



Chapter 10

Response of Selected Value Chains

This chapter examines the responses of selected value chains in West Africa to the evolving demand and supply conditions in regional and international markets described in Parts I and II. Given space limitations, the chapter makes no pretence of being a comprehensive review of how all important value chains in the region have responded to these changes.⁷⁹ Rather, the chapter presents overviews of six value chains, analysing their ability to respond to a changing market environment, lessons learned from that response, and remaining challenges and opportunities facing them. The chapter covers: (1) two value chains that have experienced large increases in production due to technological and institutional innovations but are now facing challenges in capturing or developing new market segments that require tighter quality control (rice and cassava); (2) two value chains that face very strong competition in the regional market from overseas suppliers and whose prospects, in the absence of strong protection, are limited mainly to the development of important niche markets (poultry and dairy); and (3) two value chains for export crops that have historically had strong success (cocoa and cotton) but are now seeking new institutional models as they face current challenges. The chapter also briefly highlights several other value chains where demand prospects are very strong, offering opportunities for future expansion of production if reliable output of consistent quality products can be assured. The last section of the chapter discusses cross-cutting issues and challenges for value chain development and upgrading, and implications for policies and investments.

In this study, we define a value chain as “the full range of activities that are required to bring a product from its conception to its end use. These include design, production, marketing, distribution, and support to get the product to the final consumer” (Dunn, 2005). The value chain thus includes the entire network of actors involved in input supply, production, processing, marketing and consumption of the product. It is typically composed of several, sometimes competing, supply channels that target particular market segments. This is particularly apparent in the discussion below about rice, which has several different production and marketing sub-channels, each involving different actors and serving different consumers. This chapter looks at performance largely from the perspective of the overall value chain rather than individual sub-channels. Nonetheless, in analysing the challenges and opportunities facing the different value chains, it discusses the importance of different

market segments and the roles of small, medium and large enterprises within these segments. Given space limitations, the chapter does not analyse the effectiveness, sustainability and impact of policy and programme interventions at the sub-channel and individual enterprise levels.

The chapter largely draws on secondary information including “grey literature” such as unpublished documents from donors and background papers prepared by national consultants as part of the AGWA research. This is complemented by information obtained from interviews with key value chain stakeholders, especially from the poultry sector in Ghana and various agroprocessing enterprises in and around Lagos.

⁷⁹ The literature on value chains in West Africa is immense. Elbehri, 2013 provides detailed analysis of several major West Africa Agricultural value chains, both for food and export crops. For reviews of other studies, see Drechsler, 2011 and Lambert, 2012.

10.1 Value chains oriented towards West African consumers

10.1.1 Rice⁸⁰

Rice is widely consumed throughout West Africa, with about 46% of consumption imported. As shown in Part II, demand is growing rapidly in rural as well as urban settings, driven by the desire for a staple that is readily available and is easy to prepare. Because domestic production in the region has not kept pace with demand, imports have soared (Chapter 4).

Paddy production in the ECOWAS zone averaged 10.6 million mt in 2008–10. Although production takes place throughout the region (Figure 10.1), three countries accounted for two-thirds of the production in this period: Nigeria (34%), Mali (19%) and Guinea (14%) (FAOSTAT). Rice is produced in a wide variety of systems throughout the region. These include, among others, irrigated systems under full water control in major rice development areas in Mali, Senegal, and Nigeria; irrigation under partial water control systems throughout the region, including seasonally flooded lowlands (*bas fonds*); mangrove production in coastal countries such as Sierra Leone, Liberia and Guinea; and upland production, which has expanded recently with the introduction of New Rice for Africa (*Nerica*) varieties.

Production and productivity levels vary widely across these systems. For example, typical yields of rainfed, unimproved *bas fonds* and uncontrolled flooding systems in Mali are estimated at around 800 kg/ha, while yields in the best controlled, large-scale gravity-fed irrigated systems, using improved technologies, can exceed 6 mt/ha (USAID, 2009a). Most rice producers in the region are small-scale farmers (predominantly women) growing rice for home consumption under systems at the lower end of the productivity scale. If they generate small surpluses above home-consumption needs, they are typically traded in local markets or exchanged with neighbours. For these farmers, rice production is not really a commercial enterprise. To

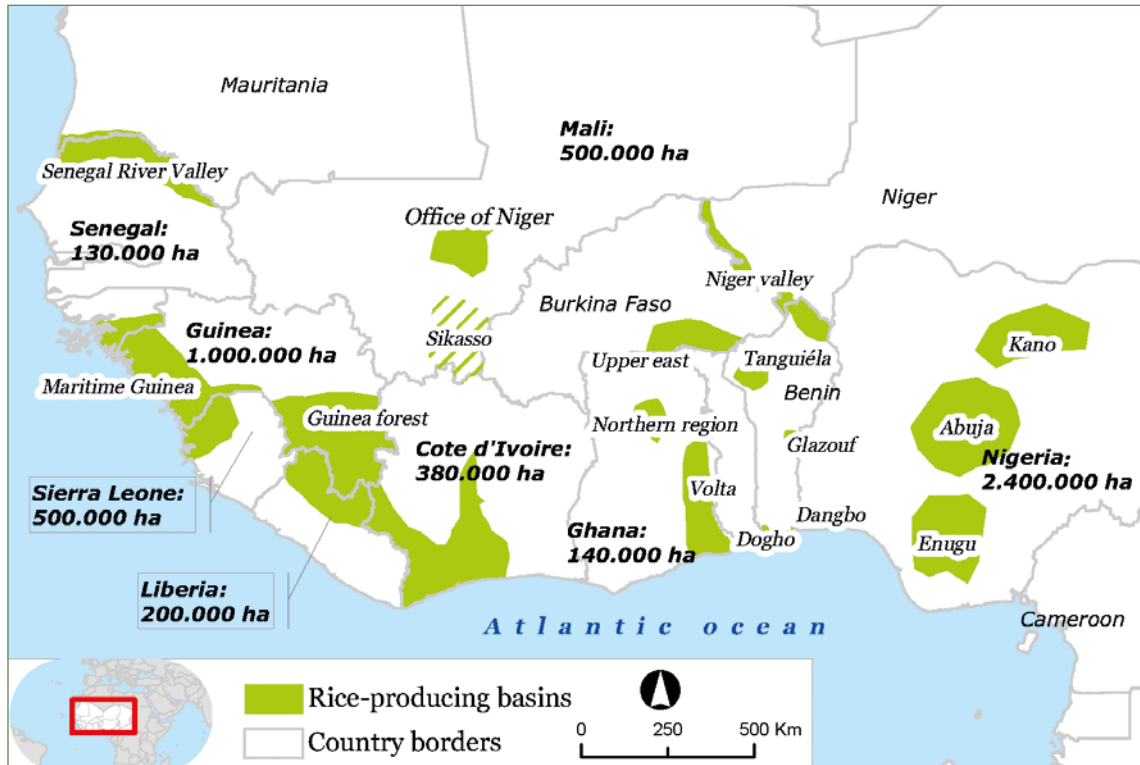
the extent that rice from these systems does enter commercial circuits, the small amount of surplus produced per farm leads to high per-unit assembly costs, lowering incentives of traders to buy from these farmers. Some of the recent national rice initiatives launched in the wake of the 2008 food price crisis, however, aim at increasing the productivity of these systems, which implies the need to upgrade the marketing channels if these systems are to become more commercially oriented.

In contrast, in the better water-control areas of larger irrigation schemes, such as in the Senegal River valley and Mali's Office du Niger, rice production, while still taking place predominantly on small farms (under 10 ha), is more commercially oriented, and men are more involved in its production. Frequently 40% or more of output is sold, and it is typically milled locally, bought by local rice traders, and moves into both urban and rural markets. A few large-scale rice farms have also emerged in the region recently, sometimes linked to outgrower schemes and a milling facility, as West African and foreign investors begin to see local commercial rice production as an alternative to imports for supplying the major urban markets.

Parallel to the supply channels just described is a very large import supply channel, with the bulk of the rice coming from Asia, and serving the large coastal and inland urban markets. Increasingly this rice reaches rural markets as well, as rice consumption in rural areas grows (see Chapter 6). Key actors in this supply channel are importers who are typically based in the capital cities. In most countries, particularly those with smaller populations, there are only a few large wholesalers who dominate the trade, given the scale economies and need for access to substantial financing to operate in the international rice trade. These wholesalers then sell to sub-wholesalers and a whole range of retailers (sometimes on credit), who in turn sell to consumers. Most consumers buy their rice in shops or open markets on a per kg basis or in large sacks. Imported rice destined for the upscale market is frequently sold in small consumer-ready packages in shops and supermarkets. In some cases (particularly in Nigeria) local processors have begun producing highly cleaned,

⁸⁰ This section draws heavily from USAID, 2009b; del Villar *et al.*, 2011; and Lambert, 2012.

Figure 10.1 Rice production basins in West Africa



Source: del Villar, *et al.*, 2011.

carefully packaged and branded rice to middle-class consumers.

The import market is also differentiated, with its largest part devoted to the mass market, but with imports of higher quality rice targeting upper-income consumers. In Nigeria, in an attempt to boost domestic milling of rice, the government has banned imports of non-parboiled (polished) rice, limiting imports to rough and brown rice.

Rice preferences are highly differentiated across the region, and agroprocessing procedures and import patterns reflect these differences. For example, Senegalese consumers overwhelmingly prefer 100% broken rice, considered to be low quality on the international market; Guinean and Nigerian consumers prefer parboiled rice, and Nigeria also has the largest market for whole grain, higher quality rice (including large quantities of imported, parboiled rice). Within each country, consumers further differentiate themselves according to cost and quality considerations. In Mali, for example,

the agricultural market information system distinguishes four major market segments: the bulk of the market (80-85%) is accounted for by 35-40% broken rice, of mediocre quality, originating from both national production and imports. A further 10% of the market is made up of somewhat higher quality 10-15% broken, while the remainder of the market (5 to 10%) is split between long-grain rice (with no broken), originating mainly from local production, and imported aromatic rices that are used mainly on special occasions (Diarra *et al.*, 2011). Preferences between imported and locally produced rice also vary by country and income segment, but there is a general perception that imported rice is of more consistent quality, with fewer impurities.

To accommodate these diverse production systems and consumer preferences, processing of rice also takes various forms across the region, involving both parboiling and milling. Milling is largely small-scale, using Engelberg-type de-hullers that are frequently up to 30 years old, often imported

from India, and that produce variable quality milled rice (USAID, 2009b).⁸¹ Nonetheless, these mills have the advantages of relatively low investment costs and of being located close to the farmer (many are mobile), reducing assembly costs for paddy and allowing the farmers to recover the husks easily for livestock feed. In some countries there has been expansion of mini- and medium-scale mills, which produce a more consistent quality and have higher conversion rates of paddy to milled rice and larger capacities, allowing the operators to target the growing middle-class demand for a higher quality product. Because of these mills' higher initial investment and maintenance costs and their need for a larger volume of paddy to operate at capacity, they are better suited for situations of concentrated production (such as in the full-water-control irrigated areas) than in areas of more scattered and less commercially oriented production as in upland and bas fonds zones.

Experience with large-scale industrial mills has, in the past, generally been poor. In situations where they have faced competition from the small-scale mills, they have often had problems in attracting enough paddy to operate close to capacity (USAID, 2009b; Diarra, *et al.*, 2000; Lambert, 2012). The ability of the small mills to outcompete for paddy likely reflects their lower assembly costs (being smaller and hence having to aggregate supply over a smaller area) and/or higher recovery rate of milled rice for a given quantity of paddy.⁸² The potential advantage of the large mills in terms of higher quality output (fewer broken grains) can be lost if paddy is not dried carefully; hence, close coordination with growers is needed to ensure consistent paddy quality. Failure to obtain such quality has led some large millers to integrate backward

into farming to produce their own paddy. Indeed, ensuring quantity and consistency of quality has been the Achilles heel for competitiveness of West African rice processors for many years. The difficulties of attracting sufficient paddy of consistent quality in Nigeria led large millers to lobby successfully for a ban on polished rice imports, leading to a substitution of imports of rough and brown rice (largely from the US) that is milled domestically.

The 2008 spike in world rice prices and the restrictions on rice exports by major exporters such as India and Vietnam focused the attention of government officials and the private sector on options for expanding rice production in West Africa. Many governments in the region launched programmes to expand domestic rice production, inspired in part by past successes such as that of Mali's Office du Niger (Box 10.1). Private-sector actors, including both domestic and multinational, also began investing in domestic production and milling, betting that West Africa could be competitive with imports from Asia under the new higher world prices for rice. A number of recent studies (e.g., del Villar, *et al.*, 2011; Adjao, 2011; Diallo *et al.*, 2012) confirm these views, suggesting that West African production costs (at least at the farm level) are comparable to those in Asia under market conditions prevailing in 2008-10.

Some of the recent private-sector investments involve attempts to develop contracts with small- and medium-scale farmers to furnish paddy to new, larger-scale mills that aim to produce a more consistent quality product to compete with imports. These efforts are works in progress, so it is not possible to draw definitive conclusions about their success. But there are some early indications that problems of contract enforcement and vertical coordination are in some cases hindering aggregation of sufficient volumes of paddy to allow the large mills to run near capacity. For example, the multinational Olam initially developed an outgrower scheme in Nigeria to supply its modern rice mills (USAID, 2009b). Fuelled by initial success and mounting political pressure, the company quickly increased the number of outgrowers with which it contracted but ran into increased management problems such as side-selling of rice by farmers

81 Engelberg-type mills de-hull and mill rice by passing the rice between two steel rollers. The advantages of these machines are their relatively low initial cost, simple design and easy maintenance. They typically can process between 200 and 1 000 kg of paddy per hour. Their disadvantages are that they produce a fairly high number of broken grains of rice and often have a lower paddy-to-milled rice conversion ratio than other types of mills. The small or mini-rice mills (minirizeries) referred to below typically have rubber rather than steel rollers, which yield a more consistent quality of output with fewer broken grains; these mills also have a higher hourly volume of output. Their higher initial investment cost, need for frequent replacement of the rollers, and requirements for a larger supply of paddy (which may be costly to assemble when roads are in poor condition) have discouraged their adoption until recently in West Africa. For more on the milling technology, see Barker *et al.*, 1985.

82 For example, in the early 1990s, the small Engelberg-type mills in the Office du Niger in Mali had a higher recovery rate than the large state-owned mills (Diarra, *et al.*, 2000). The latter, however, were old and in poor repair. Normally, one would expect a large mill to have both a higher recovery rate and a higher quality of output, but if they cannot attract enough paddy to operate near capacity, their unit cost of milling can easily exceed that of the small mills.

who had received inputs from the company on credit. According to an interview with an Olam representative during the AGWA field work in Nigeria in March 2012, the company has now leased a 3 000 ha farm in order to vertically integrate into production because of problems of assuring adequate supplies of paddy from smallholders. Similarly, in Mali, the firm Grand Distributeur Céréalière au Mali, which has been reprocessing rice bought from small mills to produce a higher-quality product for the upscale market, obtained a lease in 2010 for 7 400 ha of land to produce paddy and other products directly for its processing and marketing operations (Michigan State University Food Security Team, 2011). These examples suggest that the problems of supply aggregation and contract enforcement at the producer level remain critical. Producer organizations can play an important role in this aggregation process, as they have done in Mali's Office du Niger. A 2009 regional value chain analysis by USAID, however, argues that efforts to strengthen rice producer organizations in the region have focused too much on strengthening horizontal linkages among farmers and not enough on how the organizations need to coordinate their actions vertically with other actors in the value chain, e.g. through interprofessional organizations (USAID, 2009b).

Looking forward, two potential storm clouds loom on the horizon for expanded rice production in West Africa. First, OECD/FAO world price outlook projections through 2021 foresee declining real prices for rice as per capita rice consumption declines in Asia (due to rising per capita incomes leading to diet diversification) and as Cambodia and Myanmar enter the market as major low-cost exporters. The OECD/FAO projections foresee the world rice/coarse-grain price ratio falling from 2.5 in recent years to 1.8 by 2021 and the rice/wheat price ratio falling from 1.8 to 1.6 (OECD/FAO, 2012). Even with the long-term trend towards lower prices, however, year-to-year volatility will remain an important risk. Second, climate change may result in less favourable production conditions and lower water availability (particularly in the Sahelian regions), raising production costs. The lower price of rice relative to other cereals may further spur rice consumption in West Af-

rica, while lower real world prices and the effects of climate change may reduce the profitability of production in the region.⁸³

One implication of these factors is that efforts to expand rice production in the region need to pay particular attention to holding down per-unit costs throughout the value chain. At the farm level, improving input availability will be critical in this effort (see Focus Section C in Part IV, p. 315). It is important, however, that such cost-savings at the farm level represent savings to the economy as a whole (e.g. via more productive seeds and better water control) and not simply transfers of resources (via subsidies) to farmers from other parts of the economy. Savings in the post-harvest segments of the value chain are also critically important. These will require, *inter alia*, transmittal of financial incentives to farmers for careful drying and storage of paddy to ensure better processing outcomes, improved systems for paddy aggregation and assured delivery to processors, and improvements in wholesaling, packaging and marketing of the milled rice. Recent evaluations of the rice value chain (e.g. USAID, 2009b) argue that lack of consistent quality in milled rice is a major constraint to West African producers capturing a larger share of the market currently supplied by imports.

It will also be important, however, that rice development policies and programmes recognise the highly differentiated nature of the market for rice in most West African markets. In particular, there remains a very large proportion of the population that is low-income and is willing to make a trade-off between the cost of their rice and some degree of product quality. Larger mills produce a cleaner and more homogenous product than do the small local mills, but the widespread ability to date of the small mills to outcompete the large mills for paddy suggests that the small mills have a lower unit cost of processing than do the large facilities. There is a danger that in the quest to improve the quality of domestically produced rice, policies will subsidise industrial mills (e.g. via tax exemptions for imported equipment), thereby favouring a shift

83 A critical unknown is how Asian rice production systems will also adjust to the changing demand patterns in Asia and to climate change. Rice yield increases in Asia have been slowing in recent years, and some Asian producers (e.g. Vietnam) are already diversifying into higher-value products.

to the higher-cost processing and denying low-income consumers access to cheaper rice. This is not to suggest that efforts to introduce medium- and large-scale mills and improvements to small-scale milling systems (e.g. use of de-stoning machines for paddy prior to milling and increased use of mills with rubber rollers) should be hindered. There is certainly a growing market among the middle class for higher-quality domestic rice, and even lower-income consumers frequently complain of impurities in their rice. The shift to new milling systems, however, should be market-driven. If the large-scale mills successfully resolve their problem of ensuring a reliable volume of local paddy, they may also achieve scale economies that lead them over time to displace the small mills.

Because of the differentiated nature of both rice production systems and consumer preferences for rice in West Africa, it is unlikely that a single strategy will upgrade all the supply channels of the value chain. On the one hand, improvements in farm-level productivity in the low-yield upland and bas-fonds systems could help improve the food security of the farm families growing the rice and begin to respond to the growing demand for rice in rural areas. There is evidence, at least for Mali, that the marginal cost of increasing production in these systems would be lower than in the more input-

intensive full water-control systems (Adjao, 2011). Yet upland and bas-fonds systems are riskier than systems of full-water control, particularly in the Sahelian countries, so risk considerations may push investments towards the more capital-intensive production systems. Capturing a larger share of the burgeoning urban markets for rice, however, will require improving productivity in these irrigated systems and linking that production with improvements in milling and marketing (USAID, 2009b). This, in turn, will require better coordination between farmers and millers, e.g. through interprofessional organizations, to improve post-harvest handling of paddy to ensure better milling outcomes.

Finally, given the political sensitivity of rice prices, there are frequently pressures for tax exemptions on imports that work against encouragement of domestic production. For example, political sensitivity of rice prices has led to some market distortions in Nigeria that are self-defeating, such as the partial exoneration from import duties on unpolished rice that has led to investment in port-side rice milling capacity far from Nigeria's rice producing areas (Lambert, 2012).⁸⁴

⁸⁴ For more details on rice pricing policies and their impacts on incentives for producers in Nigeria, Ghana, Burkina Faso and Mali, see the set of studies on the rice sector produced by the FAO's Monitoring African Food and Agricultural Policies (MAFAP) project, available at <http://www.fao.org/mafap/products/countryreports-technical-notes/en/>.

Box 10.1 The rice story in the Office du Niger, Mali

Mali's Office du Niger (ON) has been called "a large irrigation scheme that works" (Aw and Diemer, 2005). Currently covering over 120 000 ha of irrigated land that is cultivated primarily by smallholders, the ON was originally developed by the French colonial authorities in the 1930s for irrigated cotton production. This proved infeasible, and the ON was soon converted to a major rice production zone. Following independence in 1960, Mali's government adopted a state-led approach to rice production in the zone, initially promoting collectivised production. The ON administration dictated that only rice could be produced on the irrigated fields

of the zone, provided farmers with inputs and extension instructions, and held the monopoly on all paddy purchases and milling in the zone (through five large state-owned mills). It in turn sold the milled rice through OPAM, the state grain board, which then marketed it through contracts with four large wholesalers who also dominated the rice import trade. Prices throughout the system were set by the government. Productivity in this system was low, and by the late 1970s, the ON had accumulated large debts, and its irrigation infrastructure was deteriorating. With support of the World Bank, the European Union, France and the Netherlands,

the ON undertook a series of reforms from 1982 through the early 2000s that resulted in a remarkable transformation of the zone, increasing production, productivity, and farmer incomes rapidly. Rainy season rice yields nearly quintupled from 1982/83 to 2002/03, rising from 1.6 mt/ha to 6.1 mt/ha, helping to drive down Mali's dependence on rice imports from 50 percent to under 20 percent (Aw and Diemer, 2005; Diarra, *et al.*, 2000).

Key elements in the ON success during this period were the following:

- » Rehabilitation of irrigation infrastructure coupled with empowering farmer organizations to play an increased role in the management and maintenance of the irrigation perimeters.
- » Research into improved rice varieties and production techniques, including encouraging a shift from broadcasting seeds to transplanting.
- » The development of a management contract between the state and the ON that linked funding to performance on a number of specific benchmarks and that called for a gradual withdrawal of the ON from marketing and processing to concentrate on water provision.
- » Liberalization of paddy milling and rice marketing. In 1987, the state abolished the ON's monopoly on rice milling and marketing within its borders.
- » With support from the Netherlands, small, mobile rice mills were introduced into the ON, which were operated by village associations, private individuals, and women's groups. The numbers increased rapidly, from 1 in 1987 to 383 in 1992. Because of the small mills' higher conversion rate of paddy into milled rice and their low assembly costs for paddy, they were able to outbid the large mills for paddy, and by 1995 the large mills had been driven out of business.
- » The rapid spread of the small mills created a new source of supply of rice for sub-wholesalers of rice in Bamako and other urban areas. These merchants had previously been dependent for their supplies on the four large rice wholesalers in Bamako who dominated both the import trade and previous sales of rice from the ON. The rice value chain thus became more competitive, driving down marketing margins.
- » The 1994 CFA franc devaluation resulted in sharp boost in rice prices denominated in local currency, strengthening farmers' incentives even more to increase production.

The sequencing of the reforms was critical to their success. The initial investments in infrastructure rehabilitation and improved production technology created the potential for a strong supply response once farmers' incentives were improved thanks to the liberalization of milling and rice marketing. This was in contrast with Mali's experience with the liberalization of coarse grain markets, where the production response was tepid, especially for millet and sorghum for which improved production technology was more limited. It was equally important that the marketing reforms preceded the currency devaluation. If the devaluation had occurred before the marketing liberalization had made the market for domestic rice much more competitive, it is likely that most of the increase in the consumer rice price resulting from the devaluation would have been captured by the tight oligopoly of Bamako-based rice wholesalers who previously had controlled both the domestic and import trade. As it happened, the strong demand by sub-wholesalers in Bamako for rice from the ON following the devaluation (to compete with the now much more expensive imported rice) led to rapid transmission of the higher prices to farmers in the Office. Within two weeks of the devaluation, the share of the Bamako consumers' price received by ON farmers jumped from 67 percent to 82 percent, while the wholesalers' share increased only from 2 percent to 3 percent (Diarra *et al.*, 2000).

Since the mid-2000s, two factors have constrained further productivity growth in the ON. First has been the difficulty of developing reliable input marketing in the zone after the withdrawal of the Office from its marketing activities. Farmer organizations have taken the lead in organising input provision on credit to their members, but it has taken time to develop a reliable system. Second, population growth has led to fragmentation of parcels. In the absence of legal market for land rentals or sales, it has proven difficult to consolidate holdings into farm sizes in many parts of the ON that can support a family, leading smaller farmers to default on their water payments to the ON and

face eviction (Michigan State University Food Security Team, 2011). On the other hand, over the past 10 years, the Malian government also leased large undeveloped areas of the ON in exchange for extension of the irrigation system in these areas. The terms of these leases were not always transparent, leading to further debates about land tenure rules in the zone. Improving the land tenure system in the zone is likely to be the next major reform challenge for the Office du Niger.

10.1.2 Cassava

Nigeria is the world's largest producer of cassava, and the crop is grown widely in the region, particularly in the coastal states. As shown in Parts I and II of this report, cassava production and availability per capita have expanded rapidly in many coastal countries of West Africa since the 1980s, and apparent per capita consumption has also been growing in several of the Sahelian states. The growth in human consumption has been driven by four phenomena. First, because of its high yield of carbohydrates per ha, cassava represents an inexpensive source of calories, and thus is attractive to West Africa's large low-income population. Second, during the period 2007-08, grain prices appear to have increased more rapidly than those of cassava, inducing consumers to substitute cassava products for cereals.⁸⁵ Third, some processed forms of the product, such as gari, are quick and inexpensive to prepare, offering a convenient substitute for rice.⁸⁶ Fourth, in the Sahelian countries, diet diversification by the middle class has led them to include processed forms of cassava, such as gari and attiéké, into their meals as a substitute for other staples.⁸⁷ As discussed below, industrial

use of cassava and its incorporation into animal feed has also been growing. Although the region is the world's largest cassava production zone, exports of processed cassava out of the region have remained small.⁸⁸ In contrast to rice, West African cassava producers face no competition from imports of cassava products or of the raw roots, which are very bulky and perishable and hence not traded internationally.

On the supply side, research at the International Institute of Tropical Agriculture (IITA) in Ibadan, Nigeria, in the mid-1970s led to the development of varieties with improved virus and mealy-bug resistance that had 40% higher yields than traditional varieties even when no fertilizer was applied (Nweke *et al.*, 2002). The IITA research focused not only on varietal selection but also on the development of improved, small-scale processing technologies, particularly mechanised peelers, chippers, and graters. Economic returns to using the new varieties in combination with the new processing equipment were higher than using any other combination of traditional or improved varieties and processing technologies. (Camara, 2000). Thus, the IITA package proved attractive

85 Between June 2007 and June 2008, cereal prices in Mali, Senegal, Ghana and Cameroon rose between 40 and 80%, while the price of cassava, plantains and beans increased on the order of 15% (Minot, 2011).

86 Gari is a granulated, partially gelatinised form of cassava flour that has been roasted or fried (often with palm oil), yielding a product that can be stored for up to 8 months without refrigeration. Because it is already partially cooked, its subsequent preparation for consumption requires less fuel than do most other staples, adding to its attractiveness to low-income and time-poor consumers.

87 Attiéké is produced from fermented cassava pulp and resembles rice in texture.

It is widely consumed in Côte d'Ivoire. In its fresh form, it is highly perishable, but in recent years, dried "instant" attiéké has become increasingly available and is sold in packaged form in several countries in the region.

88 In 1997, Ghana exported 51 000 mt (FAOSTAT), of which 20 000 tonnes were in the form of cassava chips to the European Union for use as cattle feed (Nweke and Haggblade, 2010). Since that time, annual exports from Ghana have fallen to 12 000 to 18 000 mt. There are also reportedly some unrecorded exports of gari from Benin via Togo to Central Africa (Soulé *et al.*, 2013).

to farmers and began to diffuse rapidly in Nigeria starting in 1997. It spread more slowly in other countries, beginning to be adopted in Ghana in 1993 and only later in Côte d'Ivoire.⁸⁹

Cassava is a versatile crop with many potential uses, including human consumption, animal feed and industrial uses such as starch, syrups, alcohol and polymer production (Figure 10.2). The roots of "sweet cassava" varieties can be consumed directly after peeling, but those of most varieties contain cyanic acid, necessitating processing before consumption (peeling, leaching out the acid, grinding or grating, and drying). Processing in West Africa takes place on two scales: a micro-industry level (often undertaken by women) to produce food products such as gari, attiéké, and flour; and industrial processing into starch, syrups, flour, animal feeds, and (soon) beer. IFAD (cited in Soulé, *et al.*, 2013) estimates that 30 million people in West and Central Africa, mainly women, derive income from cassava processing, most of it small-scale.

Prior to independence, colonial authorities promoted cassava as a famine-reserve crop, as it has no specific maturation date and hence can be stored in the ground until needed. Nweke, *et al.* (2002) argue that the transformation of the cassava value chain goes through four stages:

1. Initially, cassava is grown primarily as a famine reserve crop.
2. Next, it becomes more widely used as a rural food staple.
3. As production and processing expand, it becomes an important cash crop for urban consumption.
4. Finally, it also becomes an important component of livestock feed and a raw material for industrial processes.

⁸⁹ Adoption in Ghana may have been delayed by the country's overvalued exchange rate during the late 1970s and early 1980s, which gave imported staples like rice a price advantage over domestically produced staples such as cassava. In Côte d'Ivoire, the government pursued policies that held down the price of rice relative to other staples, thus favouring rice consumption over cassava. In addition, Ivorian small-scale cassava processors reported that the IITA mechanical graters, which were originally designed mainly for gari production, were not as well suited as manual graters for the production of attiéké, the main processed cassava product consumed in Côte d'Ivoire (Camara, 2000).

The past 30 years has seen cassava in West Africa shift from stage 2 to stage 3 in most countries, but there has only been timid movement towards stage 4. Estimates by Kormawa and Akoroda in 2003 for Nigeria (reported in Lambert, 2012) indicate that industrial use accounted for 16% of total production (10% for chips; 5% to produce a syrup concentrate for soft drinks and less than 1% for starch). Small-scale processors focus on producing food products such as gari, attiéké, chips for animal feed, and cassava flour, often with variable quality. Industrial scale processors not only can produce food and animal feed products, but also products not feasible for small-scale processors, such as starch, syrups, and ethanol. Nonetheless, small and large-scale processors may end up competing for the same roots to process, which can hinder the ability of the large-scale processors to operate at capacity.

Although cassava can be stored in the ground unharvested until needed, once harvested it must be processed within 24 to 48 hours to avoid deterioration. Thus, large-scale processing requires careful just-in-time coordination between farmers and processors in order to ensure that processing plants can operate near capacity while avoiding gluts. The roots are about two-thirds water by weight, and hence transport costs are high. Lambert (2012) estimates that an efficient industrial processing plant needs to draw supplies of roots from no farther than 30 km, implying that the processor needs to have reliable delivery contracts with many farmers close to the plant, use mobile processing equipment to do initial chipping/drying near the farms, or be vertically integrated into farm-level production itself. In contrast, small and medium-scale processors face a much simpler task of sourcing raw product, buying roots from spot markets or directly from farmers on an as-needed basis.

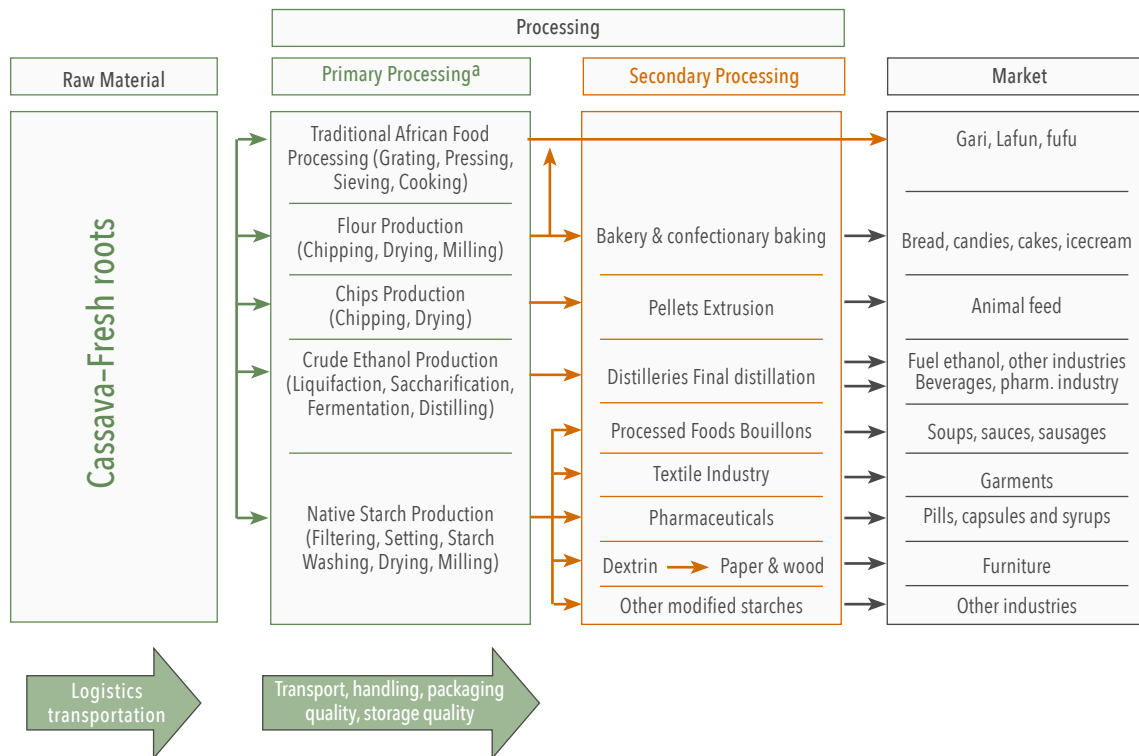
Attempts to move to from small-scale to large-scale processing (again, mainly in Nigeria), which could allow more consistent quality control, have also run into problems of aggregating and coordinating supply of the roots for processing. Frequently, plants operate at 40% or less of their capacity due to inadequate supply of roots. The problem arises for at least three reasons. First, because cassava production is rainfed, most farm-

ers plant and harvest their crop at the same time, leading to seasonal gluts and shortages of the roots.⁹⁰ Second, even if they had contracted with the plants for delivery of their crop, farmers frequently would sell to others if higher prices were offered. This suggests that the smaller-scale processors, as in the case of rice, may have been able to outbid the large processors for raw product due to their lower raw-product assembly costs and/or greater economic efficiency in processing. Third, large-scale processors face the ubiquitous problem in Nigeria of unreliable electrical service, requiring them either to shut down production when power is cut (losing the value of all the products on the production line) or operating with generators, which greatly increases their production costs.

Attempts to deal with the supply aggregation problem have met with mixed results. Beginning in 2009, the USAID MARKETS project and IITA partnered with Ekha Agro Processing, Ltd., Nigeria’s largest producer of glucose syrup, to help the company develop a more reliable sourcing system for its roots. It had previously relied on purchases from farmer cooperatives, but the failure to get firm delivery commitments from these groups led the plant to operate only at 10% of capacity. The partnership with the USAID project and IITA worked to develop contracts with more than 20 000 cassava outgrowers and cluster farmers to deliver 400 tonnes of roots per day to the company’s plant in Ogun state, near Lagos. Despite the development of these contracts and the company maintaining 3 000 ha of land for its own production of roots to supplement those bought from farmers, the plant has only managed to increase capacity utilization to 50% (AGWA field research).

⁹⁰ Because cassava can be harvested at different times, this problem is potentially resolvable through differential pricing of the root depending on its delivery date to the plant. It is not clear why processors did not adopt such a pricing strategy.

Figure 10.2 Structure of the Nigerian cassava value chain



^aAll processes above include peeling and washing

Source: Federal Government of Nigeria, 2006

Problems of vertical coordination along the value chain are illustrated by Nigeria's experience with the Presidential Initiative on Cassava Production and Export launched by the Obasanjo administration in 2005 (Lambert, 2012; AGWA field research). The Initiative set a target of increasing production from 35 million mt in 2005 to 150 million mt by end of 2010. Included in the initiative was an initial requirement for inclusion of 10% high-quality cassava flour (HQCF) in bread—a measure aimed at reducing the country's reliance on imported wheat. The initiative encouraged farmers to expand cassava production through the distribution of cuttings of improved varieties and with the promise of a greatly expanded demand by the baking industry. The prospect of this larger market for cassava flour also led to an influx of investment by small-scale processors. With the assistance of various development projects, 120 new micro cassava processing centres valued at over N1 billion (US\$6.4 million) were established across country. Bakers, however, were reluctant to substitute the HQCF for wheat flour, citing the lack of quality control on cassava flour produced by the small-scale processing facilities. Farmers, in the meantime, had expanded production and were stuck with no market for their expanded output. Even though the target for HQCF incorporation into bread was reduced to 5% after 2007, the initiative was seen as a failure by 2010. A consumer survey in Lagos carried out in 2011 found that none of the respondents interviewed said that they had ever tasted the cassava bread (AGWA field research).

With the launching of Nigeria's new Agricultural Transformation Agenda in 2011 (see Chapter 11), the goals of the previous Presidential cassava initiative have been revived and new objectives added, such as expanded production of cassava-based alcohol (to be blended with petrol). The new policy calls for reinstatement of the 10% HQCF blending requirement with wheat flour for bread effective in 2012, with the percentage increasing to 40% by 2015. In 2012, Nigeria imposed an additional 65% ad valorem tax on imported wheat, bringing the total tariff on wheat to 100%, both to encourage the shift to HQCF in baked products and to help fund the new cassava initiative. The government has taken a number of other actions,

including creating a multi-stakeholder committee to manage the newly created Cassava Bread Development Board, removing import duties on enzymes used in producing HQCF, and focusing on large-scale processing with tighter quality control to try to avoid the pitfalls of the previous cassava initiative. The government anticipates 18 large industrial scale HQCF plants will be established soon to generate the 1.2 million tonnes of HQCF required under the Federal government's very ambitious target of 40% inclusion rate of HQCF in wheat bread (Lambert, 2012). But the organizational challenges in coordinating the supply of roots to these plants are likely to be very high in a setting where contractual compliance is viewed by many farmers as optional and where side-selling is rampant. These challenges may force many of the plants to vertically integrate into large-scale farming themselves.

Thus, the cassava value chain in West Africa has had some major successes in becoming an increasingly commercial crop processed predominantly by small-scale operators and generating millions of jobs. The growth of gari and attiéké consumption are examples of small, informal-sector processors and related value chain operators responding to consumer demands for a convenient, affordable staple that is an alternative to rice. But the ability of the cassava value chain to take the next step to become a more fully commercial crop feeding into a modern processing industry and capturing regional, domestic and export markets for products ranging from animal feed to starch to pharmaceuticals has been hampered by weak coordination linking farmers to the processors. A major test of the ability to design improved contractual arrangements will be the brewer SAB-Miller's plans to launch production of a cassava-based beer in Nigeria in 2013.

In addition to improving coordination to promote large-scale processing, there is also a big potential for small- and medium-scale processors to improve their incomes and value added by improving product quality, safety, packaging and branding in order to respond to growing urban demand through modern retail systems and also service diaspora markets for traditional products

that are perceived to be nutritious and well presented. The modernization of the small-scale food processing sector will require systematic upgrading of industrial processes, equipment operation, food hygiene and business management and will require concerted public-private sector collaboration, for example through value-chain participant councils.

10.1.3 Poultry

Consumption of both eggs and poultry meat have been growing substantially in West Africa over the past 30 years (see Part II). West African poultry producers have been able to satisfy almost all of the growing market for eggs in the region. In contrast, for those countries that have kept their borders open to international trade in poultry products, most of the growth in poultry (primarily chicken) meat consumption has been captured by imports. The loss of market share in poultry meat reflects not only the ability of exporters from Brazil, the US and Europe to deliver poultry products to West African ports at low costs (for reasons explained below) but also the difficulties that West African countries have had in adopting the institutional arrangements needed to ensure the tight coordination of inputs such as feed, veterinary products, and day-old chicks required by modern industrial poultry production.

Poultry production in West Africa involves three distinct systems: small-scale traditional systems, somewhat larger semi-commercial systems, and large-scale commercial systems.⁹¹ Traditional systems account for around 70% of birds in most West African countries. In these systems, growers raise a small number of birds for home consumption, with small surpluses destined for the market. The birds scavenge for food, receiving few if any purchased inputs and no veterinary care or vaccinations.

There is no distinction between birds raised for egg production and those for meat. Productivity in this system is low due to high mortality and relatively slow growth of the birds. The system has the advantage, however, of requiring very low investment, making it a widely used system to produce animal protein for the family and to generate supplementary income and liquidity, especially for women. The birds, which are local breeds, are adapted to the local production conditions. Since much of the consumption is located in areas with few cold chains, production from this system faces little competition from imports. Semi-commercial production, which is common in peri-urban and urban areas, tends to be the main source of commercial production of meat and eggs in the inland Sahelian countries. Production is based on improved local breeds or cross-bred stock, although often there remains little differentiation between layers and broilers. Producers provide simple housing for birds, purchase at least some of the feed, and provide veterinary services when available. Production is more commercially oriented, aimed at urban markets. Formal marketing contracts are rare, however; most output is sold through oral contracts with retailers (e.g. for eggs) or on spot markets. The formal marketing contracts that do exist have little influence on choice of technology, supply of inputs, or quality of output. Some of this production is seasonal, targeting major holidays such as Christmas or New Year's Day, when poultry consumption increases.

Large-scale commercial production typically involves mechanised production facilities, in which feed costs usually represent 70% to 75% of the cost of production. For this reason, the success of these operations depends critically on developing stable, low-cost feed supplies. Production is based on genetically improved stock that are specialized for either egg or meat production. Disease control measures (vaccinations, biosecurity practices) are also critical in maintaining productivity, especially as West Africa lies on major flyways of migratory birds that can spread avian influenza and other diseases. Feed conversion rates are high under a controlled production environment in specialized housing, with broilers reaching market weight in as little as six weeks. Spent layers are sold for

91 This categorization differs from FAO's 4-way classification of poultry production systems in use globally (http://www.fao.org/docs/eims/upload//224897/factsheet_productionsectors_en.pdf). The FAO classifies poultry production into 4 sectors: (1) Industrial integrated systems with a high level of biosecurity and birds and products marketed commercially, (2) commercial systems with moderate to high biosecurity and birds/products usually marketed commercially, (3) commercial poultry production systems with low to minimal biosecurity and birds/products entering live bird markets and (4) village or backyard production with minimal biosecurity and birds/products consumed locally. Since very few West African producers fall into FAO's sector 1, in the discussion below, sectors 1 and 2 are combined and labelled "commercial systems." The following description of the three production systems is drawn largely from Farrelly, 1996, and from a series of case studies of poultry markets in West Africa carried out by researchers from the University of Washington and summarised by Schneider *et al.*, 2010.

processing, for example into soups, or on spot markets. Success of this system depends not only on the adoption of the improved technology but also a set of contractual and institutional arrangements to manage the risks inherent in such capital-intensive operations. In industrial countries, typically firms involved in selling the chickens or eggs establish contracts with growers, providing them with day-old-chicks, feed, veterinary inputs or services, and technical directions on growing practices to be followed, while the farmers provide labour, housing, and handle disposal of waste. In West Africa, given problems of contract enforcement, it is more common for all these operations to be integrated within a single firm.

Table 10.1 shows distribution of poultry numbers in West Africa. Nigeria has the largest number, 39.2% of the total, followed by Ghana (9.3%), Côte d'Ivoire (9.1%), Senegal and Burkina Faso (each 7.9%). Although Nigeria has the largest number of birds, it ranks fourth from the bottom of the 15 ECOWAS countries in terms of birds per capita; Togo, Senegal, Burkina Faso and Mali have the

highest numbers of birds per capita. Growth rates of flocks have varied substantially over time and by country, for reasons discussed below. A particular shock was the 2006 outbreak of avian influenza. Given the weak biosecurity practices of most growers, especially traditional producers where no effort is made to isolate poultry from contact with wild birds, the threat of major damage was large. Nigeria was the site of the initial outbreak, with over 1 million birds destroyed or dying there. Although this was a small proportion of the total flock, more serious was the reaction of Nigerian consumers. Fearing the disease, consumers initially boycotted chicken, leading to a fall in poultry prices of over 80% (Schneider, *et al.*, 2010). In response to the outbreak, most countries in the region banned imports of poultry products from any country having suffered infection.⁹² As noted below, some countries, such as Senegal and Burkina Faso, have maintained the import bans to the present time, using the phytosanitary controls as a non-tariff barrier to protect domestic producers.

⁹² As explained below, Nigeria had already banned imports of frozen poultry and eggs in 2002 to protect domestic producers from foreign competition.

Table 10.1 Poultry numbers in West Africa

2008–2010 averages; CAGR uses three year averages for 1981–2010

Country	Total poultry flock (million birds)	Share of ECOWAS total	Birds per capita (2010)	Compound Annual Growth Rate		
				1981-83- 1988-90	1991-93- 1998-2000	2001-03- 2008-10
Benin	15.9	3.4%	1.9	-2.3%	3.1%	3.0%
Burkina Faso	37.1	7.9%	2.4	4.2%	2.4%	5.7%
Cape Verde	0.6	0.1%	1.3	6.3%	-0.8%	3.5%
Côte d'Ivoire	42.4	9.1%	2.3	3.3%	2.0%	4.2%
Ghana	43.6	9.3%	2.0	-0.5%	6.6%	7.6%
Guinea	20.5	4.4%	2.3	2.6%	4.0%	5.5%
Guinea-Bissau	1.5	0.3%	1.1	6.3%	5.1%	0.1%
Liberia	6.8	1.5%	1.8	4.0%	0.4%	4.6%
Mali	35.5	7.6%	2.4	5.3%	1.4%	3.6%
Niger	15.1	3.2%	1.1	1.1%	1.1%	3.2%
Nigeria	183.3	39.2%	1.2	4.1%	0.2%	4.3%
Senegal	37.1	7.9%	3.3	4.2%	5.1%	4.8%
Sierra Leone	8.9	1.9%	1.7	3.4%	0.7%	21.3%
The Gambia	0.8	0.2%	0.5	6.7%	-2.0%	3.7%
Togo	18.9	4.0%	3.6	14.4%	4.7%	7.4%
ECOWAS TOTAL	468.1	100.0%	1.7	3.5%	1.7%	4.9%

Source: Calculated from FAOSTAT data

Poultry value chains

Egg value chain. West African producers appear to have become increasingly competitive in egg production. The ratio of domestic to world prices of eggs has fallen sharply since 2000; by 2007 domestic prices in most countries were at or below world prices (Schneider, *et al.*, 2010). Most countries in the region are self-sufficient in eggs, and, as indicated in Part II, consumers have increasingly turned to eggs as an inexpensive source of high-quality protein. For example, in a survey of Accra consumers interviewed in late 2011 as part of the AGWA fieldwork, 62% of respondents reported eating eggs at least once a week, compared with 35% reporting consuming frozen chicken (the most frequently consumed type of chicken) and 82% reporting consuming dried fish (the most frequently consumed form of animal protein). The widespread consumption of eggs is due to their low cost, availability in small amounts, perceived healthfulness and cleanliness.

Commercial egg production, however, is challenged by variability in feed prices, especially of maize and of protein sources, such as groundnut and soybean meal. The widespread absence of contracting between producers of these feed products and local poultry producers reduces the capacity of poultry producers to anticipate their costs and, in some cases, induces them to integrate backward into crop production themselves. Interviews with Senegalese poultry feed manufacturers also reveal that their perception of the unreliable quality of maize imported from Mali often leads them to turn to imported maize. Moreover, when production of cereals falls in West Africa, competition between use of grain for feed and for human consumption becomes more acute, driving up prices unless trade policies are flexible enough to allow imports to flow in to stabilize prices. This is a generic problem in countries where the bulk of coarse grain production still goes to direct human consumption, unlike in middle- and upper-income countries (including major poultry exporters like Brazil and the US), where most of domestic coarse grain consumption is in the form of livestock feed. In Nigeria, abrupt changes in government policies, including the imposition of import bans on cereals and oilseeds that are the object of special government production initiatives, have also

created major challenges for egg producers. The adverse effects of these trade restrictions on poultry producers have been exacerbated by increased competition for cereals from agroprocessors (breweries and breakfast cereal manufacturers), which have further bid up the prices of these inputs (AGWA field research). In some of the smaller countries in the region, especially those dependent on more semi-commercial systems of production, irregular access to other critical inputs, such as veterinary products and day-old chicks, also pose challenges.

Thus, while the egg value chain has not faced large challenges from extra-African imports in most countries, its further growth is conditioned, like that of rice processing and cassava processing, on actions aimed at improving the reliability, quality, and cost of the agricultural raw materials that serve as its key inputs.

Poultry meat (broiler) value chain. In contrast to egg producers, producers of broilers in West Africa have faced strong international competition over the past 20 years. Although poultry consumption has grown strongly in many countries, most of this increase has been met by imports. To understand the forces at work, it is useful first to discuss the nature of the demand for poultry meat in West Africa and review events that have strongly affected poultry trade into the region, and then examine the experiences of three different countries (Ghana, Nigeria, and Burkina Faso) that have had very different policy responses to these events.

Demand for poultry meat in West Africa.

In West Africa, consumption of poultry (largely chickens, but also including guinea fowl, turkeys, and ducks) traditionally was reserved for special events, as it was in much of the rest of the world before the industrialization of production drove down prices dramatically. West African consumers preferred free-range birds, purchased live, and slaughtered at home. Since poultry was frequently prepared in stews, consumers also preferred birds with tougher meat that would maintain its integrity when stewed for a long time. The introduction of chicken products, both domestic and imported, produced in large-scale commercial operations has led to market segmentation. While birds produced

in traditional and semi-commercial operations are still preferred for special occasions, the lower-priced “industrial” birds offer consumers a cheaper product, available already dressed and often cut up in parts, that is quicker to prepare and more suited to time-constrained urban lifestyles. Thus, the two products exist side-by-side in the market, but with substantial price differentials between them; consumers choose among them based on relative prices and tastes (Table 10.2). See also Chapters 5-7 which discuss the growing demand for poultry in the context of West African’s overall food budgets, food consumption shares, and changing consumption patterns.

Table 10.2 *Chicken prices in Accra in early 2012*

Type of chicken product	Average Price of Product (cedis/kg)	
	Modern Market	Traditional Market
Live chicken	–	9.07
Frozen chicken	8.60	4.61
Chilled chicken	9.56	–
Ready-to-eat	8.75	–

Source: AGWA field studies.

The poultry meat market in Ghana has become differentiated between imported frozen poultry meat and locally produced birds. The latter are of two types: spent layers, sold typically after approximately 72 weeks, when their egg production rate per day falls below about 55%; and broilers. The spent hens are sold live in local markets and are generally destined for stews. The broilers are sold in various formats, from live animals to whole dressed birds to cut-up parts. Consumers surveyed as part of AGWA research in Accra in 2011 indicated a preference, other things being equal, for local poultry. Other things are not all equal, however, as local production is most often sold either as a live or whole dressed bird, requiring a larger expenditure of money and time to prepare it. Hence, the Ghanaian poultry is more targeted for special occasions, while the imported poultry has become a more frequent item in the diet, both at home and in quick-service restaurants.

Import surges and import bans

The impact of the WAEMU CET on West Africa’s poultry trade. Beginning in the mid-1980s, and rapidly accelerating in the late 1990s, imports of

frozen chicken began arriving in West African markets. For example, between 1996 and 2003, annual chicken imports from the European Union into ECOWAS countries increased from 12 500 mt to 86 000 mt (Schneider, *et al.*, 2010). The adoption of the WAEMU common external tariff (CET), initially just in the WAEMU countries and subsequently extended to all ECOWAS countries, set the ad valorem tariff rate for poultry at 20%, well below the previous rate practiced in many countries. This prompted a further increase in imports, which increasingly came not only from the EU but also North America and more recently Brazil, which has emerged as a low-cost producer in the world market.

Differing policy responses to the import surge: Ghana, Nigeria and Burkina Faso. The experiences of Ghana, Nigeria and Burkina Faso illustrate differing policy responses to the import surge of low-cost poultry products from abroad and some of the consequences of those decisions. Ghana, after initially trying to protect its domestic producers with higher tariff rates, accepted the import surge. Nigeria banned frozen poultry imports starting in 2002 in order to protect domestic producers, particularly the larger scale commercial producers. Burkina Faso, which faced fewer imports due to the natural protection offered by its landlocked location, used phytosanitary regulations to restrict imports, protecting its semi-commercial family-farm producers of poultry.

*Ghana.*⁹³ Modern poultry production expanded rapidly in Ghana starting in the 1960s. However, by the mid-1980s, low-priced frozen chicken meat from Europe and North and South America began entering the Ghanaian market, undercutting the prices received by local broiler producers. The resulting strong price competition from imports led to an initial attempt by the Ghanaian government to protect domestic producers through the imposition of a 40% import tariff in 2003, but under pressure from the IMF and the World Bank, this was cut back to 20% (the level of the WAEMU common external tariff), in addition to a VAT of 12.5% and various other levies equalling 4.9% (for

⁹³ This section draws heavily on material collected during AGWA field research and on Killebrew *et al.*, 2010a.

a total protection rate of 37.4%). In spite of this level of protection, most of the largest broiler producers went out of business or shifted exclusively to egg production, the number of feed mills fell from 30 in 1988 to 12 in 2010, and of 16 hatcheries that were producing day-old chicks in the early 2000s, only 7 were still operating in 2011.

The growth of frozen chicken meat imports into Ghana has been phenomenal over the past 20 years, increasing from none in the period 1980–85 to an average of 70 000 mt per year over the period 2005–09. During this period, per capita availability of poultry meat increased seven-fold, from 0.7 kg/year to 4.8 kg/year, with 69% of the increase coming from imports (FAOSTAT). The competitiveness of the imports stemmed from several factors:

- » Low production costs in the exporting countries as a result of economies of scale, made possible in part by well-functioning and coordinated markets for inputs such as maize and soybean meal and contracting arrangements between integrators and producers that gave strong incentives for cost minimization.
- » The ability of the exporters to ship frozen chicken parts rather than whole birds to West Africa. This gave the imports a double advantage:
 - It allowed the exporters to Ghana (and other countries in West Africa) to segment their exports among different markets, selling the high-value parts such as breasts to high-income markets in the North that pay a premium for them while shipping lower-value products (such as wings and backs) to West Africa. For example, of 51 shipments of imported poultry recorded by the Ghanaian Veterinary Service Directorate in July 2011 (weighing just over 2 000 mt), 41% of the shipments and 44% of the weight were accounted for by chicken backs. The rest were largely wings and leg quarters (calculated from data collected during AGWA field research). In contrast, Ghanaian broiler producers had to sell their entire birds on the local market and did not have the option of sending the higher-valued portions to high-income markets in the North.
- The availability of frozen parts was more convenient for many consumers in that they could (1) purchase a small amount of chicken rather than a whole bird and (2) the chicken was already dressed, while many of the birds produced locally were sold live and had to be killed and dressed (see Chapter 7 for details). While Ghanaian commercial producers sell dressed birds, most sell them as whole birds, as only a handful have capacity to process them into cut parts (Killebrew, et al., 2010a). If they developed such capacity, they could begin to exploit a niche market for chilled, local chicken, but this would require major upgrading of their cold chains, quality control, and branding.
- » Export subsidies from Europe may have played a role in helping the frozen chicken get a foothold in the Ghanaian market.⁹⁴ Imports from the EU remain important, but Brazil is the largest exporter, and its exports are free of export subsidies.
- » The frozen parts are widely available, as any shop or market outlet with access to a freezer can stock and sell the imported chicken, as opposed to chilled or live chickens, which are generally available only in open markets or modern retail establishments.

The ability of the Ghanaian commercial broiler value chain to compete with imports has been further challenged by the variable quality of domestically produced veterinary drugs and day-old chicks and the high price of their imported counterparts, large variability in feed costs due to the feed/food competition for grain mentioned earlier, and operational challenges in terms of poor roads and unreliable electricity supply that increase costs and hinder the ability to process and distribute processed poultry to the main centres of demand (especially Accra).

94 As of late 2012, EU export subsidies on poultry stood at 325 Euros/mt (<http://www.bloomberg.com/news/2012-04-19/eu-to-cut-beef-export-subsidies-by-33-on-elevated-prices-1-.htm>). These subsidies have become a point of contention between the EU and Brazil. While the US pays no explicit export subsidies, some countries (e.g. China) charge that US farm subsidies to the grain industry drive down US feed costs, giving US poultry an unfair advantage in international markets (<http://www.nationalchickencouncil.org/statement-on-ustr-announcement-by-usa-poultry-egg-export-council-and-national-chicken-council-on-china-anti-dumping-case-on-chicken/>).

The response of the Ghanaian government to date has been to allow consumers to benefit from low international poultry prices in order to expand their consumption, even though a majority of the increase is captured by imports. Nonetheless, as per capita poultry and egg consumption in the country is increasing, due not only to lower chicken prices but also growing incomes, poultry numbers in Ghana have grown at a faster rate over the period 2001-03 to 2008-10 than any other country in the region except Sierra Leone, where the growth represents recovery from the civil war (Table 10.1).

As discussed in Chapter 12, the newly revised ECOWAS CET proposes to impose an import tariff on poultry meat of 35% rather than the current 20%. Given the cost differentials between Ghanaian and Brazilian producers, however, it seems unlikely that this modest increase in border protection will be enough to allow Ghanaian poultry producers to recapture the bulk of the domestic market (assuming that the VAT and other levies on imported poultry remain unchanged). A more realistic objective in the short- to medium-run is to focus on developing niche market strategies while addressing the basic structural constraints facing the value chain over the medium to long term.

*Nigeria.*⁹⁵ Nigeria's commercial broiler industry is much larger than that of any other country in the region, and is concentrated in the southern states surrounding Lagos. Since the 1980s, the Nigerian government also promoted semi-commercial production (known in Nigeria as "backyard production") as a poverty alleviation measure in the central and northern parts of the country. Faced with the increased international competition, Nigeria has taken a protectionist approach to defend those investments, banning imports of frozen chickens and eggs starting in 2002.

The impact of the import ban has been mitigated, however, by two factors. First, import bans on maize, soybean meal, and groundnuts in the context of special production initiatives for these products have driven up input costs for poultry

producers, offsetting some of the benefits of the poultry import ban. Second, the ban has created incentives for widespread smuggling of imported chicken from neighbouring countries, particularly Benin, into Nigeria. Benin has become the second largest importer of chicken meat in the ECOWAS zone (after Ghana), with imports exceeding 112 000 tonnes in 2009 (FAOSTAT food balance sheets). An estimated 90% of the total is re-exported clandestinely to Nigeria, often without refrigeration, raising serious public health risks (Killebrew, *et al.*, 2010b). The Poultry Association of Nigeria (as reported in AGWA field research) alleges that in order to preserve the chicken in the absence of a cold chain, smugglers often treat it with chemicals, some of which are carcinogenic.

While the protection allowed the Nigerian broiler industry to grow, consumer access to inexpensive poultry products has been much more limited in Nigeria than in Ghana. Whereas apparent per capita consumption of poultry increased sevenfold in Ghana between 1980-84 and 2005-09, in Nigeria it actually fell slightly, from 1.7 kg/year to 1.6 kg/year (see Chapter 5). Nigeria's experience thus illustrates some of the trade-offs policy makers face in balancing consumer and producer interests when designing food policies.

Burkina Faso. In contrast to Ghana and Nigeria, Burkina Faso has no large-scale commercial broiler operations, with production of eggs and broilers taking place in traditional and improved village-level systems and in semi-industrial units (with a maximum of 30 000 birds, but many with fewer than 1 000) located around Ouagadougou and Bobo Dioulasso, the two largest cities. The semi-industrial units are oriented primarily to egg production, while the improved village production supplies much of the urban market with chickens and with Guinea fowl eggs (ROPPA, 2012a; Schneider and Plotnick, 2010).

In contrast to the coastal states, imports of poultry products account for less than 1% of the market in Burkina Faso. The low level of imports is due to:

- » The country's natural protection thanks to its landlocked location. Ouagadougou is over 750

⁹⁵ This section draws mainly on material in Killebrew *et al.*, 2010b and from AGWA field research.

km from the ports of Lomé, Abidjan, Cotonou and Tema, with weak cold chain links between those cities and Burkina Faso. The high transport costs from the coast contribute importantly to the competitiveness of local production relative to imports.

- » Burkina's very strict enforcement of phytosanitary rules regarding avian diseases, which restricts imports from several countries.
- » Strong consumer preferences for locally produced, "traditional" chicken because of its flavour.⁹⁶

Table 5.4 in Chapter 5 shows that per capita availability of poultry in the country is 2.2 kg/person/year, about half that of Ghana but above the level in Nigeria. It appears unlikely that imports from abroad will displace local production to any great extent in the future. ROPPA, however, sees a threat to the village-level and semi-industrial production coming from the potential installation of larger commercial production units, driven by pressures from consumers, government, and major employers such as mining enterprises, to reduce the price of food in the country (ROPPA, 2012a). For such units to succeed, however, they would need to master the problems of obtaining stable supplies of consistent quality feed and other inputs, problems that have challenged current producers in Burkina Faso and commercial producers along the coast.

Future perspectives for the West African poultry value chain.

OECD/FAO outlook projections foresee the real prices of poultry meat remaining stable from 2012 through 2021, with poultry meat remaining the least expensive meat source on global markets. In West Africa, demand for poultry is likely to be pushed higher by the projected rise in global fish prices over the 2012-2021 period (OECD/FAO, 2012), which will induce fish consumers to shift towards cheaper sources of animal protein. The growth of international trade in poultry products is expected to slow from an annual rate of 5.5%

over the past decade to under 2% through 2021, with up to 89% of the increase in exports coming from low-cost producers Brazil and the US. These countries are low-cost producers not only because of their production technology but also because of the institutional arrangements in place to ensure reliable input availability and fulfilment of contractual obligations that are critical to the success of large-scale commercial poultry production. Such institutional arrangements are largely absent in West Africa.

It thus appears that while egg production will likely remain competitive in West Africa, it will be difficult for broiler producers in the coastal states to capture a large portion of the mass market from imports in the next five years in the absence of strong protection measures (high tariffs or outright import bans). Even with poultry moving to the higher "fifth band" of tariff protection (35%) under the proposed ECOWAS CET (see Chapter 12), it will be difficult for West African producers to compete with imports for the mass market unless the underlying structural challenges facing the value chain are addressed, and it will take time to do so. The market will remain segmented, with continuing demand for locally produced free-range birds for special occasions, and cheaper imported chicken and turkey parts (especially low-cost backs, necks and legs) meeting a demand for lower-cost and easily prepared meat. There is likely some scope to expand the niche market among upscale consumers for locally produced, well-packaged, and traceable chilled chicken, but this will require a significant upgrading of processing, packaging, distribution and branding. It is also important to continue to encourage "backyard" poultry production as a way of upgrading diets and incomes in rural areas.

The contrast between the experience of Ghana's and Nigeria's poultry value chains illustrate trade-offs faced by policy makers. Ghana, by allowing the inexpensive imports, has offered its consumers an additional source of inexpensive protein, and consumption has risen seven-fold, but many Ghanaian broiler producers, particularly commercial operations, have not been able to compete and have gone bankrupt or converted entirely to egg production. Nigeria, on the other hand, has

⁹⁶ These chickens are commonly referred to in Burkina Faso as "poulets bicyclettes" because they are often brought to market by vendors riding bicycles or motorbikes. The tradition across many income classes of consuming grilled chicken from roadside vendors and small restaurants further boosts the demand for local chickens.

protected its domestic commercial producers, but at the expense of stagnant per capita availability of poultry meat in the country and the exposure of Nigerian consumers to possibly dangerous imported products smuggled into the country in unhygienic conditions.

Landlocked countries, such as Burkina Faso (and Niger and Mali as well), will likely remain competitive with imports due to their natural protection, relying mainly on improved village-level and semi-commercial operations to supply most of the urban demand for poultry meat, with some larger-scale operations for egg production. Yet in these countries as well, improved contractual arrangements to ensure greater stability in the supply of critical inputs (particularly feed and veterinary supplies) will be critical to their long-term success—especially as transportation and cold chains that link these countries to the major ports improve over time and thus reduce the delivered cost of imported frozen poultry products to the inland markets.

10.1.4 Dairy Products

Current situation.

Even more than the poultry meat value chain, the dairy value chain is dominated by imports, particularly of milk powder, a substantial proportion of which is reconstituted into fluid milk or processed into products such as yoghurt in West African processing plants. Nigeria is the largest importer of dairy products in Africa, accounting for almost half of the imports into the ECOWAS zone. Nigeria is followed by Senegal, Ghana, and Côte d'Ivoire; these four countries absorb approximately 80% of total dairy product imports into the region (Lambert, 2012; AGWA field research). Even in a landlocked country such as Mali, 80% of the dairy products consumed in the Bamako area are derived from imported powder. Pastoral milk production, however, remains an important source of food and income generation (particularly for women) in more northern rural areas of Mali and neighbouring countries (Michigan State University Food Security Team, 2011).

Like poultry producers, dairy producers in West Africa operate in three different types of produc-

tion systems. In the northern parts of the region, pastoralists (mainly Fulanis) produce milk as part of a transhumance-based production system. The milk production is locally consumed, sold or bartered, often for grain; this enterprise is mainly the domain of women. The herds, based on zebu (*Bos p. indicus*) breeds, are managed for both dairy and beef. Milk production per cow is low, seldom exceeding a couple of litres per day, and highly seasonal, depending on pasture conditions. Over the past 20 years, as agriculturalists in the Sudano-Guinean zones have increasingly incorporated cattle into their farming systems, they have often hired Fulanis to manage their cattle for them, and milk production from these animals is similar to the system just described. A second system involves medium-scale production (from a few cows to a few dozen) in peri-urban areas in the Sahelian countries and northern parts of the coastal countries. This system involves both pure zebu breeds and crosses with European breeds. The producers, typically organised in cooperatives, sell to local small-scale dairy processors that in turn sell fresh milk and some processed products (e.g., fermented milk products) to urban consumers. Production is also seasonal, depending on feed resources, but these producers provide more purchased inputs to their animals, including feed concentrates, veterinary care, and sometimes artificial insemination. A third, and by far the smallest system, involves commercial production using imported European (*Bos p. taurus*) breeds. This production is largely concentrated in the few highland areas where these animals can survive without special housing or extensive veterinary treatments against trypanosomiasis and tick-borne diseases that are widespread in the coastal countries.

As detailed in Part II, the consumption of dairy products, including processed products such as yoghurts, is growing rapidly in the region and likely to continue to grow quickly in those countries experiencing strong economic growth. In addition to milk powder imports, there is also importation of UHT milk from abroad, as well as its local production from imported milk powder. For some of the processed products such as yoghurts, however, there are also substantial imports, as West African consumers are often wary of the quality of locally

produced products, even if they are based on imported milk powder.

The reliance on imports has been driven by the low cost and year-round availability of the imported products in contrast to local production, which varies substantially between rainy and dry seasons. The low cost is in turn due in part to the higher productivity of dairy herds based on *Bos p. taurus* breeds in temperate-climate countries as compared with the zebu breeds that predominate in West Africa. There are few areas in West Africa, such as the Jos Plateau in Nigeria, that are suitable for the higher-productivity temperate-climate breeds. Efforts to introduce them into other areas have led to the need for costly controlled environments, making production unprofitable, although in some areas cross-breeds between local and imported cattle have had some success. Production using local breeds in the coastal areas (where demand is highest due to the large cities) frequently runs into disease problems, such as trypanosomiasis and tick-borne maladies.⁹⁷ In addition to the inherent productivity advantages of dairy production in more temperate zones, substantial subsidies from OECD countries to their dairy industries – including export subsidies in the past – have put West African producers at a severe disadvantage.⁹⁸

In recent years, world prices of milk powder have increased sharply, hitting a record level of over US\$4 000/mt in 2007/08 (OECD/FAO, 2012). This, combined with rising per capita incomes, has led to expansion of commercial milk production in peri-urban areas of some of the landlocked Sahelian countries, based on small-scale processing plants supplied mainly by small-scale producers. In addition, there has been some expansion of commercial production in the Jos Plateau of Nigeria. This production is driven by a strong consumer preference in these areas for fresh milk (allowing the dairies

to charge a premium for their product) and a degree of natural protection due to their inland location. Cooperatives have played a key role in many of these efforts, both in input provision and in organizing milk assembly and processing. Major challenges remain, however, in ensuring access to quality feed year-round (lack of which leads to large seasonality in production) and in milk marketing (Michigan State University Food Security Team, 2011).

Future perspectives for the West African dairy value chain.

OECD/FAO projections foresee real prices of milk powder on the world market declining slightly from 2011 levels but remaining at a plateau of around US\$3 000/mt through 2021, well above the levels of US\$1 500–2 000 seen in the 1990s and early 2000s⁹⁹. While the higher prices of imports and the strong potential demand growth as incomes rise in West Africa may offer some scope for expansion of local dairy production, this will likely be confined to peri-urban areas in the inland countries and a few isolated highland areas such as the Jos Plateau, where disease problems are less than along the coast and where transport costs offer some degree of natural protection. In other areas, it is unlikely that West African producers, using either zebu or cross-bred cattle, will be able to compete with imported products that originate from intensive (and often subsidised) dairy systems in the North.

If West African dairy processors can assure local consumers of the quality of their products, however, there is likely strong potential for value addition through processing, based largely, but not exclusively, on imported inputs.

10.2 Value chains oriented towards exports

In contrast to rice, cassava, poultry and dairy products, which in West Africa are overwhelmingly oriented towards consumption within the region, cocoa and cotton are export commodities, with only a very small proportion of total production

97 Although India has been able to build the world's largest dairy sector based on zebu cattle, there are three critical differences between India's experience and the current situation in West Africa: (1) Indian producers did not face the problems of bovine sleeping sickness (trypanosomiasis) that severely limits production in more humid areas of West Africa; (2) the much higher human population density in India reduced per-unit marketing costs for milk, a highly perishable product; and (3) India's dairy development strategy in the 1960s and 1970s relied on heavy quantitative restrictions on imports, which would be difficult for West Africa to implement under WTO rules.

98 EU dairy export subsidies, which were substantial from the 1980s to the mid-2000s, had fallen to zero by 2012 with the spike in world prices for dairy products.

99 All prices are in 2005 dollars.

consumed in West Africa. Following the long-term decline of international prices for traditional West African agricultural exports such as cocoa and cotton and difficulties to maintain the quality and quantity of production following liberalization (described below), the attention of policy makers and donors shifted in the 1990s increasingly towards non-traditional exports, such as fruits, vegetables, and nuts. Despite some notable successes, the overall importance of non-traditional exports has remained limited. With rising global commodity prices, however, the prospects of traditional West African agricultural export crops have improved. These subsectors include large numbers of small farmers and have strong potential for contributing to overall growth and poverty reduction. Export markets for these products tend to be larger, and hence production increases are less likely to depress prices.

Effectively competing in global markets for these export crops requires the capturing of several types of scale economies, including:

- » Scale economies in maritime shipping and meeting minimum order size of overseas buyers.
- » Implementing systems of quality assurance to meet export markets' increasing demands for quality in terms of traceability and assurance of compliance with various production standards – for example with respect to labour conditions and environmental sustainability.
- » Implementing disease control measures industry-wide in situations where compliance by all producers is necessary to prevent outbreaks that could threaten the productivity and reputation of the country as a reliable exporter (e.g. spraying programmes in the cocoa industry).

To the extent that the raw products are processed domestically before export, processors face the same problems of ensuring reliable supplies of raw material and other inputs as described earlier for large-scale processing of cassava and rice. On the other hand, developing systems to capture

these scale economies and ensure vertical coordination may be easier in export crop value chains than in value chains oriented primarily towards domestic consumption. Export commodities typically move through only a few ports, making the marketing channels less complex than those for domestically consumed foods, which are sold in hundreds of thousands of locations across the region. There are also frequently fewer buyers for the export commodities, which reduces the problems of farmers' not respecting delivery commitments (side-selling), but which also opens the door to farmers' not receiving competitive prices for their output. The existence of constriction points in export value chains makes it easier to use indirect cost recovery mechanism for value-chain financing, e.g., through marketing assessments or export taxes. Unfortunately, such systems are prone to misuse, as the following discussion will illustrate. Nevertheless, financing arrangements within export crops can have important spill-over effects such as the use on food crops of fertilizer obtained through the export-crop value chain or the linkage of farmers to mutually owned financial institutions linked to the export crop but catering to the broader financing needs of the farm household.

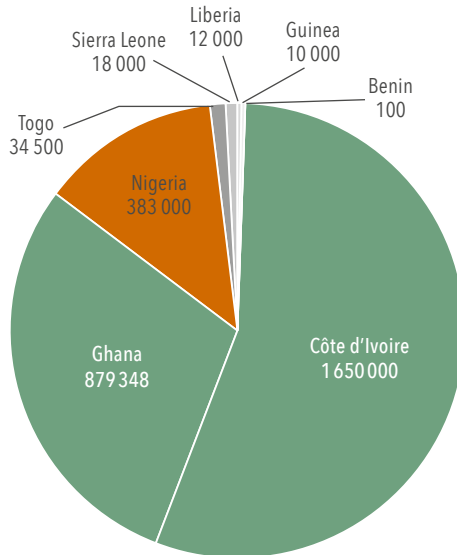
10.2.1 Cocoa

As shown in Chapter 4, cocoa is by far West Africa's leading agricultural export, and the region is the dominant force in world markets. Three West African countries – Côte d'Ivoire, Ghana and Nigeria – along with Cameroon accounted for 58% of global production in 2009/10, with Côte d'Ivoire – the world's largest producer – alone accounting for over one-third (FAOSTAT).¹⁰⁰ Other West African producers include Togo, Sierra Leone, Guinea, Liberia, and Benin (Figure 10.3). Some of these countries have important cocoa plantations that were abandoned during civil conflicts and are now being revitalized. In West Africa, 90% to 95% of all cocoa is produced by smallholders with farm sizes of two to five hectares. Production is labour-intensive, with little farm-level mechanization (Traoré, 2009). A general problem in many producing countries is the aging of trees,

¹⁰⁰ Other major global producers, in order of importance, are Indonesia (the third largest producer after Côte d'Ivoire and Ghana), Brazil, Ecuador, and Malaysia.

resulting in falling productivity levels. However, the potential for substantial productivity increases even in old trees by applying inputs and improved agricultural practices has been demonstrated in Ghana and, more recently, Liberia.

Figure 10.3 West Africa cocoa bean production, 2012 (in mt)



Source: FAOSTAT data.

While the majority of cocoa continues to be exported in the form of beans, in-country grinding of beans to produce cocoa powder and cocoa butter for export and the domestic markets has been growing over the past 30 years. West African governments have encouraged investments in grinding capacity by both international and local firms – e.g. through lower export taxes in Côte d'Ivoire for exporters who process some of their beans in-country – in order to capture more of the value added from the value chain. Worldwide, cocoa grindings in producing countries accounted for 37% of the global total in 2005/06, and by 2011, Côte d'Ivoire had overtaken the Netherlands as the world leader in cocoa grinding capacity (Lambert, 2012; Agritrade, 2012).¹⁰¹ Cocoa processing is capital intensive, and the industry is dominated by large multinational firms.

¹⁰¹ The government of Côte d'Ivoire has set a target of increasing grindings from 35% of its total crop in 2012 to 50% by 2015.

Vertical coordination challenges in the cocoa value chain.

Several characteristics of cocoa production have important implications for the vertical coordination challenges faced in the value chain.

1. Cocoa is a perennial crop. Once planted, a cocoa tree takes at least three years to enter into production, and trees stay productive for up to 30 years. Because of the time lag between planting new trees and their becoming productive, supplies expand only slowly in response to higher prices. Once the trees are productive, however, they continue to produce, so although farmers can take actions that affect their yields, production generally falls only slowly in response to lower prices.¹⁰² These rigidities in supply response contribute to cyclical price fluctuations that are typical for perennial crops and for meat production.
2. Once harvested, farmers extract the seeds from the pod, ferment them for several days (which creates the chocolate flavour) and then dry them before sale. The care with which these operations are carried out has a large effect on the quality of the beans. Because buyers obtain beans from many different farmers and the beans are usually pooled, farmers who are not careful in the post-harvest operations can impose large costs on those who are careful by degrading the quality of the entire pool. Therefore, to maintain quality, value chain participants must devise and enforce incentives for careful quality control, especially at the farm level.
3. Traceability concerns are rising among buyers of cocoa in industrial countries, e.g. with respect to sustainable production practices and non-use of child labour. Addressing these concerns requires tighter coordination among stakeholders in the value chain.
4. Disease control is critical in maintaining tree productivity and quality, and disease in one

¹⁰² Officially recorded production in an individual country may fall more in response to low prices than does actual production, as farmers frequently smuggle their cocoa to neighbouring countries where prices are higher.

grower's trees can spread easily to a neighbour's. Thus, there is need for collective efforts at disease control, typically through spraying.

5. Once in the hands of the buyer, the beans are sorted and stored. The dried beans are then shipped to a domestic or overseas processor to be shelled and roasted. The beans are ground into cocoa liquor (or paste) and then refined to produce cocoa butter and cocoa cake. Cocoa cake is used to make cocoa powder. Chocolate is made by mixing cocoa butter with cocoa liquor, an extract from cocoa cake and other ingredients, such as sugar and milk. While cocoa butter can be substituted by many other vegetable fats, such as palm or shea oil, cocoa powder has no substitute. Hence, in reality, cocoa processors face two separate markets, one for cocoa butter in which they face competition from other vegetable oils, and one for cocoa powder, which has no substitutes.
6. There are large scale economies in the assembly, processing, and sale of cocoa beans and cocoa products on international markets compared to the optimal scale of farm-level production. The scale economies in international marketing reflect both technical issues (such as scale economies in maritime transport) and the minimum lot size for the major cocoa auction markets and the large international firms that buy cocoa. One of the original justifications for creating marketing boards for cocoa and similar crops in West Africa was to assist small farmers in connecting to this international market effectively and to provide them with some countervailing bargaining power in international markets. In reality, once created, these boards became tools for taxing cocoa farmers, frequently buying at low prices and reselling on the international for much higher prices.

Different policy approaches to cocoa: Nigeria, Ghana, and Côte d'Ivoire.

At independence, the three major cocoa producers in the region, Nigeria, Ghana, and Côte d'Ivoire, opted for state control over the cocoa value chain,

both to deal with some of the structural issues discussed above and because control of cocoa exports represented a convenient way to generate substantial government revenues. As discussed in Chapter 11, all three countries taxed their export-crop sectors heavily; for example, prior to liberalization, cocoa generated 20% of government revenue in Côte d'Ivoire (Traoré, 2009). The models of government control differed across the three countries. Nigeria and Ghana opted to use the Cocoa Marketing Boards that had been established under British colonial rule. These boards held the monopoly on all cocoa purchases in the country and all export trade. Each board set pan-territorial prices for its country for the cocoa they purchased from farmers and attempted to stabilize prices paid to farmers. The boards had the potential to stabilize farm-level prices, albeit at a low level, because they earned substantial margins on their marketing operations; for example, in 1993, Ghanaian producers received only 30% of the FOB¹⁰³ price of their cocoa (Ruf, 2009).¹⁰⁴ The boards also provided extension services to growers and spraying to control black pod disease. As part of their marketing activities, the boards also instituted grading and quality control measures, typically at rural assembly points, that resulted in Nigerian and Ghanaian cocoa earning a reputation for high quality in international markets in the 1960s and 1970s.

In contrast, Côte d'Ivoire's marketing agency, the *Caisse de Stabilisation et de Soutien des Prix des Produits Agricoles (CSSPPA)*, authorised licensed buying agents of exporters (known as *traitants*) to purchase the cocoa from growers. The CSSPPA specified the producer price (which was established each year on the basis of production costs rather than world prices) and payment schedules for *traitants* to remunerate them for their marketing services. The CSSPPA also established an export reference price. If the exporter negotiated a price with international buyers higher than the reference price, the exporter paid the difference to the CSSPPA; if the negotiated price was less than the reference price, the CSSPPA reimbursed the

¹⁰³ Free on board

¹⁰⁴ The three countries also participated in international efforts to stabilize the price of cocoa through the buffer stock scheme run by the International Cocoa Organization (ICCO). The ICCO's efforts, however, like those of most other international commodity agreements, failed, and the ICCO's last stocks were liquidated in 1997 (Traoré, 2009).

exporter the difference. Quality control was left in the hands of the *traitants* (Traoré, 2009).

Nigeria's reforms. In 1961, Nigeria accounted for 18% of world cocoa exports. By 2011, it accounted for less than 1% (Nigeria Federal Ministry of Agriculture and Rural Development, 2011). From the 1960s through the mid-1980s, the heavy taxation of cocoa farmers through the marketing board system; sharp declines in world cocoa prices following the commodity boom of the mid 1970s;¹⁰⁵ overvaluation and non-convertibility of the naira; and the outflow of resources from agriculture that accompanied Nigeria's oil boom all contributed to sharp declines in Nigeria's cocoa production and exports. In addition, some production was smuggled to neighbouring CFA franc countries to earn convertible currency. As a result, the revenues of the Nigerian Cocoa Board (NCB) fell sharply, reducing its ability to deliver services to farmers. In 1986, as the broader economic crisis in Nigeria worsened, the country adopted a structural adjustment programme (SAP). As part of the SAP, the NCB was abolished and the value chain was opened to private traders (*ibid.*).

The abolition of the NCB had mixed effects. On the one hand, prices, production, and exports all increased. For example, recorded production increased from 150 000 mt in 1987 to 253 000 mt in 1988 (FAOSTAT), although it is likely that some of this increase in recorded production reflected cocoa that in previous years was smuggled out of the country now being exported through Nigeria. Farmers' share of the FOB price soared from around 20% prior to the reforms to 70%. On the other hand, with the elimination of the NCB's quality-control activities, the quality of Nigerian cocoa quickly declined and so did the price premium that Nigerian cocoa previously enjoyed on international markets. A large number of new actors entered the trade, many of whom were interested primarily in trading the liberalized products to gain foreign exchange to import other commodities rather than building long-term business relationships in the value chain. As a result, the reliability of shipments to

international buyers also fell sharply, making it increasingly difficult for Nigerian exporters to sell future delivery contracts, which were now seen as very risky. Consequently, although prices rose for farmers, so did price volatility. In addition, Nigerian cocoa processors, who had previously been aided by low domestic prices, found it increasingly difficult to compete with exporters for beans, and many had to reduce production or close (Traoré, 2009).

Today, Nigeria's cocoa value chain beyond the farm level is characterised by a mixture of large multinational firms, engaged in both export of beans and local processing, and some small and medium-scale firms involved in processing cocoa that goes into locally produced beverages. In 2011, the Nigerian government included cocoa as one of the key commodities in its new Agricultural Transformation Agenda (see Chapter 11). The aim is to double cocoa output by 2015 through expanding plantings (adding 100 000 to 150 000 new ha of cocoa production) and providing farmers with improved seedlings and expanded access to fertilizers. One of the reasons for inclusion of cocoa in the Transformation Agenda is the labour intensity of production. The Agenda estimates that 185 000 new jobs will be created across the value chain between 2012 and 2015 if the production targets are met (Nigeria Federal Ministry of Agriculture and Rural Development, 2011). The Agenda argues, however, that in order to succeed, some entity needs to take the lead in ensuring the quality control and extension functions that were formerly assured by the NCB. The Agenda calls for the creation of Marketing Corporations, "owned by the value chain", that could fulfil this role, citing the Ghana Cocoa Board (see below) as an example of a possible model.

Ghana's reforms. The history of Ghana's cocoa value chain up through the mid-1980s parallels that of Nigeria in many ways. Ghana's cocoa marketing board, known as the Cocobod, held a monopoly on all internal trade and exports of cocoa. From the early 1960s to the early 1980s, officially recorded production fell by 60%, and Ghana's share of the world market fell from 35% to 10%. By 1977, Côte d'Ivoire had surpassed Ghana as

¹⁰⁵ The wholesale price of cocoa on the New York exchange fell from over US 3 200 per mt in 1977 to just over US\$1 500 per mt in 1982 (Ruf, 2009).

the world's largest cocoa producer (Traoré, 2009; Ruf, 2009). In 1983, Ghana began its Economic Recovery Programme, supported by the World Bank and the IMF, which addressed many of the country's macroeconomic problems such as the overvaluation of the cedi and recurrent government budget deficits. The cocoa sector responded to the improved economic climate, which, by reducing overvaluation of the currency, resulted in higher producer prices. Production increased from 168 000 mt in 1983 to over 312 000 mt in 1992 (FAOSTAT). Taxation of the sector remained high, however, with growers only receiving 30% of the FOB price in 1993 (Ruf, 2009). In 1992/93, in hopes of further stimulating cocoa production, Ghana launched a partial liberalization of the value chain. The Cocobod authorised Licensed Buying Companies (LBCs) to purchase cocoa from farmers as long as they respected the minimum prices set by the board; they also were obliged to sell to the Cocobod at fixed prices, which essentially fixed marketing margins. The Cocobod retained its quality-control role, verifying close to the farm level the grades and weights of beans bought by the LBCs. The Cocobod also maintained its role in providing extension and spraying programmes.

Ghana's partial liberalization thus created a marketing structure in rural areas similar to that which existed in Côte d'Ivoire prior to that country's liberalization of its cocoa value chain. One main difference was that in Ghana, quality control remained in the hands of the marketing board rather than in the hands of the individual buyers. The Cocobod also helped organise large bidding packages for fertilizer each year, leading to lower input prices for farmers.

Since the Cocobod essentially sets output prices throughout the system, the LBCs compete mostly on non-price terms for beans, offering farmers timely cash payments, extending credit, providing extension information, and providing inputs on favourable terms. The reforms were accompanied by a falling rate of taxation on cocoa exports and other export crops (see Chapter 11); by 2007, Ghanaian growers were receiving 70% of the FOB price of their beans. As the attractiveness of cocoa production grew, the number of LBCs operating

in rural areas increased, resulting in a more competitive market (Anang, 2011). In a survey of 80 randomly selected cocoa farmers in Western Ghana in 2008/09, 93% ranked the performance of the LBCs highly and said that the reforms had improved the cocoa marketing system (Anang *et al.*, 2011). Particularly important has been the continued involvement of the Cocobod in disease control (the board has provided free mass spraying programmes since 2001) and quality control. Ghana cocoa continues to receive a quality premium on international markets well above that offered for Ivorian and Nigerian cocoa.¹⁰⁶ Ghana has also worked to increase the proportion of the crop that undergoes initial processing domestically. After independence, Ghana nationalized all grinding mills, but with the liberalization it has opened up to private investment. In 2009, the country ground approximately 150 000 mt, or 21% of its total cocoa bean production, and the private firm Cargill built a new plant at Tema with an additional 65 000 mt of capacity (Traoré, 2009).

Côte d'Ivoire's reforms. The decline of world cocoa prices from the mid-1980s through the early 1990s, combined with an ill-advised attempt by the Ivorian government to withhold cocoa from the world market in an attempt to drive up prices, contributed to a profound economic malaise in the country. In response, the government first authorised a partial liberalization of the sector in 1995/96, authorizing private firms to export cocoa and limiting the CSSPPA to 15% of the export market. In 1999, the CSSPPA fully withdrew from cocoa marketing; its role was reduced to that of an advisory and regulatory agency, and it was subsequently disbanded. With the withdrawal of the CSSPPA from the market, all price-stabilization efforts of the government ended and farm-level prices became linked to world prices, resulting in greatly increased price volatility at the farm level. At the same time, export taxes remained high, holding down producer prices. The market became increasingly dominated by multinational firms. In the initial years after the reforms, however, vertical coordination decreased,

¹⁰⁶ The Cocobod also is in charge of marketing Ghana's shea nuts and shea butter. This market has strict quality standards, as improper processing can lead to the presence of carcinogens that exclude the product from lucrative foreign export markets. Ghana is the recognised leader in West Africa for its work with producer groups to ensure that its shea products meet those standards (Perakis, 2009).

as these firms were not able to work out long-term supply arrangements with growers, who focused primarily on selling to whoever offered the best short-run price; as a result, the average quality of cocoa produced declined (Losch, 2002). In more recent years, firms such as Nestlé have expanded efforts to launch extension programmes with growers as part of initiatives to help secure their supplies and improve quality in the face of growing world demand for cocoa (Lucas, 2012).

Remarkably, despite the turmoil and civil war in Côte d'Ivoire from 1999 through 2010, cocoa production continued unabated (varying between 1.2 and 1.4 million mt/year) and investment in domestic grinding capacity increased. Rural infrastructure declined, however, and many aging trees were not replaced. As a precondition for IMF debt relief, in November 2011, the Ouattara government launched a further reform of the Ivorian cocoa sector, with the aim of restoring some of the price stability lost with the abolition of the CSSPPA and improving vertical coordination in the value chain.¹⁰⁷ The reforms involve three pillars:

- » The establishment, in 2012, of a central body, the Conseil du Café-Cacao (CCC), composed of representatives of all value-chain stakeholders, responsible for the management, regulation, development and price stabilization of cocoa.
- » The establishment of a new marketing arrangement whereby all exporters are required to engage in the forward sale of 70 to 80% of the next-year's crop through twice-daily auctions. The forward sales are intended to allow the establishment of a benchmark price for growers and ensure farmers a guaranteed minimum share of 60% of the CIF¹⁰⁸ price.
- » The establishment of a reserve fund at the Central Bank of West African States (BCEAO) to cover risks beyond the normal operations of a price guarantee system – aimed primarily at allowing orderly adjustment in case of a major drop in world prices.

In addition, the reforms have abolished a major tax break given to exporters who grind some of their beans in-country. Exporters who ship all their beans overseas for processing had argued that this tax break put them at a major disadvantage in sourcing beans in Côte d'Ivoire. Its abolition may slow down the recent rapid expansion of grinding capacity in the country.

Challenges and perspectives for the cocoa value chain.

West Africa remains a dominant producer in the world cocoa market, and it is also accounting for an increasing share of world cocoa grindings. Demand for cocoa products is growing, particularly in Eastern Europe and Latin America, and there is a growing market in high-income countries for high-quality chocolate products that are certified as having been produced under environmentally sustainable conditions. Ghana has been able to exploit some of this high-end demand through the creation of its “Ghana Quality” label for its beans and cocoa powder. There is also some scope for further value added through expanded production of cocoa-based beverages in countries like Nigeria and Ghana, where demand is growing. Further expansion into confections, however, is unlikely given the domination of European and North American firms in this part of the industry.¹⁰⁹ In Côte d'Ivoire and Nigeria, the grinding industry and the export of beans are dominated by multinational firms, so the scope for expansion of local processors, at least in the initial, highly capital-intensive grinding industry, is small.

The experiences of Nigeria, Ghana, and Côte d'Ivoire illustrate the challenges in developing institutional arrangements for addressing scale economies, structural vulnerability of growers to price instability (given the long-term nature of their investment in trees) and vertical coordination in the value chain. The three countries created various forms of state marketing agencies to try to address these challenges, but in the absence of effective measures for growers to discipline the behaviour

¹⁰⁷ The following discussion is drawn from Agritrade, 2012.

¹⁰⁸ Cost, insurance and freight

¹⁰⁹ The trend in recent years has been for international chocolate manufacturers to outsource more of their cocoa grinding to producing countries, while concentrating on confection manufacturing, new product development, and marketing (Traoré, 2009). The manufacture of chocolate confections is more difficult in warm climates, given the low melting point of chocolates, which then require refrigerated storage to maintain their integrity.

of these agencies in the years following independence, the boards became primarily tools for resource extraction from the sector and were often plagued by inefficiencies in their operations. The experiences of Côte d'Ivoire and Nigeria in abolishing their boards, however, have shown that in the absence of new arrangements to address these structural problems, simply liberalising the sector does not necessarily lead to good performance. Both Nigeria (via the proposal to create Marketing Corporations) and Côte d'Ivoire (via the creation of the CCC) are now moving back towards greater state involvement in managing the value chain, in part inspired by Ghana's reform of its Cocobod.

There are also increased efforts by multinational processors to develop long-term relationships with growers to increase productivity, quality and traceability, including certification of compliance with sustainable production practices and the non-use of child labour.¹¹⁰ For example, the Sustainable Tree Crops Programme is a public-private partnership managed by IITA with support from USAID and the World Cocoa Foundation, which is funded by the chocolate industry. The programme seeks to "maintain increased productivity of high quality tree crop products, over the long term, with an emphasis on farm rehabilitation and reclamation of deforested land; improve efficiency in the marketing chain, so that it delivers fair prices to farmers and quality products to end users; make African tree crop products competitive in international markets; improve the socio-economic situation of farmers; and conserve the natural resource base and biodiversity."¹¹¹ The challenge will be to develop such arrangements that share risks and returns equitably among the different stakeholders in the value chain.

Given the importance of cocoa export tax revenues for the major producing countries, there

has been very little discussion in West Africa of allowing cocoa buyers to source beans from any country in the ECOWAS zone, in spite of the Community's principle of the free movement of goods within the zone. Yet as grinding capacity increases in West Africa, grinders will have a growing interest in sourcing beans regionally rather than just nationally. In reality, some regional sourcing has always occurred, as farmers and traders frequently smuggle beans across borders based on relative prices. An important policy question for the future is whether such regional sourcing will be legalized, which would then require harmonization of price stabilization programmes across the producing countries.

10.2.2 Cotton in francophone West Africa¹¹²

Cotton in the francophone countries was one of West Africa's first "green revolutions", with yields quadrupling over a 40-year period and production expanding even more rapidly. In 1960, the countries of the CFA franc zone of West and Central Africa accounted for only 1% of the world's cotton fibre production and 11% of the production in sub-Saharan Africa. Over the next 40 years, production grew at a compound rate of 9% per year, and by 2000 these countries accounted for 4.4% of total world production and 69% of that in sub-Saharan Africa (Tefft, 2010). By 2010, the CFA franc zone of West and Central Africa had become the second largest cotton exporter in the world after the United States, and cotton was a major source of income for over 2 million West Africans (Lambert, 2012).

Since the early 2000s, the sector has faced crisis due to several causes, prompting a restructuring of the value chain in most countries. Understanding the reasons for cotton's initial successes and subsequent difficulties yields insights into broader

110 Concerns about the use of exploitative forms of child labour in cocoa production, particularly in Côte d'Ivoire, became a major issue in North America and Europe in the early 2000s. In response to these pressures, the major international chocolate manufacturers signed a voluntary protocol (the Harkin-Engel protocol) aimed at eliminating all child slavery from cocoa production by 2005 and removing the "worst forms of child labour" from the industry. The major chocolate companies, working through the World Cocoa Foundation, developed certification systems with growers in order to comply with the protocol. In recent years, the concerns about child labour have resurfaced. In November, 2012, the chocolate manufacturer Hershey was sued by a stockholder group that alleged the company was knowingly sourcing beans from farmers in West Africa who did not comply with the Protocol (Hsu, 2012).

111 <http://www.cocoaafederation.com/issues/stcp/index.jsp>

112 Nigeria historically has also been a major cotton producer in West Africa; over the period 2001-10, it was the second largest producer in the region after Burkina Faso, closely followed by Mali (FAOSTAT). However, Nigeria's cotton value chain has been characterised by low yields and falling employment over time. While Nigeria has historically processed a much higher percentage of its cotton production domestically than have the francophone countries, of 175 textile firms that existed in 1980, only 25 still existed in 2012 (Lambert, 2012). The Nigerian government has concluded that the past performance of the cotton sector has been poor, and has targeted it for major changes under the new Agricultural Transformation Agenda (Nigeria Federal Ministry of Agriculture and Rural Development, 2011). Since the purpose of this section is to focus on a value chain that has been regarded, at least during part of the postindependence period, as a major success, we concentrate on the cotton experience in the francophone countries.

economic coordination issues facing West African Agriculture.

*Key elements of the francophone model*¹¹³

The French introduced cotton growing as a commercial enterprise in West and Central Africa during the last decades of the colonial period as part of a strategy to supply cotton to the French textile industry. As part of that strategy, the French government created a government-owned parastatal, the CFDT (Compagnie Française pour le Développement des Fibres Textiles), to develop the cotton system as an integrated supply chain, from the provision of inputs to farmers to the sale of lint to the textile firms. The basic CFDT model remained in place in most of the francophone countries until the early 2000s. The CFDT itself remained as the chief actor in the cotton value chains of the countries until the early 1970s, when its operations were nationalized; it remained, however, a major stakeholder in the national companies that emerged out this process, such as the CMDT in Mali (Compagnie Malienne pour le Développement des Fibres Textiles).

The key elements of the integrated model of cotton production in these countries were the following:

- » Cotton was promoted among smallholders, who typically grew cotton in rotation with coarse grains (millet, sorghum and maize), and cotton usually did not exceed one-third of their area in any given year. The cotton companies developed extension recommendations that took account of this type of farming system and often explicitly developed efforts, such as the CMDT-supported maize programme in the mid-1980s, to boost productivity of the entire farming system, not just cotton.
- » The CFDT and later the national companies held a legal monopoly on all cotton purchases and ginning in the country. The overwhelming majority of the lint was exported via a subsidiary marketing firm and cotton seed was processed by other company-owned subsidiaries to produce oil (for soap and human consump-

tion) and cotton-seed meal, which was used for animal feed.

- » The cotton company announced a guaranteed purchase price before planting season and provided inputs (seed, fertilizers and pesticides) to the farmers on credit along with extension advice. Thus, unlike almost any other crop, farmers had both a guaranteed market and a price known before planting, along with access to inputs on credit.
- » Because the company had a monopsony on purchases, at harvest time it deducted the credit owed for inputs from the payment to the farmers for their cotton, solving the widespread problem in other agricultural value chains of credit recovery.
- » Through the 1990s, the farm prices were set with only a weak link to world prices, allowing the companies to offer a degree of price stabilization. In years of high world prices, the companies accumulated surpluses that were drawn upon (sometimes with additional funding from national governments) to support farm prices when the world price of cotton declined.
- » The CFDT-affiliated system of national companies was linked to an international cotton research effort supported by the French government. In 1946, the French established a cotton and textile research institute, IRCT (Institut de Recherche Cotonnière et des Fibres Textiles Exotiques), which was later merged with the French Agricultural Research Centre for International Development—CIRAD (Centre International de Recherche Agronomique pour le Développement). The IRCT/CIRAD research system, linked later to national agricultural research systems, carried out varietal selection and production-systems research across West and Central Africa, gaining regional economies of scale in a research effort that contributed strongly to the rapid growth in yields. For example, of the six major varieties grown by Malian farmers in the early 2000s, at a time when Mali was the largest cotton producer in sub-Saharan Africa, only one was

¹¹³ The following paragraphs draw heavily on Gergely and Poulton, 2009 and Tefft, 2010.

developed in Mali, the other five having come from research efforts in neighbouring countries.

- » Starting in the 1970s in Mali and spreading to other countries, the cotton companies began encouraging the growth of village associations/cooperatives and hired them to handle much of the initial cotton assembly from farmers and the provision and recovery of credit.¹¹⁴ The associations invested part of the revenues earned from these operations into village schools, health centres and wells. In addition, to help improve the management of the associations, the companies (especially in Mali) provided functional literacy programmes for adults in the cotton areas.
- » In some countries, particularly Mali, the cotton companies were given broader rural development mandates for the zones in which they operated. Some of the activities contributed directly to cotton production, such as developing training programmes for local blacksmiths to manufacture and repair animal-traction equipment, and some involved actions such as construction of feeder roads that not only helped expand cotton production but also had broader development impacts.

Cotton revenues played a major role in capitalizing farms in the cotton zones through the financing of farm equipment (particularly animal-traction equipment), fertilizer – some of which was used on other crops – and veterinary inputs and services. As a result, cotton growers also expanded production of other crops and livestock. For example, those farmers most involved with cotton production in Mali's CMDT zone also produced the bulk of the marketed surplus of rainfed cereals in that area during the late 1980s (Dioné, 2000).

Increasing difficulties: was the system a victim of its own success?

As cotton production grew rapidly in the CFA franc zone, the cotton companies began to face increasing difficulties. As the companies grew, so

did their management problems. These were aggravated starting in the mid-1980s when the world cotton price started to fall, due in part to changes in US domestic cotton support policies and to China shifting from being a net importer to a net exporter of cotton. The increasing overvaluation of the CFA franc further eroded the competitiveness of West African cotton. Given the large number of farmers now growing cotton, the companies found it increasingly difficult to support the farm price without incurring substantial losses, and increasingly turned to national governments for support. Governments responded by establishing performance contracts (*contrat plans*) for the companies, but these were not wholly successful in improving performance due to the opacity of the cotton companies' accounting systems, which made it difficult to establish reliable estimates of their costs (Tefft, 2010).

The 1994 devaluation by 50% of the CFA franc provided a temporary respite to these problems, as the international price of cotton denominated in CFA francs jumped. Farmers responded by expanding areas planted, but yields stagnated, in part because the price of imported inputs also jumped with the devaluation. The recovery, however, was short-lived, as world prices began to decline again in 1995. In addition, given the size and the resources controlled by the companies, they became increasingly subject to political pressures and manipulations in the countries, pressures that increased as the countries democratised. This was epitomised by the "disappearance" in 2000 of the Malian company's US\$36 million stabilization fund at a time when prices in the country had fallen precipitously. Many in the Malian press attributed the disappearance, which was never fully explained by the company or the government, to its being used to finance the electoral campaigns of leading politicians. In part in response to these problems, increasingly autonomous farmer organizations began to demand a greater voice in price-setting and other management decisions in the value chain.

Falling world prices, due in part to continuing subsidies to cotton growers in the US, and increased management problems in the cotton companies in the early 2000s hit the value chain

¹¹⁴ The initial development of farmer associations in the cotton area in Mali grew out of farmers' discontent with what they perceived as dishonest weighing and grading of raw cotton at the village level by CMDT agents. For details, see Tefft, 2010.

hard. Production of cotton lint in the West African CFA-zone countries fell by 200 000 mt between 1998-2000 and 2001-2003, half of the decline attributable to a boycott of cotton production by Malian farmers in 2001 that resulted from a cut in the farm price that was brought about in part due to the disappearance of the stabilization fund. Malian production fell by 50% in 2001/02 (FAOSTAT; Tefft, 2010). These problems led to strong pressures to restructure the system, with the World Bank calling for liberalization of the sector, arguing that competition among buyers would lead to higher farm prices and better company performance. Many government and farm leaders resisted, fearing, among other things, a collapse of the input delivery/credit system if the single-channel marketing system was broken up.¹¹⁵

The proposed reforms included: (1) strengthening of farmer associations and their increased involvement in providing critical services, (2) opening of ginning and input supply to private actors, (3) gradual withdrawal of the government from the management of the cotton sector and the parallel empowerment of cotton sector “interprofessional committees” (IPCs) and (4) introduction of price-setting mechanisms that attempt to ensure a better link between farm prices and world prices (Gergely and Poulton, 2009). As part of its reforms, Burkina Faso also proposed to link its pricing mechanisms to a national “smoothing fund” to be managed not nationally but at the BCEAO, which would be aimed at avoiding brutal year-to-year changes in the producer price. This proposal looks similar to the price stabilization tool proposed in the most recent reform of the Ivorian cocoa value chain discussed above.

What has emerged from the reform process thus far is a mixed picture across countries. In most countries, the cotton-seed processing plants formerly owned by affiliates of the national cotton companies have been sold to private operators. Benin and Burkina Faso have both opened ginning and input provision to private entities,

but have yet to allow ginners to compete among themselves for seed cotton supplies.¹¹⁶ Benin appears to be moving in the direction of shifting from a public monopoly to a private monopoly. In Mali, the plan has been to liberalize the CMDT by creating four separate companies, each with a monopoly in its own area of operation, but to date the sale of the CMDT has not gone forward. In most countries, there has been some movement to create the IPCs, but it is not clear that they have the capacity to date to provide the type of vertical coordination previously provided by the integrated system. National governments also appear reluctant to relinquish control over the sector, given its economic and political significance for the countries. For example, while Burkina Faso has allowed private ginners, as of 2009 they processed only 15% of total output, and SOFITEX, in which the state retains 35% ownership, remained by far the largest ginner in the country (Gergely and Poulton, 2009).

Challenges and perspectives for the cotton value chain.

Stakeholders in francophone West Africa are searching for a new model of organizing the cotton value chain that builds on the successes of the previous integrated system but that is globally competitive and accountable to farmers and taxpayers. Key contributors to past success included:

- » A sustained government commitment, spanning 40 years, to building the value chain, including investing in research, local infrastructure and support services.
- » The tight vertical coordination throughout the system that linked input supply, extension, a regional research system and output marketing.
- » The commercial orientation of the CFDT, which promoted cotton as a business enterprise to farmers and not just a rural development project.
- » The increasing emphasis over time to strengthening farmer organizations and empowering

¹¹⁵ Experience in other African countries that have liberalized their cotton sectors has shown that credit recovery has often become a problem once such single marketing channels have been abolished. See Tschirley *et al.*, 2009, for details.

¹¹⁶ In Burkina, each private ginner operates in its own exclusive zone, while in Benin seed cotton is allocated to ginners administratively.

them to play a key role as part of a vertically coordinated system.

The dilemma facing stakeholders is how to design financially sustainable institutional arrangements that capture the vertical coordination and economies of scale of the prior integrated system, but that also face enough internal and external discipline to hold down costs, offer attractive prices and related services to stakeholders, and promote technical advancement. In many ways, the dilemma is similar to that facing the cocoa value chain discussed above. It is not apparent that replacing the national monopolies of the state-directed cotton companies with private monopolies, either on a national or subnational level, will lead to better performance. The maintenance of the monopolies, even in subnational zones, is linked to the need for assured credit recovery. An alternative would be to run all input loans and payments to farmers for their cotton through a single banking clearinghouse through which all cotton companies would operate. Such an arrangement would ensure credit recovery while allowing the companies to compete with each other for seed cotton. It would require, however, mandatory participation by all the cotton companies. To date, such a proposal has not been part of the reform programmes.

It remains to be seen whether the IPCs will be able to promote the level of coordination that the national companies provided. The IPCs are still young, and it is not clear how much authority they will be granted to act autonomously from government. It seems highly unlikely at this stage that they would be able to organise the type of regional research programme operated by the previous system.¹¹⁷

In addition to these organizational issues at the national level, three issues will become increasingly important at the regional level. First is the question of whether private ginners in the newly configured value chain will be able to source cot-

ton across national borders. Such sourcing could reduce assembly costs and increase competition for farmers' seed cotton, but it would require coordination across countries regarding export tax revenues and credit recovery. Second, currently only about 5% of cotton produced in the CFA franc zone is processed in the region into textiles. This low level is in part related to high electric energy costs in the region that make textile processing uncompetitive internationally (ECOWAS, 2010). ECOWAS's efforts to extend and interconnect the West African electrical grid will be critical if local processing is to expand. Third, the countries of the region have adopted very different paths with respect to adopting genetically modified (BT) cotton.¹¹⁸ Currently, only Burkina Faso has authorised its use, although Nigeria has set a goal of quickly authorizing its use as part of the country's Agricultural Transformation Agenda. Given porous borders, it is inevitable that the seeds will move to neighbouring countries. In the absence of protocols in these other countries governing transgenic crops and agreements with buyers about whether they will accept BT cotton, unregulated spread of the technology could prove disruptive. This is an area where regional coordination is clearly needed.

10.3 Other value chains with strong growth potential

The AGWA background studies identified a number of other value chains with strong growth potential. Space limitations do not permit a full discussion of these value chains here, but key characteristics of these value chains are summarised below.¹¹⁹

10.3.1 Vegetable oil

West Africa has a strong structural deficit in vegetable oil, rapidly rising demand (see Part II) and heavy reliance on imports, particularly inexpensive palm oil from Indonesia and Malaysia. This heavy reliance on imported palm oil is ironic, as West

¹¹⁷ Since 1990 Senegal has had more experience than any other country in the region in promoting IPCs for a wide range of agricultural value chains. Their performance has varied widely, in part as a function of the degree to which stakeholders believed that they, as opposed to government, had major responsibility for key coordination tasks in the value chain (Duteurtre and Dieye, 2008).

¹¹⁸ BT cotton refers to cotton varieties in which genes from the *Bacillus thuringiensis* bacteria have been inserted. The genes produce a protein that is toxic to a narrow range of insect larvae that are very damaging to cotton, greatly reducing the need for farmers to apply insecticides to their cotton crop.

¹¹⁹ For more details of most of these, see Lambert, 2012 and Elbehri 2013.

Africa dominated the world palm oil industry in the 1960s, with Nigeria alone accounting for 27% of world exports in 1961 (Nigeria Federal Ministry of Agriculture and Rural Development, 2011). Other important oilseeds in the region are cottonseed, groundnuts and, to a lesser extent, soybeans, sesame, and (recently) sunflowers. There is also strong demand globally for vegetable oils – especially palm oil with its bio-fuel applications – and FAO/OECD projections (2012) foresee continued strong international demand through 2021. The region has good agronomic potential and a long tradition in production of the basic raw materials, such as cotton seed, oil palm fruits and kernels, groundnuts and sesame. The strong demand for palm oil internationally has also led to increased direct foreign investment in oil palm plantations in West Africa. Like many other value chains in the region, there is both small-scale and industrial processing.

Challenges for the various vegetable-oil value chains in West Africa include:

- » The need to upgrade the quality of many of the small-scale processors to meet quality and health standards and adopt improved technologies and better business practices. The health concerns are particularly acute with respect to groundnut and cottonseed oil. In groundnuts, the major concern is widespread contamination with aflatoxin, a carcinogen linked especially to liver cancer. For cottonseed, the liberalization of the market in countries like Mali has resulted in the growth of small-scale cotton presses that are selling unrefined cotton oil for human consumption, which is dangerous because it contains gossypol, a natural phenol that is toxic to human red blood cells.
- » Developing better models to link smallholders to industrial processors in order to ensure reliable, high quality supplies of raw materials (similar to the challenges discussed above for cassava). In contrast to Southeast Asia, palm oil is native to West Africa and as such is well integrated into the local diet. Hence, there are many small oil mills and presses competing for oil palm fruit, which increases the risk of side-selling by small farmers who have contracted to

produce for industrial processors. In Southeast Asia, where unrefined palm oil is not a central part of the diet, the risk of side-selling is much lower. For this reason, Malaysia, Indonesia and other countries used oil palm outgrower schemes successfully for rural development and poverty reduction.

- » In cases where palm oil plantations are being contemplated, the terms of access of investors to large tracts of land need to be made more transparent so that the rights of current inhabitants of the land are respected.
- » There is a need for regional governments and RECs to study and adopt best practices learned from around the world, including Southeast Asia, in order to ensure social and environmental safeguards are included in any concessions or leases for large-scale development.

10.3.2 Ruminant livestock¹²⁰

The coastal areas of West Africa, where demand for animal protein is rising rapidly, are structurally deficit in cattle, sheep, and goats; production is constrained inter alia by trypanosomiasis and tick-borne diseases. These areas have historically relied on imports of live animals from the Sahelian zones, with Mali, Burkina Faso, Niger and northern Nigeria being major exporters.

Demand prospects appear strong for these value chains, as indicated by the high income elasticities of demand for meat products discussed in Part II. These value chains, however, need to be concerned about holding down production and marketing costs given the potential competition from other animal protein sources, particularly inexpensive imported poultry, in the coastal markets. The capacity of the value chains for ruminant livestock to respond to growing coastal demand for meat is likely to be constrained by three factors:

- » Growing demand for animal products in the exporting countries themselves, which will raise prices for export-grade animals.

¹²⁰ This section draws on Borlaug Institute for International Agriculture, 2012, and Michigan State University Food Security Team, 2011.

- » Low productivity of the herds, which is primarily due to poor nutrition as a result of seasonal variation in pasture resources and a weak animal feed industry.
- » Climate change, which will put pressure on traditional pasture resources and likely lead to increased conflicts between herders and agriculturalists. Some such conflicts have also arisen as irrigation projects have increasingly encroached on dry-season grazing areas. It will be critical to develop improved land use rules that are capable of accommodating live-stock production systems under these changing conditions and to develop more intensive models of production in areas where feed supplies (e.g. by-products from agroprocessing) are available.

Attempts by the inland countries to capture value added by shifting from live animal to meat exports will be constrained by the poor state of refrigerated transport between the inland and coastal markets, the higher prices paid for offal and other by-products (the “fifth quarter”) in the coastal states, and the policy of some of the coastal states (e.g. Nigeria) to foster the construction of abattoirs near their northern borders in order to capture the value added from imported animals.

The regional livestock trade, which historically has been overwhelmingly in the hands of the private sector, has shown remarkable resiliency in adapting in recent years to disruption caused by civil strife in major import markets, such as Côte d’Ivoire. Yet, regional trade continues to face numerous barriers, ranging from rent seeking by government agents at roadblocks along major trade routes to the imposition of taxes on livestock by importing countries (e.g., value-added taxes in Senegal) in contravention of ECOWAS and WAEMU agreements. Addressing such problems is one focus of the ECOWAS CAADP regional programmes discussed in Chapters 11 and 12.

10.3.3 Maize

As shown in Chapter 3, maize production has been grown rapidly in many countries in the region over

the past 20 years. The growth is attributable to the existence of improved technology and inputs (particularly improved seeds and fertilizer) and strong demand growth, both for human consumption (as maize has substituted for millet and sorghum in several countries) and for animal feed. The feed demand is driven particularly by the growing egg industry and increasing demand by fish-farmers, and feed manufacturers increasingly source maize regionally as well as nationally. The emergence of small-scale processing of maize into grits, flour, and other consumer-ready products has also helped spark consumption. Demand prospects globally for maize are strong (driven in part by biofuel policies in the United States), with OECD/FAO projecting higher real prices through 2021 and higher maize prices relative to both wheat and rice (OECD/FAO, 2012).

Like rice and cassava, processing of maize for both human consumption and animal feed takes place both in SMEs and larger-scale industrial operations. Nigeria has the largest number of industrial processing operations, producing starch, animal feeds, high-fructose corn syrup, dextrose, and corn oil. Small- and medium-scale processors focus mainly on maize meal, flour, grits and animal feeds. While small-scale milling at the village and household level seems to operate satisfactorily in serving much of the mass market, industrial processing and the feed industry have been hindered by the volatility of quantities, prices and quality of maize available from West Africa’s mainly small-scale producers. Both large and small processors usually act as passive buyers of maize from traders or farmers, with little up-stream involvement, to the detriment of raw material quality and availability. A particularly serious problem is aflatoxin contamination, estimated by IITA to affect over 60% of the maize grain harvested in Nigeria (Lambert, 2012). Aflatoxin is dangerous for both humans and animals and can greatly affect the rate of feed conversion among animals. Addressing this problem requires improved actions across the value chain, from encouraging the use of resistant varieties to improved harvest, drying and storage procedures.

Historically, West African maize markets were only weakly integrated into the international mar-

kets, but integration has grown in recent years, particularly in the coastal states where egg producers (e.g. in Senegal) increasingly rely on imported maize because of its more reliable availability, prices and quality than local supplies. Capitalizing on the strong potential of this crop to spur further growth will involve, like many of the other value chains reviewed here, efforts to organise the aggregation of supplies from the farm level, improved coordination of production with the needs of processors, and the improved control of quality along the entire value chain in order to compete with imports. Reducing barriers to regional trade will also be important in allowing processors to source maize more easily across national borders.

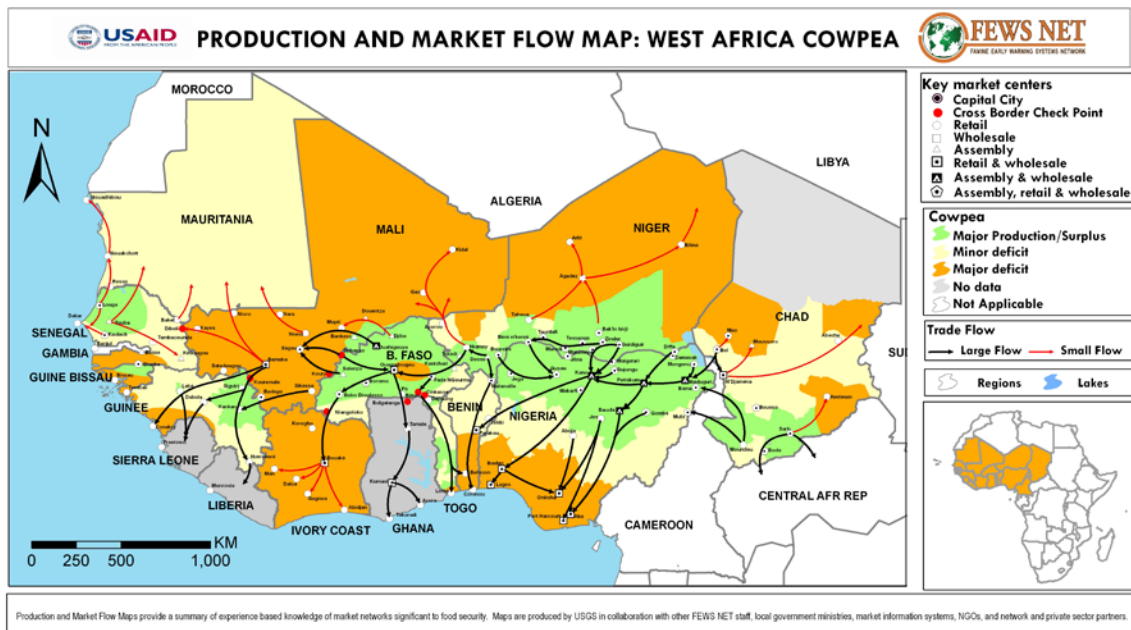
10.3.4 Cowpeas

Part II highlighted the high level and strong growth of pulse consumption in several countries of the region, particularly in Nigeria, Niger, Mali, Burkina Faso and Benin. By far the most important of these pulses is cowpeas. West and Central Africa account for about 80% of the world's harvested area of cowpeas, with Nigeria being the world's largest cowpea producer and its largest importer. Niger is the world's second larg-

est producer. Other producers in the ECOWAS region, in order of importance, include Burkina Faso, Mali, Benin, Ghana, Togo, Senegal, and Côte d'Ivoire (Langyintuoa *et al.*, 2003). Cowpeas are produced predominantly in the drier inland areas of West Africa due to their drought tolerance and the lower insect pressure in these areas, and a well-developed trade moves them south to major coastal markets (Figure 10.3).

Cowpeas growers are likely to face growing demand for their crop for three reasons: (1) cowpea grain provides a relatively low-cost, high-protein source ("poor people's meat") to the large number of low-income consumers in West Africa who are trying, with very low incomes, to upgrade their diets; (2) the high-protein cowpea hay is a valuable livestock feed, and demand for it is growing as forage markets expand in response to the increasing profitability of livestock production, especially in peri-urban areas; and (3) processed cowpea products, particularly cowpea fritters and steamed cakes, are very popular street and snack foods in urban areas such as Accra and Lagos, appealing to the growing, time-poor urban population (Nagai, 2008). As a drought-resistant crop, cowpeas are also likely to be an important part of farmers'

Figure 10.4 Cowpea production and trade flows in West Africa



Source: FEWSNet

farming systems as they adjust to climate change in the Sahelian and Guinea-savannah areas of West Africa.

After de-hulling (done either manually or in small mills), cowpea grains can be consumed without further processing, while processing for preparation of products like fritters or cakes is currently done either in the household or in small-scale neighbourhood mills. There is little evidence to date that large-scale industrial processing is competitive with the small-scale milling given current consumption patterns (Nagai, 2008). In contrast to the other value chains discussed here, the major constraints seem not to be aggregation for large-scale processing, but rather increasing production at the farm level to meet growing demand and improving storage systems to deal with cowpea weevil (bruchid) infestation, which can lead to heavy damage of grains. Research and extension programmes by IITA, the USAID-funded Dry Grain Pulse Collaborative Research Program, and Purdue University, with partners throughout the region, are currently addressing these problems.¹²¹

10.3.5 Fruits for processing

Demand for fruit juices is strongly growing throughout the region (Part II), particularly in Nigeria, Ghana and Côte d'Ivoire. Euromonitor (cited in Lambert, 2012) forecasts future demand growth in Nigeria at 8% per year. Surveys indicate that consumers consider fruit juices (either consumed directly or incorporated in flavoured yoghurt drinks) as a more nutritious alternative to soft drinks, although the latter are more widely consumed due to their low cost. In order to stimulate the growth of the domestic fruit juice processing industry, Nigeria has banned the importation of fruit juice in consumer-ready containers. This has led to a shift in imports to fruit juice concentrates, which are reconstituted domestically. Currently, the region imports about US\$50 million per year in fruit juices

and concentrates. In addition to Nigeria, Ghana, Côte d'Ivoire and Sierra Leone all have fruit juice processing facilities.

Since the fruit juice processing sector is growing strongly and private regional capital is well entrenched, the main challenge for the industry is to develop capacity for domestic supply of raw materials, both fresh and processed, into concentrates and pulps. A few firms in Nigeria have integrated backward into production or have developed out-grower schemes, but the problems of ensuring quality raw materials consistently and developing equitable systems to share risks and benefits among farmers and processors remain in this value chain as in others discussed earlier in this chapter. Given the time lags involved in orchard establishment, developing financing arrangements for establishing new production will also need to be addressed.

10.3.6 Cashew

As shown in Chapter 4, despite very low yields, West Africa has become a major raw cashew exporter, and the region's share of the global market is growing. Nigeria, Côte d'Ivoire, Guinea-Bissau and Benin are all major producers. In addition to strong global demand, there is a growing internal market, particularly in Nigeria, for cashews as a snack food. The challenge now is to increase farm yields and dramatically increase capacity for processing into high quality kernels for export to world markets. There are numerous examples in East and Southern Africa (e.g. Condor in Maputo, Mozambique) of successful processing operations exporting products of the highest quality, HAACP certified, to international markets. As India industrializes and domestic demand for cashew reduces India's export capability, West Africa can take a leading role in cashew nut processing provided supply is ramped up and quality is enhanced and becomes independently certified. Development of a major processing industry requires significant private investment in new facilities, however, and the organization of producers to ensure a reliable supply of quality nuts so that the plants can operate close to capacity.

¹²¹ The bruchid infestation (1) induces farmers to sell soon after harvest to avoid insect damage, with the result that they receive lower prices for their product than if they could hold it off the market and sell later; and (2) results in farmers and traders often using insecticides on the stored beans, which if applied improperly can be harmful to human health. A joint IITA-Purdue University project, with support from the Bill and Melinda Gates Foundation, is promoting the triple bagging of stored cowpea grains in polyethylene bags as a safe alternative. By cutting off the oxygen supply to the insects, they die before they can cause significant damage. For details, see Sanon *et al.*, 2011.

10.4 Summary of key points and conclusions

This chapter has reviewed the opportunities and constraints facing several value chains in responding to the changing demands facing West African Agriculture. Of the six value chains examined in some detail, rice is the most diverse in terms of its geographical dispersion, range of production and processing systems and consumer preferences as well as its number of marketing sub-channels that respond to the diverse demand. Overall, it appears that West African rice production, at least at the farm level, is increasingly competitive with Asian rice given the high world prices prevailing since 2008. Yet constraints appear widespread at the processing level, especially in ensuring consistent product quality. A widespread shift to large-scale milling does not seem to be the solution, however, as small mills frequently have been able to outbid the large mills for paddy given the former's lower costs of aggregating paddy in situations of low levels of production and poor transportation infrastructure. Improving the performance of this value chain will require differentiated approaches targeted at the various sub-channels rather than a "one-size fits all" approach.

The cassava value chain has been remarkably dynamic in recent years, with greatly expanded farm-level production and small-scale processing into products like gari thanks to new cultivars and improved processing technologies. The value chain employs millions of people, predominantly women, across the region and processed cassava products like gari effectively compete with imported rice as a home-grown West African "fast food." Cassava also has the potential to be an input into a wide range of industrial products, from starch to pharmaceuticals, yet problems of assuring a consistent supply of raw product to industrial cassava processing plants has been an on-going challenge. Most of the large-scale processing plants (which are predominantly located in Nigeria) operate far below capacity, and government initiatives to spur cassava consumption in that country by mandating that cassava flour be included in bread have run into serious problems of product availability and quality. Overcoming the vertical coordination problems of raw prod-

uct aggregation will be essential if cassava is to become a major industrial input as well as a key raw product for small-scale processors.

Poultry and dairy products are two West African value chains facing very stiff competition from low-cost imports. In the case of poultry meat, imports from low-cost producers like Brazil, which benefits from its tightly organized production system and abundant supplies of feedgrains, have captured a large share of the market in coastal countries like Ghana that have remained open to imports. Other countries, like Nigeria and Senegal, have protected their domestic producers through import bans, but at the cost of denying their consumers an inexpensive source of high-quality protein. The inland countries, such as Burkina Faso, have benefitted from a degree of natural protection against such imports. The market for poultry in countries like Ghana has become segmented between the cheaper frozen imports and locally produced, more costly but more appreciated local birds. While opportunities exist to expand niche marketing of local poultry, it appears unlikely that West African producers will be cost-competitive with imports in the near future for the low-cost market. A similar situation exists in the dairy value chain, which is dominated by imports of milk powder. Local milk production in the coastal states is severely hampered in most areas by endemic cattle diseases and the lower productivity of native breeds compared to temperate-climate dairy breeds that can only be raised in a few areas in West Africa. There is some scope for expanded production in the inland states, where consumers are willing to pay a premium for fresh milk, but, even in these countries, the main focus of the commercial dairy industry in the urban areas will be on producing processed products from imported milk powder.

The chapter also analysed two value chains that historically have been pillars of export earnings for West Africa: cocoa and cotton. Cocoa remains West Africa's major agricultural export and has greatly expanded local processing in recent years. Yet the major producing countries have struggled to find a governance structure for their cocoa value chains that captures economies of scale and deals with the need for collective action while still

being transparent and accountable to farmers and other stakeholders. The chapter's review of the on-going reforms carried out by Ghana, Nigeria and Côte d'Ivoire of their cocoa value chains illustrates how elusive striking such a balance can be. A similar story emerges with the analysis of the cotton value chains in the francophone countries of West Africa. The integrated cotton system in these countries spurred one of West Africa's first green revolutions starting in the 1950s, but since the 2000s the value chain has struggled to deal with volatile world market prices, political pressures that have sometimes compromised its management, and increased demands for accountability to farmers. The various reforms currently underway in all of the francophone-country cotton systems illustrate the need for the institutions governing value chains to evolve as the production technologies, markets and broader societal institutions change.

The chapter also briefly discussed a number of other value chains in West Africa that appear to have strong demand prospects, including vegetable oil, ruminant livestock, maize, cowpeas, fruits for processing (especially into juices) and cashews.

In addition to the challenges that are specific to the individual value chains discussed above, three general conclusions emerge from the analysis of the value chains examined in this chapter. First, many of the value chains, particularly for staple crops, involve both small-scale and large-scale processing. While the small-scale processors often have advantages in serving low-income consumers, they require considerable upgrading to ensure greater product consistency and product safety. Some of the upgrading involves improving access to simple technologies and practices – for example for de-stoning paddy before processing by small millers. Others involve more system-wide efforts, such as the need to improve storage and handling processes across the value chain to reduce aflatoxin contamination in groundnuts and maize. Yet given the importance of these small and medium processing enterprises to serve an important part of the mass market at low cost while generating substantial employment, they warrant efforts to improve their performance.

Second, the larger-scale processing enterprises have the potential to capture scale economies and provide a broader range of outputs that are critical to capturing new markets, such as industrial products derived from cassava. Yet across most of these value chains, the problem of aggregating and coordinating raw product supplies to these industries is a recurrent problem. Those value chains that have been successful in expanding large-scale processing, particularly into higher-value products, have frequently had an actor or group of actors that have played a central role (dubbed “channel captain” in some of the value chain literature) in ensuring vertical coordination within the chain, including the critical tasks of quality control and supplying access to improved technology. These channel captains have ranged from dominant firms (e.g. the national cotton companies in the francophone countries) to quasi-public agencies (such as Cocobod in Ghana). Yet in many instances, it has been difficult to design such organizations so that they succeed in providing such coordination and, at the same time, are responsive to stakeholders and transparent in their management. The current efforts in many of the francophone countries to build and strengthen interprofessional committees and Nigeria's plan to create public-private Marketing Corporations are efforts to find this balance.

Third, the case studies illustrate that the challenges faced by value chains evolve as the value chains develop and the markets in which they operate change. Thus, there is no “one-size-fits-all” set of recommendations for value chain development. Rather, there is a need to put in place institutional arrangements through which value chain stakeholders can develop continually evolving strategies to address the challenges and opportunities facing them.

In addressing these challenges, at least two approaches deserve special attention. One is the role that interprofessional committees (sometimes called “commodity associations” or “value chain participant councils”) can play in helping ensure some of the greater coordination needed within value chains, particularly between farmers and processors, in order to capture new market opportunities. These types of primarily private-sector

led organizations have been used with mixed results in both high-income and developing economies, including West Africa, to address system-wide problems. These organizations have engaged with design and implementation of grades and standards, development of new products and development of tools to adjust supply to anticipated demand over time (Shepherd, *et al.*, 2009). Lessons learned from these experiences identify at least three key design elements for such efforts to succeed (Staatz and Ricks, 2010):

» *Identifying an impartial organizing entity.* It is critical that someone or a core group in the interprofessional committee be perceived and accepted by the participants as an objective, impartial, and contributory organizing entity. The role of the organizing entity includes helping to frame the debates about the nature of value-chain-wide challenges and opportunities and, ideally, helping to provide unbiased information to illuminate the discussions, problems, and performance-enhancing alternatives. This role might be played, for example, by a national agricultural research institute or independent think tank. A key question is what role government agencies should play in the committees and whether they would be perceived as an impartial organizing entity.

» *Membership structure.* This issue involves deciding which organizations and individuals should be represented on the committee. This, in part, involves deciding the boundaries of the value chain. For example, will consumers be included? What about by-product processors (e.g., cotton seed processors as well as ginners in cotton IPCs)? The individuals on the committees should be acknowledged industry leaders, “broad thinkers,” and those who are open to exploring possibilities for working with other value-chain participants for needed improvements rather than simply defending, in a syndicalist way, the interests of their own groups. Ideally, these people also are leaders of stakeholder organizations within the value chain, such as farmer or processor associations. Including such participant organization leaders in the committees allows these key indi-

viduals to link back to their memberships effectively, leading to broader discussion, input, and information into the issues the committee is addressing and broadening the ownership and implementation of its proposed solutions.

» *Financing.* A critical issue is whether the organization should seek dedicated funding for its activities. While obtaining external “core” funding for the activities of the IPC may allow it to act more quickly on key decisions (such as to undertake consumer testing of a new product), a possible disadvantage is that such funding may attract participants to the council who are mainly interested in gaining access to the funding for their personal benefit. In order to avoid this sort of rent-seeking, it is often preferable to rely on in-kind contributions of time and resources by the IPC members for the committee’s main ongoing activities, complemented with applications for small grant funding for specific information-gathering or outreach activities (Chitundu *et al.*, 2009).

A second important issue to explore is the scope for expanding farmers’ equity participation in processing plants. A recurrent problem facing industrial scale agroprocessors in West Africa is unreliable supply of high-quality raw agricultural products for their plants. Attempts to design contracts with outgrowers to meet these needs have frequently been undermined by side-selling and lack of respect of contracts. Farmers sometimes charge that processors also do not always respect their contractual commitments – for example, using complaints about quality to drive down prices to farmers. If, over time, farmers built up an equity participation in the plants, they would have greater incentives to see the plant succeed as well as a stronger voice in dealing with plant managers regarding contracting practices with farmers. One challenge is how to build up this ownership stake over time while still returning a price to farmers that is attractive enough for them to continue to produce for the plant. Such arrangements are probably most feasible for production of perennials (e.g. tree crops) where the farmers are “locked in” to the value chain for a long period and thus have a strong incentive to invest in its future success.