

## Chapter 3.3

# Regional Integration, Resilience, and Innovation

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### Introduction

**R**egional integration has become a strategic objective for Africa in an era marked by global tensions, climate vulnerability, and persistent structural transformation challenges. Despite decades of regional trade agreements, intra-African trade remains limited and concentrated in a narrow range of products, reflecting shallow productive integration and high trade costs. These constraints are particularly present in agriculture, which employs nearly 60% of Africa's labor force and plays a central role in food security, income generation, and poverty reduction (Mamboundou et al. 2026). The launch of the African Continental Free Trade Area (AfCFTA) represents a structural shift toward continent-wide deep integration, with the potential to expand intra-African trade, strengthen regional value chains, and enhance economic resilience. At the same time, digital innovation and climate imperatives are reshaping the policy landscape, creating both opportunities and adjustment pressures. This chapter examines the interconnections between regional integration, resilience, and innovation in Africa, assessing the evolution and performance of regional trade integration, evaluating the projected impacts of AfCFTA implementation, and analyzing the roles of digitalization and climate-smart trade pathways in supporting inclusive and sustainable transformation. In the context of the post-MC14, the chapter contributes to ongoing debates on how regional integration can complement multilateral reform, particularly in agriculture, digital trade governance, and climate-related trade measures.

## Regional integration in Africa

This section examines whether African regional integration has generated measurable trade creation, especially in agriculture. Regional trade integration is measured using the Regional Trade Introversion (RTI) index proposed by Ipadre (2006) and later applied by Bouët, Cosnard, and Laborde (2017). Unlike simple intra-regional trade shares, the RTI is symmetric and scale-independent, addressing the size and symmetric limitations of traditional measures, and enabling meaningful comparisons across Regional Economic Communities (RECs) and over time.<sup>33</sup> Importantly, the index increases only when intra-regional trade grows faster than extra-regional trade, thereby avoiding the biases inherent in traditional indicators.

The analysis covers the eight RECs officially recognized by the African Union (AU): COMESA (Common Market for Eastern and Southern Africa), EAC (East African Community), ECCAS (Economic Community of Central African States), ECOWAS (Economic Community of West African States), SADC (Southern African Development Community), AMU (Arab Maghreb Union), CEN-SAD (Community of Sahel-Saharan States), and IGAD (Intergovernmental Authority on Development). In addition, other regional initiatives are included, notably WAEMU (West African Economic and Monetary Union), TFTA (Tripartite Free Trade Area), and SACU (Southern African Customs Union).

## Evolution of regional integration in Africa

Applied to African regions, the RTI calculated using the African Agriculture Trade Monitor (AATM) database reveals pronounced heterogeneity across blocs, sectors, and time periods (2003-2005, 2011-2013, and 2021-2023) (Table 1). For industrial goods, continental introversion declined over the past two decades. Africa's RTI decreased from 0.52 in 2003-2005 and 2011-2013 to 0.44 in 2021-2023, signaling a growing orientation toward extra-African markets in manufacturing and other non-agricultural sectors. Most regions followed this downward trend, though EAC, WAEMU, and IGAD sustained a relatively

33 Formally, the symmetric RTI for a region  $i$  can be written as  $RTI_i = \frac{H_i/E_i - 1}{H_i/E_i + 1}$  where:

- $H_i$  = intra-regional trade intensity, i.e., the ratio of intraregional trade to total trade,
- $E_i$  = extra-regional trade intensity, i.e., the ratio of trade with the rest of the world to total trade.

By construction, the RTI ranges from  $-1$  to  $+1$ , with:  $|RTI| > 0$  indicating that intraregional trade is stronger than extra-regional trade (introversion);  $RTI < 0$  indicating relative extraversion;  $RTI = 0$  indicating parity between intra- and extra-regional trade.

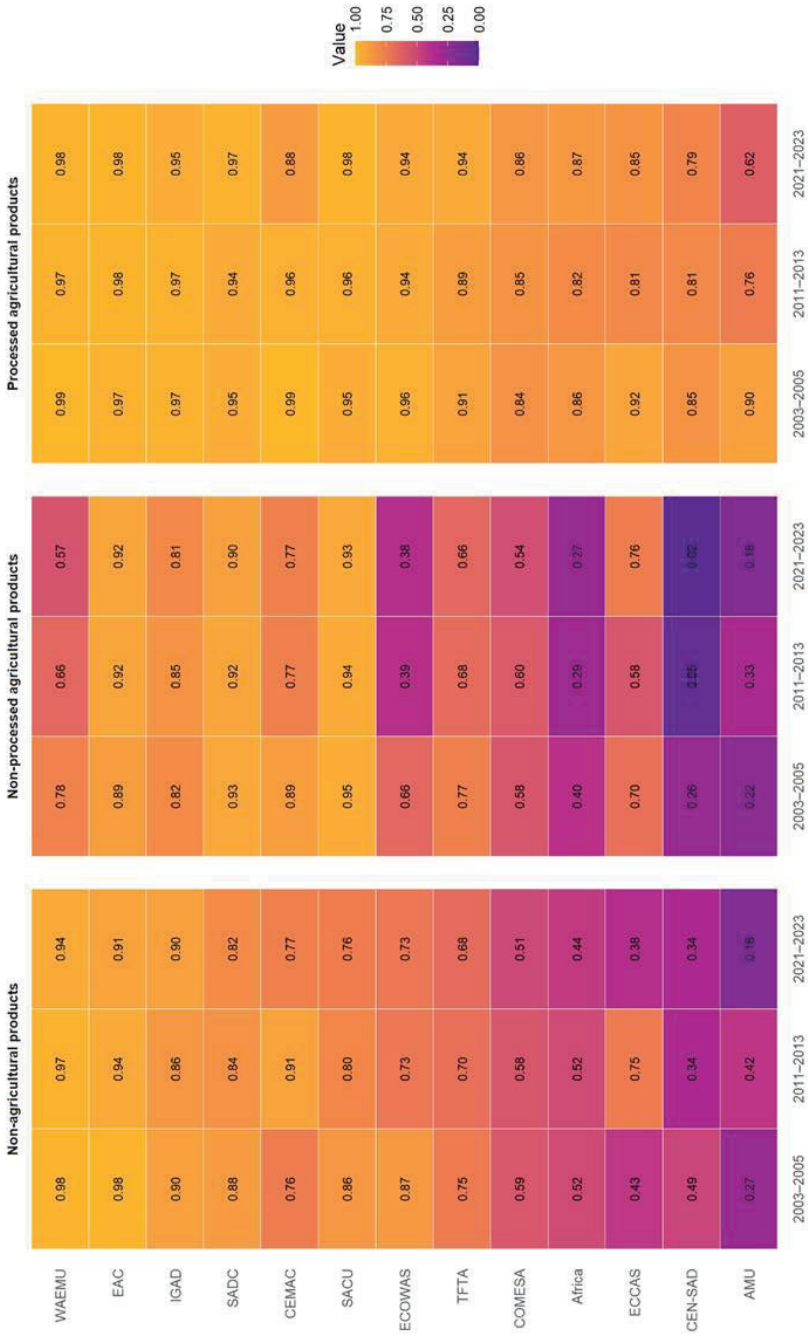
high level of introversion by 2021-2023. Conversely, AMU exhibited a sharp drop, indicating a stronger shift toward extra-regional industrial trade.

For unprocessed agricultural products, the continental RTI also fell from 0.40 to 0.27 over the two decades, reflecting growing global orientation in raw agricultural trade. Yet several RECs in Southern and Eastern Africa continued to display robust intra-bloc linkages, while CEN-SAD saw its index collapse almost to zero.

A different pattern emerges for processed agricultural products, where introversion remains higher than in other sectors, reaching 0.87 at the continental level in 2021-2023. Many RECs record near-unity indices for processed goods, highlighting the strength of regional circuits for value-added agricultural products relative to raw commodities or manufactured non-agricultural goods.

The contrast between processed and unprocessed agricultural products is particularly telling. While raw commodity trade has become more extraverted over time, driven by global demand for primary agricultural exports, processed agricultural trade remains deeply anchored within African regions. This suggests that regional markets in Africa may serve as platforms for food processing and regional value chains, where countries exchange and integrate value-added goods more intensively than raw inputs.

**Table 1: Evolution of regional trade introversion in Africa by sector and regional economic community**



Source: African Agriculture Trade Monitor (AATM) 2025 database. Authors' computations.

## Ex-post assessment of Regional Trade Agreements

Building on the descriptive analysis of the RTI trends across regions and sectors, this section examines how the design features and legal depth of regional trade agreements translate into measurable integration outcomes. The analysis relies on a structural gravity model using Poisson Pseudo-Maximum Likelihood (PPML) with high-dimensional fixed effects, controlling multilateral resistance terms and unobserved bilateral heterogeneity over time. This specification retains zero trade flows and provides consistent estimates under heteroskedasticity. The baseline analysis focuses on the period 1995–2024, corresponding to the post-establishment of the WTO, which offers a more institutionally consistent global trade environment. Two robustness checks complement the baseline specification: (i) an extended sample covering 1988–2024 to capture pre-WTO dynamics, and (ii) specifications interacting regional trade agreements with WTO membership to examine whether regional integration effects differ within the multilateral framework (see Tables 3 and 4 in Annex).<sup>34</sup> This approach allows to compare pre- and post-WTO dynamics. Agricultural trade in Africa is characterized by a large share of informal cross-border exchanges, which are not captured in official trade statistics (Bouët et al. 2020). Bouët, Sy, et al. (2025) show that, in 2018, the COMTRADE database missed 84% of the total value of trade flows for the 33 products investigated by the ECO-ICBT database. As a result, econometric estimates based on formal trade flows are likely to underestimate the true extent of regional integration in agrifood markets.

The findings reveal substantial heterogeneity in trade effects<sup>35</sup> across regions. Strong and statistically significant positive trade effects are observed for SACU, IGAD, EAC, and ECCAS (Figure 1). Among these, SACU displays by far the largest trade-creating impact, with agricultural trade increasing by approximately 180%, indicating deep intraregional integration. IGAD also stands out, with agricultural trade increasing by nearly 150%, substantially exceeding its aggregate trade impact (119%), suggesting that regional cooperation in this bloc operates primarily through agrifood exchange. EAC shows

34 The analysis combines bilateral trade data from the BACI database (1995–2024), covering 233 countries, with information from the CEPII Gravity database (2025), the WTO RTA database (2025), and the World Bank Deep Trade Agreement database (2025). Detailed data construction procedures and empirical specifications are provided in (Sall et al. 2025 and Sall et al., forthcoming) and summarized in Annex 1.

35 Trade effects are computed by exponentiating the estimated coefficients and correcting for Jensen's inequality:

$$\frac{\partial \ln(X_{ijt})}{\partial RTA_{ijt}} = (e^{\beta_{RTA} - \frac{\sigma_{RTA}^2}{2}} - 1) * 100$$

significant and stronger effects in agriculture (52%) than in total trade, while ECCAS records robust and balanced positive impacts (around 50%) across both sectors (Figure 1).

### *Formal agreements do not automatically generate agricultural trade creation*

In contrast to the strong performers identified above, several regional agreements show limited or uneven trade effects. COMESA exhibits modest positive effects for total trade at 11%, but its agricultural trade effect is statistically insignificant. This suggests that while the agreement may have facilitated aggregate trade flows, it has not generated robust integration in agrifood markets. CEMAC presents a more contrasting pattern: total trade shows an insignificant effect, while agricultural trade displays a negative at roughly 50%, indicating that sectoral dynamics differ substantially within the bloc and that agricultural integration has lagged behind broader trade patterns. Similarly, TFTA shows no statistically significant effects in either total trade or agriculture, pointing to limited measurable trade creation.

WAEMU records a negative and statistically significant agricultural trade effect of about -40%, with an insignificant aggregate effect. CEN-SAD, by contrast, presents a sector-specific pattern, with positive agricultural effects (21%) despite insignificant aggregate results. This suggests that the existence of a formal agreement is not sufficient to generate trade creation; the depth of implementation and the effectiveness of policy coordination are critical determinants of outcomes.

### *Agriculture as a primary channel of integration*

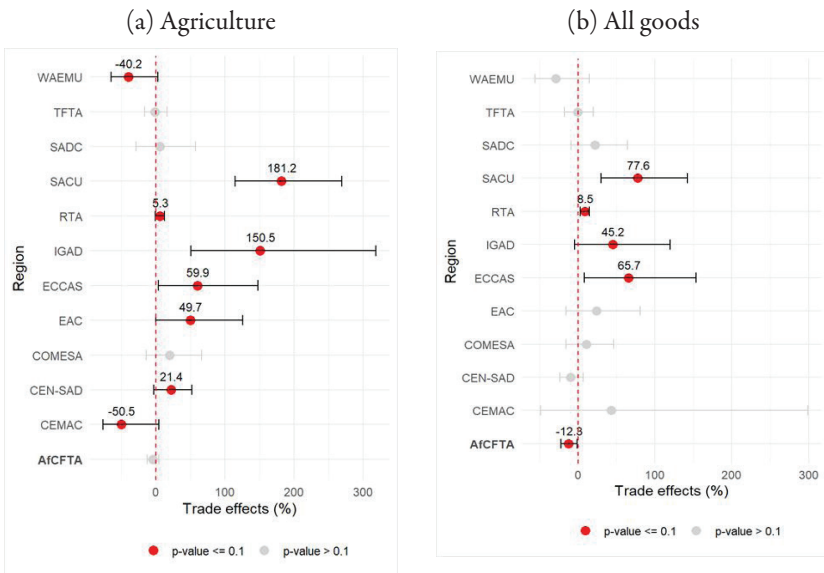
A notable pattern across the estimates is that agricultural trade often responds more strongly than aggregate trade to regional integration. This is particularly evident in SACU, IGAD, EAC, and CEN-SAD, where agricultural trade effects exceed those for total trade (Figure 1). This result is consistent with the RTI evidence showing that processed agricultural products exhibit the highest levels of regional introversion across many RECs. Together, the descriptive and causal findings point to a structural feature of African integration: regional agreements play a central role in consolidating agrifood markets and strengthening regional value chains. While industrial trade in several regions increasingly targets global markets, agricultural trade remains more deeply embedded within regional circuits.

*AfCFTA effects reflect transitional dynamics*

The AfCFTA variable is negative and statistically significant for total trade and statistically insignificant for agriculture over the observed period. Given the short implementation window and the gradual nature of tariff dismantling schedules, this result likely reflects transitional dynamics rather than structural underperformance. The sensitivity analysis for 1988-2024 broadly confirms the ranking and sign of the main results, reinforcing the robustness of strong performers such as SACU and IGAD and maintaining the negative agricultural effect for WAEMU (Table 3 in Annex).

Overall, the ex-post evidence confirms that regional integration in Africa can generate meaningful trade creation, particularly in agriculture, but outcomes vary substantially across agreements. A limited group of RECs, notably SACU, IGAD, ECCAS, and EAC, combine strong positive impacts with sectoral depth in agrifood markets, while others exhibit insignificant or even negative effects. These findings underscore that African regional integration is neither uniformly successful nor uniformly ineffective; its trade-creating impact depends critically on institutional depth, policy implementation, and sector-specific governance, especially within agricultural value chains.

**Figure 1: Trade effects by regions, 1995-2024**



Source: Authors' simulations

Note: ECOWAS is excluded from the analysis because it entered into force in 1995, leaving no pre-treatment variation for estimation.

## **Multilateral-regional coherence: interactions between regional groupings, WTO, and AfCFTA**

To examine whether regional integration in Africa operates in isolation or in complementarity with broader multilateral and continental frameworks, we introduce interaction terms in the structural gravity framework. Those interaction terms capture: (i) complementarities between regional grouping and WTO membership (Region  $\times$  WTO), and (ii) potential amplification effects between regions and the AfCFTA (Region  $\times$  AfCFTA).

The results confirm heterogeneity across regional groups, both in their standalone trade effects and in their interactions with the WTO and AfCFTA frameworks. For agricultural trade, several regional blocs with limited or insignificant trade effects display positive interaction effects with WTO membership (Table 2). For instance, COMESA shows a non-significant coefficient but a strong positive Region  $\times$  WTO interaction (+51%), suggesting that the multilateral system may enhance the effectiveness of regional commitments. The same holds for CEMAC, which has a very large positive interaction with WTO membership (+331%), indicating that WTO participation may compensate for regional integration where baseline effects are weak.

Conversely, regional blocs such as IGAD and SACU, which already exhibit strong positive baseline effects, show either insignificant or negative interactions with WTO membership. This suggests that their trade gains stem primarily from internal regional coordination rather than multilateral reinforcement.

For total trade, the results mirror the agricultural's findings. Regional blocs such as CEMAC display strong positive interaction effects with WTO membership, despite negative baseline regional effects. In contrast, blocs such as SACU and IGAD again show insignificant interaction terms. This suggests that the role of WTO membership varies across regional groupings, acting as a complementary framework in some cases (e.g. IGAD and SACU), while in others regional trade dynamics appear less dependent on multilateral reinforcement (e.g. CEMAC).

The Region  $\times$  AfCFTA interaction terms provide limited evidence of systematic amplification effects. In agriculture, only IGAD exhibits significant negative interaction (-29%), suggesting potential adjustment or reallocation effects, while all other regions show no measurable AfCFTA impact. For total trade, COMESA records a negative interaction (-13%), whereas most other regions display no statistically significant effects. Overall, the results indicate that the AfCFTA has not yet generated measurable additional trade gains beyond existing regional arrangements during the period considered, consistent with its recent implementation and gradual operationalization.



## Legal enforceability and RTAs effectiveness

Beyond membership, the depth of trade agreements plays a central role in shaping trade outcomes. While shallow agreements focus primarily on tariff reductions, deeper agreements, like the AfCFTA, extend to behind-the-border policies such as services, investment, competition, and regulatory cooperation. These provisions can reduce policy uncertainty, lower trade costs, and support participation in value chains, particularly where regulatory compatibility matters (Baldwin, 2011). Empirical evidence shows that deeper agreements tend to generate stronger trade effects, especially in services and value-added trade (Mattoo et al., 2017; Fernandes et al., 2021).

Trade agreement depth is captured using the World Bank's Deep Trade Agreement (DTA) database along two complementary dimensions: horizontal depth reflects the number of policy areas covered by an agreement, while vertical depth captures the degree of legal enforceability.

In addition, provisions are grouped into WTO-plus and WTO-X categories. WTO-plus provisions cover trade-related disciplines that deepen commitments within the traditional trade policy sphere (e.g., tariffs, customs procedures, sanitary and phytosanitary measures (SPS), technical barriers to trade (TBT), services, state aid). WTO-X provisions, in contrast, extend beyond the WTO framework into areas such as investment, competition policy, labor, environment, governance, and production-related cooperation.

Following the classification of Aboushady et al. (2023), WTO-plus provisions are grouped into three categories: (1) tariffs; (2) non-tariff measures (NTMs); and (3) services. WTO-X provisions go beyond the WTO's scope and are grouped into five broad categories: (1) agriculture and health; (2) institutional and regulatory frameworks; (3) production processes and economic policies; (4) cooperation and institutional support, and; (5) Other policy areas covering political, security, and social policies beyond economic issues (See Annex 3 for details).

African RTAs tend to display strong enforceability in traditional areas, especially tariffs, but limited enforceability in services and broader WTO-X provisions. To assess whether deeper and more enforceable agreements improve trade performance, we interact RTA membership with the vertical depth of the eight policy areas described above (3 WTO-plus and 5 WTO-X areas). Within each area, vertical depth is measured as the share of provisions legally enforceable

and subject to dispute settlement. The full econometric specification is further detailed in Annex 1.

The results show that the effects of legal enforceability are not uniform across policy areas.

The interaction between RTA membership and “Institutions and Regulatory Frameworks” under WTO-X provisions is consistently negative and statistically significant across several regions for overall trade. In agriculture, however, the pattern is more nuanced: while negative effects also appear, they are not uniformly significant across all regional groupings. This indicates that strengthening legal enforceability of provisions will not necessarily enhance trade performance and may even constrain it, as observed for WAEMU (Table 3). One possible explanation of the negative interaction is the regulatory nature of these commitments. Provisions, such as environmental laws, competition policy, anti-corruption measures, data protection, consumer protection, and intellectual property rights, often impose compliance costs and administrative requirements. In developing regional contexts, these measures may enhance long-term institutional quality and regulatory credibility, but they can generate short- to medium-term trade frictions.

In contrast to “Institutions and Regulatory Frameworks” enforceability, cooperation-oriented provisions (“Cooperation and Institutional Support” under WTO-X provisions) display more mixed effects on agricultural trade. While results vary across regional groupings, cooperative mechanisms appear more conducive to agricultural trade than strict legal enforceability. A similar pattern is observed for all goods (Tables 3 and 4). This suggests that coordination instruments, such as regulatory dialogue, information exchange, and technical cooperation, may facilitate gradual convergence without imposing excessive rigidity. In agriculture, where regulatory systems differ widely across countries, such flexible mechanisms seem particularly valuable.

Ultimately, WTO-plus provisions related to non-tariff measures (NTMs) show strong positive effects on average in agriculture, although at the regional level these effects are not uniformly significant (Table 3). Given the structural importance of SPS standards, technical regulations, and border procedures in agricultural markets, harmonization or mutual recognition of NTMs can substantially reduce trade friction. Deeper NTM integration may also introduce compliance costs, stricter harmonization requirements, and implementation challenges. Where regulatory capacity is uneven, adjustment frictions can limit

immediate gains. Nevertheless, compared to broad institutional judicialization, NTM-related deepening appears more directly linked to trade facilitation in agriculture. The contrast with total goods confirms that regulatory alignment is particularly critical for agricultural integration.

### *Strategic implications for cooperation under AfCFTA*

The findings suggest that institutional depth matters for agricultural trade, but its form and sequencing are decisive. While stronger legal enforceability of broad institutional provisions is, in some cases, associated with weaker trade performance, cooperation-based mechanisms and WTO-plus NTM provisions appear more compatible with agricultural trade expansion. These results suggest that AfCFTA coordination should prioritize functional integration before expanding the legal enforceability of deeper institutional commitments. Achieving sustainable continental integration will therefore require carefully calibrated institutional design, differentiated implementation speeds across regions, and strong capacity-building support.

**Table 3: Regional interaction effects of the legal enforceability of trade agreement provisions in agriculture**

	Agriculture				166688.99
	Estimate	Stderr	Stars		
UEMOA	✓	1.86	0.59 ***	✓	198.16
EAC	✗	-2.08	1.23 *	✓	2.15
ECCAS	✓	0.94	0.51 *	✓	82.37
SACU	✓	0.91	0.13 ****	✓	90.73
UEMOA x Institution	✗	-22.78	6.11 ****		
EAC x Production	✗	-9.31	4.46 **		
ECCAS x Production	✗	-5.92	2.82 **		
SACU x Production	✓	2.47	1.46 *		
UEMOA x Cooperation	✓	2.30	1.36 *		
COMESA x Cooperation	✗	-1.48	0.68 **		
EAC x Other	✗	-41.79	6.78 ****		
SADC x Other	✓	31.94	5.50 ****		
RTA x NTMS	✓	7.35	1.31 ****		

Source: Author's estimations.

Note: \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ ; \*\*\*\*  $p < 0.001$ . Only coefficients of statistically significant interaction terms are reported. Institution = "Institutions and Regulatory Frameworks" WTO-X area. Production = "Production Process and Economic Policies" WTO-X area. Cooperation = "Cooperation and Institutional Support" WTO-X area. Other = "Other Policy Areas". NTMs = "Nontariff measures" WTO-plus area

**Table 4: Regional interaction effects of the legal enforceability of trade agreement provisions for all goods**

	All goods			Trade effects	
	Estimate	Stderr	Stars		
UEMOA	✓	1.09	0.31 ****	✓	104.66
COMESA	✗	-2.21	0.88 **	✓	2.73
EAC	✗	-3.05	1.71 *	✓	0.40
ECCAS	✓	1.30	0.35 ****	✓	127.03
SACU	✓	0.56	0.14 ****	✓	63.62
UEMOA x Institution	✗	-14.76	3.65 ****		
COMESA x Institution	✗	-11.30	5.21 **		
EAC x Institution	✗	-8.87	4.58 *		
ECCAS x Institution	✗	-19.59	5.21 ****		
RTA x Institution	✗	-0.41	0.12 ****		
COMESA x Production	✓	16.41	8.09 **		
ECCAS x Production	✓	4.56	2.32 **		
COMESA x Cooperation	✗	-2.39	0.92 ***		
CEMAC x Cooperation	✓	5.37	2.28 **		
ECCAS x Cooperation	✓	2.52	1.19 **		
AfCFTA x Cooperation	✓	3.22	1.45 **		
RTA x Cooperation	✓	0.22	0.11 *		
EAC x Other	✗	-24.52	10.51 **		
SADC x Other	✓	42.40	16.42 ***		
EAC x NTMs	✓	6.46	2.67 **		

Source: Author's estimations.

Note: \* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ ; \*\*\*\* $p < 0.001$ . Only coefficients of statistically significant interaction terms are reported. Institution = "Institutions and Regulatory Frameworks" WTO-X area. Production = "Production Process and Economic Policies" WTO-X area. Cooperation = "Cooperation and Institutional Support" WTO-X area. Other = "Other Policy Areas". NTMs = "Nontariff measures" WTO-plus area.

## AfCFTA and intra-African trade

The AfCFTA is a continent-wide trade agreement designed to establish a single African market for goods and services. Through the gradual elimination of tariffs, reduction of non-tariff barriers, and improved trade facilitation, the agreement aims to deepen economic integration, expand intra-African trade, and support the development of regional production networks and value addition across the continent.

## Economic and trade effects of implementation

While the previous section assessed regional integration through observed trade patterns and ex-post evidence from existing regional trade agreements, evaluating the potential impacts of the AfCFTA requires a forward-looking, ex-ante analytical approach. This section, therefore, draws on the simulation from the MIRAGE computable general equilibrium (CGE) model to simulate the potential impacts of AfCFTA implementation. The model compares an AfCFTA scenario for 2045 with a counterfactual baseline in which the agreement is not implemented.

In the AfCFTA scenario, the simulation incorporates a set of core trade reforms, including:

- Implementation of the agreed AfCFTA modalities on trade in goods;
- A 50% reduction of actionable non-tariff measures (NTMs) on goods within Africa; and
- A 50% reduction of actionable trade barriers to trade in priority services sectors, including communication, tourism, transport, business, and financial services, as well as health and education services.

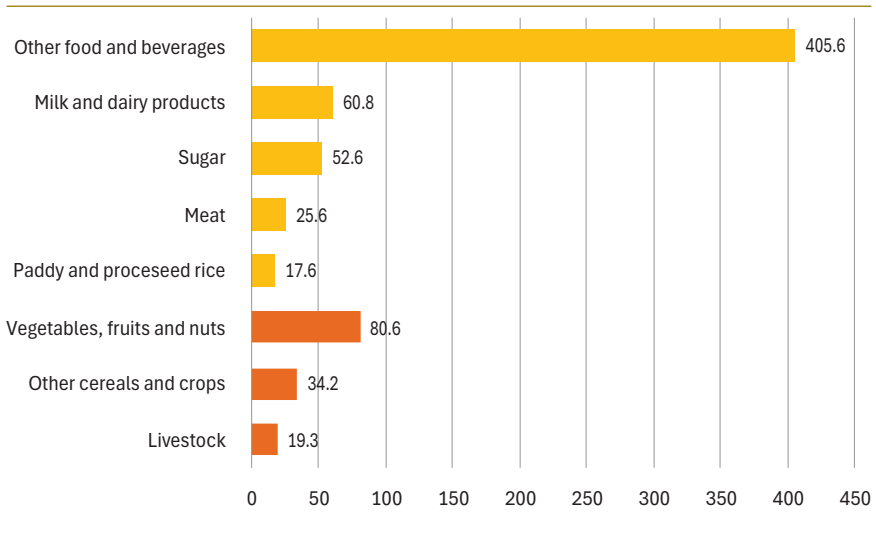
Although the reforms are assumed to be fully implemented by 2035, results are reported for 2045 to allow sufficient time for the economy to adjust and reach a long-term equilibrium after the policy changes.

The most significant macroeconomic gains from AfCFTA implementation are projected to arise from the expansion of intra-African trade. Estimates by the United Nations Economic Commission for Africa (ECA) suggest that relative to a baseline without the agreement, intra-African exports could increase by 44.5% in 2045, which is equivalent to USD275.7 billion. In cumulative terms, aggregating the additional trade generated annually between 2021 and 2045, the increase in intra-African exports is projected to amount to approximately USD3 trillion. As a result, the formal share of intra-African trade in Africa's total trade is expected to increase from 15% in 2021 to nearly 25% in 2045. These projections are likely conservative, as they exclude informal cross-border trade, which remains substantial but difficult to quantify due to data limitations (ECA, forthcoming-b).

Sectoral projections show that the largest proportional increases are concentrated in the agrifood trade. Agrifood trade is projected to expand by 60% (or USD58.6 billion) in 2045 compared to the baseline without the AfCFTA. In

cumulative terms, this represents an increase of approximately US\$696.3 billion in total intra-African agrifood trade between 2021 and 2045. On the product level, the largest increases are expected for processed agrifood, which is projected to grow by 56% (or USD563.2 billion), while non-processed agrifood is expected to expand by 44% (or USD134.1 billion) (ECA, forthcoming-b) (Figure 2).

**Figure 2: Projected cumulative trade gains in agrifood (2021-2045), in USD billions**



Source: ECA, forthcoming-b

Note: Yellow represents processed agrifood, and orange indicates non-processed agrifood.

These projected gains are particularly relevant in the context of persistent food insecurity across the continent. In 2023, about 58% of Africa’s population (around 846.6 million people) experienced moderate to severe food insecurity, while 20.4% were undernourished (FAO 2025). Structural factors continue to constrain progress, notably the relatively high protection applied to agriculture. On average, tariffs imposed by African countries on agricultural products (23.8%) are more than three times higher than those on non-agricultural goods (7.1%) (ECA forthcoming-b). In addition, many RECs classify key food items as “sensitive” or “excluded” products, while persistent non-tariff barriers further restrict cross-border agricultural trade.

These constraints contribute to Africa’s continued reliance on external suppliers: between 2015 and 2024, about 72% of Africa’s agrifood imports origi-

nated from outside the continent. This dependence increases vulnerability to global supply disruptions, such as those observed during the Russia–Ukraine conflict (ECA forthcoming-b). By reducing tariffs and non-tariff barriers, the AfCFTA has the potential to create a more integrated continental food market, enabling agricultural products to move more efficiently from surplus to deficit regions and strengthening food security across Africa.

These results should be interpreted with some caution, given the underlying modelling approach and data limitations. The CGE models calibrated on the GTAP database exclude a large share of informal cross-border trade, which may lead to an underestimation of intra-African trade and the associated gains from integration. In addition, the static framework focuses on long-term equilibrium outcomes and does not capture short-term adjustment dynamics or the immediate effects of global shocks, including recent episodes of price volatility and currency depreciation.

## **Implications for regional value chains and agrifood transformation**

Beyond its effects on trade flows, AfCFTA implementation is expected to play an important role in the development of regional value chains (RVCs). Modelling results indicate that implementation of the AfCFTA is expected to reconfigure Africa's trade structure in ways that support the emergence and deepening of RVCs. By expanding both intermediate and final trade flows, the Agreement strengthens production linkages across countries and enables firms to source inputs regionally rather than externally.

However, these dynamics unfold against a persistent structural constraint: African exports remain highly concentrated in a narrow range of primary commodities, leaving African economies exposed to commodity price volatility. In this context, while Africa is likely to remain largely engaged in trade in intermediate goods—reflecting its current role as a supplier of raw and semi-processed inputs—the extent to which AfCFTA can support a transition toward higher value-added production depends critically on overcoming this structural dependence.

Under the AfCFTA implementation, African exports are projected to rise by 17% for final goods and services and by 5.2% for intermediate goods and services by 2045 compared with a baseline without the agreement. Imports are also expected to increase; particularly intermediate inputs used in production. Among

all sectors, agrifood exhibits some of the strongest potential for RVC development, largely because intra-African agricultural trade currently faces relatively high tariffs and non-tariff barriers. Their reduction generates disproportionately large gains once liberalization is implemented (ECA and CEPII 2025).

AfCFTA implementation is projected to substantially increase in intra-African agrifood trade for both final consumption (food products traded for direct use) and intermediate consumption (inputs used in processing and manufacturing). In 2045, projected changes include (ECA and CEPII 2025):

- Non-processed agrifood (final consumption): +81.6%
- Processed agrifood (final consumption): +62.8%
- Processed agrifood (intermediate consumption): +59.7%
- Non-processed agrifood (intermediate consumption): +30.6%

These projections indicate a substantial expansion of intra-African agrifood trade for both intermediate and final consumption following the implementation of the AfCFTA, supporting the development of RVCs in the agrifood sector.

In addition to trade flows, assessing the development of RVCs requires examining changes in value added across sectors. Value added measures the increase in a product's value generated by production, capturing the contribution of labor, capital, and other inputs while excluding the cost of intermediate goods. Processed agrifood subsectors such as dairy, meat, sugar, and prepared foods experience increases in both trade and value added, indicating genuine value-chain formation across borders. In contrast, non-processed agriculture expands in trade volume but shows limited or declining value added, as these products are mostly used directly in final consumption, with no value chain likely to be created during the process (ECA and CEPII 2025).

Regional studies identify strong opportunities for agrifood value chain creation under the AfCFTA, including fish and shellfish, fruits and vegetables, cashew and almond processing, root- and tuber-based flours, and cocoa products in West Africa. Several countries in Eastern and Western Africa also hold comparative advantages in cereals, though trade remains dominated by unprocessed outputs—highlighting significant scope for value-chain upgrading (ECA et al. 2025; ECA 2025b).

By fostering more integrated and predictable agrifood production networks, the AfCFTA could gradually narrow Africa's deficit in processed agrifood trade

and strengthen domestic value addition (ECA 2025a). Realizing these gains will require addressing structural barriers faced by women, who make up the majority of smallholder farmers, through complementary frameworks such as the AfCFTA Protocol on Women and Youth in Trade and the 2025 Kampala Comprehensive Africa Agricultural Development Programme (CAADP) Declaration (ECA forthcoming-b).

## Regional value chains and digitalization

Africa has significant potential to develop competitive and integrated agri-food value chains, including higher value-added and processed products. However, realizing this potential requires structural transformation across the agrifood system. Persistent bottlenecks, such as weak logistics and transport infrastructure, fragmented standards and certification regimes, weak quality control and traceability systems, limited access to affordable finance, and pronounced information irregularities, continue to constrain productivity, value addition, and integration into both regional and global markets. These structural gaps disproportionately affect smallholders and agri-SMEs, limiting their ability to upgrade and fully benefit from expanded market opportunities.

In this context, digitalization offers a powerful enabler to address these constraints while enhancing the resilience, efficiency, and sustainability of agrifood systems. By applying data-driven technologies across the value chain, from farm management to processing, logistics, and trade, digital solutions can improve productivity, optimize input use, reduce post-harvest losses, and strengthen climate resilience (FAO, 2022). Digital platforms facilitate coordination among producers, processors, aggregators, and traders across borders, lowering transaction costs, improving market access, and enhancing traceability and standards of compliance throughout regional and global value chains (RVCs & GVCs). Tools such as mobile-based advisory services, remote sensing, artificial intelligence, and digital financial services also support risk management and informed decision-making, which are critical for stabilizing regional supply chains and enabling cross-border trade.

Recognizing this transformative potential, Africa has explicitly positioned digitalization as a strategic pillar of agricultural transformation. Continental frameworks, including the Agenda 2063, the Malabo Declaration, the Digital Transformation Strategy for Africa (2020–2030), and the Science, Technology and Innovation Strategy for Africa (STISA-2024), identify agriculture as a

priority sector where digital solutions can drive modernization, value addition, and regional trade. Complementing these initiatives, the AfCFTA Protocol on Digital Trade establishes common rules for digital transactions, cross-border data flows, and payments, providing a regulatory foundation for digitally enabled agricultural value chains and cross-border trade.

Importantly, Africa's digital agriculture and value chain strategies are also shaped in a way that interacts with global trade and digital governance frameworks. Initiatives such as the WTO and World Bank's Digital Trade for Africa project support African countries in strengthening regulatory environments for e-commerce, electronic transactions, and cross-border data flows.<sup>36</sup> By combining digitalization with policy frameworks that support trade facilitation, standards compliance, and cross-border integration, Africa is positioning its agri-food systems not only for stronger intra-African trade under the AfCFTA but also for meaningful participation in global markets.

Evidence from African countries highlights the transformative role of digitalization in strengthening agricultural value chains and regional trade. Ethiopia provides a notable example through its Digital Agriculture Roadmap (DAR) 2025–2032, which deploys integrated digital platforms, such as AgDataHUB, the Ethiopian Digital Agro Climate Advisory Platform (EDACaP), the Agricultural Stress Index System (ASIS), SIMAGRI, the NextGEN Fertilizer Advisory tool, the Ethio-seed Exchange Platform, and the Climate-Smart Agriculture Knowledge Hub, to support farmers, extension services, and policymakers.<sup>37</sup> These initiatives have delivered measurable results, for example, the NextGEN fertilizer advisory tool has increased wheat yields by 14–25% and improved

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36 See [https://www.wto.org/english/thewto\\_e/minist\\_e/mc13\\_e/policy\\_note\\_digital\\_trade\\_africa\\_e.pdf](https://www.wto.org/english/thewto_e/minist_e/mc13_e/policy_note_digital_trade_africa_e.pdf)

37 **AgDataHUB:** Ethiopia's central agriculture data platform that collects and shares real-time agronomic, climate, market, and extension data to support evidence-based decision-making. **EDACaP:** Provides real-time climate and farming advice (weather, planting time, irrigation, pests) to support climate-smart decisions.

**ASIS:** Monitors and predicts drought using satellite data; gives early warnings and maps drought risk areas.

**SIMAGRI:** A simulation and decision-support tool for planning, budgeting, and analyzing farming and market scenarios.

**NextGEN Fertilizer Advisory:** AI-based tool that gives customized fertilizer recommendations based on soil and crop needs.

**Ethio-Seed Exchange Platform:** Tracks seed demand, supply, and distribution to improve seed planning and availability.

**Climate-Smart Agriculture Knowledge Hub:** A data platform that provides research-based insights to support climate-smart agriculture decisions.

farmers' incomes, while EDACaP, as the climate advisory services, have raised yields by around 25% and enhanced supply predictability (Seid et al. 2025).

Similar initiatives across Africa, such as Kuuzacomores<sup>38</sup> in Comoros, provide smallholders with digital access to market opportunities and buyers, an on-line presence for their agricultural products, helping farmers connect directly with consumers. In Ghana, mobile platforms such as Esoko<sup>39</sup>, provide smallholders with real-time weather forecasts and climate information, up-to-date market prices, and agronomic advice, helping farmers make informed decisions about planting, selling and crop management.

These examples demonstrate how low-cost digital tools can enhance production efficiency, market transparency, and coordination between producers and buyers in resource-constrained environments. Such experiences highlight the potential for replication and adaptation across diverse agro-ecologies, reinforcing the role of digitalization in structuring regional agricultural value chains, facilitating intra-African trade under the AfCFTA, and enhancing competitiveness in global markets.

Despite promising progress, the adoption of digital agriculture across Africa remains uneven. Limited rural connectivity, unreliable power supply, low digital literacy among farmers, data governance gaps, high costs of digital tools, and constrained access to finance continue to hinder the transition from pilot-level initiatives to system-wide transformation (IFPRI 2025). Gaps in extension services, combined with disparities in access to resources and opportunities across different population groups, further limit inclusive uptake. Addressing these barriers will require targeted investments in digital infrastructure, capacity building, and supportive policy frameworks that expand both technological access and human capital. When effectively implemented, digital agriculture can significantly boost productivity, strengthen regional and global value chains, and enhance Africa's competitiveness in international markets, particularly when aligned with international trade rules and standards.

## Climate-smart and green trade pathways

The climate and environmental impacts of AfCFTA implementation are projected to be modest at the continental level but uneven across sectors and

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38 see <https://www.kuuzacomores.com/>

39 See <https://www.esoko.com/>

regions. ECA modelling suggests that full implementation would raise cumulative greenhouse gas emissions by around 0.14% between 2021 and 2045, compared to a baseline without AfCFTA. This increase would largely reflect higher CO<sub>2</sub> emissions from expanded economic activity and transport. The relatively small aggregate effect is explained by Africa's low emissions base, partial substitution away from extra-continental trade, and declining output in some emissions-intensive sectors. However, these estimates may understate environmental pressures, as they do not fully account for emissions linked to trade-induced land-use change. Projected agricultural expansion and continued pressure on forest resources could therefore generate additional emissions and reduce carbon sinks (ECA, forthcoming-a). At the same time, the global proliferation of climate-related trade measures (TrCMs), including carbon border adjustment mechanisms, sustainability standards, due diligence requirements, and product traceability rules, is reshaping the external trade environment facing African exporters. These measures may create additional compliance costs and market access challenges, particularly for carbon-intensive and agriculture-based exports, but they also strengthen the case for greener production systems and regional value chains under the AfCFTA.

Beyond emissions, AfCFTA implementation may affect biodiversity, water resources, fisheries, and waste generation. Agricultural land is projected to expand by around 2% cumulatively between 2021 and 2045, raising localized risks of habitat loss and fragmentation, particularly where export-oriented cash crops expand. Water use patterns shift, with lower irrigation and livestock demand but rising industrial and residential water consumption, leading to largely stable aggregate water stress but increased pressures in some countries. Waste generation and pollution are expected to rise alongside production and consumption, underscoring the importance of complementary environmental regulation and enforcement to avoid adverse outcomes (ECA forthcoming-a).

At the same time, the AfCFTA provides a platform for advancing climate-smart and green trade pathways. Expanding trade in sustainably produced agricultural products offers a pathway to align AfCFTA implementation with climate and biodiversity objectives. Agriculture is one of the largest sources of emissions and ecosystem pressure in Africa, but climate-smart practices can enhance carbon storage, reduce land degradation, and strengthen resilience. Provisions in the Goods Protocol enable the harmonization of sustainability standards and the reduction of trade costs for eco-friendly products. Continental standards and ecolabelling schemes developed by African institutions support regulatory convergence, facilitate market access, and incentivize low-emission

and biodiversity-friendly production. By promoting compliance with harmonized sustainability standards, the AfCFTA can help scale climate-smart agriculture, foster value addition within the continent, and support a more sustainable transformation of African agrifood systems (ECA forthcoming-a).

## Conclusions

The findings of this chapter offer insights for the post-MC14 and the broader debate on the future of the multilateral trading system. First, the evidence demonstrates that regional integration in Africa can generate substantial trade creation, particularly in agriculture, when institutional depth and effective implementation accompany formal liberalization. The strong responsiveness of agricultural trade to regional integration highlights the strategic role of agrifood markets in advancing resilience, food security, and structural transformation in Africa, suggesting that WTO agricultural reform should be aligned with regional value-chain development in Africa, supporting trade facilitation, standards harmonization, and investment in productive capacity.

Second, the results highlight the importance of institutional interactions. Multilateralism, through WTO membership, appears to compensate for weaker regional implementation in some RECs, indicating that multilateral rules can reinforce fragile regional arrangements. At the same time, institutional depth does not automatically translate into stronger trade outcomes. Stronger legal enforceability of broad institutional (WTO-X) provisions is, in some cases, associated with weaker trade performance, likely reflecting compliance costs and adjustment constraints. In contrast, WTO-plus provisions targeting non-tariff measures, along with cooperation-based mechanisms, appear more conducive to agricultural trade expansion.

Third, the projected gains from AfCFTA implementation indicate that deep South–South integration can complement rather than undermine the multilateral trading system. Finally, the chapter highlights the growing importance of digitalization and climate-smart trade pathways in shaping the future of agricultural trade. Digital trade facilitation can significantly reduce transaction costs, improve traceability, and strengthen the efficiency of cross-border supply chains. At the same time, the integration of sustainability standards and climate-smart production practices offers opportunities to align trade expansion with environmental and biodiversity objectives

Taken together, the African experience suggests that a reformed multilateral trading system should view deep regional integration not as fragmentation but as a complementary building block. When embedded within transparent, rules-based frameworks and supported by digital and green transitions, regional integration can strengthen resilience, enhance inclusiveness, and promote sustainable development. For the WTO, recognizing and supporting such regional dynamics, particularly in developing countries, will be critical to ensure that the global trading system remains relevant, equitable, and capable of addressing the interconnected challenges of food security, and economic transformation.

## References

Aboushady, Nora; Ramzy, Myriam; and Zaki, Chahir. 2023. Which agreements boost agricultural trade in Africa? In *Africa agriculture trade monitor 2023*. Odjo, Sunday P.; Traoré, Fousseini.; Zaki, Chahir (Eds.). Chapter 2, Pp. 32-68. Kigali, Rwanda; and Washington, DC: AKADEMIYA2063; and International Food Policy Research Institute (IFPRI). <https://hdl.handle.net/10568/140132>

African Union. 2025. *Kampala CAADP Declaration on Building Resilient and Sustainable Agrifood Systems in Africa: Extraordinary AU Summit on the Post-Malabo CAADP Agenda, 9–11 January 2025*. Kampala, Uganda: African Union.

Baldwin, R. 2011. “21st Century Regionalism: Filling the Gap between 21st Century Trade and 20th Century Trade Rules.” WTO Staff Working Paper No. ERSD-2011-08. World Trade Organization (WTO). <https://www.wto-ilib.org/content/papers/25189808/107>

Bouet, A., L. Cosnard and D. Laborde. 2017. “Measuring trade integration in Africa”, *Journal of Economic Integration* 32(4): 937- 977. [https://www.e-jei.org/upload/JEI\\_32\\_4\\_937\\_977\\_2013600144.pdf](https://www.e-jei.org/upload/JEI_32_4_937_977_2013600144.pdf)

Bouët, A., B. Cissé, and F. Traoré. 2020. “Informal Cross-Border Trade in Africa.” In *Africa Agriculture Trade Monitor 2020*, eds. A. Bouët, S.P. Odjo, and C. Zakir, Chapter 5, 119–148. IFPRI. [https://doi.org/10.2499/9780896293908\\_05](https://doi.org/10.2499/9780896293908_05)

Bouët, A., A. Sy, and F. Traoré. 2025. “The Economic Costs of Bribes and Road Harassment by Officials in ECOWAS.” *Review of World Economics*, forthcoming <https://doi.org/10.1007/s10290-025-00615-2>

Fernandes, A.M., N. Rocha, and M. Ruta. 2021. “Introduction: The Economics of Deep Trade Agreements.” In *The Economics of Deep Trade Agreements*, eds. A.M. Fernandes, N. Rocha, and M. Ruta, 1–7. London: CEPR Press.

Food and Agriculture Organization of the United Nations (FAO). 2025. *FAOSTAT: Suite of Food Security Indicators*. Accessed March 3, 2026. <https://www.fao.org/faostat/en/#data/FS>

FAO. 2022. *The State of Food and Agriculture 2022. Leveraging automation in agriculture for transforming agrifood systems*. Rome, FAO. <https://doi.org/10.4060/cb9479en>

Iapadre, L. 2006. Regional integration agreements and the geography of world trade: statistical indicators and empirical evidence. In *Assessment and measurement of regional integration* (pp. 83-103). Routledge. <https://doi.org/10.4324/9780203087893>

International Energy Agency (IEA). 2025. “Global Critical Minerals Outlook 2025 (Revised version, June 2025)”. Paris: IEA.

International Food Policy Research Institute (IFPRI). 2025. *Outcome Assessment of the Digital Agriculture Ecosystem in Ethiopia*. <https://cgspace.cgiar.org/server/api/core/bitstreams/f7343a43-7b4b-4ae5-b3ec-d96f260eb962/content>

Mamboundou, Pierre; Traoré, Fousseini; 2026. *Agricultural trade in Africa: Current trends and challenges*. Washington, DC: International Food Policy Research Institute. <https://hdl.handle.net/10568/181883>

Seid J, Tibebe D, Wuletawu A, Sotelo S, Grossi A, Ghosh A, Ramirez-Villegas J, Teferi D, Solomon D, Desta L. 2025. Policy Brief: Advancing Digital Agriculture in Ethiopia: Experiences and Achievements from the CGIAR and Partners. AICCRA Brief. Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA) <https://hdl.handle.net/10568/177588>

United Nations Economic Commission for Africa (ECA) and Centre d'Etudes Prospectives et d'Informations Internationales (CEPII). 2025. *Implementing the AfCFTA Agreement and Impacts for Africa's Regional Value Chains*. <https://repository.uneca.org/entities/publication/05c140f4-a5ad-4001-aaad-e37dcf830514>

ECA. Forthcoming-a. *Strategic Environmental Assessment of AfCFTA Implementation*.

ECA. Forthcoming-b. *What is the Promise of the AfCFTA Today? An Updated Economic Projection*.

ECA. Forthcoming-c. *Impact of the EU Carbon Border Adjustment Mechanism (CBAM) on Africa*.

ECA. 2025a. *Economic Report on Africa – Advancing the Implementation of the African Continental Free Trade Area: Proposing Transformative Strategic Actions*. Addis Ababa: ECA. <https://repository.uneca.org/entities/publication/ffc1fc2f-c9f5-4631-856b-a6836c0837a5>

ECA. 2025b. Improving Food Security in Eastern Africa Through Greater Intra-Regional Trade – A Review of the Issues. Kigali: ECA. <https://repository.uneca.org/entities/publication/30a5f0cc-4d42-45ed-bde4-99eca9a7ac43>

ECA, African Union Commission (AUC) and African Development Bank (AfDB). 2025. *Assessing Regional Integration in Africa ARIA XI Delivering on the African Economic Community: Towards an African Continental Customs Union and African Continental Common Market*. Addis Ababa: ECA.

Mattoo, A., A. Mulabdic, and M. Ruta. 2017. “Trade Creation and Trade Diversion in Deep Agreements.” Policy Research Working Paper No. 8206. World Bank, Washington, DC <https://openknowledge.worldbank.org/entities/publication/45b1f762-4e1e-56a7-ae29-83136df510f9>

Sall, Leysa Maty; Bouët, Antoine; and Seck, Abdoulaye. 2025. Regionalism, “continentalism,” and multilateralism: Building or stumbling blocks for Africa? In *Africa Agriculture Trade Monitor 2025*, eds.

Sunday Odjo, Fousseini Traore, and Chahir Zaki. Chapter 5, Pp. 139-176. Kigali: AKADEMIYA2063; Washington, DC: International Food Policy Research Institute. <https://doi.org/10.54067/9798991636919>

Sall L. M. Forthcoming. Impact of regional trade agreements in Africa.

Seid J, et al. 2025. Policy Brief: Advancing Digital Agriculture in Ethiopia: Experiences and Achievements from the CGIAR and Partners. AICCRA Brief. Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA)

World Bank Group and World Trade Organization. 2023. Turning Digital Trade Into a Catalyst for African Development, JOINT WBG-WTO POLICY NOTE, [https://www.wto.org/english/thewto\\_e/minist\\_e/mc13\\_e/policy\\_note\\_digital\\_trade\\_africa\\_e.pdf](https://www.wto.org/english/thewto_e/minist_e/mc13_e/policy_note_digital_trade_africa_e.pdf)

World Bank. 2025. World Bank Deep Trade Agreements database. Accessed on Janvier, 2025. <https://datatopics.worldbank.org/dta/table.html>

World Trade Organization (WTO). 2025. WTO Regional Trade Agreements database. <https://rtais.wto.org/UI/PublicMaintainRTAHome.aspx>

## Annexes

### Annex 1: Econometric specification and estimation method

#### A. Structural gravity specification

The baseline structural gravity equation estimated for both goods and agricultural goods is:

$$X_{ij,t} = \exp [\pi_{i,t} + \chi_{j,t} + \mu_{ij} + \beta_1 RTA_{ij,t} + \beta_2 WTO_{ij,t} + \beta_3 (RTA_{ij,t} \times WTO_{ij,t}) + \sum_r \gamma_r Region_{r,ij,t} + \sum_r \delta_r (Region_{r,ij,t} \times Z_{ij,t})] \varepsilon_{ij,t} \quad (1)$$

where:

- $X_{ij,t}$  denotes exports from country  $i$  to country  $j$  at time  $t$ ;
- $\pi_{i,t}$  and  $\chi_{j,t}$  are exporter-time and importer-time fixed effects, controlling for multilateral resistance terms and all country-specific time-varying determinants of trade.
- $\mu_{ij}$  represents country-pair fixed effects absorb all time-invariant bilateral trade frictions.
- $RTA_{ij,t}$  is a dummy equal to one if countries  $i$  and  $j$  share a regional trade agreement at time  $t$ .
- $WTO_{ij,t}$  is a dummy equal to 1 if both countries are WTO members at time  $t$ .
- $Region_{r,ij,t}$  denotes dummy variables for membership in specific Regional Economic Communities (RECs) or regional initiatives  $r$ , including the AfCFTA.
- $\varepsilon_{ij,t}$  is the multiplicative error term.

The interaction term  $Z_{ij,t}$  varies depending on the specification. In the first interaction,  $Z_{ij,t}$  includes multilateral and continental integration variables, namely  $WTO_{ij,t}$  and  $AfCFTA_{ij,t}$ , so that regional heterogeneity is captured through interactions between regional membership and these institutional frameworks. In the second interaction,  $Z_{ij,t}$  instead represents

the vertical depth of trade agreements ( $DTA_{ij,t}$ ), measured for different provisions areas defined in the chapter allowing the trade effects of agreement depth to vary across regions. Interactions are therefore included when necessary to test whether the impact of multilateral integration, AfCFTA membership, or agreement depth differs across African regions.

The model is estimated using Poisson Pseudo Maximum Likelihood (PPML), and coefficients are interpreted as semi-elasticities of bilateral trade flows.

### *B. Treatment of overlapping regional memberships*

Overlapping regional memberships are explicitly permitted. Multiple regional dummies may take the value 1 for a given country pair each year, reflecting the institutional structure of African integration.

Country-pair fixed effects absorb all time-invariant bilateral characteristics (e.g., distance, common language, colonial ties) and address the potential endogeneity of trade agreements due to self-selection into RTAs, following the identification strategy in Baier and Bergstrand (2007).

Multicollinearity concerns are mitigated by the inclusion of pair fixed effects and the simultaneous control for the main overlapping regional blocs.

## Annex 2: Sensitivity analysis

**Table 1: Estimated trade effects of African regional trade agreements (PPML Gravity Model), 1988–2024 and 1995–2024**

	1988-2024		1995-2024	
	All products	Agriculture	All products	Agriculture
WAEMU	-0.360 (0.243)	-0.553** (0.279)	-0.308 (0.243)	-0.476* (0.275)
ECOWAS	4.551**** (0.426)	4.512**** (0.425)	0 (.)	0 (.)
COMESA	0.231* (0.133)	0.271 (0.165)	0.115 (0.141)	0.190 (0.169)
EAC	0.357* (0.196)	0.523** (0.204)	0.232 (0.194)	0.426** (0.209)
CEMAC	0.738 (0.480)	-0.248 (0.361)	0.497 (0.522)	-0.631* (0.380)
SADC	0.454*** (0.142)	0.287* (0.158)	0.212 (0.151)	0.0778 (0.202)
TFTA	-0.0151 (0.095)	-0.0228 (0.084)	-0.000716 (0.095)	-0.0125 (0.084)
AMU	0 (.)	0 (.)	0 (.)	0 (.)
ECCAS	0.516** (0.205)	0.427** (0.207)	0.528** (0.218)	0.494** (0.222)
IGAD	0.421** (0.208)	0.938**** (0.234)	0.395* (0.212)	0.952**** (0.261)
CEN-SAD	-0.0747 (0.086)	0.254** (0.122)	-0.0981 (0.086)	0.201* (0.115)
AfCFTA	-0.137** (0.062)	-0.0616 (0.046)	-0.129** (0.062)	-0.0478 (0.046)
SACU	0.713**** (0.156)	1.200**** (0.134)	0.587**** (0.159)	1.043**** (0.138)
RTA	0.0764*** (0.029)	0.0608* (0.034)	0.0824*** (0.029)	0.0525* (0.033)

	1988-2024		1995-2024	
	All products	Agriculture	All products	Agriculture
numRTA	-0.0149 (0.019)	-0.00255 (0.021)	-0.0302 (0.020)	-0.0183 (0.021)
cons	23.61**** (0.013)	20.99**** (0.020)	23.65**** (0.013)	21.05**** (0.020)
N	1550813	1368628	1297643	1143724

Source: Author's estimations.

Note: ECOWAS and AMU are omitted in the estimation due to limited variation in the timeframe.

**Table 2: Sensitivity analysis of regional trade agreement effects: interaction with WTO membership (1995-2024)**

	All products		Agriculture products	
	(1)	(2)	(1)	(2)
WAEMU	-0.306 (0.243)	-0.308 (0.243)	-0.479* (0.275)	-0.476* (0.275)
ECOWAS	- -	- -	- -	- -
COMESA	0.113 (0.141)	0.115 (0.141)	0.190 (0.169)	0.190 (0.169)
EAC	0.230 (0.194)	0.232 (0.194)	0.441** (0.211)	0.426** (0.209)
CEMAC	0.492 (0.521)	0.497 (0.522)	-0.645* (0.384)	-0.631* (0.380)
SADC	0.205 (0.150)	0.212 (0.151)	0.0839 (0.205)	0.0778 (0.202)
TFTA	-0.00155 (0.095)	-0.000716 (0.095)	-0.0141 (0.084)	-0.0125 (0.084)
UMA	- -	- -	- -	- -
ECCAS	0.530** (0.218)	0.528** (0.218)	0.501** (0.222)	0.494** (0.222)

	All products		Agriculture products	
	(1)	(2)	(1)	(2)
IGAD	0.393*	0.395*	0.950****	0.952****
	(0.212)	(0.212)	(0.261)	(0.261)
CEN-SAD	-0.101	-0.0981	0.202*	0.201*
	(0.086)	(0.086)	(0.115)	(0.115)
AfCFTA	-0.129**	-0.129**	-0.0529	-0.0478
	(0.062)	(0.062)	(0.046)	(0.046)
SACU	0.587****	0.587****	1.038****	1.043****
	(0.159)	(0.159)	(0.138)	(0.138)
RTA	0.0647	0.0824***	0.224*	0.0525
	(0.084)	(0.029)	(0.122)	(0.033)
numRTA	-0.0299	-0.0302	-0.0150	-0.0183
	(0.020)	(0.020)	(0.021)	(0.021)
WTO	0.101		-0.0859	
	(0.076)		(0.107)	
RTA x WTO	0.0179		-0.182	
	(0.083)		(0.123)	
cons	23.56****	23.65****	21.13****	21.05****
	(0.070)	(0.013)	(0.103)	(0.020)
N	1297643	1297643	1143724	1143724

Source: Author's estimations.

Note: ECOWAS and AMU are omitted in the estimation due to limited variation in the timeframe.

## Annex 3: Description of WTO-X and WTO-plus areas

### *Description of WTO-plus areas*

Category	Description	Provisions
<b>Tariffs</b>	Goes beyond WTO tariff bindings by accelerating or expanding liberalization	Complete elimination of tariffs in certain sectors under FTAs (FTA Industry and FTA Agriculture)*
<b>Nontariff measures</b>	Expands or deepens rules on trade barriers other than tariffs	· Customs procedures (deeper trade facilitation rules)*
		· Export taxes (restrictions on export duties)
		· TBT*
		· SPS (harmonization or mutual recognition of standards)*
<b>Services</b>	Extends GATS commitments in trade in services	· Trade remedies (stricter rules on antidumping and countervailing duties)*
		· State aid (competition rules on subsidies)*
		· Public procurement (more open government procurement markets)
		· TRIMs (additional investment rules)
		· TRIPS (stronger IPR protection)
· GATS (greater market access in specific service sectors)*		

*Note: \* Provision is mentioned in the AfCFTA.*

*Description of WTO-X areas*

Category	Description	Provisions
<b>Agriculture and Health</b>	Provisions related to agriculture, food security, and public health	Agriculture, Health
<b>Institutions and Regulatory Frameworks</b>	Governance and legal provisions enhancing transparency, market competition, and consumer rights	Anticorruption, Competition, IPR, Environmental Laws, Consumer Protection, Data Protection, Human Rights, Information Society, Social Matters, Statistics
<b>Production Process and Economic Policies</b>	Policies affecting investment, labor, education, innovation, and energy markets	Investment, Labor Market Regulation, Movement of Capital, Innovation Policies, Education & Training, Energy, Research and Technology, SMEs*
<b>Cooperation and Institutional Support</b>	Provisions related to economic dialogue, financial assistance, taxation, governance, and regional integration	Economic Policy Dialogue, Financial Assistance, Taxation, Public Administration, Regional Cooperation
<b>Other Policy Areas</b>	Covers political, security, and social policies beyond economic issues	Approximation of Legislation, Audio-Visual, Civil Protection, Cultural Cooperation, Illegal Immigration, Illicit Drugs, Industrial Cooperation, Mining, Money Laundering, Nuclear Safety, Political Dialogue, Terrorism, Visa and Asylum

*Only Regional Cooperation, SME, Human Rights, and Movement of Capitals are WTO-X provisions included in the AfCFTA Agreement.*