries due to higher export earnings.

Among agricultural products, the fastest growing import commodity group is vegetable oils, with an annual increase in the value of imports of 18% for the region as a whole, followed by meat and meat preparations, beverages, fruits and vegetables. The increase in the growth rates for these last three commodity groups is indeed huge. Vegetable oils are a fast-growing import commodity for all countries. Except for Burkina Faso, Cape Verde, Guinea Bissau, Niger and Senegal, all countries had an annual growth rate of over 10%. Nigeria and Ghana have the highest growth rates for most products.

Imports of several commodities grew at an increasing rate over the past decade. The most important of these, in terms of volumes and values, include:

- Rice and wheat, which grew at 9.8% and 9.6% respectively during the period 1996-2000 to 2006-2010 compared to 7% and 6%, respectively, in the preceding decade.
- Palm oil, with an annual growth rate of 29% between 1996-2000 and 2006-2010 compared to 24% in the preceding decade.
- Dairy products, with net imports of 'total milk equivalent' growing at 14% in 1996-2000 to 2006-2010 compared to 0.3% in the previous decade.
- Chicken meat, with a 22% annual growth rate of net imports during 1996-2000 to 2006-2010.
- Other meats including fresh bovine meat (11%), canned meat (10%), pig meat (15%), fresh sheep meat (23%) and goat meat (10%).
- Non-alcoholic and alcoholic beverages. Net imports of non-alcoholic beverages increased at an annual growth rate of 26% from 1996-2000 to 2006-2010. Among alcoholic drinks, distilled beverages increased by 11%, beer by 11% and wine by 14%.
- Tomato paste, with a growth rate of 17% during 1996-2000 to 2006-2010; peeled tomatoes (15%), carrots and turnips (20%), potatoes (10%), green onions (13%) and various forms of processed vegetables: preserved (15%), dehydrated (22%) and frozen (16%). Among fruit, accelerating net imports include apples at 16%, grapes (14%), oranges (14%), as well as dates (23%) and all kinds of fruit juices.

There are some important products for which the region was a net exporter prior to 1996 but now is a net importer and for which imports are growing at an accelerating rate. Most notably, this includes fish, with an annual rate of increase in net imports of 14% in 1996-2000 to 2006-2010 compared to growing net exports (at 5%) in the previous decade.

While these increases in the value of imports are partly due to world price increases over this period, volumes of imports also increased significantly for several commodities. These include all the top imported food commodities such as rice, wheat, fish, milk, palm oil, sugar, poultry, onions, and tomato paste.

There are some noteworthy trends regarding processed products, indicative of efforts in the region to expand local processing capacity. For example, while wheat net imports have been growing at 13% per year in the most recent period, wheat flour has been growing only at 1%, signifying a growing West African milling capacity. The same is true for certain other processed cereal products, such as breakfast cereals and macaroni, which have been growing at a decelerating rate during the 1996-2000 to 2006-2010 period, at

10% and 5%, respectively – less than half the rates of the previous decade. Other examples of likely expansion of domestic processing capacity include sugar, where net imports of refined sugar have been growing at a rate of 4%, compared to the rate of growth of raw sugar of over five times as much (at 20%) in the previous decade; and tobacco, with net imports of unmanufactured tobacco growing at 8% while cigarettes imports grew at 3%.

Also among processed products, there is a huge growth in the imports of fruit juices of various types. The annual growth rate for all fruit juices (both temperate and tropical juices) averaged some 27% in recent years. Nigeria, the largest importing country in the region, has banned importation of fruit juice in consumer-ready containers, leading to a shift towards imports of concentrates that are reconstituted, bottled and canned domestically. The strong import demand for fruit juices reveals a highly dynamic domestic market in all countries of the region, suggesting that there should be very good potential for development or further strengthening of local processing industries based not only on imported raw material but increasingly on processing locally available fruits.

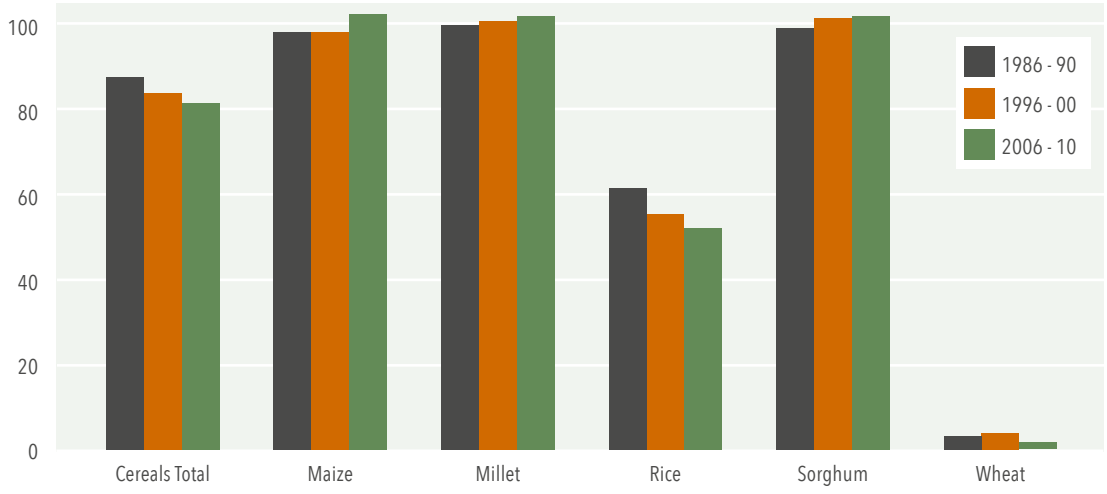
4.3.4 Import dependency

Self-sufficiency ratios (SSRs) for cereals

Cereals are the main item in the food import basket. They are of pivotal importance to the food security of the region, being the leading commodity group imported to meet food needs in normal years and more so in years of domestic production shortfalls. The dependence of the region on the world market of cereals has been on the rise in recent years and is now close to 20%. The region's overall self-sufficiency ratio (SSR) for cereals stood at 88% in the second half of the 1980s, and it has declined to an average of 81% in 2006-10 (Figure 4.9).

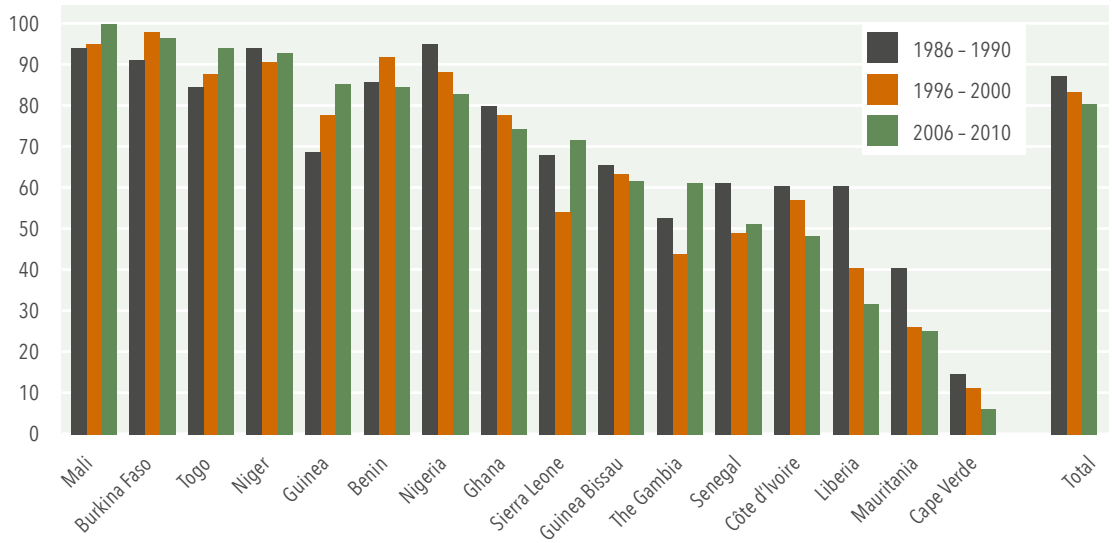
SSRs of individual countries vary widely, ranging from as low as 7% for Cape Verde to 100% for Mali in recent years (Figure 4.10). There are also major differences among countries regarding changes in their SSRs over time. Countries that have improved their reliance on domestic cereal supplies include Mali, Burkina Faso, Togo, Guinea, Sierra Leone and The Gambia. However, the majority of countries increased their dependence on imported supplies, with substantial increases for Nigeria, Côte d'Ivoire, Senegal, Liberia, Mauritania and Cape Verde.

Figure 4.9 *Self-sufficiency ratios of individual cereals in West Africa (%)*



Source: Based on FAOSTAT data.

Figure 4.10 *Self-sufficiency ratios of total cereals by country (%)*



Source: Based on FAOSTAT data.

There are significant differences in SSRs between commodities and countries. Given the limited potential for domestic production in the region, nearly all of the wheat consumed (99%) comes from abroad. Also, none of the countries meets fully its rice consumption needs from domestic production, although some of them do so to a considerable degree (Mali's SSR is 96%, Sierra Leone's is 80% and Guinea's is 80%). Nigeria, the largest rice consuming and producing country in the region, has seen a decrease in its SSR from 83% to 56% from the late 1980s to 2006-10 (Appendix Table A4.1, p.115).

On the other hand, in the case of local grains (millet, maize and sorghum), nearly all countries at least maintained their SSRs and some of them increased their domestic production considerably and moved into an export position. For millet, all countries aside from two (Liberia and Cape Verde) are at least self-sufficient. For sorghum, four countries are not self-sufficient (Senegal, Côte d'Ivoire, Liberia and Cape Verde), while in the case of maize about half of the countries meet their needs from domestic production alone.

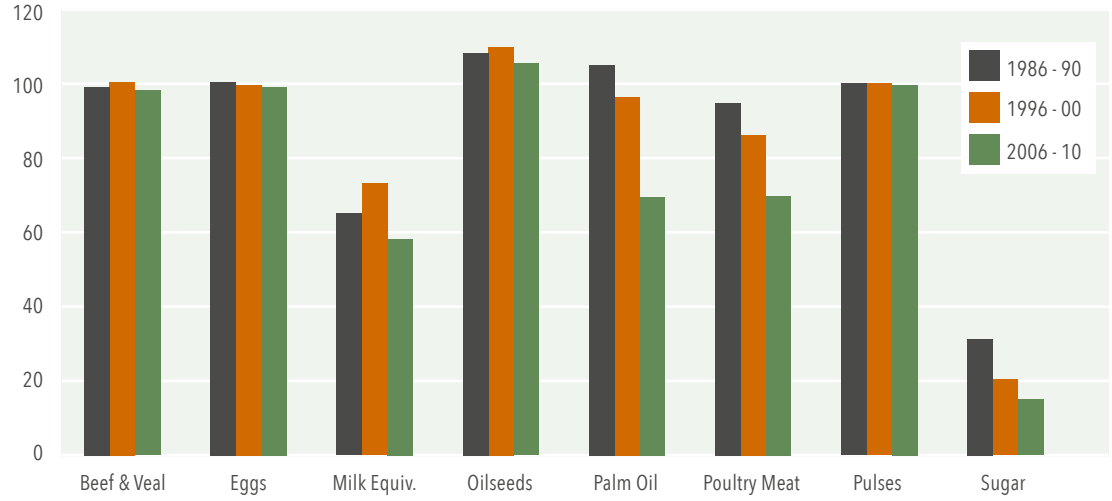
Self-sufficiency ratios for non-cereal commodities

Beyond cereals, regional SSRs are also declining for certain other basic food commodities. This is particularly true for milk, palm oil, poultry meat and sugar (Figure 4.11). From a net exporting position or near self-sufficiency in the 1980s in both palm oil and poultry meat, the region turned into a net importer and has reduced its self-sufficiency ratio to below 70% in 2006-10. For milk and sugar, the region has always depended on imports to meet a large share of its needs, but further substantial reductions in their SSRs have been experienced in recent years as per capita consumption of these goods has expanded (see Chapter 5). In the case of sugar, the region now covers only some 15% of its aggregate needs, half the level of the 1980s.

As in the case of cereals, there are large differences among the countries of the region regarding their dependence on imports in these other basic food commodities (Appendix Table A4.2, p.117). None of the countries is self-sufficient in milk. Six counties (Cape Verde, Côte d'Ivoire, The Gambia, Ghana, Liberia and Nigeria) actually produced less than one-third of the milk they consumed in 2006-10, and their dependence on imports is increasing.

For palm oil, all countries that are producers in the region, except Côte d'Ivoire and Benin, have decreased their SSR considerably in recent years. While palm trees are native to West Africa, the region has been unable to expand production and

Figure 4.11 *Self-sufficiency ratios of selected non-cereal commodities in West Africa (%)*



Source: Based on FAOSTAT data.

productivity to meet domestic and export demand. Other parts of the tropical world (especially Malaysia and Indonesia) are now the main producers and exporters of palm oil. These two countries alone now command an 80% share in global production and are the principal exporters to West Africa and elsewhere (Minal and Bahari, 2011).

Poultry meat is yet another commodity where SSRs for nearly all countries have been declining fast. While the regional average SSR is just below 70%, some countries (Cape Verde and The Gambia) now import over 80% of their expanding poultry meat consumption compared to meeting nearly fully their lower levels of consumption in the late 1980s. Other countries have also increased their dependence on imports to a considerable degree, and some have taken protective measures to limit this situation (e.g. Nigeria's ban on importation of chicken).

Finally in the case of sugar, although several countries never had production in any significant way, among those that did, only Niger appears to have managed to maintain its already low SSR. All other countries have increased their dependence on imported sugar, some to a considerable degree, as per capita consumption has grown.

These developments, largely driven by large increases in domestic demand due to demographic trends as well as rapid increases in export revenues in some countries, are likely to continue. OECD/FAO projects that SSRs for several non-cereal commodities will fall even further by 2020. On the other hand, SSRs for cereals are projected to improve slightly by 2020 on account of projected increases in coarse grains and rice production, but they would still remain well below SSR levels of the past (see Konandreas, 2012b for details).

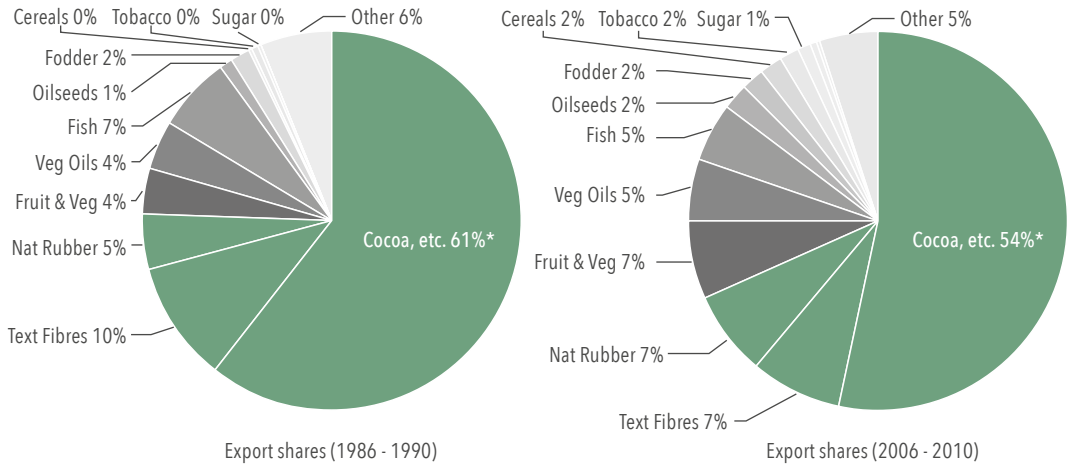
4.4 Exports: composition, trends, and competitive position

4.4.1 Composition and contribution to export earnings

The dominant commodity groups within agricultural exports of West Africa are tropical products. The cocoa/coffee/tea/spices commodity group, together with textile fibres and natural rubber, account for well over two-thirds of its total agricultural exports (Figure 4.12). This concentration of exports in these three commodity groups was even more pronounced in the past, when they accounted for over three-quarters of agricultural exports.

By far the most important agricultural export commodity for the region as a whole is cocoa beans, accounting for nearly 40% of the total value

Figure 4.12 *Composition of agricultural and fish exports over time*



Source: Based on FAOSTAT data.
*Includes Cocoa beans, Cocoa paste, Cocoa butter, Cocoa husks shell, Chocolate Preps and Cocoa powder & Cake

of agricultural exports, and this share has remained relatively stable over time. Other top commodities, but far behind cocoa, are cotton lint (7.5% in 2006-10), natural rubber (7.5%), fish (5%), cocoa paste (5%), cocoa butter (4%), palm oil (4%), cashew nuts (3%) and coffee (2%). Overall, the cocoa-related export commodities account for 54% of agricultural exports.

While palm oil is a major and rapidly growing net import commodity for the region as a whole, it remains also an important export commodity for Côte d'Ivoire and to a lesser degree Liberia. As all other countries are net importers, it is evident that the exports of palm oil shown in the statistics include large amounts of re-exports. Such is clearly a case for Benin where exports during 2006-10 amounted to 170% of domestic palm oil production. The same is likely to be the case for other commodities for which the region is a net importer, such as rice, chicken, and cigarette and tobacco products.

As in the case of imports, the geographical distribution of exports is highly concentrated in a few countries. For the key exports of the region, a handful of countries account for nearly the totality of exports, with Côte d'Ivoire being by far the leading exporter in several commodities. These include cocoa and its by-products, natural rubber, coffee, cashew nuts, palm oil and bananas. More geographically diversified export commodities include cotton lint, fish and tobacco among the main ones.

While the region is a net importer of fish, the types of fish exported and imported are not the same. Fish exports comprise high-value fish species fetching a much higher price than that of imported fish. Per unit values of fish exports by the region averaged three to four times the unit values of the region's imports.

4.4.2 Trends and dynamics of individual commodities

The value of exports of agricultural and food products has been growing at a rate of 6% from 1996-2000 to 2006-10, less than half the rate as in the previous decade (1986-90 to 1996-2000). This growth rate is also less than half that of total merchandise exports of the region; however, the latter has been dominated by petroleum exports and other mineral commodities that have been affected by a global boom in demand and attendant strong export prices.

Top performing commodities are those whose values of net exports are growing at an accelerating rate in the most recent decade (1996-2000 to

2006-10) compared to the previous decade. Among these are cocoa beans and all cocoa by-products, natural rubber, oilseeds, fodder and feeding stuffs, and a small number of fruits and vegetables. Rates of growth over the past decade have been as follows: cocoa beans (7%), cocoa paste (23%), cocoa butter (9%), rubber (11%), oilseeds (11%), fodder and feeding stuffs (9%), all of them at rates greater than in the preceding decade.

Some fruits and vegetables also enjoy this accelerating net export status, such as mangoes and even tomatoes, although the latter's net export value is small. Most of them, however, while increasing, are growing at a slowing rate, and for several fruits and vegetables the region has already switched into a net import position, reflecting growing domestic per capita consumption of these products (see Chapters 5 and 6). Other commodities whose exports have grown, but at a slowing rate over the past decade, include cotton lint (1% growth rate compared to 5% in the previous decade), cashew nuts, sesame seed, bananas, green beans, yams, ginger, papayas, watermelons and eggplants.

Another category of products are those whose net exports have been falling over the past decade. Among the most important of these is coffee, with a net export value declining by 4.9% in the most recent period following a decline of 4.5% in the previous period; palm kernel oil (4% decline); and cottonseed (3.3% decline). The aggregate group of Fruits and Vegetables also falls under this declining net exports category, with an overall 9.5% decline rate compared to a massive positive net export growth in the previous decade.

Finally, there are several commodities in the "emerging net exports" category, implying that they have switched from being imports to net exports between the periods of the study. Notable among these commodities is maize. The value of maize net exports has been growing by 13.7% between 1996-2000 and 2006-10, compared to growing net imports (4.3%) during the preceding decade. In absolute terms, the value of other commodities in this emerging net exports category is small; however, some of them have had an impressive net export growth performance that could make them promising candidates for continued growth. Some commodities in this category include almonds (83% growth rate), flour of roots and tubers (33%), green chillies and peppers (25%) and Brazil nuts (72%).

4.4.3 Competitive positioning of agricultural exports

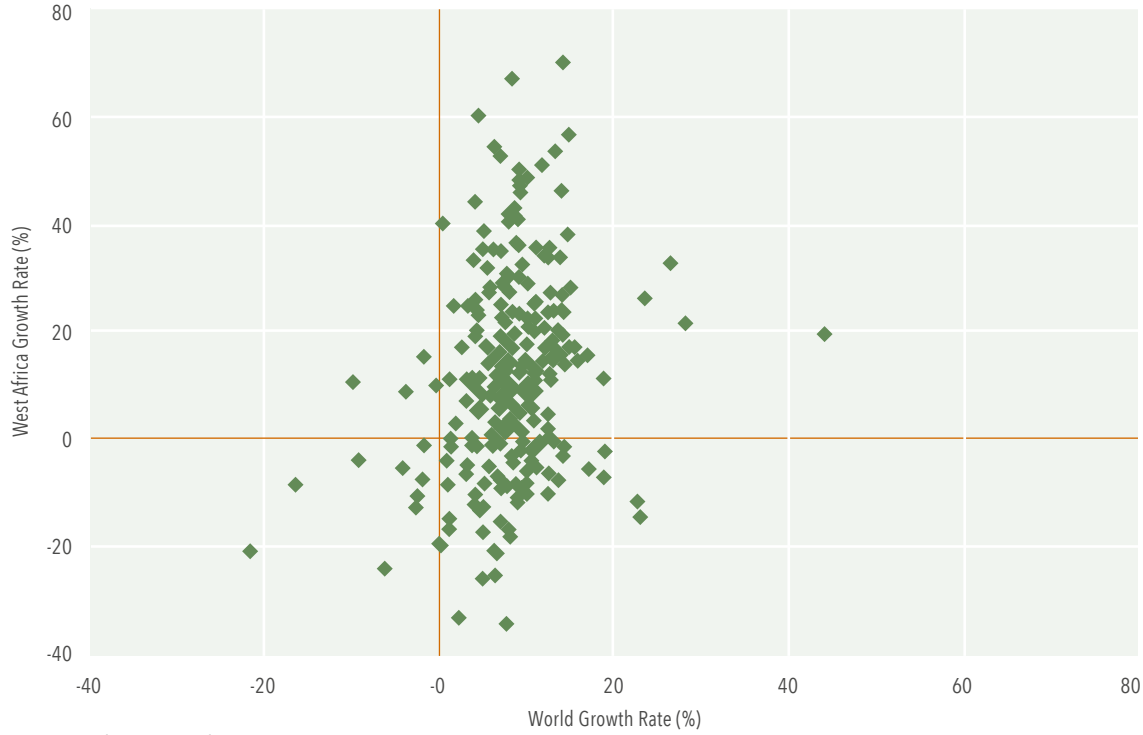
Overall, the region is a relatively small player in world trade. The share of the region in world exports of agricultural products amounted to a mere 0.89% in recent years (2006-10 average), slightly better than the region's share in total merchandise exports of 0.67%. Its share in agricultural products has declined considerably over time while that of total merchandise exports has increased on account of petroleum exports. West Africa's annual rate of growth of agricultural exports was 6.2% during the 1996-00 to 2006-10 period, some 20% less than the rate for the world as a whole of 7.7%.

The opposite was the case for total merchandise exports, where the region's aggregate annual rate of growth was 13.3% compared to the world total of 9.4%. This differential between West Africa's and world growth rates is not a recent phenomenon, and in fact it was more pronounced during the preceding decade (1986-90 to 1996-2000). However, the export performance of West Africa compared to the world varies widely, with some commodities clearly doing much better than the world averages and some performing much worse. Figure 4.13 compares West Africa's export performance by commodity to that of the rest of the world. Each commodity's performance is mapped into one of the four quadrants of the figure. Out of all agricultural products for which West Africa had average aggregate exports of US$5 000 or more in 2006-10 (265 commodities in total), the majority of them (183 commodities) are mapped in the upper right-hand quadrant, implying a positive growth in both West Africa and the world as a whole.

Within these commodities, there are several for which West African exports are doing much better than those from the rest of the world. These include cocoa paste, cocoa powder and cake, cashew nuts, sesame seed, sheanuts, natural rubber, mangoes, bananas, papayas, watermelons, sorghum, flour of

Figure 4.13 *Mapping growth rates of main West African export commodities* [a]

1996 - 00 to 2006 - 10



Source: Based on FAOSTAT data.

[a] 265 commodities with average regional exports above US$5 000in 2006-10

roots and tubers, dried cassava, cassava starch, and linseed oil. A fair number of the principal export commodities of West Africa generally correspond to dynamic sectors of the world market, growing at a rate comparable to that of the world's average. In addition to the above commodities, these include cocoa beans, palm oil, sesame seed, and cocoa husk shells. For some products within the category of "overachievers" the high export growth rates registered were largely due to re-exports. These include, among others, cigarettes, palm oil, rice, olive oil, wine, flour of wheat, chicken and turkey meat, macaroni, infant foods, and tomato paste.

At the other extreme, there are ten commodities for which both West Africa and the world have a negative growth rate. Some of them include cottonseed cake, kolanuts, pineapple juice, copra and different types of skins.

For 68 commodities, the performance of West Africa is negative while the world's is positive. These include some important commodities, such as fish, green and roasted coffee, cottonseed, carded cotton, cotton lint, palm kernel, palm kernel oil, palm cake, coconuts, coconut oil, spices, dry onions, garlic, plantains, lemons and limes, citrus juice, honey, sesame oil, groundnut oil, groundnuts shelled, pineapples, and wet salted cattle hides.

Fish, traditionally a major export commodity of West Africa, has experienced a negative export growth rate although world exports have been growing by 6%. Similarly, exports of cotton lint, also one of the major export commodities of West Africa (a 6.2% share in the world market and a 7.5% share in West Africa's agricultural exports), have been practically stagnant during the 1996-2000 to 2006-10 period (at 0.3%). This apparent lack of dynamism in West Africa's cotton exports may be due to competition from other major cotton suppliers, including those that subsidise production. Also the disruption of the cotton value chain linked to restructuring and mismanagement of the value chain in countries like Mali may have contributed to the decline (see Chapter 10 for details).

Finally, four export commodities are "achievers in adversity", i.e. growing in West Africa despite declining world exports. These include cottonseed oil, cassava flour, natural gums and must of grapes.

Out of the 265 commodities considered, in 78 of them (nearly 30%) West Africa had a negative rate of growth compared to only 14 (some 5%) for the world as a whole. This difference explains the slower growth in West Africa's aggregate exports of agricultural products compared to that of the world as a whole.

While the region has a small share in world agricultural trade, for some commodities it is a major player in world export markets. For 20 commodities the region accounts for over 5% of world exports, and for some of them it is the sole or main exporter. Among the largest by far are cocoa beans and cocoa-related products, cashew nuts, cotton lint and natural rubber, which make the bulk of the contribution to export earnings of the region.

4.5 Intra-regional trade

West Africa has long been linked together through interregional trade, dating back to the caravan trade of pre-colonial times. Major north-south and east-west flows of livestock, coarse grains, cowpeas, and horticultural products such as onions have existed for many years and have increased substantially over the past 30 years in response to the growth of urban consumption centres along the coast that are far removed from the major production basins for many of these products. Re-exportation of rice and wheat, often induced by differences in exchange rates and fiscal policies across countries, have also been widespread in certain areas (e.g. between Nigeria and its neighbours and between The Gambia and Senegal). In addition, Nigeria's frequent imposition of import bans on products such as frozen poultry has stimulated a lively clandestine trade in these items between the country and its neighbours, particularly Benin. As consumption patterns have diversified within the region (see Part II), there has also been an expansion in trade of staples such as gari, attiéké and yams from the coastal states toward the Sahel (Soulé and Gansari, 2010).

4.5.1 A largely under-reported trade

Unfortunately, data on intra-regional trade are fragmented and of uncertain quality.[33] The elimination of official export taxes for regionally traded goods as part of the regional integration processes of WAEMU and ECOWAS reduced incentives of customs services to carefully record such flows, and often traders try to avoid official control posts to avoid having to pay bribes to cross the borders. As a result, official data underestimate the importance of intra-regional trade vis-à-vis extra-regional trade. Official estimates of the volume of all intra-regional trade put it at no more than 16% of the total value of commercial trade of the region (Soulé and Gansari, 2010). The official data show a low degree of sourcing of imports from within the region, particularly for the coastal states, whose seaports provide easy access to international suppliers. Nigeria, the largest market in the region, has the lowest share of supplies sourced intra-regionally according to official trade data. This apparent low reliance on regional markets may be driven by the sheer volume of imports by Nigeria, which may not be easily secured within the region on a regular basis. Another reason could be well-established trade channels with firms from outside the region, more competitive prices and more consistent quality considering the large volumes being imported.

Between 2009 and 2013, CILSS, with assistance of the USAID-supported ATP and EATP projects, began monitoring cross-border trade for ruminant livestock, cereals, and onions at 50 key observation points in West Africa in order to obtain better estimates of the volume and value of regional agricultural trade (Josserand, 2013). The resulting information shows that regional agricultural trade is much larger and more diverse than is generally recognized. For example, using data from this monitoring system and reasonable assumptions about livestock production and offtake rates, Josserand estimates that official statistics capture no more than a third of the value of cattle and small ruminant exports of Burkina Faso and Mali to other countries in the region (ibid.). Offi-

33 For further analysis of regional staple food trade view Maur and Shepherd (forth coming)

cial figures on the regional grain trade, as reported through FAOSTAT, are even more deficient. For example, while official data show millet and sorghum exports from Mali in 2010/11 totalled 280 tonnes, the CILSS study recorded 4 827 tonnes over a similar period. For Nigeria, the figures were even more shocking: official statistics recorded only 45 tonnes of millet and sorghum exports, while the CILSS monitoring noted over 53 000 tonnes (ibid.). Already in the1990s, studies by Seyni and Soulé estimated the total regional cereal trade between Nigeria and its immediate neighbours (Benin, Nigeria, Chad and Cameroon) at nearly 500 000 tonnes per year (Soulé and Gansari, 2010).

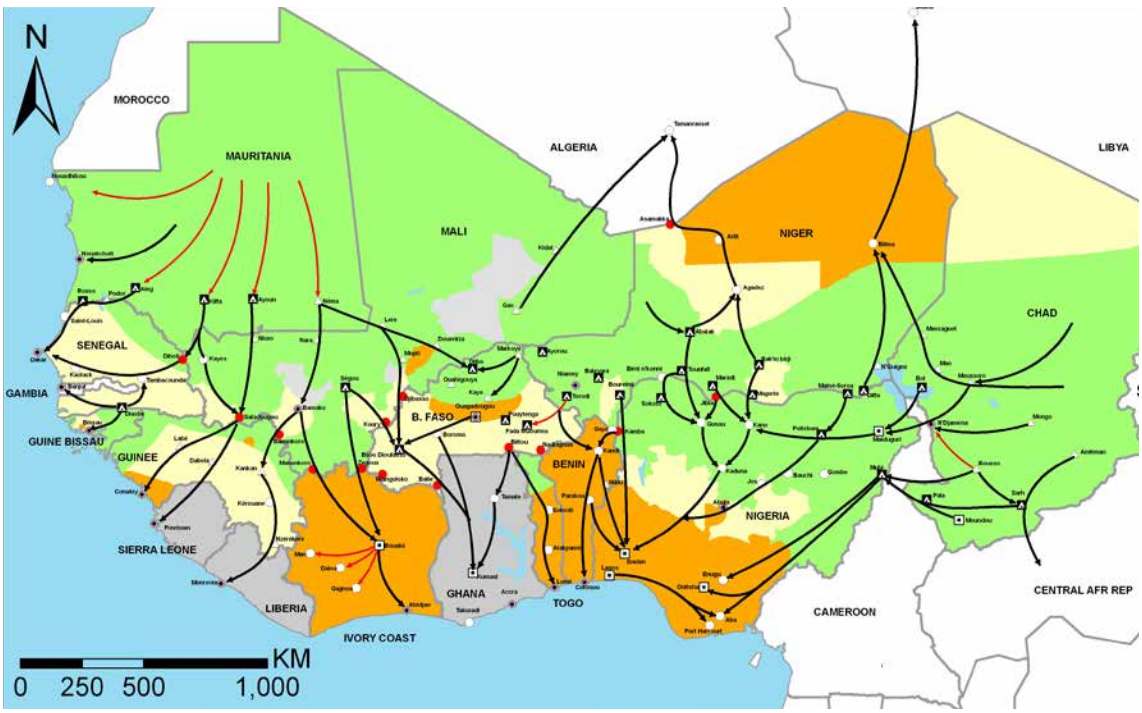
4.5.2 Major products traded regionally

Regional trade is an important contributor to the food security of West African countries, allowing them to access a broader range of products than they produce domestically and helping them to balance fluctuations in national production with imports and exports. It is also a growing source of income for West African farmers given the growing regional demand for an expanding range of food products. Among the key agricultural commodities important in regional trade are the following:[34]

Ruminant Livestock. Exports of cattle, sheep and goats typically flow from the Sahelian and Sudano-Guinean zones towards the demand centres of the humid coast, where disease problems limit ruminant livestock production (Figure 4.14). There are also some exports of sheep and goats to North Africa, particularly at times of major Muslim holidays such as Tabaski. In recent years, demand from Nigeria has led to expanded flows of cattle eastward from Mali and Burkina Faso towards Nigeria, but the volume of this trade fluctuates depending on the Naira/CFA franc exchange rate (Makadji *et al.*, 2013). The regional trade in livestock has proven resilient in adapting to various political and economic shocks affecting West Africa. For example, the Ivorian crisis of the 2000s combined with the paving of the road between Bamako and Dakar led to a major shift in Malian cattle exports

34 FEWSNET provides maps of the regional trade flows for many of these products. Because of space considerations, only the map for livestock flows is included below.

Figure 4.14 *Regional Ruminant Livestock Trade Flows, 2010*



Source: FEWSNET

from Côte d'Ivoire to Senegal, while the emergence of Liberia and Sierra Leone from civil wars led to an expansion of exports of both cattle and small ruminants from the Sahel to these countries (ibid.). As discussed in Chapter 10, a major challenge for the regional ruminant livestock trade will be expanding its capacity to respond to the likely rapid expansion in demand for meat along the coast in the coming decades.

Coarse grains (millet, sorghum, and maize). Trade in coarse grains flows in both a north-south and a south-north direction, depending on the season. The largest flows appear to be between Nigeria, Benin, and Niger, with over 50 000 tonnes of millet and sorghum flowing northward, while Nigeriens export livestock and cowpeas to their southern neighbours. The Niger/Nigeria trade is strongly influenced by the Naira/CFA franc exchange rate. In 2005, when the Naira jumped strongly in value, the direction of the grain trade reversed, contributing the Niger's severe food shortage that year (Kelly *et al.*, 2008). Ghana, Benin, Togo and Côte d'Ivoire all export maize to their northern neighbours (and Ivorian maize also transits through Mali to Senegal), particularly during the Sahelian hungry season starting in June, which corresponds to the period of the main maize harvest in the coastal countries. Later in the season, the direction of the flow frequently reverses, with maize from Mali and Burkina flowing southward as well as eastward to Niger. In recent years, rising demand for maize to be used as poultry feed has further stimulated regional trade in this grain, although inconsistent quality and reliability of trade flows often leads feed millers along the coast to look to overseas suppliers instead.

Rice. All countries in West Africa are net importers of rice, but there is a substantial trade in re-exported rice across borders (Haggblade *et al.*, 2012; Soulé and Gansari, 2010). In addition, some of the major rice producers in the region (e.g., Guinea and Mali) export some locally produced, higher-valued rice (e.g. parboiled rice from Guinea) to their neighbours, while compensating with imports of cheaper Asian rice to cover some of their domestic consumption.

Cowpeas. As described in Part II, cowpeas are an increasingly important source of high-quality protein in several countries, particularly Nigeria, Niger, Ghana, Burkina Faso and Mali. Nigeria is the world's largest producer of cowpeas, but is a net importer, with Niger being the largest exporter in the region. Though largely uncaptured by official statistics, border monitoring in the mid-1990s estimated Niger's cowpea exports to Nigeria at nearly 35 000 tonnes (Soulé and Gansari, 2010). Burkina Faso and Mali are also major suppliers to the coastal states, such as Ghana and Togo. Given the drought tolerance of cowpeas, which makes them particularly adapted to changing climatic conditions in the Sahel, and the growing demand for low-cost protein sources by coastal consumers, it is likely that the regional cowpea trade will continue to grow.

Horticultural products. Niger, and to a lesser extent Mali and Burkina Faso, have been major exporters of onions in both fresh and dried forms to the coastal countries for many years. During certain market windows, this trade competes in the coastal markets with imports from Europe, particularly the Netherlands. Since the 1994 CFA franc devaluation, the range of horticultural products in regional trade has broadened, as the devaluation made regionally produced products more competitive with imports from Europe. Particularly strong growth has been experienced in potato exports from Mali to Côte d'Ivoire and tomato exports from Burkina Faso to Ghana.

Roots and tubers. As documented by FEWSNet, there has been a growing trade in cassava products and yams, both among the coastal countries and from the coastal countries to the Sahel, as consumers in the Sahelian countries begin to diversify their staple food consumption away from just cereals (see Part II). Increasingly, processed cassava products are marketed by modern retailers in the Sahelian countries as a quickly prepared alternative carbohydrate product for the emerging middle class.

4.5.3 Constraints and growth prospects

As discussed in detail in Chapter 12, poor road infrastructure, rules that restrict competition in the

trucking industry, administrative barriers, difficulties and risks of transferring funds across countries with different monetary systems, growing insecurity and rent-seeking by police and border officials all restrict the volume and raise the costs of regional trade. These factors also push much of the trade toward the informal sector, as traders try to circumvent official channels, in most cases to avoid a direct or indirect cost in doing business, especially a cost perceived to be unjustifiable and unfair. This, in turn, leads the trade to remain largely unrecorded, which hampers the development of more trade-friendly policies. Many of the efforts being carried out currently by regional organizations such as ECOWAS and WAEMU, discussed in Chapter 12 attempt to address these constraints.

Despite these constraints, expansion of intra-regional trade offers the largest export opportunity for many of the countries in the region over the coming 10 to 20 years. Given current demand projections for major agricultural commodities in the region, if imports from outside of West Africa continue to cover 15% of the region's food consumption as they have in the past, regional trade will have to expand four-fold by 2040 to cover the remaining consumption gap, mainly in the coastal countries (Josserand, 2013). Moreover, given the proximity of the neighbouring markets and the generally lower quality standards in these markets compared with export markets in the North, regional exports represent the easiest markets for West African countries to capture. They can also serve as training grounds for developing the supply chains that can eventually penetrate overseas markets.

4.6 Quality demands in regional and overseas export markets

In both overseas markets and regional markets, demand is becoming more differentiated. As discussed more in Part II, in regional markets, one segment of the market consists of the large number of low-income consumers whose primary emphasis remains on obtaining basic calories and proteins at low cost. A second segment is made up of an emerging middle class that puts increasing importance on quality and diet diversity. Within both groups, however, diets are evolving, with the potential for very rapid growth in the demand for animal products, fruits, vegetables, cooking oils, and processed foods if per capita incomes continue to grow robustly in the region (see Chapter 6). The ability of individual West African countries to capture these markets on their doorsteps will depend on their ability to be consistent and reliable suppliers of quality products at competitive prices. Consumers see overseas imports as providing benchmarks in terms of price, quality, food safety and consistent availability; and failure to meet such benchmarks (e.g. through disruptions of supply due to export bans) will shift demand increasingly away from West African suppliers.

The overseas export demand facing West African Agriculture is also changing, with Asia growing in importance as an export destination (e.g. for West African cotton) and strong competition from new competitors in certain value chains, such as Vietnam in coffee. While there still remains ample room for expanding export earnings from bulk commodity exports, especially from the Guinea-Savannah zone (World Bank and FAO, 2009), export markets are increasingly demanding in terms of quality control and product differentiation (Drechsler, 2011). Such quality control requires tighter vertical coordination in value chains, for example through delivery contracts between farmer organizations and exporters that specify production and post-harvest handling practices. Thus, West African Agriculture faces a dual challenge in the overseas export market similar to that it faces in the domestic and regional markets: driving down the real cost of output to serve the mass market, which still has a commodity focus; and responding to a growing demand from higher-income consumers for more diversified and higher quality products. These issues are explored in more detail in Chapter 10.

4.7 Summary of main findings

West Africa has become increasingly dependent on international markets for several key foods, such as rice, wheat, fish, dairy products, meats (particularly

poultry), fruit juices, and vegetable oil. Imports, however, are heavily concentrated among the "big four" countries of Nigeria, Ghana, Côte d'Ivoire and Senegal and appear to be linked as much to those countries' increased capacity to import, due to rising export earnings resulting from the world commodity boom, as to their lacklustre agricultural growth. Nonetheless, the growing trade imbalance for some of these products, driven by rapidly growing demand for them throughout the region (see Part II), raises questions about the scope for import substitution. As we shall see in Part III and IV, the desire for such import substitution is driving much of Agricultural policy as well as agroprocessors' strategies in the region.

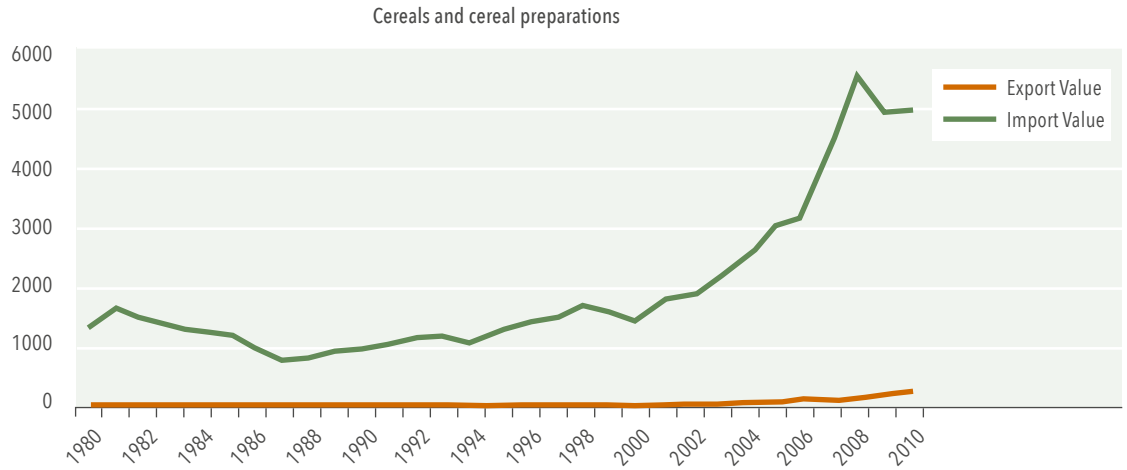
On the export side, the region is heavily dependent on cocoa exports, which are overwhelmingly dominated by Côte d'Ivoire and Ghana. There are a few promising "growth exports" such as natural rubber and some fruits. A major challenge, however, will be to try to revive some of the export value chains that have previously been major foreign-exchange-earners but whose performance has lagged in recent years, such as cotton, cashews, and coffee. Another challenge is to incorporate greater value-added into exports. This is being done successfully in cocoa (see Chapter 10), but has not extended to many of the other exports aside from a few high-quality horticultural crops.

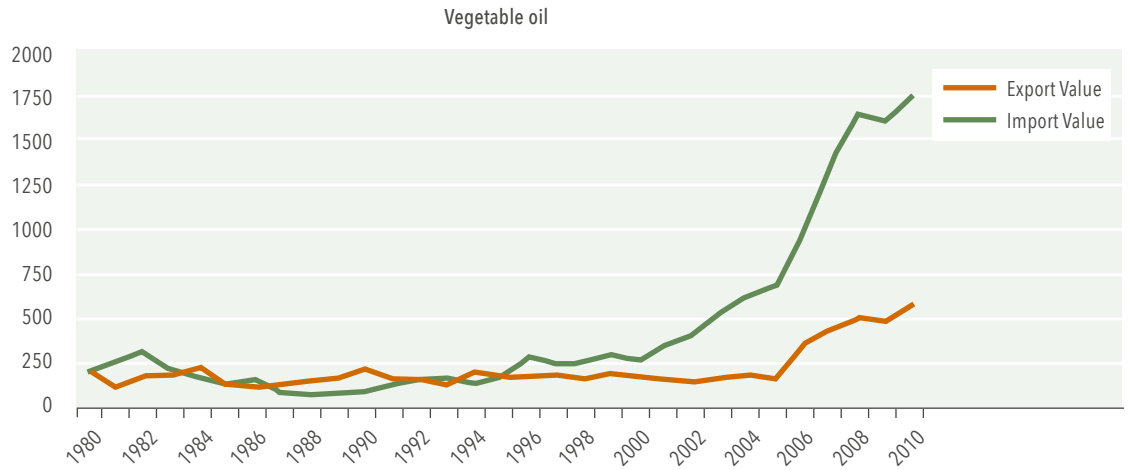
Trade, however, involves not only exchange with countries outside of the region. While data on intra-regional trade are weak, it appears currently to be a grossly under-reported and under-exploited opportunity to expand markets and diversify consumption patterns and export earnings. Such trade is particularly important for the smaller and inland countries of West Africa in order for them to benefit from economies of scale and enjoy a wider range of consumption options. The desire to build an integrated regional market as part of a strategy of economic diversification lies at the heart of ECOWAS and its agricultural policy, ECOWAP. The opportunities and challenges involved in this endeavour are explored in Chapters 12.

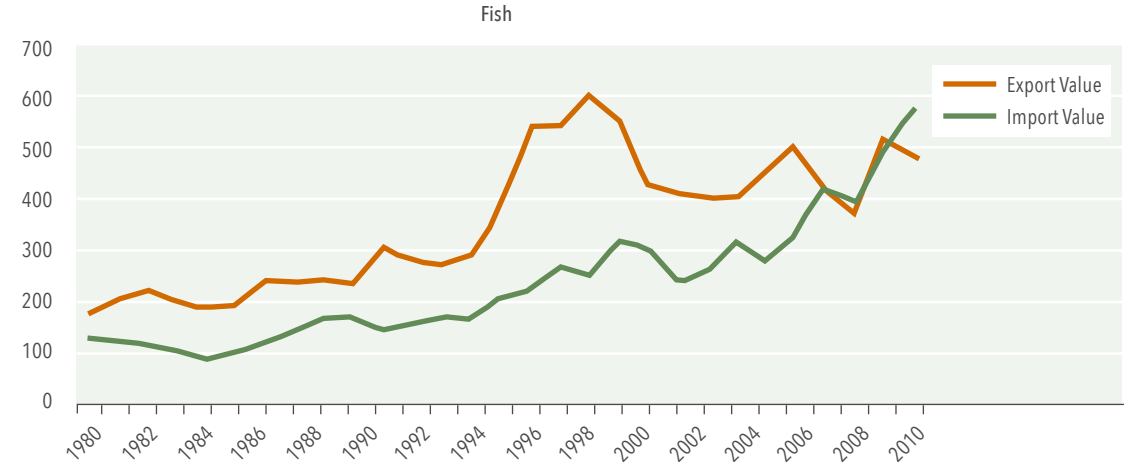
In both the regional market and the international market, demand is becoming increasingly differentiated, with both a strong demand for bulk commodities and a growing demand for higher quality, value-added products. The forces driving these changes in demand are explored in detail in Part II, while Part III analyses their implications for the structure and vertical coordination of West African agricultural value chains and retailing systems.

Appendix to Chapter 4

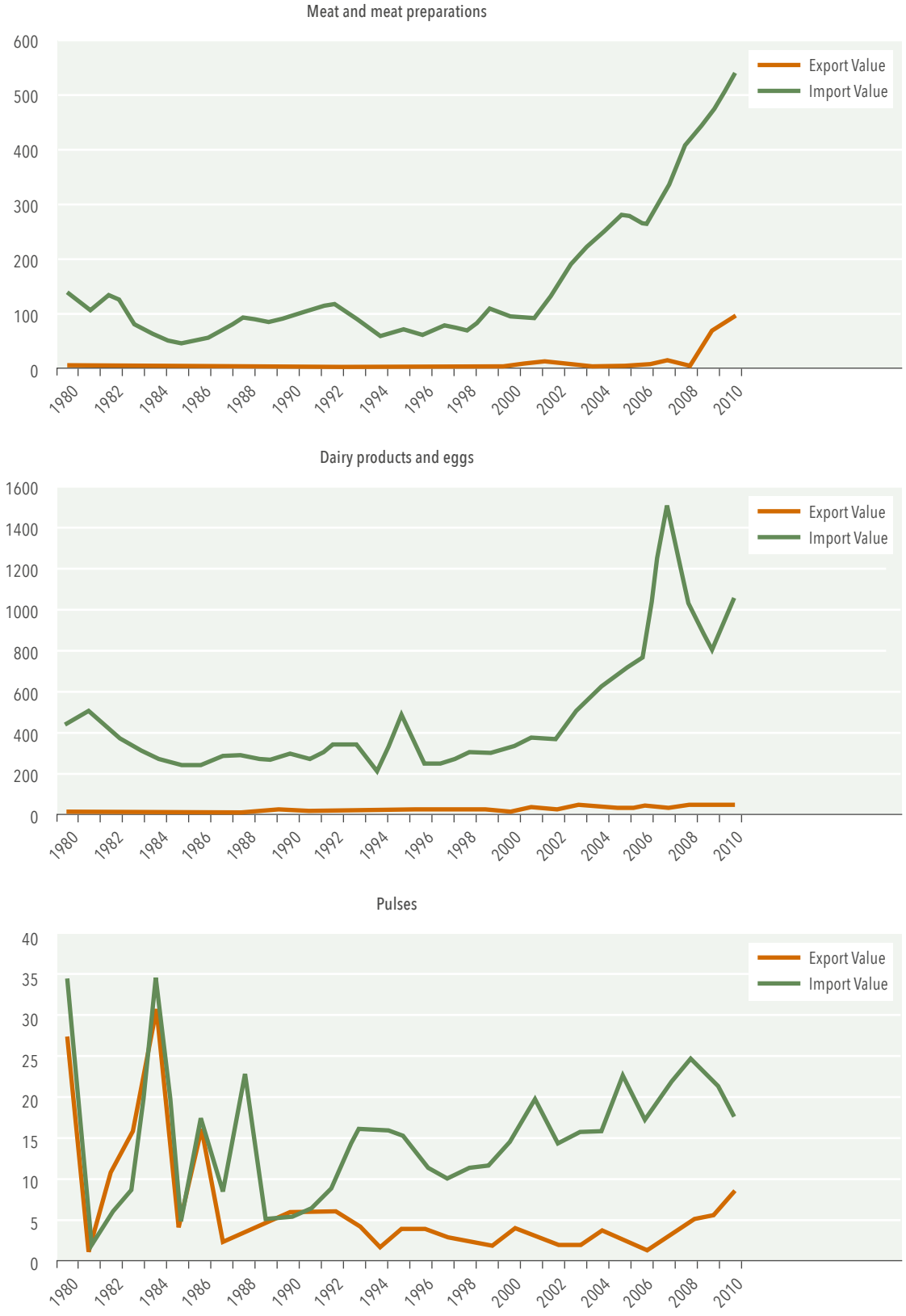
Appendix Figure A4.1 *Aggregate trade balances of West Africa with the rest of the world.*
Value of Imports and Exports (million US$), 1980 -2010



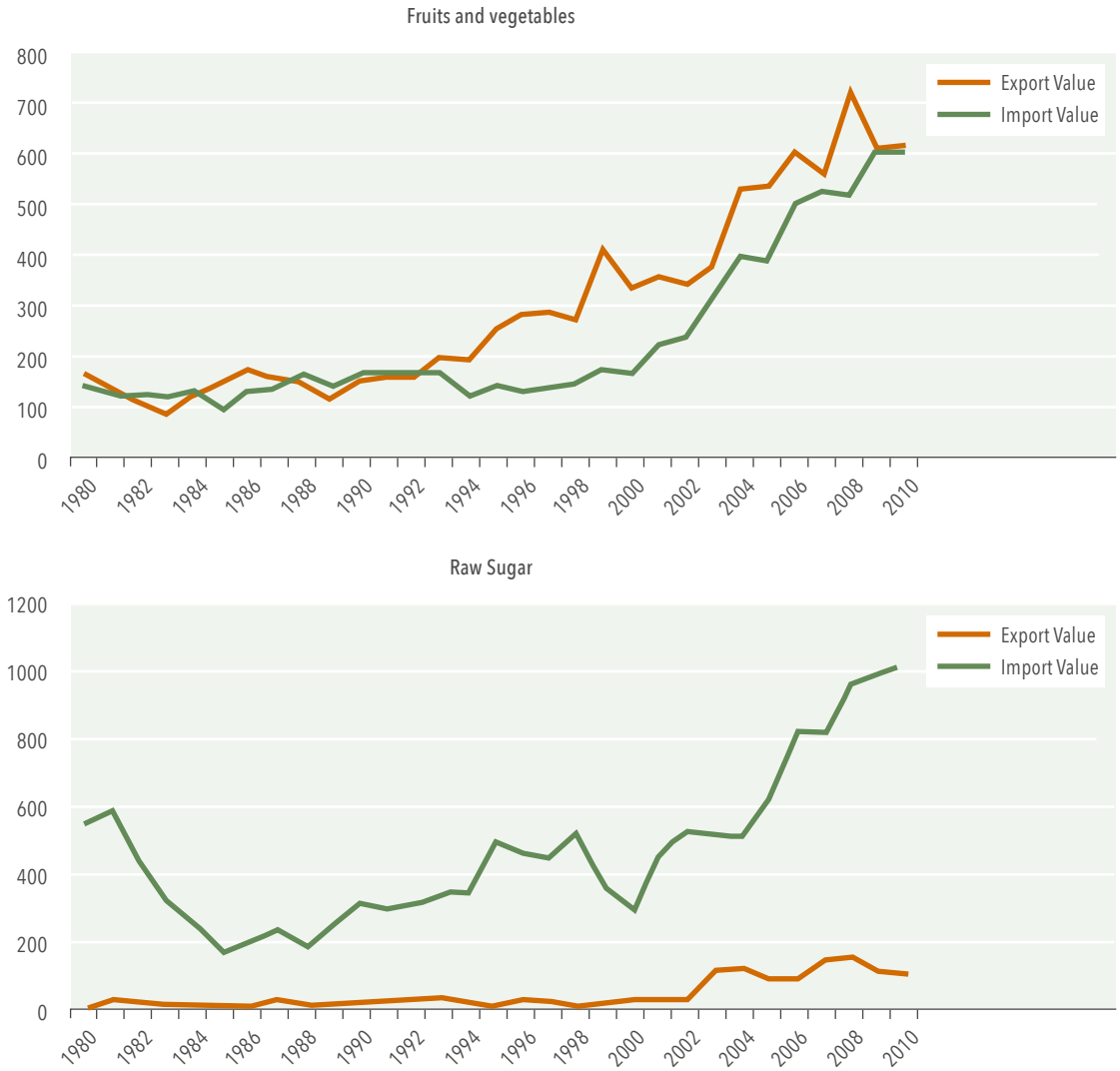




Appendix Figure A4.1 *Aggregate trade balances of West Africa with the rest of the world (continued).*
Value of Imports and Exports (million US$), 1980 -2010



Appendix Figure A4.1 *Aggregate trade balances of West Africa (continued)*
Value of Imports and Exports (million US$), 1980 -2010



Source: Based on FAOSTAT data.

Appendix Table A4.1 *Evolution of SSRs for cereal commodities by country*

	Year	Cereals Total	Maize	Millet	Rice	Sorghum
Benin	1986-90	86.0	100.0	100.0	7.1	113.0
	1996-00	91.9	106.9	100.0	21.6	104.9
	2006-10	84.6	107.3	112.4	19.3	105.7
Burkina Faso	1986-90	91.5	86.1	99.5	29.7	98.6
	1996-00	91.6	100.2	99.9	25.7	100.1
	2006-10	96.8	108.7	102.9	34.1	104.8
Cape Verde	1986-90	14.9	26.0	0.0	0.0	0.0
	1996-00	11.2	21.3	0.0	0.0	0.0
	2006-10	6.8	25.7	0.0	0.0	0.0

Source: Based on FAOSTAT data.

Appendix Table A4.1 *Evolution of SSRs for cereal commodities by country (continued)*

	Year	Cereals Total	Maize	Millet	Rice	Sorghum
Côte d'Ivoire	1986-90	61.0	103.3	96.7	51.9	78.9
	1996-00	57.1	101.6	99.5	43.9	80.8
	2006-10	48.3	96.8	100.0	34.1	79.2
The Gambia	1986-90	53.0	93.9	102.7	21.1	100.0
	1996-00	43.7	87.7	100.0	13.0	100.0
	2006-10	61.8	120.5	107.2	21.4	110.1
Ghana	1986-90	79.9	98.4	100.0	36.5	97.0
	1996-00	77.9	97.8	100.0	38.0	98.6
	2006-10	74.7	106.4	100.0	28.7	101.3
Guinea	1986-90	69.2	99.2	100.0	66.5	100.0
	1996-00	77.2	97.7	100.0	77.2	100.0
	2006-10	85.7	106.4	105.4	79.7	100.0
Guinea-Bissau	1986-90	65.9	95.6	100.0	60.1	96.8
	1996-00	63.7	89.6	100.0	53.2	100.0
	2006-10	62.2	88.7	100.0	52.8	107.5
Liberia	1986-90	61.4	0.0	0.0	64.7	0.0
	1996-00	40.7	6.2	0.0	63.0	0.0
	2006-10	32.4	0.0	0.0	39.0	0.0
Mali	1986-90	94.9	93.1	103.4	75.0	103.9
	1996-00	95.8	104.6	101.1	84.9	101.1
	2006-10	100.3	109.6	103.1	96.4	107.9
Mauritania	1986-90	40.9	65.9	100.0	36.1	89.8
	1996-00	26.4	96.5	76.4	37.4	92.0
	2006-10	25.3	76.3	100.0	29.2	101.3
Niger	1986-90	94.1	26.9	99.4	59.3	95.0
	1996-00	90.5	15.8	98.9	23.3	95.6
	2006-10	93.2	28.5	101.1	16.1	104.2
Nigeria	1986-90	95.1	100.2	100.3	82.6	99.3
	1996-00	88.3	99.2	100.6	64.3	101.1
	2006-10	83.2	101.2	102.0	56.4	100.4
Senegal	1986-90	61.5	86.6	95.6	22.0	82.2
	1996-00	48.9	65.7	99.8	11.8	94.3
	2006-10	51.8	89.1	100.0	24.2	96.2
Sierra Leone	1986-90	68.4	80.8	100.0	70.7	100.0
	1996-00	53.9	36.5	100.0	62.3	100.0
	2006-10	72.0	74.9	100.0	80.3	100.0
Togo	1986-90	85.2	101.7	100.0	32.5	97.6
	1996-00	88.0	103.1	100.0	50.3	100.0
	2006-10	94.3	114.0	100.0	44.5	103.9
West Africa	**1986-90**	**87.7**	**98.5**	**100.0**	**61.6**	**98.9**
	1996-00	**83.3**	**98.2**	**100.1**	**54.9**	**100.5**
	2006-10	**81.4**	**102.4**	**101.9**	**51.8**	**101.7**

Source: Based on FAOSTAT data.

Appendix Table A4.2 Evolution of SSRs for selected non-cereal commodities by country

	Year	Beef & Veal	Eggs	Milk Equivalent	Oilseeds	Palm Oil	Poultry Meat	Pulses
Benin	1986-90	100.0	99.9	66.4	167.8	111.6	86.2	99.7
	1996-00	100.0	99.3	43.7	244.1	134.5	26.9	99.6
	2006-10	99.7	99.8	42.6	116.8	143.0	22.6	99.8
Burkina Faso	1986-90	100.0	99.8	67.5	118.6	0.0	100.0	100.9
	1996-00	100.0	100.0	80.6	127.6	0.0	99.9	99.4
	2006-10	100.0	100.0	85.9	142.4	0.0	99.8	100.8
Cape Verde	1986-90	91.9	98.9	26.5	61.4	0.0	98.4	82.9
	1996-00	85.3	94.1	31.3	38.3	0.0	53.8	46.4
	2006-10	67.3	94.1	32.8	94.3	0.0	8.3	44.5
Côte d'Ivoire	1986-90	59.5	99.7	8.5	100.6	152.0	87.2	92.0
	1996-00	96.8	99.5	18.8	101.4	128.7	92.0	97.2
	2006-10	82.7	99.3	22.4	108.7	140.8	95.5	92.0
The Gambia	1986-90	100.0	77.8	32.7	135.0	100.0	100.0	100.0
	1996-00	99.8	41.6	29.1	123.2	64.5	36.8	89.2
	2006-10	98.9	34.3	14.1	121.1	7.1	19.2	88.9
Ghana	1986-90	100.0	99.6	43.1	108.7	101.9	78.7	98.5
	1996-00	91.0	99.4	40.9	118.0	105.8	55.8	99.9
	2006-10	78.5	99.9	19.0	114.7	62.9	26.7	83.1
Guinea	1986-90	100.0	100.0	74.7	102.6	100.0	85.0	100.0
	1996-00	100.0	100.0	73.7	108.3	97.1	85.8	96.0
	2006-10	100.0	99.7	78.3	100.2	66.4	53.2	97.7
Guinea-Bissau	1986-90	100.0	100.0	73.1	142.1	103.6	95.1	97.1
	1996-00	100.0	100.0	87.2	119.1	89.8	85.9	84.7
	2006-10	100.0	100.0	83.2	97.4	58.0	62.2	73.1
Liberia	1986-90	100.0	99.8	6.4	95.5	115.9	80.7	95.4
	1996-00	100.0	73.7	12.5	100.0	112.4	71.4	24.0
	2006-10	100.0	58.0	6.9	99.7	75.2	58.5	42.6
Mali	1986-90	100.0	100.0	89.7	113.5	0.0	100.0	100.7
	1996-00	100.0	100.0	87.6	114.4	0.0	99.9	100.0
	2006-10	100.0	99.6	92.8	109.4	0.0	99.3	99.0

Source: Based on FAOSTAT data.

Focus Section A

Food Price Volatility in West Africa: Impacts, Causes, and Policy Options

Agricultural prices vary, seasonally and from year to year, for a variety of reasons. Price variation is expected by participants in agricultural markets and is neither detrimental to allowing efficient markets to develop nor a disincentive to short- and long-term investments in the sector. It becomes a concern when the amplitude and the frequency of price changes are so large that consumers and producers face serious problems in coping with the changes. This situation is described by the term price volatility. Since the 2008 spike in world food prices, the term volatility has often been used in debates in West Africa as synonymous with price increases, but historically large and frequent falls in agricultural prices have been at least as frequent and problematic as price spikes. It is important to distinguish between increased price volatility and a higher level of average prices, as different policies are needed to deal with each.[35]

Nature and impacts of price volatility

Staple foodstuffs, particularly in unprocessed form, are often characterized by inelastic demand, whereby the quantity demanded changes little with a variation in price. Conversely, inelastic demand inplies thar even small changes in supply result in disproportionate changes in prices. The impacts are larger in the thin markets that characterize many West African countries, wherein a large proportion of production is consumed on the farm. In such situations, a relatively small change in output can result in a large change in marketed surplus, leading to large changes in market prices. In the absence of compensating imports or stocks to augment domestic supplies, food crop production shortfalls result in large increases in price of food, with devastating effects for poor households. Conversely, a bumper domestic crop can lead to a collapse of producer prices unless surplus production can be absorbed in the export market or used to build up domestic stocks. These depressed prices can have disastrous effects on farmers as well as other participants in the domestic food system. The effects can be particularly devastating for poor smallholders who do not have access to credit and thus may have to sell farm equipment and livestock to cope with price collapses, which then constrains their ability to expand production in the future when prices increase.

Sources of price volatility

Price volatility comes from two sources. One part is imported from the volatility of international markets with which West Africans trade, and one part is endogenously generated from supply and demand shocks internal to the region. As a general rule, imported volatility is more important in countries that trade extensively internationally, depend heavily on food imports, and adopt policies that allow fluctuations in international prices to be transmitted into domestic markets. Also, as a general rule, landlocked countries with high transport costs from the port to internal markets (such as the Sahelian countries of ECOWAS) and high marketing and other transaction costs, or countries that consume staple foods not traded internationally, are much more susceptible to endogenous than imported volatility.

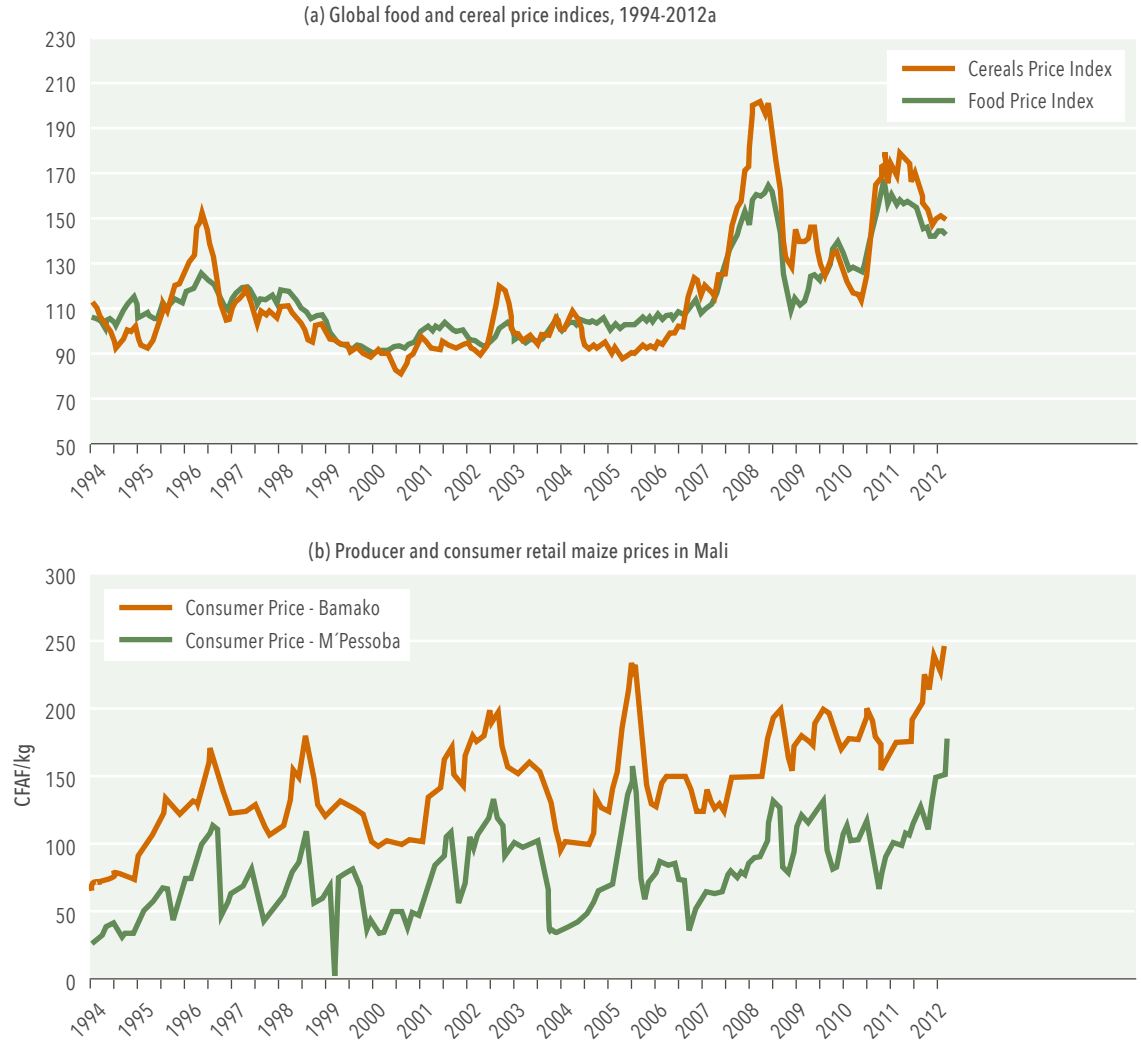
Figure A.1 illustrates these two sources of volatility. Panel (a) shows the volatility of world food prices as measured by the FAO food price and cereal price indices, while Panel (b) shows the

35 Analysis by IFPRI (Minot, 2012) shows that while prices for many basic staple foods became more volatile in international markets during the period 2007-2010 compared to 2003-2006, in the 11 African countries for which time-series data were available, prices for these commodities generally did not become more volatile, although they did increase in absolute magnitude.

variability of farm and retail-level prices in Mali over the same period. What is striking is that while world prices (a potential source of imported price volatility) varied in recent years by a factor of two, farm-level maize prices varied by a factor of up to four, suggesting that locally generated factors were at least as important as imported factors in generating the price volatility facing Malian farmers.

The sources of global price volatility, including factors such as extreme weather events, decreased carryover stocks and the imposition of biofuel mandates in OECD countries, have been well documented in the literature. (For recent summaries, see Konandreas, 2012a; and HLPE, 2011). Factors contributing to endogenous volatility include the thinness of domestic markets; weather and pest shocks; weak transport infrastructure; high transaction costs of regional trade; weak information on the level of production and stocks in the region, which creates uncertainty for both traders and governments, often leading to poorly informed market actions; and the unpredictability of government policy interventions, particularly regarding regional and international trade.

Figure A.1 *Examples of imported and internally generated price volatility*



Sources: (a) FAOSTAT, and (b) Observatoire du Marché Agricole (2014)
[a]2002-2004 = 100

ECOWAS experience with price volatility

Price spikes and price troughs are the two extremes of the price spectrum, and both have been a challenge for the ECOWAS countries. Regarding food price spikes, the most recent experience was in 2007-08, 2010-11 and again in 2012. The global food crisis of 2008 induced some major international grain-exporting countries, such as India and Thailand, to restrict exports in order to protect their domestic consumers. Some grain exporters in West Africa, such as Burkina Faso and Mali, likewise banned exports. The trade restrictions reduced volumes available in international and regional markets, thereby increasing price volatility. They also created doubts among national policy makers about the reliability of international and regional markets as a way of ensuring domestic food security – thereby leading to policies aimed at increasing the level of national food self-sufficiency and moving away from regional- and trade-based food security. In the long run, such policies deprive these countries of the potentially stabilizing effects that trade could offer in smoothing out domestic production variability.

It is not surprising that considering the heavy dependence of West Africa on imports for some key staples such as wheat and rice, local consumers felt the brunt of the price spikes since 2008. For example, between July 2007 and July 2008 rice prices rose by 43% in Mali, by 50% in Niger, by 64% in Burkina Faso and by 112% in Senegal (Demeke *et al.*, 2011). All countries have been affected, but the coastal countries more so because their consumption basket is more heavily laden with imported wheat and rice compared to the Sahelian countries, which consume more sorghum, millet and maize. However, even for those commodities, prices increased considerably (for example for millet by 28% in Mali, 39% in Niger, 46% in Burkina Faso and 8.5% in Senegal, during the 2007-08 period). Partly, this was also due to consumers not being able to afford the imported rice and wheat and shifting to local grains. Production of these locally grown crops also dropped significantly in 2007, which amplified the inflationary pressure of high international prices in 2007-08.

As would also be expected, in a region where households spend up to 75% of their income on food and where many of them are already at risk nutritionally, high prices had detrimental effects on short-term food security. Reduced consumption was a general consequence of the crisis, and civil unrest and large-scale riots were also a common response in many West African capitals (Aker *et al.*, 2011).

While recent years have been characterised by a period of high world food prices, the opposite has often been the case in the past. For a region with a high degree of dependence on the world food market, periods of depressed world food prices have often been associated with import surges. In primarily agricultural economies, unfair competition for domestic producers of competing commodities resulting from these import surges[36] has been an important food security issue.

FAO analysis, spanning a decade and involving selected commodities and developing country situations, attempted to identify the incidence of import surges, their sources and impacts, and the actual measures that government and private sectors have taken in response.[37] In the ECOWAS region, some specific commodity groups have been particularly affected by such surges, including poultry, rice and dairy products.

In the case of poultry, 52% of the total cases of import surges identified between 1995 and 2003 concerned Africa, of which nearly half were West African countries (FAO, 2006b). A general opening of economies under regional trade agreements combined with structural adjustment requirements of donor organizations limit countries from increasing applied tariffs, even if significantly below bound rates committed to WTO. In the case of Côte d'Ivoire, poultry imports expanded six-fold between 1998 and 2004. In Ghana and Senegal, a lowering of tariffs led to a four-fold import rise over 2000-05. The Ghana Poultry Farmers Association led a successful campaign to increase tariffs

36 Although there is no universally accepted definition of import surges, they are generally described as sudden and often relatively short-lived increases in imports (Rakotoarisoa et al. (2011).

37 This work is summarised in a recent volume by Rakotoarisoa, et al. (2011). Analyses of import surges by OXFAM include Ceesay et al. (2005; Diagne (2004; Fowler (2002).

on poultry imports from 20% to 40%; however, the new tariff rate could not be implemented due to conflict with other protocols and government obligations, allegedly under IMF pressure (Sharma, 2011; for more details, see Chapter 10).

In the case of rice (FAO, 2006c), Africa also saw the highest occurrence of import surges (some 56% of the global total identified between 1983 and 2003, with West Africa accounting for 40% of them). Several contributory factors have been identified, including exchange rate appreciation in some countries. However, in some cases, such as in Côte d'Ivoire (in 2000, 2001 and 2002) and in Ghana (in 1998 and 2001), low world prices have been the primary factor behind import surges.

In the case of dairy products (FAO, 2006a), Africa accounted for 49% of total import surges identified between 1999 and 2003 in skim milk powder (SMP) and 55% of those in whole milk powder (WMP). Of these, West Africa accounted for nearly 50% for both dairy products. A mix of external and domestic factors has been identified for the occurrence of import surges in dairy products. These include domestic and export subsidies in main exporting countries, combined with low import tariffs in importing countries, currency appreciation in some of them, as well as constraints in domestic dairy development due to high cost structures of local production, inadequate marketing and transportation infrastructure (see Chapter 10 for more details).

Overall, countries in the ECOWAS region have often been affected by import surges, with external factors such as low import prices and dumping of products as contributing factors. However, domestic causes such as low productivity, lack of competitiveness, trade and market reform policies, weak institutions and market failures have often been key internal constraints contributing to import surges. Thus, the FAO studies do not support a widely held view that trade liberalization itself was the main cause of import surges, but one out of many contributors to the surges.

The consequences of import surges also varied widely across products and countries, and the perceptions about their impacts were also mixed among various stakeholder groups. While import surges caused minor or no decline in profit or market shares in some cases, they provoked the collapse of the entire sector in other cases. Similarly, while small-scale producers felt harmed by import surges, others such as large-scale producers, processors, traders and especially consumers often claimed benefits from the import surges. This raises a difficult political economy dilemma in dealing with the surges.

Selected policy options to deal with price volatility in the region

There are a number of policy instruments available within the ECOWAS region to mitigate and deal with the effects of both endogenously generated and imported agricultural price volatility.

Stabilizing production systems

Strengthening the resilience of domestic production is a key factor in reducing endogenous market volatility. Investments in irrigation and better soil and water management are particularly critical, especially in light of climate change. Research into crop and animal varieties that are more resilient in the face of weather conditions can also reduce variability in supply and hence limit volatility. These types of investments are planned both in the regional and national CAADP agricultural investment plans discussed in Chapter 11.

Promoting more fluid trade within the region

The routine imposition of informal trade bans by some member states during periods of high prices is not only in violation of the ECOWAS Treaty but, by making regional markets thinner, aggravates price volatility at the regional level. Proposals currently included in the regional ECOWAP programme (described in Chapters 11 and 12) to reduce barriers to regional trade would help move the region towards a notion of regional food security and away from the notion of national food self-sufficiency. By making regional trade more reliable, such measures would also open up opportunities

for investors to exploit regional economies of scale in agricultural production, storage, processing and distribution, as well as risk-management possibilities, thereby creating incentives for increased investment. This would not only increase aggregate regional food output but also result in a broadened and diversified food commodity basket which is also an effective defence against price volatility.[38]

Improving market information and coordination

Improving the information base. Lack of access to timely market information hinders market transparency, price transmission and the efficiency of markets. Information on informal trade flows within the ECOWAS region and on inventory levels at the farm and commercial levels is particularly weak. Lacking such information, governments frequently are tempted to restrict exports, fearing that "too much food is flowing out of the country." Not knowing actual volumes traded, governments are also unable to gauge imports, especially during periods of crises, with potentially adverse fiscal and food security consequences. Therefore, an important first step in improving the information base to better respond to price volatility would be to build upon current efforts of CILSS to better quantify informal cross-border trade in basic foodstuffs and develop improved tools to gauge the levels of commercial and farm-level inventories in the system.

Putting in place a trade surveillance system. For the ECOWAS to be successful against the threats of import surges during periods of depressed world prices and for timely scheduling of cereal imports in situations of increasing prices, an effective trade surveillance system at the regional level is needed to provide timely market information and give an early warning of impending problems. In addition, there is need for analytical capacity to consider possible response options and assess credibly possible regional and country-specific impacts. Such actions fall under the mandate of the proposed regional agricultural information system, ECOAMIS, which presumably would work closely with the recently constituted AMIS (Agricultural Market Information System) coordinating structure at the FAO (FAO, 2011a). The information system needs to be complemented by creation of mechanisms within the ECOWAS structure for technical consultations on possible national and regional policy responses and remedial actions in cases of external threats to food security, as well as for advocating a strong political will to act regionally and not nationally.

Strengthening physical and logistical infrastructure in the region

In addition to streamlining agricultural and trade policy across the ECOWAS and improving information systems, there are also important physical, institutional and logistical constraints that impede the movement of supplies from surplus to deficit areas. In particular, during periods of shortage, expeditious mobilization and transport of supplies through national borders to the deficit areas are critical in avoiding price escalation at the local level. To take advantage of the potential of regional trade to play a greater role in dampening price volatility, the following issues need to be addressed:

Reducing high transaction and transfer costs. High transaction and transfer costs affect the whole supply chain and many factors are responsible, both physical and policy related. These high costs discourage trade and increase marketing margins, with the result that a given change in price at the retail level translates into much larger proportional change at the farm level. The limited availability of navigable waterways as well as an inadequate railroad network implies that the bulk of trade in the region is carried out by the more expensive trucking mode, which adds considerably to the cost of the commodity ultimately paid by consumers. This is particularly true during the rainy season when journeys are longer and delays are frequent, leading to an increase in cost by about one-third. What is also damaging from the food security perspective is that the rainy season coincides with the lean season when the already-high price of grain becomes even higher because of the increased transport charges.

38 When food consumption patterns become more diversified, markets become more interlinked and stable than in cases where one commodity dominates food consumption patterns (Jayne et al., 2009).

Quick improvements in reducing transfer and transaction costs could be made by easing regional transport and transit formalities and cracking down on petty corruption, which is highly disruptive to the free movement of foodstuffs. This would require capacity building of border personnel and harmonization and enforcement of border formalities, and monitoring and reporting bad practices, inter alia through the *Observatoire des Pratiques Anomales (OPA)*.[39] Also important would be the promotion of better understanding and appreciation by traders of their rights and obligations emanating from the faithful application of official rules and regulations at the border and creating more effective mechanisms for traders to pursue grievances in case of alleged abuse.

Helping finance the building of storage capacity. Lack of efficient storage facilities in the region is one of the factors that limit temporal arbitrage and contribute to high seasonal price variability. Although public financing of storage capacity might not be justified on narrow economic considerations, this should be viewed as a public good with important externalities in terms of strengthening food security and in providing possibilities for local communities to avoid the pressure of selling their crops immediately after harvest at depressed prices and having to repurchase food during the lean season at much higher prices. Public financing of a portion of the cost of storage facilities does not imply, however, that such facilities should be managed by the public sector. The ECOWAP proposal for public-private partnerships in commercial storage and its support for expanded development of tradable warehouse receipt systems (see Chapter 11) are examples of models that merit experimentation. However, these initiatives need to be accompanied with improved grades and standards for the commodities being stored, as lack of formal grading standards makes it difficult to assure credible valuation of the inventory, thereby making collateralization of commodities very difficult.

39 OPA was established in 2005 jointly by the WAEMU and ECOWAS with the financial support of USAID and the World Bank, in partnership with the West Africa Trade Hub. Its objective is to facilitate trade by monitoring unlawful harassment faced by truckers along interstate highways in West Africa.

National and regional food stocks

Public stockholding operations are generally of two types: those aiming at price stabilization and those with the objective of safeguarding security of supplies. Public stockholding with the first objective in mind is often referred to as ***buffer stocks or price stabilization stocks/reserves***. The public intervention in this case is to buy commodities at harvest when prices are low, thus supporting prices to producers, and release stocks into the market during the lean season when prices are high, thus keeping prices in check. In general, the mechanism involved is a price-band, whereby action is triggered based on minimum and maximum target price levels. To the extent government intervention is able to defend these trigger levels, buffer stocks can help protect farmers' incomes and avoid excessive price increases for consumers. For such a policy to be successful, however, governments must be prepared to do whatever it takes to defend trigger levels (i.e. commit to open-ended expenditures to buy or sell product), which may or may not be possible depending on how the price-band is set and available resources. A narrow price-band and one that bears little relationship with import and export parity levels is difficult to maintain and invariably renders the policy costly and ineffective. For example, analysis by IFPRI (Minot, 2012) for 11 African countries between 2003 and 2011 showed that price volatility was higher in countries such as Malawi and Zambia that actively used buffer stocks to try to stabilize prices than in countries like Kenya and Mali that did not. This suggests that price stabilization efforts, if not carefully designed and implemented, can actually increase rather than decrease volatility.

Public intervention that aims at safeguarding security of supplies is often referred to as ***food security stocks or emergency stocks/reserves.*** The aim of such stocks is normally to target vulnerable segments of the population under direct distribution schemes (i.e. outside the market) and, occasionally, to augment domestic food supplies during years of national shortages. Short-term food security is thus the main objective of such stocks and not to influence price behaviour, although the latter is inevitably affected to some degree depending on the magnitude

of intervention. Hence the size of the food security stocks and their management are key considerations, both as regards costs as well as on how they may interfere with the market. For example, release of public stocks should not interfere with the discharge of private-sector stocks, in order to minimize disincentives and avoid crowding out the positive role of private storage in the market (Wright, 2009).

Factors involved in deciding on size would include historical variability of domestic production, import dependency and delays in securing imports, dependability of suppliers and affordability of likely volume of imports. It is clear that all these factors need to be carefully weighed taking into account both cost/benefit and food security considerations. Stocks tie up capital, are expensive to maintain and are prone to physical deterioration and losses. One option that has been used in many countries to help deal with these costs, and which ECOWAS is considering, is to hold a portion of the reserve in physical form with the remainder as a financial reserve, used to purchase additional product as needed.

Regional food reserves are arrangements of regional country groupings for pooling resources into a common regional reserve, to be drawn upon based on pre-agreed rules. The constitution of such regional reserves typically entails the earmarking of a certain percentage of each country's national reserve into the regional food reserve. The benefits of pooling resources at a regional level include economies of scale, greater price stability, enhanced regional cooperation and integration, facilitating movement of supplies across borders, and enhancing regional market information and monitoring of available food supplies. However, at times governments are reluctant to commit to such reserves, because of costs, a perceived loss of sovereignty over national food reserves, distrust of neighbours, legal obstacles, and a lack of commitment to honour the rules of the reserve during times of national food stress (ActionAid, 2011). Chapter 12 discusses ECOWAS's current plans to create a regional food security reserve.

Providing targeted support to farmers

ECOWAS countries have limited financial possibilities for providing subsidies to farmers. Any resources allocated in this area could best be used in the form of targeted and "market-smart" input subsidies (including subsidies for irrigation and equipment for improved soil/water management) to increase productivity of specific food security crops rather than price supports for farmers. In countries where a large part of the population spends most of its income on food, an input subsidy does not penalize poor consumers (which is the case of an output support policy) while providing an incentive to farmers (by reducing production costs). However, care is needed in the design of such programmes in order to make them effective and financially sustainable (see Focus Section C).

Trade measures vis à vis the rest of the world

Retaining flexibility in border protection. In the absence of budgetary resources to support farmers, tariffs can play an important role for domestic market stability and for protecting producers in years of low world prices. ECOWAS countries should preserve some flexibility in the form of bound tariffs above applied levels to defend against external volatility, partly emanating from policies in some OECD countries, reform of which is likely to be slow. However, existing flexibility in bound tariffs is not uniform across countries, with some of them having bound tariffs at multiple levels of those actually applied and others are already in a binding position.

While ECOWAS countries negotiated their bound tariffs at the WTO as individual entities, now the region is a customs union with a common external tariff and this will necessitate renegotiation of a common external bound tariff. It is important in this process that ECOWAS retain an effective margin of flexibility. This will require careful negotiations not only with other members of the WTO but also, and prior to that, careful assessment of the needs of the region for such protection, taking into account the sensitivi-