CHAPTER 3

The Rice Value Chain in Africa

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1. Introduction

Rice is both a strategic commodity and a staple food in most African countries. It is the second most important source of dietary energy in the region, after maize, providing 9 percent of human calorie intake (van Oort 2023). In many countries, particularly in West Africa, per capita consumption exceeds 100 kg/year (FAO 2024), putting Africa second only to Asia. Due to the combined effects of population growth, changing diets, urbanization, and income growth in Africa, rice demand is now growing at 6 percent annually, faster than any other staple food (AfricaRice, n.d.), and projected to increase significantly in the next decade. By 2034, Africa is likely to be the largest importing region globally, despite increasing intraregional trade (FAO 2025).

Rice is produced in 40 of 54 African countries, and production has increased steadily over the past 30 years, though more slowly than consumption, creating persistent trade deficits. Average yields across the continent remain 57 percent below the world average (FAO 2025). Rice production is carried out by millions of smallholders, primarily in rainfed systems, with only a quarter of Africa's rice-producing areas under irrigation. As a result, production increases have been driven mainly by expansion of cropping area. Although the low productivity of Africa's rice systems is likely to improve with climate change, due to the effect of CO_2 fertilization, Africa's comparative advantage at the global level is projected to deteriorate (Thomas 2024).

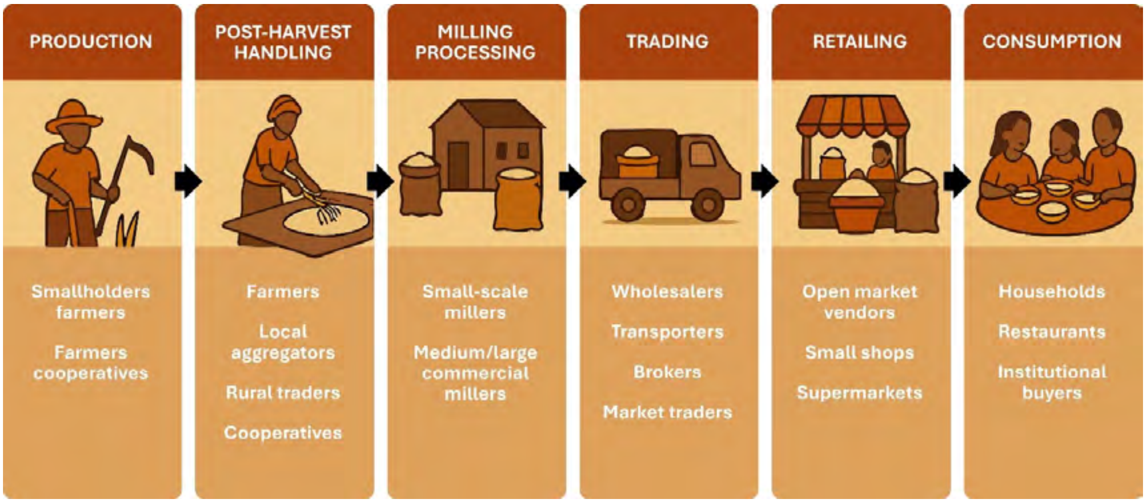
The policy environment plays a key role in the rice sector's evolution. In general, the sector benefits from significant market price support mechanisms and subsidies, although there is some heterogeneity: some countries aim to promote self-sufficiency by incentivizing rice production while others, particularly during food crises, aim to protect consumers through policies intended to maintain low prices and dampen the effects of international price surges, and thus their social and political consequences (Headey and Fan 2010). Understanding how these policy supports have shaped the sector's evolution is essential to analyzing today's African rice sector.

Rice is not a homogeneous product, and the rice value chain involves multiple stages from production to food preparations. Therefore, this chapter provides an overview of the African rice sector from a value chain perspective, analyzing the different stages, the market, and its environment and drivers, as well as the main challenges and opportunities facing the sector. The chapter structure is as follows. In the next section, we set the scene by describing the rice value chain. We then examine the current rice market and future outlook in Africa, focusing on production and consumption. In the following section, we examine trade patterns, showing Africa's dependence on global markets and the role of informal intra-African trade flows. The final part of our analysis examines the policy environment, focusing on the roles of price incentives and public expenditures. The final section offers conclusions and recommendations.

2. The Rice Value Chain

Value chains encompass all the activities and actors involved in bringing a product from farms to consumers. Figure 3.1 below illustrates the rice value chain for a typical African country.

Figure 3.1 Rice value chain



Source: Authors' elaboration.

The first stage (production) involves the supply and demand of farming inputs (seeds and fertilizers, especially NPK fertilizers) and primary factors of production (labor and capital). Rice production in Africa is labor-intensive, with a predominance of female labor (Palacios-Lopez et al. 2017). Production is carried out by millions of small-scale farmers, typically farming less than 3 hectares (Kinkingninhoun Medagbe et al. 2020). Rainfed systems (the majority of farms in Africa) rely solely on rainfall, limiting production to the rainy season and low-lying wetlands and inland valleys. Rainfed rice competes with other crops in production, leading to extensive practices. Depending on the region, single- or double-season production is practiced, with a diversity of crop calendars across and within countries (Balasubramanian et al. 2007). In irrigated systems, which account for a much smaller share of African rice, production depends on water control and management, which is still an issue in Africa.

Rice is harvested mainly by manual methods, and in the postharvest stage, it is aggregated by various value chain actors, including individual farmers, rural traders, and cooperatives, who move it to processing areas. Rice is usually transported using human and animal power, and sometimes, machine power. Depending on the region, some (manual) threshing and drying may take place in the field. However, these practices are known to induce significant postharvest losses (Lantin 1999).

In the middle nodes of the chain, millers play a pivotal role[1]. Africa's milling sector includes small artisanal, medium-scale, and large industrial actors. While the artisanal sector includes hundreds of mills across the continent, the concentrated industrial sector comprises just a few companies, which derive potential market power from this oligopsonistic and oligopolistic structure. Depending on the nature of paddy rice received, threshing, drying, and cleaning may take place before milling. The milling process then removes the husk and bran layers, thereby converting paddy into milled rice suitable for consumption. Clean products include brown and white rice with different levels of milling and polishing (semi or wholly milled), which can then be processed further. Byproducts from milling include broken rice, and straw and husks, which are largely used as animal feed or fuel.

1 See Box 3.1 for more details and specific issues pertaining to milling.

In addition to millers, the distribution nodes of the value chain—trading and retail—are playing an increasingly important role. These actors include transporters, wholesalers, brokers, and retailers. The expansion of modern supermarkets as incomes increase is particularly important (Campbell et al. 2009) as these retailers shape demand and create quality and marketing challenges for local producers. It is worth noting that the distribution stage is the point where imported and local rice begin to compete. However, while the domestic rice market is often competitive (less concentrated), comprising many small actors, (formal) imports are dominated by large wholesalers who often operate under oligopoly conditions (Box 3.2).

Consumers make up the final node of the value chain. Households are the most important consumers, and have specific tastes and dietary patterns across and within countries (discussed in more detail in the following section). In addition to households, recurrent food crises have led many national, regional, and international actors to enter, or amplify their actions, in the market. Their institutional purchases aim to build stocks (reserves) and serve either as a rapid response to crises (food emergencies) or as a price-stabilization mechanism. The ECOWAS regional food security reserve, created in 2013, is one of the most active entities playing this role.

Box 3.1 Rice Processing Issues

Rice millers play a pivotal intermediary role in the rice value chain, particularly in developing countries where smallholder farmers dominate agricultural production. In addition to their role as processors, they frequently operate as aggregators, credit providers, storage operators, and even exporters. Their strategic position—embedded between upstream producers and downstream traders—affords them considerable influence over both the operational and financial dynamics of the rice sector.

Millers' role goes beyond serving as price-setting intermediaries. They are also critical enablers of coordination, credit provision, and resilience. In Ghana and Côte d'Ivoire, Laurent et al. (2025) find that millers frequently engage in interlinked transactions—offering credit or accepting delayed payments from farmers in exchange for paddy. These arrangements alleviate liquidity constraints, deepen commercial ties, and allow for more stable procurement.

Beyond logistics and credit, millers are also the initial point of quality upgrading and value addition. Investments in modern milling equipment—such as rubber roll mills, huskers, and sorters—allow millers to produce higher-quality rice that meets the demands of increasingly segmented domestic and export markets. Soullier et al. (2020) document such a process in West Africa, where millers are central to ongoing efforts to upgrade value chains both technologically and in terms of organization. These changes are not merely technical—they involve shifts in institutional arrangements, sourcing strategies, and marketing channels, all of which hinge on the capabilities of millers to lead the transformation.

However, the adoption of upgraded technologies and practices remains uneven. Barriers such as limited access to long-term finance, fragmented procurement systems, and poor infrastructure continue to constrain the broader transformation of the milling sector. Ghana, for example, has seen the emergence of semi-industrial millers with improved machinery and business models, but these remain concentrated in more accessible regions (Laurent et al. 2025). Soullier et al. (2020) similarly argue that successful upgrading often depends on policy coordination, public-private partnerships, and targeted investment in midstream actors such as millers.

In sum, rice millers are far from passive intermediaries. They are active economic agents whose decisions and capacities shape farmer incentives, product quality, and market structure. Their position in the value chain allows them to simultaneously respond to and shape upstream production and downstream demand. Strengthening the role of millers through targeted policy support, access to finance, and institutional innovation is essential for building more inclusive and resilient rice value chains—especially in economies where rice is central to food security and rural livelihoods.

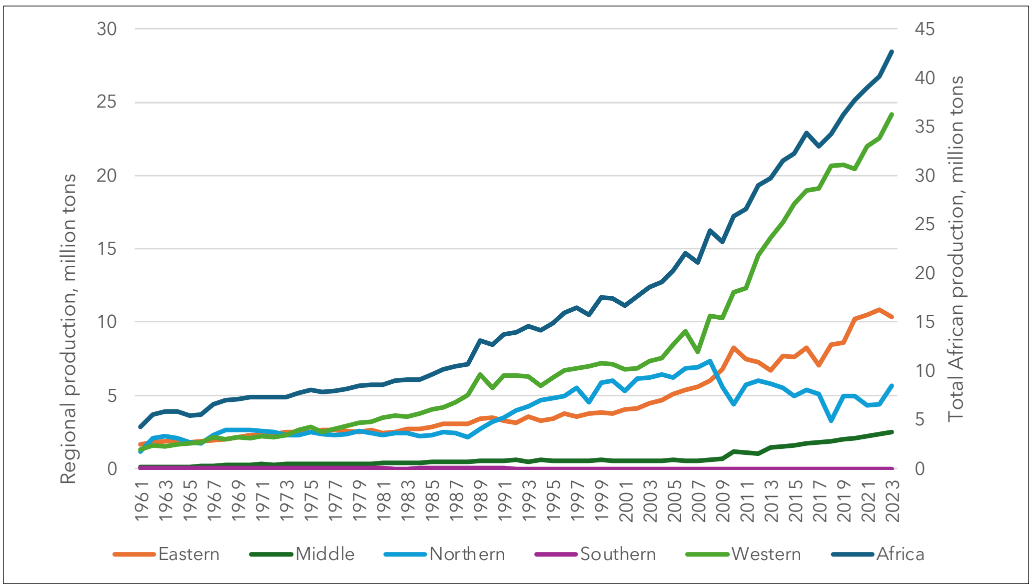
3. The Rice Market in Africa

Production

Africa produces 42 million metric tons of paddy rice (about 27 million tons of milled rice), accounting for 26 percent of its cereals production value in 2023 (FAO 2025). Africa accounts for 5 percent of the world's rice production and 11 percent of the total world rice area. Rice is grown in 40 out of the 54 African countries and involves more than 35 million smallholder farmers, with a labor force comprising more women than men (AfricaRice n.d.; Saito et al. 2023). Production has increased continuously over the past 30 years (Figure 3.2), doubling from 2003 to 2023, especially after the 2008 food price crisis, when it received a boost in public support. Production is concentrated in western and eastern African countries, accounting for 57 percent and 24 percent of total volume, respectively, as well as in Egypt, which is the continent's second-largest producer (Table 3.1). The top five producers have remained stable over the years, though concentration has decreased. While in 1993 the top five producers realized 78 percent of total volume, this share declined to 63 percent in 2023.

The primary driver of increasing rice production in Africa has been area expansion, rather than yield growth. The area under rice expanded steadily from 1993 to 2023 (Figure 3.3), doubling in 14 years alone (from 2009 to 2023). Regional figures indicate the distribution of production has not changed, with significant shares in western and eastern Africa throughout the period. Although cropping systems are diverse across the continent, rice is grown in three main environments: irrigated lowlands, rainfed lowlands, and rainfed uplands. In sub-Saharan Africa, these three systems account for 26 percent, 38 percent, and 32 percent of Africa's total rice area, respectively (Dossou-Yovo et al. 2022).

Figure 3.2 Rice production volume, African total and main African regions, 1961–2023



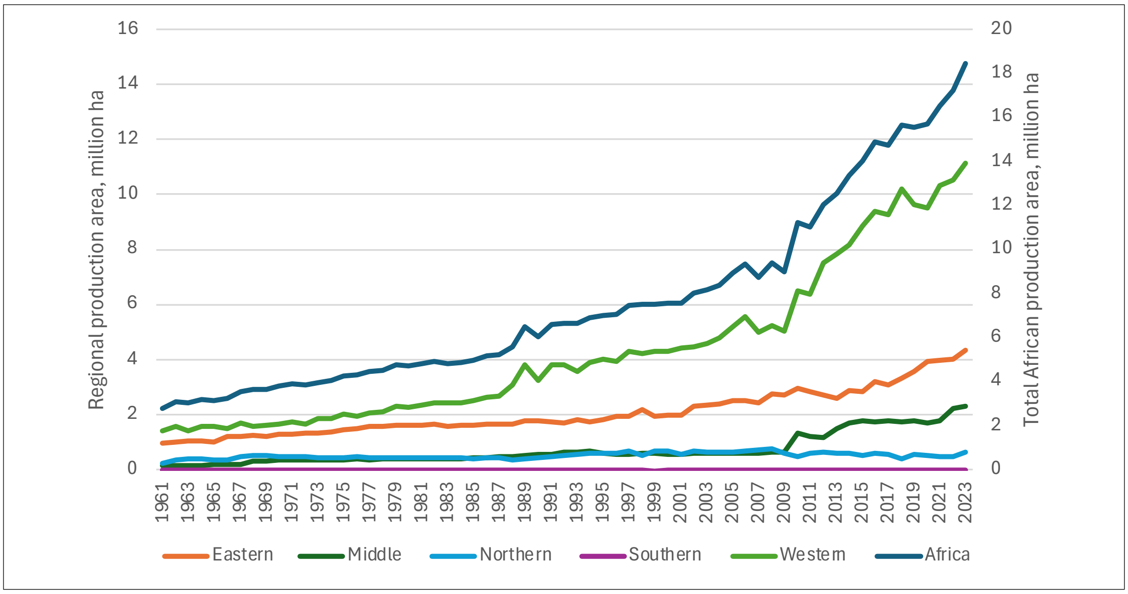
Source: FAO (2025).

Table 3.1 Top rice producers, production volume, and share in African total, 1993 and 2023

1993			2023		
Country	Production (thousand tons)	Africa share (%)	Country	Production (thousand tons)	Africa share (%)
Egypt	4.161	29	Nigeria	8.902	21
Nigeria	3.065	21	Egypt	5.600	13
Madagascar	2.550	18	Madagascar	5.118	12
Guinea	843	6	Tanzania	3.588	8
Côte d'Ivoire	676	5	Guinea	3.535	8
Total	**11.294**	**78**	**Total**	**26.743**	**63**

Source: FAO (2025).

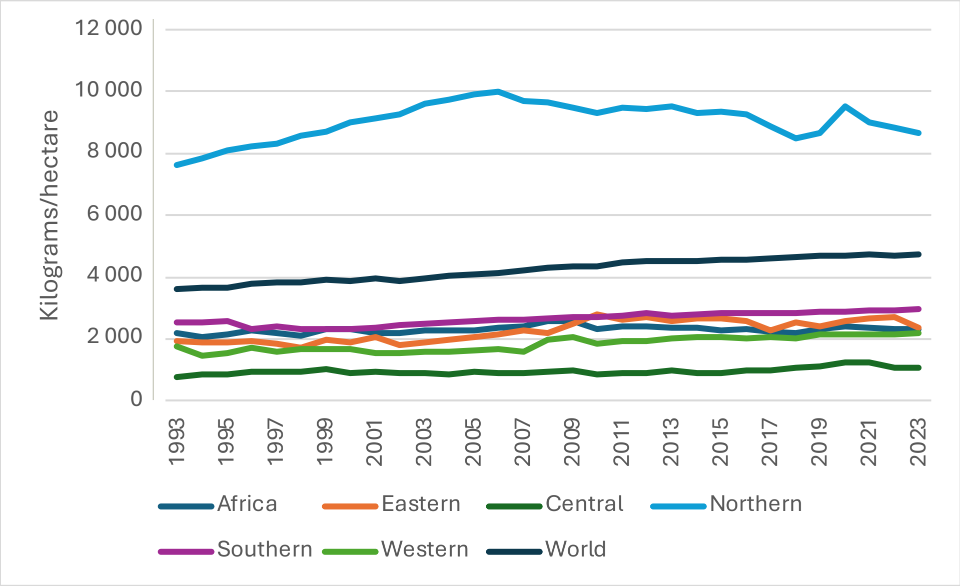
Figure 3.3 Rice production area, African total and main African regions, 1961–2023



Source: FAO (2025).

The average yield in Africa (2.1 tons/ha) is less than half the world average (4.8 tons/ha). Excluding Egypt, the average yield in Africa has shown very little improvement over time and has almost stagnated over the past three decades (Figure 3.4). Egypt is a notable exception, with yields reaching twice the world average, which is reflected in the Northern Africa yield data. Africa's low yields are caused by several factors, including limited and outdated production technologies, poor management practices, and the dominance of rainfed agriculture (Saito et al. 2023). Compared with rice production in other parts of the world, irrigated cropping systems are only a tiny share of the rice area in Africa.

Figure 3.4 Evolution of rice yields in kg/ha, 1993–2023



Source: FAO (2025).

Given this lag in productivity, climate change is one of the most serious challenges Africa's agricultural systems will face over the next decades. Most studies conclude that rising temperatures, plant pests, droughts, and changes in the distribution of precipitation pose significant threats, given the importance of rainfed agriculture and the frequency of water stress. Using data aggregated from the GAEZ project (IIASA and FAO 2012), Gouel and Laborde (2021) find that rice yields will be reduced by 15 percent in 2040 due to climate change (changes in temperature and rainfall) compared to a baseline without it. In a comprehensive study using five climate models, Thomas (2024) estimates even lower figures (Table 3.2). For rainfed rice, the most vulnerable variety, the median figure is positive (+2.9 percent), with an uneven distribution. East Africa registers negative impacts, while North Africa sees a significant gain of up to 30 percent. For irrigated rice, all regions register gains, although smaller than those accruing to rainfed production. It is worth noting that these results incorporate the impact of "CO_2 fertilization"; increased CO_2 in the atmosphere, although a driver of climate change, is expected to benefit some crops, including rice (Leung et al. 2022). Without CO_2 fertilization, the impact of climate change is negative in all scenarios. This modeling effort also allows us to compare Africa's performance under climate change (with and without CO_2 fertilization) with the rest of the world. Without the CO_2 fertilization effect, average yields for rainfed rice fare worse in Africa (−8.1 percent) than in the rest of the world (−6.8 percent), reducing the continent's comparative advantage. Similarly, with CO_2 fertilization, while yields for the rest of the world are expected to increase (+8.2 percent), African yields will rise much less (+3 percent).

Table 3.2 Estimated impacts of climate change on rice yields in 2050, percent change

Region	Rainfed		Irrigated	
	Median	Without CO_2 fertilization	Median	Without CO_2 fertilization
World	8.2	−6.8	7.8	−6.4
Africa	2.9	−8.1	5.4	−5.5
Eastern Africa	−4.5	−14.1	3.1	−9.0
Central Africa	2.0	−9.2	7.0	−10.4
Northern Africa	29.5	14.1	4.8	−14.9
Southern Africa	6.6	−2.2	6.5	−1.4
Western Africa	3.4	−8.7	2.0	−12.4

Source: Thomas (2024).

Consumption

Rice is an important staple food in Africa, particularly in Sub-Saharan Africa, and is the second largest source of dietary energy and fastest growing staple food (AfricaRice, n.d.). Due to the combined effect of rising incomes, urbanization, and population growth, rice consumption has risen steadily over recent decades. In most parts of the continent, consumers are moving away from other traditional cereals and roots and tubers toward rice as their incomes rise (D'Alessandro et al. 2020). Before analyzing consumption data, a couple of preliminary remarks are needed. First, comparable data on consumption is rarely available. Therefore, as in other studies, we rely on data from the Food and Agriculture Organization (FAO)'s food balance sheets (FBS) on per capita supply to estimate human consumption. Second, while our study covers more than 30 years, comparing figures across time requires some caution, as the methodology used for the FBS has undergone changes. Notably, data collected before 2010 are for milled rice; post-2010, the FBS data are for paddy rice and various derived products. This change increases the figures for per capita supply by at least 50 percent. To convert all figures to rice milled equivalent for comparability, we use the average conversion factors from the 2010 to 2013 period, in which the two datasets overlap.

Per capita figures show that West African countries, particularly in coastal regions, are by far the largest rice consumers in Africa (Table 3.3). In 1992 and in 2022, 7 of the 10 biggest consumers in Africa were in West Africa. With a few exceptions, per capita consumption rose significantly between 1992 and 2022, increasing by at least 20 percent in half of the top-10 consuming countries, and by 2022, consumption levels exceeded 100 kg per capita in most of these countries (Table 3.3).[2] Increased consumption has contributed to increased imports, discussed in the section of this chapter on trade.

In Africa, rice is consumed mainly in urban areas with a preference for the imported varieties, particularly in West Africa. In addition, several other consumption patterns are apparent across the continent, and consumers' tastes vary between and within countries. While rich households tend to prefer long-grain white and parboiled rice, low-income households generally consume broken rice, a byproduct of rice processing that is much cheaper than long-grain rice. Yet in some West African countries, including Mali and Senegal, broken rice is the main ingredient of the national dish and is also consumed by rich households, accounting for more than 70 percent of imports (see the section in this chapter on trade).

Consumers' preferences are complex, and their choices between local and imported varieties depend on several factors, including their income levels, prices, and the quality attributes of the product. The main attributes affecting rice consumers' choices are t≠he degree of milling,

2 The figure for Gambia in 2022 appears to be an outlier, as the average value for the five previous years is 145 kg per capita.

foreign matter content, organoleptic[3] qualities, and the ease of preparation and preservation. Locally produced rice often fails to meet consumer standards, leading to a preference for imported varieties (Hathie and Ndiaye 2015). However, when these market attributes are improved for local rice varieties (absence of impurities, greater ease of preparation and conservation, and so on) and the product is attractively packaged, consumers prefer it over imports. This is the case of Gambiaka rice in Mali and Ofada rice in Nigeria (Koné and Camara 2014; D'Alessandro et al. 2020). Given the importance of these attributes in shaping consumer preference, rice millers play a pivotal intermediary role in the rice value chain, and there may be several entry points to strengthen their role through product improvements (see Box 3.1).

Table 3.3 Top 10 rice-consuming countries, kg per capita, 1992–2022

1992		2009		2010		2022	
Guinea-Bissau	113.5	Madagascar	103.6	Madagascar	105.0	Gambia	222.9
Sierra Leone	98.0	Guinea	98.8	Guinea	100.5	Comoros	168.1
Madagascar	97.9	Sierra Leone	94.0	Guinea-Bissau	99.1	Guinea	127.1
Guinea	93.2	Guinea-Bissau	91.2	Liberia	89.5	Liberia	109.4
Liberia	90.7	Liberia	89.6	Sierra Leone	88.2	Madagascar	103.3
Gambia	69.6	Senegal	69.0	Côte d'Ivoire	82.4	Sierra Leone	94.2
Mauritius	64.0	Gambia	67.8	Comoros	70.9	Guinea-Bissau	93.9
Senegal	58.9	Côte d'Ivoire	64.4	Senegal	66.6	Senegal	82.7
Côte d'Ivoire	54.7	Mauritius	59.3	Mauritius	63.9	Djibouti	79.7
Mauritania	48.7	Mali	58.3	Gambia	58.2	Côte d'Ivoire	74.9

Source: FAO (2024).

Market outlook

In this subsection, we explore the outlook for the African rice market over the next 10 years, drawing on the recent 10-year baseline projections (OECD and FAO 2024). The projections assume no change in current national policies and support, stable weather conditions, and a continuation of current trends in technological progress. Therefore, the projections shown here are "deterministic" ones (Glauber and Mamun 2024), although some partial stochastic analysis accounting for uncertainties is performed for price forecasts.

The baseline projects a significant 33 percent increase in rice production in Africa over the next 10 years. For Nigeria and Egypt, the two largest producers, production is expected to increase by 39 percent and 16 percent, respectively. These figures are higher than projections from the U.S. Department of Agriculture (USDA-ERS, n.d.), which estimates 18 percent growth for the continent's production, and growth of 10 percent for Nigeria and 7 percent for Egypt. The divergence in the projections reflects differences in the data sources used by the two institutions, along with different assumptions in their models about the evolution of key exogenous variables. In addition, while USDA uses 2024 as the starting point, the OECD-FAO baseline starts with the average values over the 2021–2023 period.

Rice consumption is expected to continue growing at a sustained pace, increasing by 41 percent in 2033, while consumption per capita increases at an annual pace of 0.79 percent, reaching 13 percent by 2033 (OECD and FAO 2024). Consumption growth over the next decade will continue to be driven by population growth, a shift in diets toward more carbohydrates, urbanization, and income growth. Over this decade, Africa's population is projected to grow by 24 percent, with slightly higher growth in sub-Saharan Africa (26 percent), while urbanization

3 "Organoleptic qualities" refers to the properties perceived by the senses.

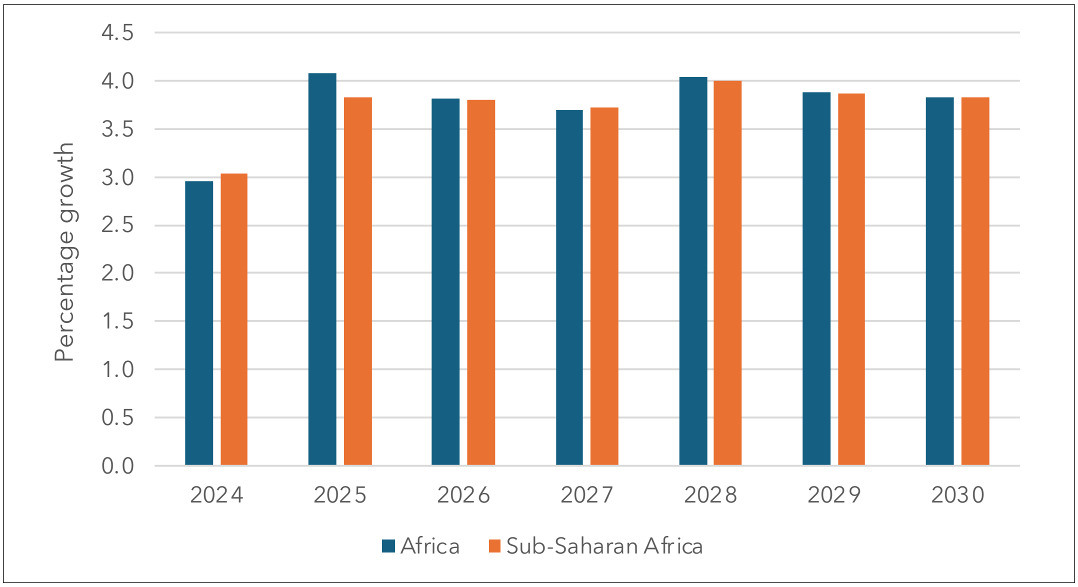
rates will rise from 45 percent to 50 percent for the whole continent, and from 43 percent to 49 percent in the sub-Saharan region (UN 2025). Income is also expected to register continuous growth, at a rate exceeding 3 percent annually (Figure 3.5). A surge in imports will be among the main consequences of increased consumption. Overall, imports will grow by 56 percent (Table 3.4), reaching 27 million tons annually, representing 40 percent of world imports by 2034, and making Africa the top rice-importing region in the world.

Table 3.4 OECD-FAO projections for the rice market, 2021/23–2033

	Production	Growth	Consumption		Growth		Imports	Growth
	Thousand tons	%	Tons	Kg per capita	Total	Kg per capita	Thousand tons	%
Africa	33.512	33.18	60.101	28.5	41.85	13.54	26.956	56.02
Egypt	4.194	15.63	4.936	34.0	18.89	2.10	752	72.08
Nigeria	7.208	38.90	11.247	33.7	49.38	17.01	4.043	73.52

Source: OECD and FAO (2024).

Figure 3.5 Annual growth in GDP per capita, 2024–2030



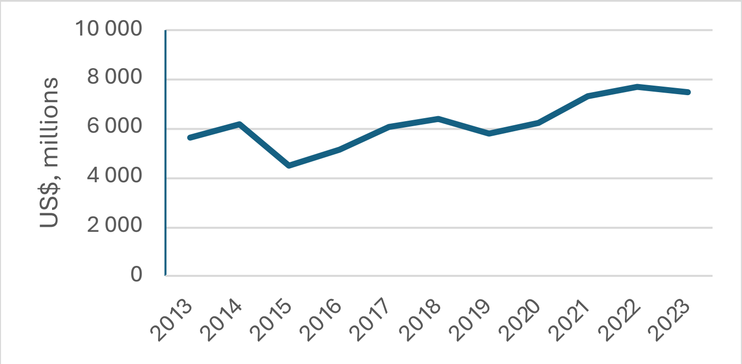
Source: IMF (2025).

4. Trade

External trade

Africa is the world's second largest rice importer, accounting for 24 percent of world rice imports by value and 34 percent by volume. Annual imports average 15 million tons, with a value of US$6.2 billion per year over the past decade (Figure 3.6), meeting 40 percent of continental demand. Africa's rice imports have grown continuously, at an annual rate of 8.25 percent over the past two decades, and are expected to double in the next decade, making the continent the largest rice importer in the world by the mid-2030s. Exports are marginal, averaging US$40 million over the past decade. An important feature of import markets in Africa is the double concentration phenomenon: the concentration of suppliers (countries) and of importers and traders (see Box 3.2).

Figure 3.6 Africa's net rice imports, million US dollars, 2013–2023



Source: 2025 AATM database.

As of 2023, 36 African countries imported rice from the rest of the world. These imports are highly concentrated, despite some decrease in concentration in recent years. On average, the top three importers accounted for 41 percent of the continent's imports in 2009/2013 and 26 percent in 2019/2023 (Table 3.5). Nigeria, Côte d'Ivoire, Benin, South Africa, and Senegal were the main importers during these years. For Benin, the small size of the country suggests that re-exports are likely at play, as highlighted in many studies since the 1990s (Bensassi et al. 2019; Benz 1991), due mainly to Nigeria's restrictive policies (high tariffs and bans) (see also the section on informal trade in this chapter). Africa's suppliers are also highly concentrated, with the top three accounting for 7 percent of imports in 2013 and 80 percent of imports in 2023. India and Thailand were the top two suppliers in both years, with Viet Nam emerging as the third-largest supplier in 2023. Other suppliers, though with a limited share, include China and Pakistan. India remains the continent's main supplier of rice despite a series of restrictions—including a ban on exports of broken rice—that India imposed beginning in July 2022 (partially lifted in 2025), which led Africa to decrease imports from India and shift toward new actors such as Brazil (Antonio et al. 2025). It is also worth noting that India granted temporary exemptions for some African countries, including Madagascar, Kenya, Senegal, and Egypt.

Box 3.2 Imports market concentration

An important feature of import markets in Africa, and particularly in West Africa, is the double concentration phenomenon: concentration of suppliers (countries) and concentration of importers and traders. The market is oligopolistic in most African countries, with just a few traders controlling a significant market share. In Mali, which is probably the most extreme case, the top three companies realize two-thirds of imports, with the largest accounting for more than half (D'Alessandro et al. 2020). In Ghana, the top four importers account for 75 percent of the total volume of imports, while in Senegal they controlled 64 percent of imports as of 2010 (Traoré et al. 2022).

The main consequences of the oligopolistic nature of the market are asymmetric price transmission and downward price rigidities. Due to the market power of importers, increases and decreases in world prices are transmitted differently. This market failure is observed in most developing countries, and several studies have highlighted the phenomenon. In Burkina Faso, Badolo (2012) finds an asymmetric transmission in the rice market: 54 percent of the deviations from the long-run equilibrium are corrected when world prices go up, against 22 percent when world prices decrease. In Senegal, Traoré et al. (2022) find a similar pattern: when world prices go up, 39 percent of deviations are eliminated after one month, but when international prices go down, only 11 percent of deviations are eliminated by the end of the subsequent month.

The structure (composition) of imports is presented in Figure 3.7 by regional economic community (REC). For all RECs, milled rice (semi- or wholly milled) makes up the vast majority of imports. Paddy, that is, unprocessed rice, is barely traded. The shares of milled rice in total REC rice imports represent between 69 percent (observed in ECOWAS) to 92 percent (in EAC). As highlighted in the previous section, rice is not a homogeneous commodity. Consumers prefer broken rice in some regions, particularly in West Africa, where it is the main ingredient in many dishes. In ECOWAS, broken rice makes up 27 percent of total rice imports. In addition to its taste, this category of rice is also cheaper than whole grain rice and is generally consumed by low-income households. Overall, processed rice (semi or wholly milled and broken categories[4]) is by far the most traded product.[5]

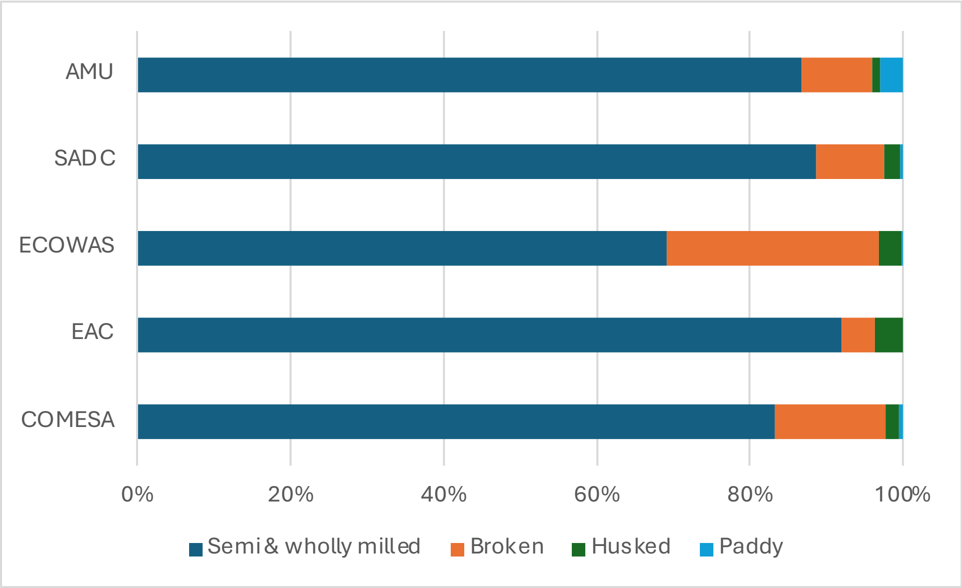
Table 3.5 Top rice importers in 2009/2013 and in 2019/2023, by value, averages

2009/2013			2019/2023		
Country	**US$ millions**	**Share of African imports (%)**	**Country**	**US$ millions**	**Share of African imports (%)**
Nigeria	1.211	21	Côte d'Ivoire	712	10
Côte d'Ivoire	560	10	Benin	584	8
South Africa	550	10	South Africa	520	8
Senegal	397	7	Senegal	499	7
Ghana	317	6	Ghana	395	6
Cameroon	297	5	Ethiopia	292	4
Benin	275	5	Niger	250	4
Mozambique	199	4	Mozambique	249	4
Angola	173	3	Cameroon	201	3
Kenya	159	3	Guinea	191	3
Total	4.140	73	Total	3.892	56

Source: 2025 AATM database.
Note: This table does not include intra-African trade.

4 Although broken rice is milled, therefore processed, it is considered a by-product.
5 It is also worth noting that while part of milled rice can go through further processing and enter different preparations, especially in chapters 11 and 19, the latter are not disaggregated by cereal type.

Figure 3.7 Composition of rice imports by REC, average, 2019–2023



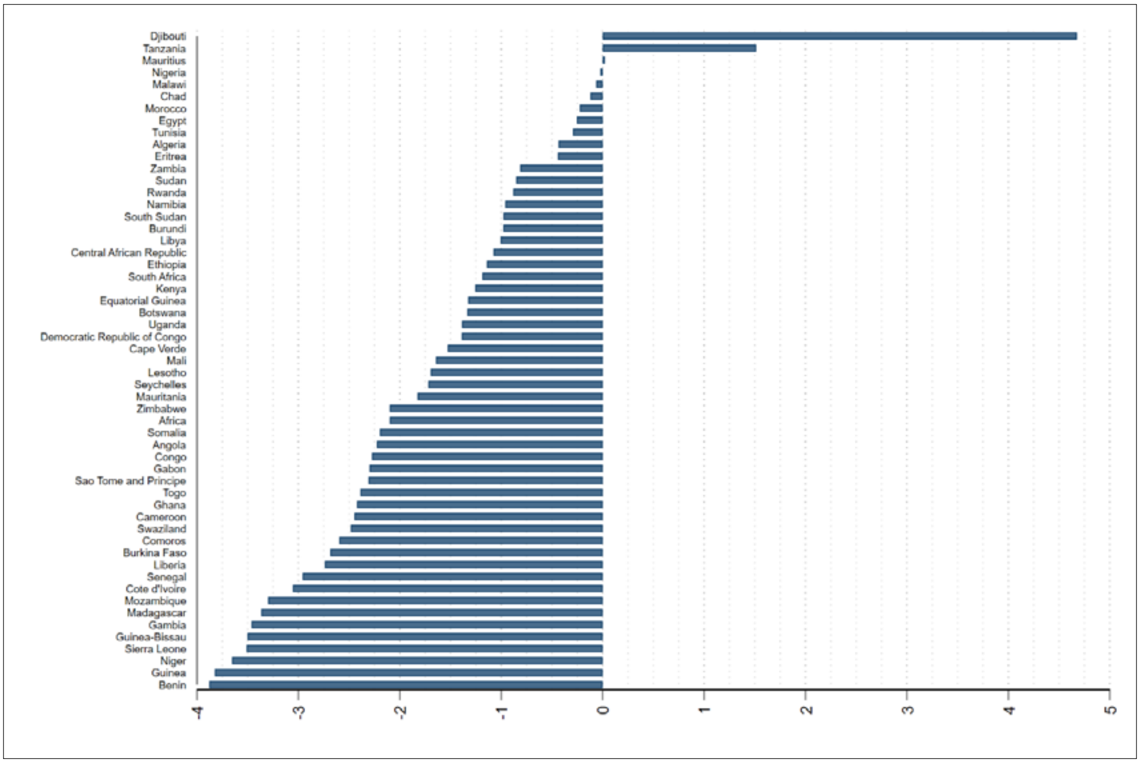
Source: 2025 AATM database.

Note: COMESA: Common Market for Eastern and Southern Africa; EAC: East African Community; ECOWAS: Economic Community of West African States; SADC: Southern African Development Community; AMU: Arab Maghreb Union.

5. Competitiveness of African countries

The previous subsections highlighted the supply constraints of the rice sector in Africa, which, in combination with rapidly growing consumer demand, contribute to a high dependence on extraregional imports. Rice productivity remains low in Africa, and output growth is driven mainly by the expansion of cultivated area, with both productivity and area expansion facing challenges associated with climate change. In this subsection, we explore the competitiveness issue by analyzing the comparative advantage of the continent and the main importer countries (see Box 3.3).

Figure 3.8 Comparative (dis)advantages for rice of African countries, 2019–2023 average



Comparative disadvantage Comparative advantage

Source: 2025 AATM database.

Note: A positive (negative) value refers to a comparative advantage (disadvantage); for instance, Djibouti shows the highest comparative advantage and Benin the highest disadvantage. To reduce the dispersion while preserving signs and orders in calculating comparative (dis)advantage, we used the Inverse hyperbolic sine (IHS) transformation. For any given x, $IHS(x) = \log\left(x + \sqrt{1 + x^2}\right)$.

Figure 3.8 presents the comparative advantage of rice producers in Africa. All the main importing countries reveal a comparative disadvantage for rice, and not surprisingly, Africa as a whole also reveals a comparative disadvantage. Among the top five performers, only Djibouti, Tanzania, and Mauritius present a comparative advantage in trading rice. These three countries also figure among the top exporters within the continent. Nigeria and Malawi, the next two best performers, exhibit a slight comparative disadvantage. Since the relative position of the continent vis-à-vis the rest of the world is expected to deteriorate with climate change, in all likelihood, comparative disadvantages will persist in the absence of new policies.

Box 3.3 Revealed comparative advantage index

To compute the revealed comparative advantage of each country, we rely on the Contribution to Trade Balance (CTB) index (modified version of Cheptea et al. 2014), which is more robust and has fewer shortcomings compared with the more frequently used Balassa index. The index is defined as follows:

$$CTB_{i,k,t} = \frac{1000}{Y_i}\left[X_{i,.,k,t} - M_{i,.,k,t} - w_{i,k,t}\left(X_{i,.,.,t} - M_{i,.,.,t}\right)\right]$$

with $w_{i,k,t} = \frac{X_{i,.,k,t} + M_{i,.,k,t}}{X_{i,.,.,t} + M_{i,.,.,t}}$ referring to the share of k (rice) HS4 product in country i's total trade

with the rest of the world, Y refers to the GDP of the country, X refers to exports, and M to imports. The index consists of the realized trade balance minus the expected trade balance, given the share of the product in total trade. Therefore, to reveal comparative advantages (disadvantages), the observed trade balance $X_{i,.,k,t} - M_{i,.,k,t}$ must be greater (less) than the theoretical balance $w_{k,t}(X_{i,.,.,t} - M_{i,.,.,t})$. Thus, positive (negative) values of CTB refer to a comparative advantage (disadvantage). The index is normalized on the GDP (Y) of the country in question to take the size of the economy into account.

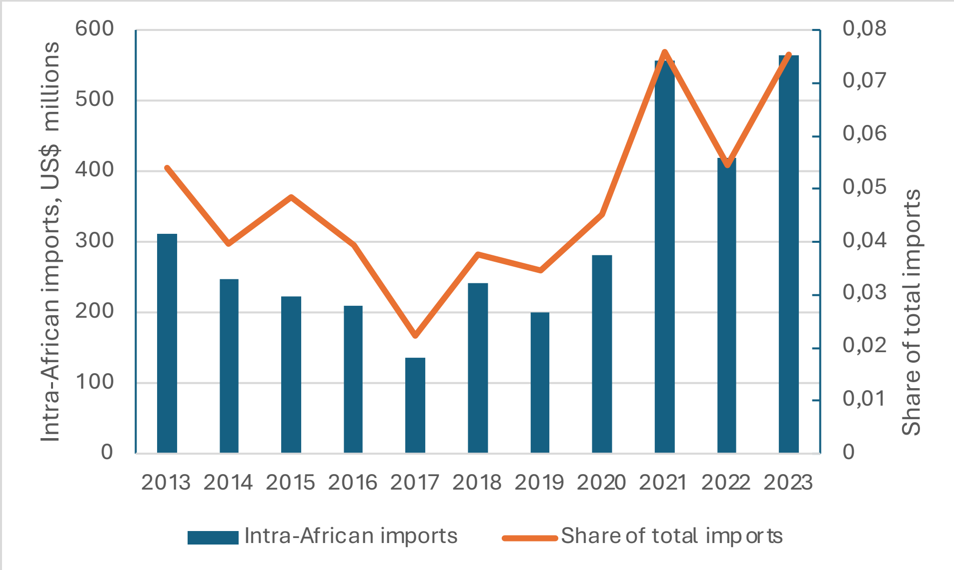
Intra-African trade

Most African rice trade is with partners outside the continent. While extracontinental imports averaged US$6 billion over the past decade, intra-African trade never exceeded $600 million according to official data, although it has generally risen in the current decade (Figure 3.9). The value of intra-African trade fluctuates with the domestic and international environment, and its share in total imports follows a similar pattern. For any given year, intra-African flows represented less than 10 percent of total imports, ranging from 2 percent in 2017 to 7 percent in 2023. In addition to supply conditions, trade policies of both exporting and importing countries have strong effects on intra-African trade. First, although most trade takes place between countries in the same REC, that is, under free trade, and rice is generally exempt from certificate of origin requirements, various impediments remain. Illegal checkpoints, payments, and bribes impose significant costs on traders. In West Africa, these illegal payments represent an ad valorem equivalent that can be as high as 23 percent (Bouët et al. 2021). Another major limiting factor within Africa is the surge of various trade restriction measures, including full trade bans, put in place to stabilize domestic rice markets and favor consumers. Since the 2008 crisis, Burkina Faso (in 2023), Cameroon (in 2022), Ghana (in 2024), Mali (in 2021), and Niger (in 2024) have implemented such measures.

Table 3.6 shows the main intra-African rice exporters and importers, indicating a high degree of concentration for both groups. Exports are dominated by Djibouti, South Africa, and Tanzania, with 74 percent of flows. Intra-African imports are dominated by Ethiopia, Uganda, and Zimbabwe, which together realize 47 percent of these imports. The presence of trade overlap in South Africa is worth noting; while South Africa is among the main importers from outside Africa, it also contributes 21 percent of intra-Africa exports. However, while South Africa's imports from the rest of the world are almost entirely (98 percent) composed of semi and wholly milled rice, intra-African exports are more diversified, including 25 percent broken rice and 3 percent rough or paddy rice.

All these figures should be considered with caution, given that intra-African trade in agricultural products, particularly rice, is often informal, sometimes through re-exports, as a response to differences in trade policies between neighboring countries. The next section discusses this issue.

Figure 3.9 Intra-African rice imports, millions of US dollars (left axis), and share in total rice imports (right axis), 2013–2023



Source: 2025 AATM database.

Table 3.6 Top rice exporters and top importers, share in 2019/2023 average value

Exporter	Share in exports (%)	Importer	Share in imports (%)
Tanzania	39	Uganda	23
South Africa	21	Ethiopia	13
Djibouti	14	Zimbabwe	11
Senegal	8	Kenya	9
Mauritius	6	Botswana	8
Total	**88**	**Total**	**64**

Source: 2025 AATM database.

Informal cross-border trade

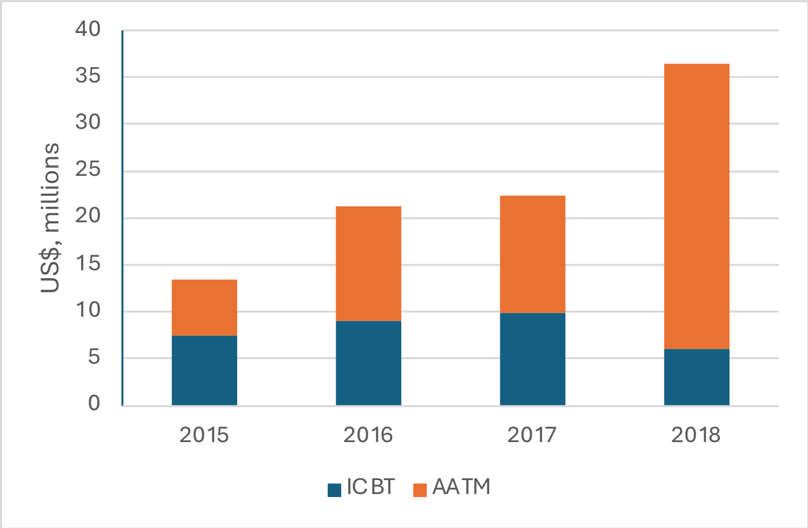
Informal cross-border trade (ICBT) is pervasive within Africa, particularly for agricultural products. Previous studies find that official statistics rarely include ICBT, but it could account for 10 percent to 60 percent of total trade flows in the agriculture sector (Bouët et al. 2020). A recent literature review concludes that ICBT makes up between 7 percent and 16 percent of intra-African trade and between 30 percent and 72 percent of the value of trade between neighboring countries (Gaarder et al. 2021). A recent assessment for West Africa finds that intraregional trade flows are six times the officially reported flows (OECD and SWAC 2025). It is worth noting that no continental direct assessment of ICBT exists to date, although a recent initiative by the African Union, Afreximbank, and UNECA is seeking to fill the gap. In addition, several initiatives are underway at the subregional level. In West Africa, CILSS and WACTAF[6] have the only permanent ICBT monitoring system for agro-silvo-pastoral products and fisheries.

6The Permanent Committee for Drought Control in the Sahel (CILSS) and the West African Association for Cross-Border Trade, in Agro-forestry-pastoral and Fisheries Products (WACTAF).

The data collection activities started in April 2013 and cover 57 products for which the value and volume of intraregional trade is recorded for strategic markets and along the major commercial corridors linking Senegal, Mali, Burkina Faso, Benin, Togo, Ghana, Côte d'Ivoire, and Nigeria. In eastern and southern Africa, FEWSNET, in collaboration with local partners, conducts regular analysis of markets and trade of food commodities such as maize, beans, wheat, rice, sorghum, and sesame. At the country level, the Uganda Bureau of Statistics has the most exhaustive and regular ICBT data collection system, in an effort initiated in 2005 in collaboration with the Bank of Uganda. While other sources or initiatives exist, they are neither exhaustive nor regular.

In West Africa, the Benin–Nigeria case is of particular interest since trade flows involve both exports and re-exports. While official sources report no rice trade data for the 2019–2020 period (partly due to the closure of the border between the two countries in 2019–2020), informal flows recorded by CILSS-ECO-ICBT are valued at more than US$3 million over the period. Trade flows to Togo present a similar pattern: official flows are less than US$10,000 while CILSS reports US$1.1 million. In East Africa, two cases illustrate the magnitude of ICBT in rice. In Uganda, ICBT represents a significant share of trade flows, accounting for up to 55 percent of total imports (Figure 3.10). For Tanzania's exports to Burundi, in three of the five years considered, ICBT constitutes a majority of flows, reaching 78 percent in 2021 (Figure 3.11). These three examples are in line with previous studies and point to the need for caution when analyzing intraregional agricultural trade flows in Africa.

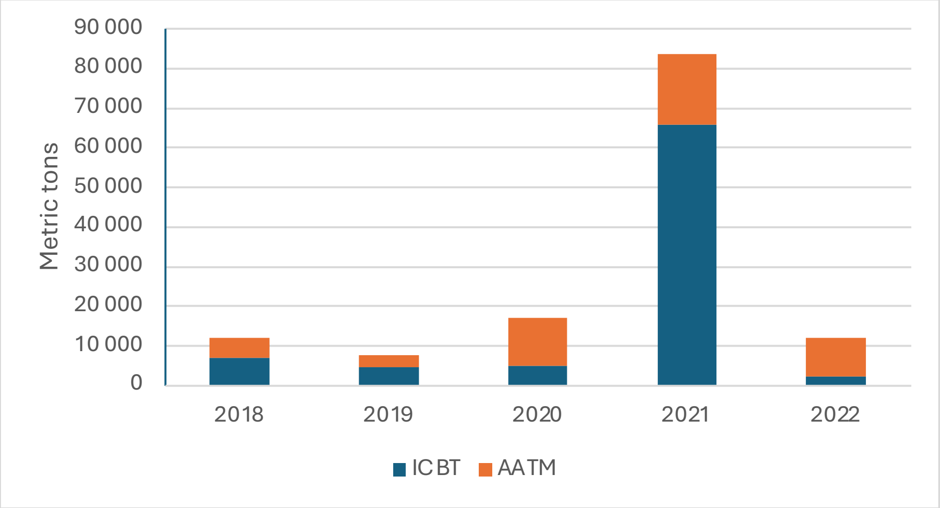
Figure 3.10 Uganda imports of rice, millions of US dollars, 2015–2018



Source: Uganda, Bureau of Statistics (2019).

Note: AATM refers to the AATM (formal) trade database.

Figure 3.11 Tanzanian exports of rice to Burundi, metric tons, 2018–2022



Source: FEWSNET.

Note: AATM refers to the AATM (formal) trade database.

Rice market integration

The previous sections highlighted the presence of intra-African trade flows, although flows from the rest of the world tend to dominate for rice. It is therefore relevant to assess the extent to which these regional markets are integrated. Although different approaches are available for testing market integration, we use the "border effects" approach (Engel and Rogers 1996), which allows us to compare the evolution of relative prices across and within neighboring countries. We compare pairs of markets across and within countries, controlling for distance and other relevant exogenous variables in ECOWAS, SADC, and COMESA. It is assumed that the difference in prices between two markets is positively related to the distance between them, but holding distance constant, it should be higher for two markets separated by a national border if trade barriers exist. In this framework, a significant border effect suggests markets are not integrated (see a description of the underlying model in Box 3.4).

Our analysis finds that, for all three REC examples—ECOWAS, SADC, and COMESA—at the conventional significance levels, the price dispersion is higher for cross-border market pairs than within-country market pairs, suggesting additional transaction costs associated with crossing international borders[7]. The largest effect is observed for ECOWAS (28 percent) and the smallest for SADC (8 percent). The small border effect observed in the SADC example, compared with other RECs, is consistent with previous findings on agricultural market integration in Africa (Cissé et al. 2020). When the sample is split into individual RECs to test whether these effects vary over time, the results suggest an increasing impact of the border in all three examples. These high and increasing border effects identified for rice differ from results found in previous studies on Africa for other staples, such as millet, sorghum, and cassava, which are less or, most often, not impacted by international trade and less subject to public interventions (Araujo Bonjean and Brunelin 2013). Indeed, since the 2008 food crisis, the rice sector has been subject to significant public interventions aimed at isolating domestic markets and reducing trade (see section on intra-African trade). The results also suggest a decreasing impact of distance over time, which may reflect falling transportation costs, possibly as a result of infrastructure improvements.

7 Table A3.A in the appendix reports the results from the regression.

Box 3.4 Border effects model

We run fixed-effects regressions of the form:

$$y_{ijt} = \alpha_0 + \alpha_1 Border_{ij} + \alpha_2 \ln\left(Distance_{ij)}\right) + \delta_i + \mu_j + \lambda_t + \varepsilon_{ijt} \qquad (1)$$

where y_ijt $ln\left|\frac{P_{it}}{P_{jt}}\right|$ is the log of the price ratio between market i and market j.

$Border_{ij}$ is a dummy variable taking 1 if i and j are not in the same country and 0 otherwise; α_1 represents the border effect between countries; and δ_i and μ_j represent the markets fixed effects and λ_t represents monthly fixed effects.

In the analysis, we consider three examples involving three countries with strong trade links in three RECs in Africa: ECOWAS, SADC and COMESA. For ECOWAS, since reexports are present and represent a majority of flows, we consider the imported variety of rice, while we restrict the study to local rice for COMESA and SADC. In addition, since for a pair of markets located in different countries and far from the border, country-level unobserved heterogeneities can be an issue and potentially confound the border effects, in our estimation sample, we consider only market pairs no more than 500 kilometers apart.

Two sources of data are available: the Global Information and Early Warning System on Food and Agriculture (GIEWS), through its food price monitoring and analysis tool, and the World Food Program's Economic Explorer platform. As the Economic Explorer has greater coverage—providing monthly food price data by regional markets in 75 countries—we rely on it first. Due to data availability, the sample covers the 2000–2024 period for SADC and COMESA and 2013–2024 for ECOWAS. Distance matrices between and within countries have been computed using the centroid coordinates from shapefiles.

AfCFTA and regional trade potential

The African Continental Free Trade Area (AfCFTA) is the most ambitious trade initiative ever undertaken on the continent. When fully operational, the AfCFTA will establish a market of 1.2 billion people and US$2.5 trillion in GDP (World Bank 2025). The agreement is creating high expectations and aims to address some key issues in Africa's trade landscape. First, Africa remains the least open continent in the world. Its intracontinental tariffs are the highest in the world, averaging 9 percent, while the world average is 3.5 percent (Bouët et al. 2017). Yet, trade complementarities exist between African countries, and there is a potential for regional trade to help stabilize domestic markets, particularly in agriculture and especially for cereals (Badiane et al. 2014). In addition, recent crises and tensions in global markets (in particular, export restrictions in large exporting countries) have highlighted Africa's dependence on the rest of the world, underscoring the importance of greater integration as a risk-coping strategy (Laborde Debucquet et al. 2023).

To identify the continental trade potential of rice, it is important to analyze the state of taxation in the sector. Rice is currently highly taxed in Africa (see Tables 3.7 and 3.8), particularly in AMU, COMESA, and SADC, while ECOWAS and ECCAS apply relatively low tariffs (around 10 percent). Overall, paddy (unprocessed) rice, including seeds, is taxed less than processed rice, with ECOWAS applying the lowest tariffs. This taxation structure creates positive effective protection for the sector. Moreover, some intracontinental tariffs are higher than the ones applied to imports from the rest of the world. This is the case for AMU and COMESA. These high intracontinental tariffs confirm the results from the border effects analysis and the potential for increasing intracontinental trade.

The strategic nature of rice is visible in countries' market access offers under the AfCFTA. For the three RECs for which data are available (CEMAC, EAC, and ECOWAS), at least one tariff line for rice is treated as sensitive (to be liberalized over a longer period) or excluded from liberalization. This special treatment will dampen the positive effects expected from the AfCFTA as a risk-coping strategy and a domestic market stabilization mechanism. This risk is particularly important for COMESA,[8] where rice imports face high tariffs despite strong potential for regional trade to stabilize domestic markets. Indeed, in this REC, aggregate production is much more stable than domestic production, and cross-country correlations are weak (Mamboundou et al. 2024).

Table 3.7 Average duties applied on paddy (unprocessed) rice, percentage

		Importing blocs					
		AMU	**COMESA**	**ECCAS**	**ECOWAS**	**SADC**	**ROW**
Exporting blocs	**AMU**	7.5	14.3	7.1	5.0	26.3	27.1
	COMESA	17.7	3.6	7.1	5.0	14.0	25.5
	ECCAS	19.7	14.3	2.0	5.0	26.1	27.0
	ECOWAS	19.7	15.0	7.1	0.0	26.3	25.3
	ROW	18.4	14.8	7.1	5.0	26.3	32.2
	SADC	19.7	9.3	7.1	5.0	0.0	28.0

Source: MacMAp-HS6 database (2019).

Note: ROW: rest of the world; COMESA: Common Market for Eastern and Southern Africa; EAC: East African Community; ECOWAS: Economic Community of West African States; SADC: Southern African Development Community; AMU: Arab Maghreb Union.

Table 3.8 Average duties applied on processed rice, percentage

		Importing blocs					
		AMU	**COMESA**	**ECCAS**	**ECOWAS**	**SADC**	**ROW**
Exporting blocs	**AMU**	7.5	14.4	7.06	11	27.5	24.9
	COMESA	20.6	3.6	7.06	11	14.9	25.7
	ECCAS	23.2	14.9	2.02	11	27.2	25.7
	ECOWAS	23.2	15.0	7.06	0	27.5	25.6
	ROW	20.7	14.9	7.06	11	27.5	25.2
	SADC	23.2	9.0	7.06	11	0.0	27.1

Source: MacMAp-HS6 database (2019).

Note: ROW: rest of the world; COMESA: Common Market for Eastern and Southern Africa; EAC: East African Community; ECOWAS: Economic Community of West African States; SADC: Southern African Development Community; AMU: Arab Maghreb Union.

8 Most EAC countries are also part of COMESA, thus with a special treatment for rice.

6. Policy Environment

The development of the rice sector and its value-chain linkages largely depends on the policy environment, both domestic and international. This section examines that environment using two key indicators: price incentives and public expenditures. Price incentives are a widely used measure to assess how policies influence agricultural returns and whether they create an enabling environment for farmers and consumers (Krueger et al. 1988; Anderson et al. 2008). In particular, we analyze the nominal rate of protection (NRP) at the commodity level, which is a preferred indicator because it captures the combined effects of policies on producer and consumer behavior and on overall welfare. For public expenditures, to take advantage of a newly developed tool, we use economic modeling to determine if budget support for rice producers should be increased (decreased) because it will be relatively more (less) optimal to support them vis-à-vis other farmers, which is an indication of the competitive advantage of the sector vis-à-vis other sectors. The policy implications of the analysis are discussed.

Price incentives through market price support and subsidies

The first indicator we look at is the nominal rate of protection (NRP), which quantifies the impact of agricultural policies on the market price of a commodity compared to world prices. It is calculated as the percentage difference between the farmgate price received by producers and an undistorted reference price at the farmgate level. Reference prices are derived from border prices of commodities, adjusted for market costs and quality and quantity factors to ensure comparability with domestic prices. These prices are considered free from domestic policy influences and market distortions. A positive NRP indicates that local prices exceed reference prices, signifying that there are price incentives for producers and wholesalers, whereas a negative NRP indicates price disincentives for those actors. The price incentives or disincentives result from border measures (that is, trade policies) and market price regulations. Krueger et al. (1988) first used the NRP approach, and Anderson et al. (2008) expanded it to measure the nominal rate of assistance to agriculture (NRA), which includes the elements in the NRP and also encompasses broader assistance mechanisms that affect the incentives for agricultural production, such as fiscal transfers or subsidies.

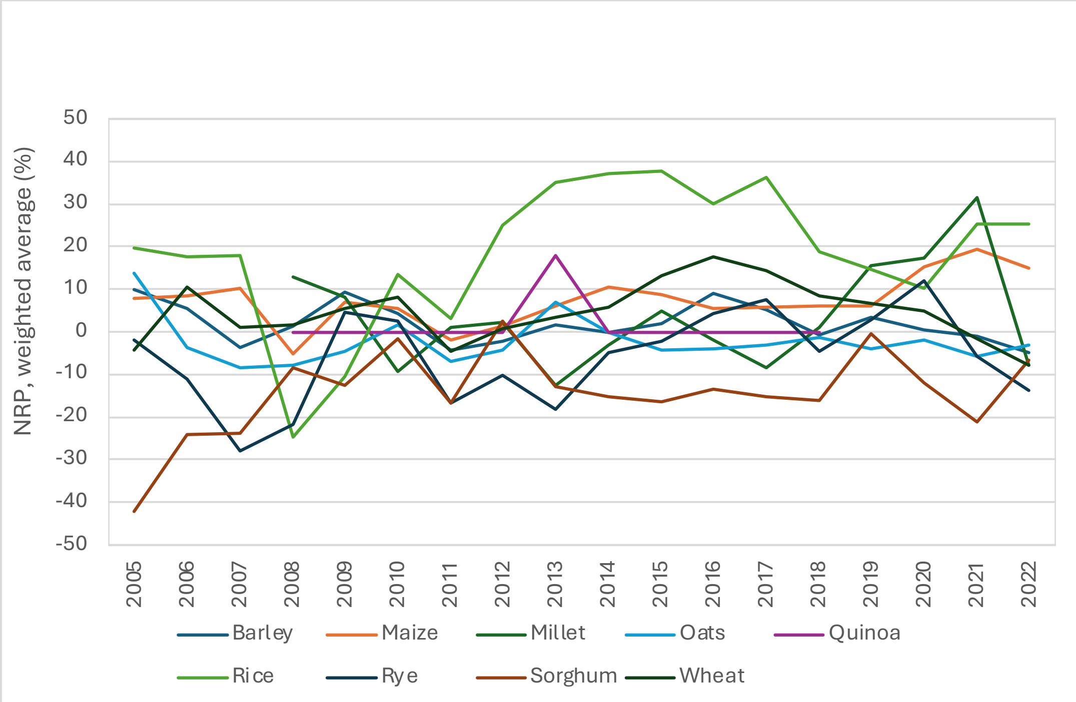
We analyze the NRP for 47 countries over the period 2005 to 2022. Figure 3.12 shows that rice is the most protected grain,[9] with an average NRP of 18.5 percent over the period.[10] Since 2010,[11] the NRP of rice has consistently exhibited positive values, followed by that of maize and wheat. Although the rice price incentives are the highest, they also show significant variation over time and across countries. The standard deviation of 16.5 makes rice's NRP nearly three times greater than those of maize (5.8) and wheat (6.8), underscoring substantial heterogeneity in terms of how the sector is incentivized/disincentivized over time.

9 We exclude teff from Figure 3.1 because its maximum NRP of 415 percent is out of scale, and it is produced exclusively in Ethiopia.

10 Grains as a group, including rice, maize, and wheat, exhibit significantly higher price incentives than other sectors, with an average NRP of 9.3 percent from 2005 to 2022.

11 Export restrictions imposed by major rice exporters, including India and Viet Nam, caused global rice prices to surge sharply in 2007/08. The highly negative NRP observed during this period suggests that farmers did not fully benefit from the price increase, as importers appear to have captured most of the gains.

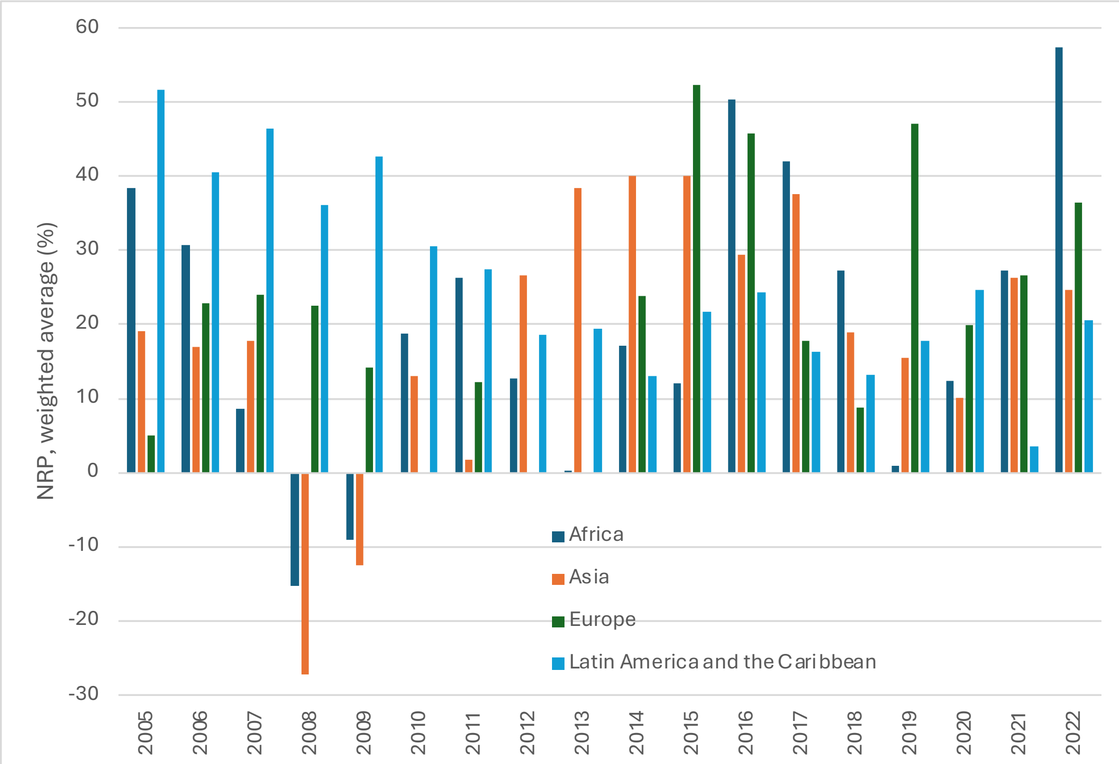
Figure 3.12 Product-level global nominal rate of protection, 2005–2022



Source: AgIncentives Consortium (2024).

Figure 3.13 shows that on average, during the 2005 to 2022 period, African countries also provided price incentives for rice producers, reflected by a 19.9 percent NRP, which is comparable to levels observed in Latin America (26 percent) and Europe (21 percent). However, these averages mask considerable heterogeneity. Across African countries, the standard deviation of rice producer support is 19.7, the highest among all regions analyzed, reflecting substantial differences in producers' support across the continent. Moreover, the average for Africa also shows considerable fluctuations in price support over time, with reductions from 2005 to 2007 and even price disincentives in 2008 and 2009, negligible support in 2013, and an increasing trend beginning in 2019. This underscores that, while Africa has recorded the highest average price support for rice in recent years, it is also the region with the greatest variability.

Figure 3.13 Nominal rate of protection for rice at the regional level, 2005–2022

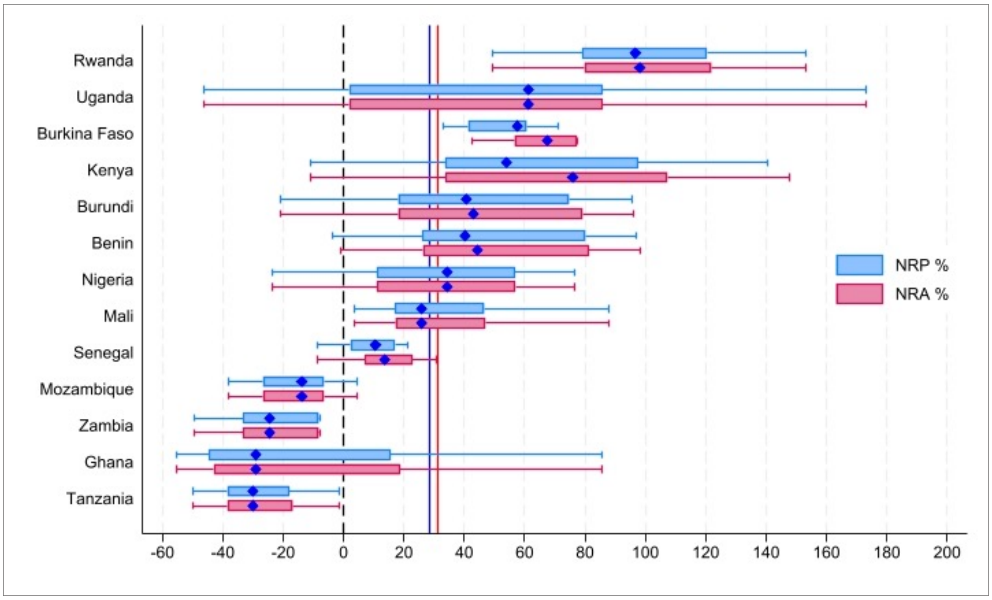


Source: AgIncentives Consortium (2024).

Focusing on Africa, significant variability is evident in both the NRP and the NRA for rice, not only across but also within countries (Figure 3.14). The two measures largely overlap, as data are available for only a subset of countries and years in our sample, and, as explained, the NRA includes the elements of the NRP. Where this information was available, we see that market price support constitutes 90 percent of the total NRA value, with fiscal transfers accounting for the remainder. This breakdown suggests that budget support for rice farmers—such as subsidies related to production and inputs exclusively due to fiscal transfers—is relatively low in the region, as we discuss.

While some countries (Rwanda and Uganda) display high positive NRPs, reflecting strong price incentives for producers, others (Zambia and Tanzania) consistently show negative NRPs, indicating disincentives. Notably, there are no clear regional patterns in the distribution of the NRP, as the NRP range is wide in both western and eastern African regions. Regarding within-country heterogeneity, this is evident in the length of the boxplots (Figure 3.14). For example, Uganda shows a particularly wide range for its NRP, highlighting substantial fluctuations in producer price incentives over time.

Figure 3.14 Nominal rates of protection and assistance for rice at the country level, 2005–2022



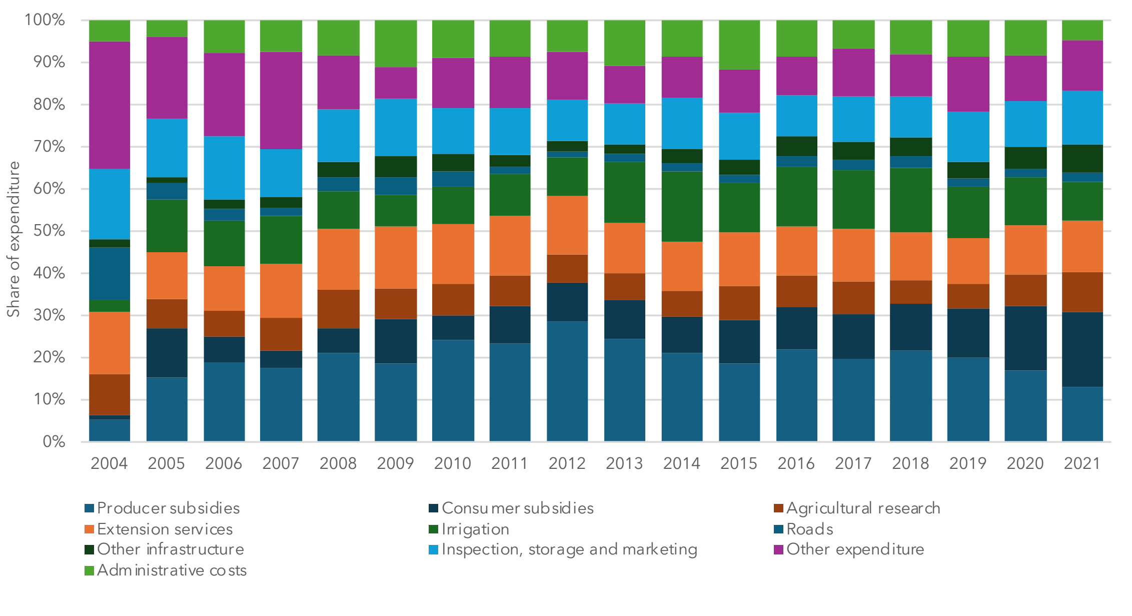
Source: AgIncentives Consortium (2024).

The analysis of the NRP and the NRA also highlights the diverse and intertemporally inconsistent policy environments affecting rice production in Africa. On the one hand, countries with high positive price incentives likely aim to boost domestic production through protective measures. For instance, this is the case of Rwanda, which has supported its producers with a 75 percent import duty and various initiatives to promote self-sufficiency and market competitiveness, including the country's Crop Intensification Programme (CIP) launched in 2007, the National Rice Development Strategy (NRDS II, 2021–2030), and the Strategic Plan for Agricultural Transformation (PSTA IV, 2018–2024). On the other hand, negative NRPs (such as those of Mozambique, Zambia, Ghana, and Tanzania, shown in Figure 3.15) may be evidence that countries prioritize low consumer prices rather than boosting domestic production. Such high heterogeneity in NRPs and NRAs both across and within countries suggests the need for more stable and targeted policy interventions to balance producer incentives and market competitiveness.

Public expenditure and budget support

The NRA includes fiscal transfers (that is, subsidies) that are reflected in agricultural budgets and expenditures. However, the NRA does not provide a full picture of all the domestic policy support, requiring a more thorough analysis of agricultural budgets and their allocation across policy-support measures. Historically, the share of government budgets devoted to agriculture in Africa has been low compared with Asia and has even been declining recently (Fan and Breisinger 2011; Pernechele et al. 2021). Recently, Sánchez et al. (2024) have shown that the share of public spending on agriculture in 18 African countries over the 2004–2021 period was consistently below the 10 percent CAADP target in most of the countries and has been declining. They also note that a substantial portion of public expenditure in food and agriculture (including consumer transfers) in these countries was allocated to producer subsidies (about 21 percent on average), followed by extension services (12 percent), and irrigation infrastructure (12 percent). But, as further noted below, the rice sector may not be the main beneficiary of such subsidies. Over time (Figure 3.15), the shares of budgets allocated to producer subsidies, roads, and irrigation have trended downward.

Figure 3.15 Composition of public expenditure in the food and agriculture sector over time, average for all countries by year, 2004–2021



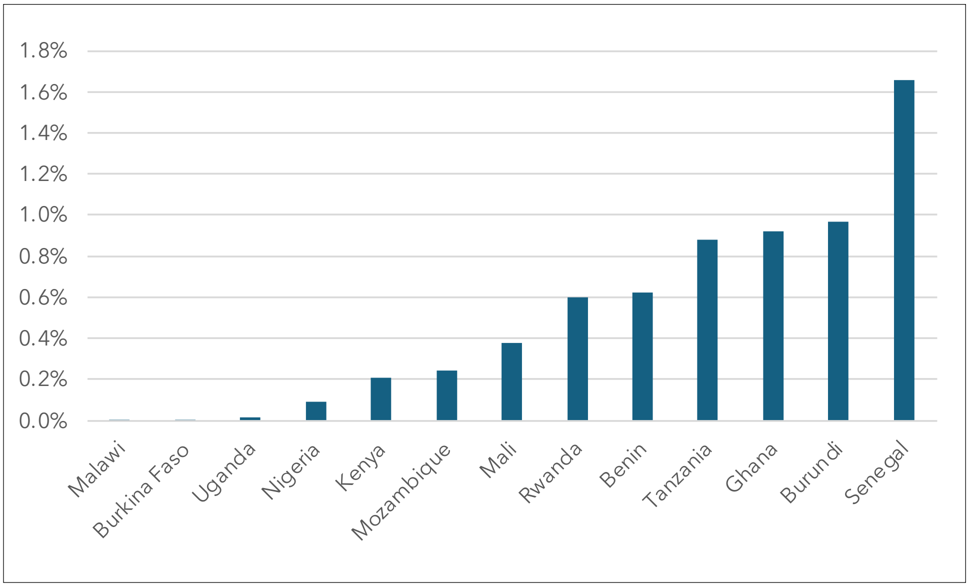
Source: Sánchez et al. (2024), based on Monitoring and Analysing Food and Agricultural Policies: Data hub–Public expenditure, accessed October 2024. https://www.fao.org/in-action/mafap/data-hub

Note: Countries and years covered are as follows: Benin (2008–2020), Burkina Faso (2006–2020), Burundi (2005–2017), Ethiopia (2009–2021), Ghana (2016–2020), Kenya (2007–2018), Malawi (2006–2020), Mali (2005–2020), Mauritania (2009–2021), Mozambique (2009–2020), Niger (2004–2018), Nigeria (2015–2021), Rwanda (2012–2020), Seychelles (2004–2013), Uganda (2004–2022), United Republic of Tanzania (2011–2017), Zambia (2014–2019), and Zimbabwe (2011–2017). Unfortunately, the number of countries is not homogeneous across all years.

In the case of rice, market price measures have been the primary support mechanism (reflected in NRP, recall Figures 3.13 and 3.14), rather than budget support, although some countries have invested in increased irrigation for rice, among other priority areas. In fact, data available in 13 African countries indicate three important characteristics of the share of direct budget support to producers in total agriculture public expenditure (Figures 3.16 and 3.17):[12] (1) this share varies substantially across countries, (2) it is a very small share on average, close to negligible in some countries, and reaches 1 percent only in one country (Senegal), and (3) considering the countries together, the support has been steadily declining, after having reached its maximum in 2010. Putting fiscal constraints aside, this evidence raises important questions: Is budget support for rice producers low and declining because it does not produce expected outcomes (such as boosting productivity)? Or, to the contrary, should it be increased to help producers reach their potential? To answer these questions, we employ economic modeling.

12 Countries and years covered are: Benin (2008-2020), Burkina Faso (2006-2020), Burundi (2005-2017), Ghana (2016-2020), Kenya (2007-2018), Malawi (2006-2020), Mali (2005-2020), Mozambique (2009-2020), Nigeria (2015-2020), Rwanda (2012-2020), Senegal (2010-2020), Tanzania (2011-2017), Uganda (2004-2022). The number of countries varies across years, and it is lower for the initial and final years.

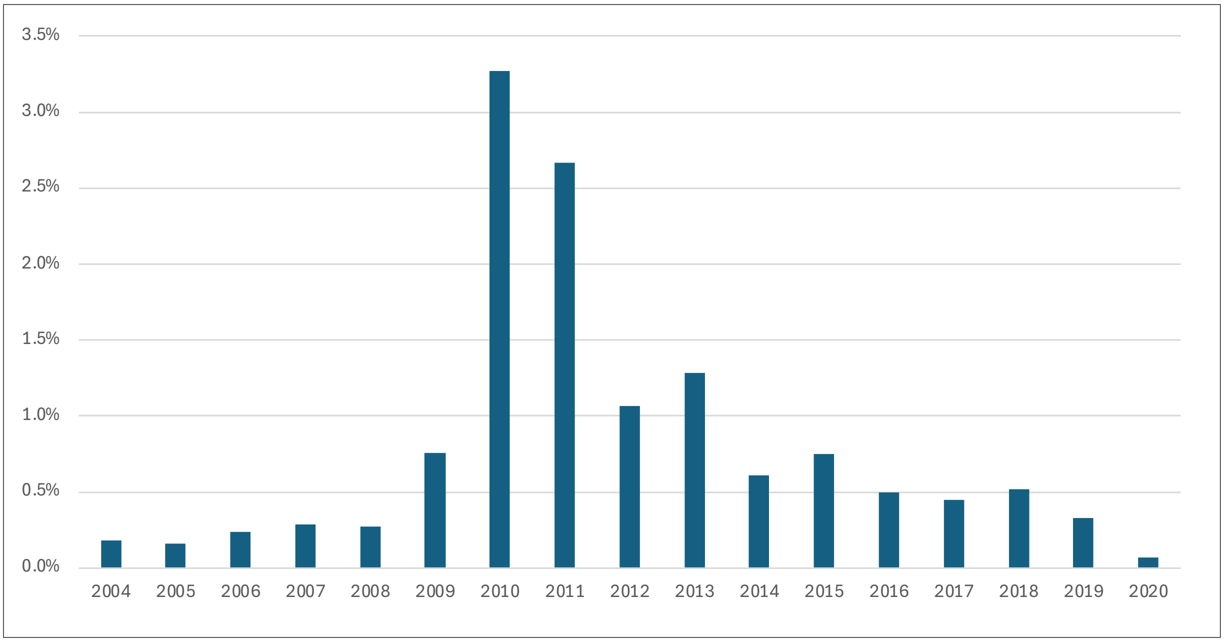
Figure 3.16 Direct support to rice producers as a share of total public expenditure in agriculture, annual average, 2005–2020



Source: Authors based on Monitoring and Analysing Food and Agricultural Policies: Data hub – Public expenditure, Accessed on December 2024. https://www.fao.org/in-action/mafap/data-hub

Note: Direct support to producers includes subsidies to production, inputs, and on-farm services; income support; and other producer transfers. Total public expenditure for agriculture includes this support, transfers to the value chain agents (producers, consumers, and other agents), general support to the sector (extension services, R&D, technical assistance, training, inspection, storage, marketing, and agricultural infrastructure), and administrative costs.

Figure 3.17 Direct support to rice producers as a share of total public expenditure in agriculture across 13 African countries, 2004–2020



Source: Authors based on Monitoring and Analysing Food and Agricultural Policies: Data hub-Public expenditure, accessed December 2024. https://www.fao.org/in-action/mafap/data-hub

Note: The 13 countries are the same as those presented in the previous figure.

A scenario analysis, presented in Sánchez et al. (2024), uses a policy optimization modeling tool for six sub-Saharan African countries to provide additional insights into the position of the rice sector in the current budget support landscape, where not only subsidies but also other policy support measures are identified.[13] First, they generate a base business-as-usual scenario for 2025 to 2030, in which there is no change in the public budget in food and agriculture as a share of GDP or its relative allocation across policy support measures and subsectors/ commodities. Second, they develop a policy optimization scenario in which the projected public expenditures in the crop farming and livestock sectors are optimized across policy support measures to pursue four policy objectives from 2025 to 2030: (1) maximize agrifood output, (2) maximize off-farm job creation in rural areas, (3) minimize rural poverty, and (4) minimize the cost of a healthy diet. The comparison of these two scenarios points to existing inefficiencies in the allocation of public support to agriculture in the six countries.

Reallocation of public expenditures to optimize policy support measures to improve on the four policy objectives can be expected to change the support across subsectors/commodities.[14] In the particular case of the objective that seeks to reduce the cost of a healthy diet, governments in most of the six countries would have to reduce support to cereals primarily, but also to livestock, in order to increase the supply of fruits and vegetables. Overall, the authors find that eliminating budget support inefficiencies will allow for higher agrifood output growth, the creation of thousands of off-farm jobs in rural areas (852,461), helping millions of people to escape poverty (2,776,027), and allowing many more to newly afford a healthy diet (more than 16 million).

Disaggregation of the results presented in Sánchez et al. (2024) to single out rice for five countries for this paper[15] shows that resolving the existing budget support inefficiencies to achieve the four socioeconomic objectives would have important implications for the rice sector. We find that increasing budget support to rice producers is optimal only in Mozambique, and even there only to a very modest extent (Figure 3.19), given the observed impact of this support on productivity.[16] In the other four countries, it would be more cost-effective to reduce the budget support to rice producers and reallocate it to other sectors where the productivity effect will be larger at given unit costs and coverage of the existing budget support measures. The productivity effect would increase by almost 7 percentage points in Ghana and 4 percentage points in Burkina Faso. This observation is valid only if current budget support needs to be prioritized (given a continuing budget constraint) to gain efficiency, and it implies a trade-off for rice that can only be reversed with investments in climate-smart technological shifts that change the cost-effectiveness of budget support in the sector.

Without such technological shifts, the implication is that current support to rice producers in the five countries considered would result in larger total factor productivity effects (and the resulting economywide effects) if reallocated to support other producers, including those of

13 The policy optimization modeling tool applied in Sánchez et al. (2024) was developed by and is fully described in Sánchez and Cicowiez (2022, 2023). It combines a multicriteria decision-making technique with a recursive-dynamic computable general equilibrium model that is calibrated to country-specific datasets. The six countries are Burkina Faso, Ethiopia, Ghana, Mozambique, Nigeria, and Uganda.

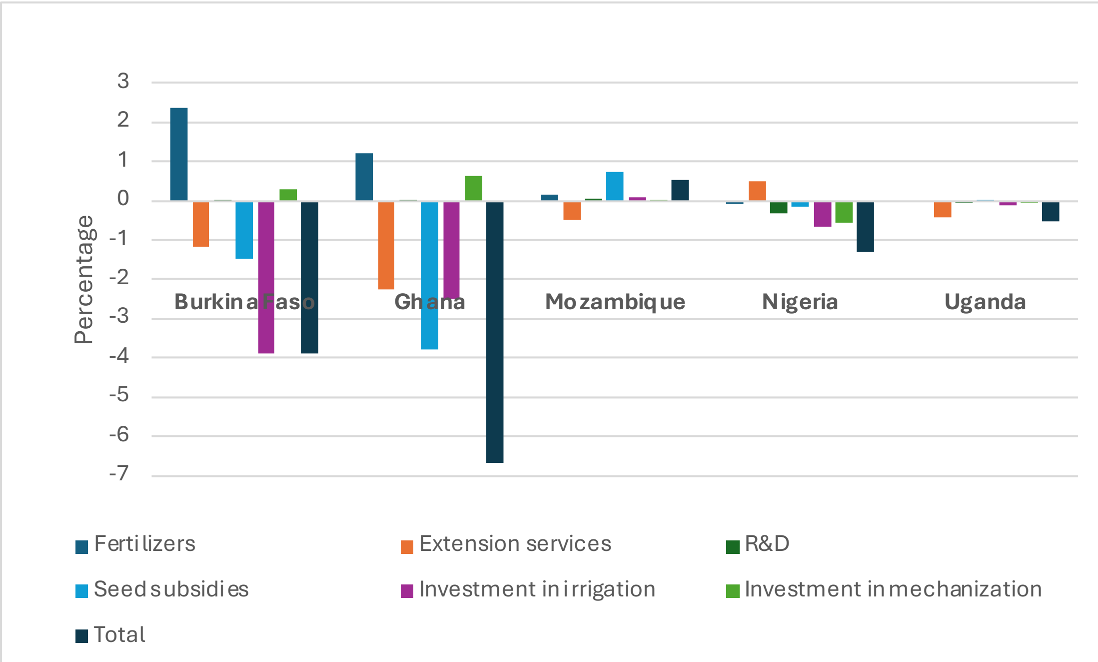
14 Sánchez et al. (2024) find that some countries would have to spend relatively less on irrigation (Ghana, Ethiopia, Nigeria, and Uganda) or seed subsidies (Burkina Faso and Ghana), whereas others would need to increase support for seed subsidies (Ethiopia and Mozambique) or investment in mechanization (Burkina Faso, Ghana, and Nigeria). In addition, extension services would need to be given greater priority in Burkina Faso and Nigeria in order for these countries to improve on the four policy objectives.

15 For the purposes of this chapter, we have further disaggregated the scenario results presented in Sánchez et al. (2024) to separate the rice subsector from the group of cereals in all cases except Ethiopia, where the national account data disaggregation was not available. Hence, we present results only for Burkina Faso, Ghana, Mozambique, Nigeria, and Uganda. .

16 The observed impact accounts for the unit cost of support measures for rice and the coverage of these measures vis-à-vis those for other sectors (as reported in Sánchez et al. 2024; Annex 2).

fruits and vegetables, as shown in Sánchez et al. (2024). Interestingly, while the current overall support to rice producers seems suboptimal, increasing fertilizer subsidies, investment in mechanization, and R&D in Burkina Faso, Ghana, and Mozambique, or even seed subsidies and investment in irrigation in Mozambique, would increase the support's return in the sector compared with the other policy support measures (Figure 3.18).

Figure 3.18 Optimal reallocation of public expenditure across support measures for rice to improve output level and diversity and income (relative to a business-as-usual scenario), 2025–2030



Source: Authors based on a commodity disaggregation of the scenario results reported in Sánchez et al. (2024).

Note: The optimal reallocation of public expenditures across support measures covers all commodities in the crop farming and livestock sectors. The sum of the percentages shown for rice in the figure and the percentages for all other commodities (not shown in the figure) is equal to zero. Other support measures included in Sánchez et al. (2024), such as investments in rural electrification or rural roads, are excluded as they do not target specific commodities.

7. Conclusion

Given its contribution to diets in many African countries, rice is a strategic commodity. This chapter has illustrated and confirmed this status and provided new insights. The sector involves millions of small farmers, with women predominant in the labor force. Due to the combined effects of population and income growth, urbanization, and changing diets, rice consumption will continue to grow at a sustained pace. At the same time, production is expected to grow but at a slower pace, and driven mainly by expansion of the production area rather than yield improvements. While climate change—one of the main threats to African agricultural systems—is expected to have some positive effects on these yields in parts of the continent due to CO_2 fertilization, the relative situation of the continent vis-à-vis the rest of the world is expected to deteriorate. Moreover, in the absence of this CO_2 effect, yields will decline significantly. Given this risk, policy support should be aimed at boosting resilience and productivity in the rice sector. Such measures should first focus on increasing water-use efficiency through intelligent irrigation systems using real-time data and artificial intelligence. In addition, the development of drought-resistant varieties must be prioritized, as not all production systems will benefit from irrigation. Furthermore, the best management practices adopted from Asia should be strongly promoted as they have proven effective (Otsuka et al. 2024). These measures should be accompanied by strong insurance mechanisms and early warning systems to fill information gaps.

Africa has consistently been a net importer of rice over recent decades. Rice accounted for one-quarter of the region's total cereals trade deficit on average during the 2019 to 2023 period. Overall, the continent does not have a comparative advantage in producing rice. Given the rising demand and the production challenges that are likely to be exacerbated by climate change, Africa is expected to be the largest rice-importing region by 2035. While intra-African trade is present, it remains marginal and is subject to various restrictions by both importing and exporting countries. Significant border effects remain compared to intranational trade, even between countries in the same RECs. Informal flows and smuggling are pervasive and aim at avoiding restrictions.

African countries have intervened in the rice sector with different strategies and objectives. The policy environments affecting rice production in Africa are both diverse and intertemporally inconsistent. While one group of countries provides large price incentives to producers through various market price support measures (trade policies and regulations), rice producers in another group of countries are disincentivized by policies that aim to maintain low consumer prices, particularly in urban areas. This heterogeneous pattern even occurs within the same country over time, with positive incentives during normal times and disincentives in periods of crisis (high world prices) intended to protect consumers. Despite the heterogeneity of price support mechanisms across the continent, overall, other forms of support through fiscal transfers, particularly subsidies to producers (as a share of agricultural public expenditure), have been declining since 2010. However, even with limited budgets, there is room to make support to the rice sector more efficient through an optimal reallocation among its different components. In some countries, increasing fertilizer subsidies and investing more in mechanization and R&D would better support the rice sector, whereas in other countries the solution may be to step up seed subsidies or invest more in irrigation, in order to contribute to a range of socioeconomic goals.

One key question remains regarding the status and the future of the commodity. Rice has been at the forefront of contentious debates in Africa, particularly in the aftermath of the 2008 food crisis. Governments intervened massively to protect consumers and launched various initiatives to reach self-sufficiency and even produce a surplus. At the same time, efforts have been made to improve the quality of local varieties. Both actions aim at increasing consumption in countries with already high consumption levels. Yet recent studies show that shifting toward more healthy, cost-effective diets would likely require reducing rice consumption in these countries to allow for a more diverse diet (Marivoet et al. 2021). In fact, to make healthy diets less costly, policy support within existing budgets would have to be reallocated to promote fruit and vegetable supply, rather than staples (Sánchez et al. 2024). Thus, if African governments shift policies to increase the affordability of healthy diets, it could pose a challenge for the rice sector or provide an opportunity to realign trade. Furthermore, budget support is likely to be shifted away from rice and toward sectors deemed more cost-effective if support must be prioritized amid fiscal constraints in African countries. Managing this potential trade-off from budget reprioritization will require investments in climate-smart technological shifts that enhance the cost-effectiveness of budget support in the rice sector.

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Appendix 3.1

Table A3.1. Border effects estimation by REC (ECOWAS, SADC, COMESA)

Dependent variable: |ln (*Pit/Pjt*)|	ECOWAS (NGA-BEN-NER)			SADC (MOZ-MWI-TZA)			COMESA (MWI-ZMB-DRC)		
	2013-2024	2013-2018	2019-2024	2000-2024	2000-2012	2013-2024	2000-2024	2000-2012	2013-2024
Border Effect	0.25***	0.10***	0.33***	0.08***	0.02	0.12***	0.19***	0.12***	0.21***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)
Log (Distance)	0.02**	0.03***	0.02**	0.05***	0.04***	0.05***	0.03***	0.05***	0.03***
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)
Constant	0.07**	0.01	0.06*	-0.13***	0.06*	-0.19***	-0.04	-0.01	-0.05
	(0.03)	(0.05)	(0.03)	(0.02)	(0.04)	(0.02)	(0.03)	(0.07)	(0.03)
Markets FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Monthly FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country pairs FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	4.369	1.447	2.922	26.340	5.504	20.836	13.808	3.072	10.736
r2	0.36	0.36	0.54	0.10	0.28	0.10	0.20	0.20	0.22

Source: Authors

Note: *plural * Significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level; Standard errors are in parentheses. Niger officially withdrew from ECOWAS in January 2025.

The border effect measures the additional cost associated with crossing a border between two markets in different neighboring countries, compared to the equivalent markets located in the same country. When significant, it indicates a lack of regional market integration.