



## CGIAR Initiative on Diversification in East and Southern Africa

### Priority Agricultural Commodities for Expanding and Diversifying Intra-Regional Trade in Eastern and Southern Africa

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The [CGIAR Initiative on Diversification in East and Southern Africa](#) aims to help smallholders transition to sustainably intensified, diversified, and de-risked agri-food systems based on maize in 12 ESA countries. Specifically, it seeks to enable 50,000 value chain actors, including farmers (at least 40% women, 40% youth), to adopt climate-smart maize-based intensification and diversification practices and one million to access digital agro-advisory services. Emphasizing the role of the private sector in driving such transformation, UU targets to support at least 30 start-ups and SMEs.

## Abstract

Economic diversification is one of the key strategic options to ensure resilience and create opportunities for value chain actors including smallholder farmers. This report explores the potential to diversify intra-regional trade in Eastern and Southern Africa countries (Kenya, Uganda, Ethiopia, Tanzania, Rwanda, South Sudan, Democratic Republic of the Congo, Zambia, and Burundi), with special reference to the COMESA regional market. More specifically, three critical issues were analyzed. First, the current performance and the potential to trade has been examined using several regional trade performance indicators including the production and trade similarities, and the competitiveness of the sample countries in the regional trade. The analyses revealed that there exists significant production and trade dissimilarities among the sample countries, which implies the existence of untapped potential for expanding agricultural trade in the region with tremendous consequences for smallholder producers. Second, the outlook for increasing trade and competitiveness under different policy change scenarios (reduction of cross-border trade barriers; lowering the overall cost of trading, and/or increasing productivity—crop yield) has been projected using a regional multi-commodity Market Model (ESA-EMM). This projection has indicated that the response to the policy changes and the potential for competitiveness differs across agricultural commodities and countries. Based on this deference, candidate commodities that could help countries expand their competitiveness and trade diversification have been identified. Third, the candidate commodities are prioritized based on multiple criteria that include not only regional trade potential but also the commodity's contribution to economic growth, agricultural value addition, employment, and poverty reduction using country-level Computable General Equilibrium Model (CGE) and Micro-Simulation Models. The models simulations revealed that priority commodities that would increase the countries' agricultural trade and other economic outcomes include both the conventional export crops such as coffee, tobacco, tea and oilseeds, and the staple crops such as maize and pulses. Maize has come out as a competitive and priority commodity for Ethiopia and Tanzania, not only to support the local food demand but also to supply for the regional market and improve the countries' competitiveness. It was also learnt that there exists a huge potential for expanding regional trade in live animals and animal products.

## 1 Introduction

This report is the first deliverable of the CGIAR initiative on Diversification in East and Southern Africa under Work Package 4: “Govern and Enable”. The report covers Eastern and Southern African countries such as Kenya, Uganda, Ethiopia, Tanzania, Rwanda, South Sudan, Democratic Republic of the Congo, Zambia, and Burundi. The purpose is to identify priority agricultural commodities for diversifying intra-regional trade in East and Southern Africa in general and in the nine study countries in particular. The goal is to understand the critical factors and root causes of low regional trade and identify potential options for trade expansion in the region.

The prioritization of agricultural commodities is one of the key policy-making processes in improving the competitiveness of economies and social welfare. In a policy environment where competing public

actions are needed to facilitate objectives such as market functioning, social security, competitiveness, poverty reduction, and employment expansion, the prioritization of policy options is a challenging step within policy formulation and implementation. Unlike previous studies which have relied on relatively few indicators to prioritize commodities (or value chains), in this study we use multiple criteria ranging from trade performance and outlooks under different scenarios at the regional level, to impacts on economy-wide outcomes at the country level. Country-level value chain prioritization is based on the comparative contribution of candidate commodities to improving other national development objectives in addition to boosting regional trade. The analysis looks beyond regional trade expansion and captures the performance of the candidate commodities for improving incomes, employment, poverty, and gender and youth inclusivity. The purpose of this analysis is to help countries identify trade expansion potential and to prioritize investment and policy decisions for diversifying and improving intra-regional trade performance.

We first start with a brief descriptive analysis of prevailing regional and overall agricultural trade performance by all COMESA member countries. This is followed by an evaluation of trade performance and competitiveness using a series of specific indicators. The selected indicators shed light on the degree of production and trade specialization across countries, their relative competitiveness in regional agricultural markets and across 50 traded commodities, and the scope for regional trade expansion based on existing production and trading patterns.

We then assess the long-term outlook for intra-regional trade in agricultural products under a baseline scenario assuming a continuation of recent historical trends to 2030. Here, we customize and apply the Eastern and Southern Africa Economy-wide Multi-market (ESA-EMM) model to explore how the continuation of current supply and demand trends, including changes in crop yields, cultivated areas, outputs, Gross Domestic Product (GDP) and other relevant value chain dynamics would shape long-term regional agricultural trade competitiveness and performance by individual countries. This part of the analysis helps identify the leading regional agricultural commodities with the highest potential contribution to boosting cross-border trade in agricultural commodities if nothing else changes and recent historical trends hold until 2030.

Finally, we simulate three alternative policy scenarios that would enable countries in the region to exploit the potential identified earlier to boost regional trade above the projected baseline levels. The three scenarios consider three types of interventions that should raise the competitiveness of regional goods in regional markets. These are: the reduction of trading costs in general; the elimination of cross-border trade barriers; and an increase in farm productivity.

The combined results from the different steps listed above are then used to identify the most promising commodity value chains in terms of trade performance and competitiveness in regional markets. For every country, a list of leading commodities is compiled based on their ranking under the baseline and alternative trade policy scenarios in terms of future export growth and added export revenues.

The report is organized as follows: section 2 provides an analysis of country performance and competitiveness in regional agricultural markets. Section 3 explores the long-term outlook for regional agricultural trade and the position of individual countries and commodities through to 2030. Section 4 further ranks commodities in selected countries using a comprehensive list of criteria including trade expansion potential and contribution to macro-economic growth and employment and food security. Section 5 summarizes the major findings and provides concluding remarks.

## 2 Agricultural Trade Performance and Expansion Potential

This section describes the structure of agricultural trade among the nine target countries. It highlights the relative weight of countries and commodities in shaping agricultural trade in general, and cross-border agricultural trade in the COMESA region in particular. Key findings include the identification of the top imported and exported commodities as well as the current main regional trading partners for each country, using 2015–2019 as a reference period.

### 2.1 Trade Performance

#### 2.1.1 Intra-regional agricultural trade patterns

The role of agriculture in regional trade and that of individual countries in intra-regional trade varies widely among COMESA member states (**Error! Reference source not found.**). These variations relate to the size of regional trade flows, the share of agriculture in regional trade and the share of regional markets in overall country trade. Kenya and Uganda, and to a lesser extent Tanzania and Zambia, are the biggest players in regional agricultural export markets. The same countries dominate agricultural exports to the rest of the world, with Ethiopia joining the group in second position. For all these countries, except Zambia, regional exports are a tiny fraction of total agricultural exports. Even for the remaining countries, total agricultural exports are at least twice the size of regional exports. On the import side, Kenya, Uganda, South Sudan, and Rwanda are the biggest players, while Kenya, Ethiopia, Congo (D.R.) and Tanzania lead in terms of overall agricultural imports (**Error! Reference source not found.**).

Similarly, the importance of agriculture in regional as well as total trade varies significantly across countries. The share of agriculture in regional trade varies from as little as less than 3 percent in Zambia to close to 54 percent in South Sudan, which is also the only instance of it exceeding 50 percent. Except for South Sudan and Congo (D.R.), the share of agriculture in regional exports is much lower than its share in total exports, signaling a heavier bias towards agricultural commodities in the global exports of the study countries. The opposite is observed for agricultural imports. These make up more than 50 percent of regional imports in the majority of countries, far more than their share of total country imports. The latter exceeds 20 percent only in the case of South Sudan. Thus, in general, regional imports are more tilted towards agricultural commodities.

**Table 1:** Agricultural exports in 9 East and Southern African countries, 2015–2019

| Countries    | Agricultural Exports     |                                      |                          |                               |
|--------------|--------------------------|--------------------------------------|--------------------------|-------------------------------|
|              | Intra-region export      |                                      | World export             |                               |
|              | Value<br>(millions US\$) | Share (% of total<br>COMESA exports) | Value<br>(millions US\$) | Share (% of<br>total exports) |
| Burundi      | 29.4                     | 29.9                                 | 92.5                     | 41.8                          |
| Congo (D.R.) | 7.8                      | 30.0                                 | 77.8                     | 1.0                           |
| Ethiopia     | 105.8                    | 18.6                                 | 2110.3                   | 64.8                          |
| Kenya        | 659.1                    | 47.4                                 | 3633.5                   | 57.4                          |
| Rwanda       | 137.9                    | 26.7                                 | 270.3                    | 30.8                          |
| South Sudan  | 0.1                      | 53.6                                 | 22.9                     | 1.8                           |
| Tanzania     | 340.7                    | 24.4                                 | 2022.4                   | 33.1                          |
| Uganda       | 638.8                    | 24.7                                 | 1454.3                   | 43.8                          |
| Zambia       | 422.7                    | 2.6                                  | 765.7                    | 6.9                           |

Source: Authors' calculations using AATM2021 database. Note: Intra-region export indicates export to COMESA member countries while World export indicates export to all countries in the world including COMESA countries.

**Table 2:** Agricultural imports in 9 East African countries, 2015-2019

| Countries    | Agricultural Imports      |  |                           |                                |
|--------------|---------------------------|--|---------------------------|--------------------------------|
|              | Intra-region import       |  | World import              |                                |
|              | Values<br>(millions US\$) | Shares (% of<br>total COMESA<br>imports) | Values<br>(millions US\$) | Shares (% of<br>total imports) |
| Burundi      | 58.3                      | 62.1                                     | 129.8                     | 17.0                           |
| Congo (D.R.) | 371.1                     | 0.8                                      | 955.3                     | 15.6                           |
| Ethiopia     | 62.8                      | 75.2                                     | 1336.2                    | 8.5                            |
| Kenya        | 719.7                     | 36.0                                     | 2430.6                    | 13.2                           |
| Rwanda       | 187.4                     | 52.1                                     | 357.1                     | 16.3                           |
| South Sudan  | 180.4                     | 3.2                                      | 215.7                     | 34.5                           |
| Tanzania     | 124.1                     | 24.3                                     | 953.3                     | 8.8                            |
| Uganda       | 208.2                     | 53.9                                     | 723.2                     | 12.7                           |
| Zambia       | 40.1                      | 34.3                                     | 392.8                     | 4.9                            |

Source: Authors' calculations using AATM2021 database. Note: Intra-region import indicates imports from COMESA countries while World import indicates imports from all countries in the world including COMESA countries

### 2.1.2 Commodity composition of agricultural trade

**Error! Reference source not found.** presents the top five agricultural commodities exported to regional markets and worldwide by each of the nine study countries. The combined list includes 29 commodities exported regionally and 25 worldwide by the group of countries. In terms of global trade, coffee is the most frequently exported commodity, found among the top five exports in seven countries out of nine. Leguminous vegetables, oilseeds and oleaginous products, tea, tobacco, cocoa beans, maize, cotton, wheat, and rice are also among the top exported commodities in at least two countries. At the regional level, tea, palm oil, maize and wheat are the commodities most frequently traded, found among the top five in at least three countries. It is worth noting that several products, including palm oil, oil cakes, and live animals are represented only in cross-border exports.

**Table 3: Top 5 agricultural exports to COMESA countries and all countries in the world, 2015–2019**

| Country      | COMESA                                      |              |         | WORLD  |              |         |
|--------------|---|--------------|---------|--|--------------|---------|
|              | Top 5 exports                               | Values US\$M | Share % | Top 5 exports  | Value US\$ M | Share % |
| Burundi      | Wheat                                       | 8.7          | 25.5    | Coffee   | 46.8         | 47.4    |
|              | Tea   | 6.9          | 20.2    | Tea  | 25.1         | 25.4    |
|              | Cigars, cheroots, cigarillos and cigarettes | 4.5          | 13.1    | Wheat  | 8.7          | 8.8     |
|              | Beer  | 4.4          | 12.9    | Cigars, cheroots, cigarillos and cigarettes                        | 4.5          | 4.6     |
|              | Coffee                                      | 4.2          | 12.2    | Beer   | 4.4          | 4.5     |
| Congo (D.R.) | Palm oil                                    | 3.7          | 35.4    | Cocoa beans  | 25.1         | 29.7    |
|              | Vegetable products                          | 1.2          | 11.8    | Coffee   | 17.5         | 20.7    |
|              | Fruit, nuts                                 | 1.2          | 11.8    | Bran, sharps and other residues                                    | 8.9          | 10.5    |
|              | Plants and parts of plant                   | 1.1          | 10.6    | Plants and parts of plants   | 7.2          | 8.5     |
|              | Coconut                                     | 0.8          | 7.4     | Fruit, nuts  | 4.5          | 5.3     |
| Ethiopia     | Vegetables                                  | 61.8         | 29.7    | Coffee,  | 813.0        | 36.2    |
|              | Live Animals                                | 36.6         | 17.6    | Oil seeds/ oleaginous fruits                                       | 418.7        | 18.7    |
|              | Vegetables, leguminous                      | 24.2         | 11.7    | Flowers; cut flowers and flower buds                               | 227.6        | 10.1    |
|              | Bovine animals                              | 22.9         | 11.0    | Vegetables, leguminous   | 178.4        | 8.0     |
|              | Pepper of the genus piper                   | 10.5         | 5.0     | Vegetables, others   | 158.8        | 7.1     |
| Kenya        | Tea   | 287.7        | 43.5    | Tea  | 1294.2       | 35.4    |
|              | Cigars, cheroots, cigarillos/ cigarettes    | 64.5         | 9.8     | Flowers; cut flowers and flower buds                               | 736.2        | 20.1    |
|              | Sugar confectionery                         | 41.7         | 6.3     | Coffee   | 250.5        | 6.8     |
|              | Palm oil                                    | 40.6         | 6.1     | Vegetables, leguminous   | 154.6        | 4.2     |
|              | Margarine                                   | 25.3         | 3.8     | Dates, figs, pineapples, avocados, guavas, mangoes and mangosteens | 131.5        | 3.6     |
| Rwanda       | Tea   | 32.5         | 19.3    | Tea  | 82.1         | 26.8    |
|              | Rice  | 24.5         | 14.5    | Coffee   | 67.7         | 22.1    |

|             |  |       |        |   |       |      |
|-------------|--|-------|--------|---|-------|------|
|             | Wheat  | 15.8  | 9.4    | Rice  | 24.5  | 8.0  |
|             | Animal or vegetable fats and oils                    | 11.3  | 6.7    | Wheat   | 15.8  | 5.2  |
|             | Palm oil   | 8.7   | 5.2    | Animal or vegetable fats and oils   | 11.4  | 3.7  |
| South Sudan | Beer   | 0.1   | 22.4   | Swedes, mangolds, fodder roots, hay, lucerne (alfalfa), clover, sainfoin, forage kale, lupines, | 20.3  | 48.9 |
|             | Lac; natural gums, resins, gum-resins and oleoresins | 0.1   | 20.5   | Cotton; not carded or combed  | 7.1   | 17.1 |
|             | Vegetable products                                   | 0.1   | 18.2   | Vegetables, leguminous  | 4.6   | 10.9 |
|             | Fruit, nuts  | 0.1   | 18.2   | Flours and meals of oilseeds or oleaginous fruits   | 3.9   | 9.4  |
|             | Plants and parts of plants                           | 0.0   | 9.8    | Oil seeds and oleaginous fruits   | 1.6   | 3.7  |
| Uganda      | Maize (corn)   | 63.0  | 9.8    | Coffee  | 462.2 | 31.4 |
|             | Vegetables, leguminous                               | 55.2  | 8.6    | Tobacco, unmanufactured   | 87.4  | 5.9  |
|             | Cane or beet sugar                                   | 54.8  | 8.5    | Cocoa beans   | 73.9  | 5.0  |
|             | Tobacco, unmanufactured                              | 53.5  | 8.3    | Vegetables, leguminous  | 69.6  | 4.7  |
|             | Milk and cream                                       | 53.1  | 8.2    | Maize (corn)  | 63.1  | 4.3  |
| Tanzania    | Oil-cake and other solid residues                    | 37.7  | 10.8   |   | 378.  |      |
|             | Wheat or meslin flour                                | 33.2  | 9.5    | Tobacco, unmanufactured   | 6     | 18.4 |
|             | Vegetables   | 30.5  | 8.7    | Nuts, edible; coconuts, Brazil nuts and cashew nuts   | 339.7 | 16.5 |
|             | Maize (corn)   | 26.0  | 7.5    | Vegetables, leguminous  | 179.8 | 8.8  |
|             | Bread, pastry, cakes, biscuits                       | 19.0  | 5.5    | Coffee  | 163.8 | 8.0  |
| Zambia      |  |       |        | Oil seeds and oleaginous fruits   | 144.2 | 7.0  |
|             | Maize (corn)   | 104.1 | 23.8   |   | 205.  |      |
|             | Cane or beet sugar                                   | 96.0  | 21.9   | Tobacco, unmanufactured   | 4     | 25.4 |
|             | Waters   | 42.9  | 9.8    | Cane or beet sugar  | 116.1 | 14.4 |
|             | Tobacco, unmanufactured                              | 38.8  | 8.9    | Maize (corn)  | 111.6 | 13.8 |
|             | Oil-cake and other solid residues                    | 18.7  | 4.3    | Cotton; not carded or combed  | 50.8  | 6.3  |
|             |  |       | Waters | 43.1  | 5.3   |      |

Source: Authors' calculations using AATM2021 database

In Table 4, the same information is detailed for imports. The imports basket is less diverse at the regional level, with a total of 25 products. The most frequently imported commodities identified are sugarcane (seven countries), palm oil (six countries), maize (four countries), wheat (three countries), and rice, fruit juices, food preparations and sugar (two countries). Imports worldwide are concentrated in 16 products, much less than for exports, with the most important ones being sugar (imported by eight countries), palm oil (seven countries), rice (seven countries), wheat (seven countries), maize (three countries), and food preparations and beers (two countries).

**Table 4: Top 5 agricultural imports to COMESA and overall, 2015–2019**

|  | COMESA | WORLD |
|--|--------|-------|
|--|--------|-------|

| Country         | Top 5 imports                     | Value<br>US\$M | Share<br>% | Top 5 imports                       | Value<br>US\$M | Share<br>% |
|-----------------|-----------------------------------|----------------|------------|-------------------------------------|----------------|------------|
|                 |                                   |                |            |                                     |                |            |
| Burundi         | Cane or beet sugar                | 20.5           | 30.8       | Cane or beet sugar                  | 25.4           | 17.8       |
|                 | Maize (corn)                      | 7.1            | 10.7       | Wheat and meslin                    | 18.5           | 13.0       |
|                 | Tobacco, unmanufactured           | 3.2            | 4.8        | Rice                                | 14.5           | 10.2       |
|                 | Palm oil                          | 2.9            | 4.4        | Malt                                | 9.4            | 6.6        |
|                 | Food preparations                 | 2.9            | 4.4        | Maize (corn)                        | 7.7            | 5.4        |
| Congo<br>(D.R.) | Cane or beet sugar                | 62.5           | 16.3       | Meat and edible offal of<br>poultry | 108.2          | 11.2       |
|                 | Wheat                             | 53.8           | 14.1       | Cane or beet sugar                  | 81.2           | 8.4        |
|                 | Palm oil                          | 28.9           | 7.5        | Wheat and meslin flour              | 60.4           | 6.2        |
|                 | Waters                            | 28.7           | 7.5        | Rice                                | 52.2           | 5.4        |
|                 | Rice                              | 28.5           | 7.4        | Wheat and meslin                    | 50.7           | 5.2        |
| Ethiopia        | Fruit juices                      | 10.8           | 13.6       | Palm oil                            | 373.8          | 27.5       |
|                 | Wheat or meslin flour             | 9.2            | 11.6       | Wheat and meslin                    | 226.7          | 16.7       |
|                 | Grain sorghum                     | 7.3            | 9.2        | Rice                                | 100.9          | 7.4        |
|                 | Onions, shallots, garlic, leeks   | 6.8            | 8.5        | Cane or beet sugar                  | 83.0           | 6.1        |
|                 | Food preparations                 | 5.8            | 7.3        | Malt extract                        | 60.0           | 4.4        |
| Kenya           | Cane or beet sugar                | 114.2          | 15.7       | Palm oil                            | 387.8          | 15.9       |
|                 | Tea                               | 75.6           | 10.4       | Wheat and meslin                    | 382.2          | 15.7       |
|                 | Maize (corn)                      | 74.8           | 10.3       | Rice                                | 253.1          | 10.4       |
|                 | Vegetables, leguminous            | 59.5           | 8.2        | Cane or beet sugar                  | 246.4          | 10.1       |
|                 | Milk and cream                    | 50.7           | 7.0        | Maize (corn)                        | 135.9          | 5.6        |
| Rwanda          | Cane or beet sugar                | 30.8           | 16.3       | Cane or beet sugar                  | 52.2           | 14.5       |
|                 | Maize (corn)                      | 19.9           | 10.5       | Wheat and meslin                    | 37.3           | 10.3       |
|                 | Bread, pastry, cakes, biscuits    | 18.1           | 9.6        | Palm oil                            | 30.9           | 8.6        |
|                 | Animal or vegetable fats and oils | 16.4           | 8.7        | Rice                                | 22.3           | 6.2        |
|                 | Palm oil and its fractions        | 9.9            | 5.2        | Bread, pastry, cakes, biscuits      | 21.4           | 5.9        |
| South<br>Sudan  | Cane or beet sugar                | 34.5           | 18.5       | Cane or beet sugar                  | 40.7           | 17.9       |
|                 | Cereal flours                     | 17.7           | 9.5        | Cereal flours                       | 17.7           | 7.8        |
|                 | Palm oil and its fractions        | 14.5           | 7.8        | Food preparations                   | 14.8           | 6.5        |
|                 | Beer                              | 13.1           | 7.0        | Palm oil                            | 14.6           | 6.4        |
|                 | Wheat                             | 10.3           | 5.5        | Beer                                | 13.9           | 6.1        |
| Uganda          | Palm oil                          | 28.9           | 13.7       | Palm oil                            | 206.5          | 28.4       |
|                 | Sugar confectionery               | 15.2           | 7.2        | Wheat and meslin                    | 129.1          | 17.8       |
|                 | Cane or beet sugar                | 12.5           | 5.9        | Cane or beet sugar                  | 71.5           | 9.8        |
|                 | Rice                              | 12.2           | 5.8        | Rice                                | 55.7           | 7.7        |
|                 | Ethyl alcohol, undenatured        | 11.5           | 5.5        | Sugar confectionery                 | 17.5           | 2.4        |
| Tanzania        | Maize (corn)                      | 21.2           | 16.7       | Palm oil                            | 258.6          | 27.0       |
|                 | Cane or beet sugar                | 20.5           | 16.1       | Wheat and meslin                    | 158.8          | 16.6       |
|                 | Sugar confectionery               | 8.2            | 6.5        | Cane or beet sugar                  | 141.2          | 14.7       |
|                 | Oilcake and other solid residues  | 7.7            | 6.0        | Rice                                | 52.6           | 5.5        |
|                 | Groundnuts                        | 6.7            | 5.3        | Maize (corn)                        | 30.0           | 3.1        |
| Zambia          | Margarine                         | 3.9            | 8.3        | Palm oil                            | 40.5           | 10.1       |



|   |     |     |                     |      |     |
|---|-----|-----|---------------------|------|-----|
| Cigars, cheroots, cigarillos & cigarettes | 3.6 | 7.7 | Beer made from malt | 20.3 | 5.1 |
| Vegetables                                | 3.1 | 6.8 | Food preparations   | 19.1 | 4.8 |
| Fruit juices                              | 2.2 | 4.8 | Milk and cream      | 18.1 | 4.5 |
| Palm oil                                  | 2.2 | 4.6 | Soya-bean oil       | 17.3 | 4.3 |

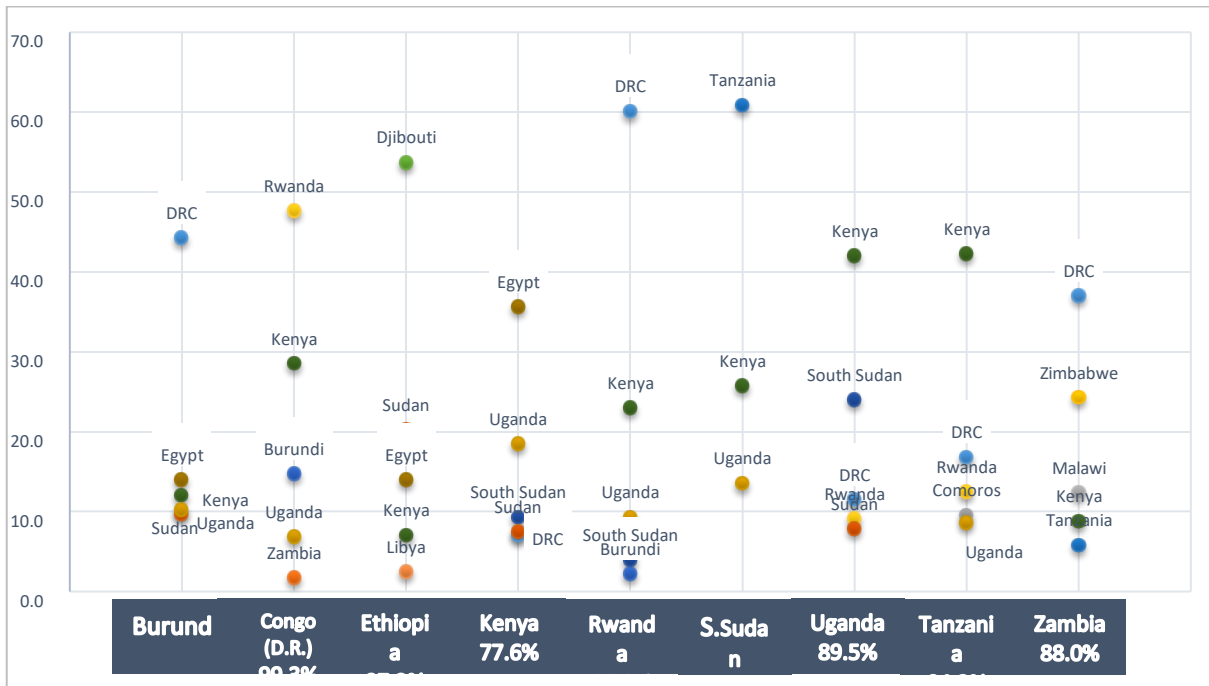
Source: Authors' calculations using AATM2021 database

### 2.1.3 Main trading partners in agricultural commodities

Though all of these countries are part of the same region, they have relatively different sets of major trading partners. **Error! Reference source not found.** presents the top five agricultural export partners among COMESA members for each of the target countries. The top five export partners account for more than 90 percent of exports by individual target countries, except for Kenya, where the top five regional export destinations account for 78 percent of its exports. That share reaches 100 percent for South Sudan, which trades with only three countries in the region. Globally, Kenya, Congo (D.R.), and Uganda are found most frequently among the top five export destinations for regional exporters. Kenya, in particular, is among the top export destinations for all countries, while Congo (D.R.) and Uganda are among the top destinations for six countries. Three countries play a dominant role as export destinations with shares above 50 percent: Tanzania for exports by South Sudan; Congo (D.R.) for exports by Rwanda; and Djibouti for exports by Ethiopia.

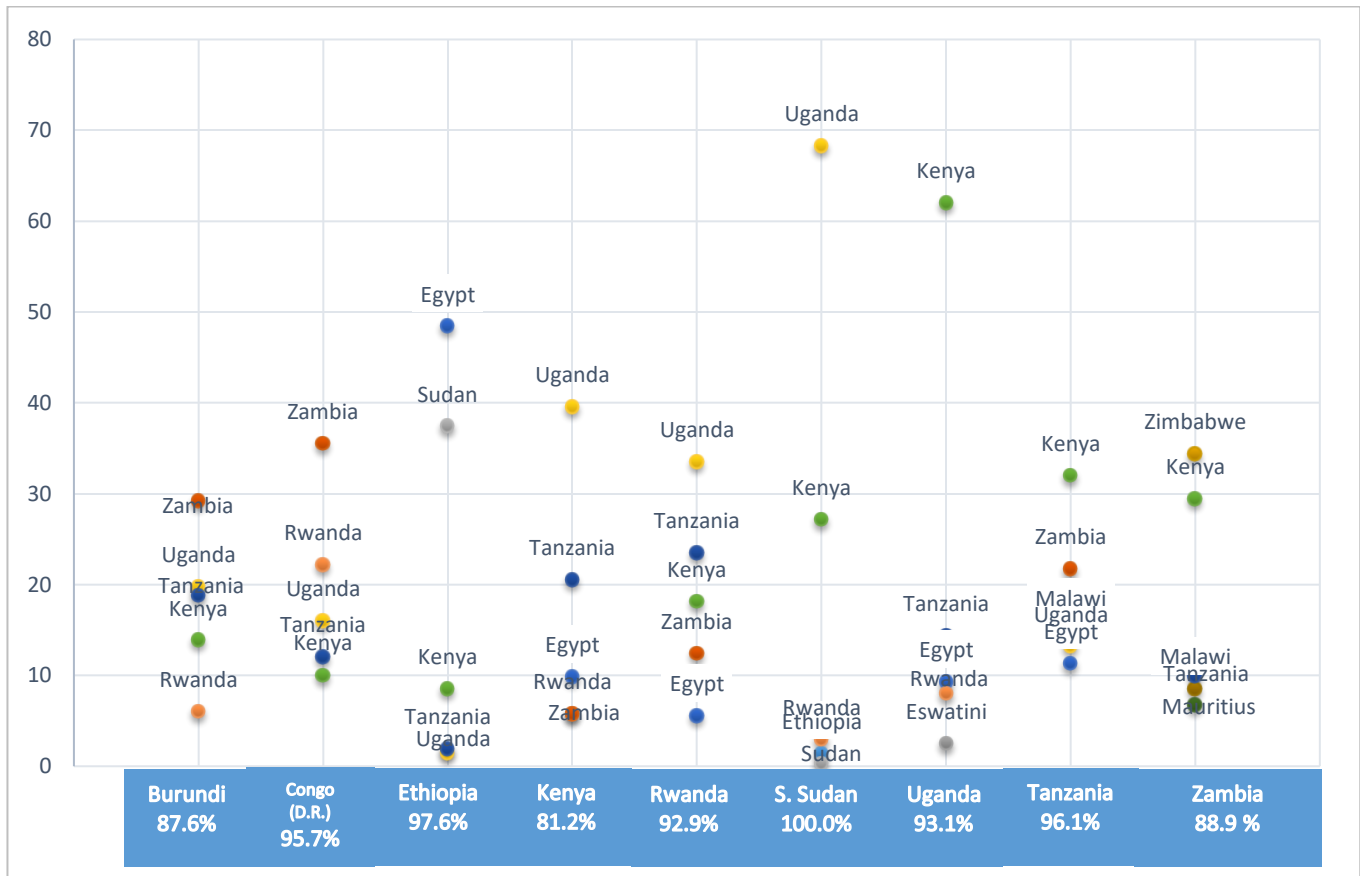
**Error! Reference source not found.** shows the top five sources of regional imports for the same target countries. Here, with the exception of Burundi, around 90 percent of regional agricultural imports by individual study countries come from their top five trading partners. As in the case of its exports, South Sudan is the only country drawing 100 percent of its imports from no more than five countries: Uganda, Kenya, Rwanda, Ethiopia and Sudan. Egypt and Zambia are the main regional suppliers, being among the top import partners in at least five target countries. Three countries supply at least around 50 percent of imports to one of the study countries. This applies to Uganda, which supplies almost 70 percent of imports by South Sudan; Kenya, which supplies more than 60 percent of imports by Tanzania; and Egypt, the source of nearly 50 percent of regional agricultural imports by Ethiopia.

**Figure 1: Top 5 regional export partners in 9 East and Southern African countries, 2015–2019**



Source: Authors' calculations using AATM2021 database. Note: countries are arranged in order of importance. The top country is the most important export partner. For example, Djibouti is the top export country for Ethiopia followed by Sudan, Egypt, Kenya, and Libya respectively.

**Figure 2: Top 5 import partners in 9 East African countries, 2015–2019**



Source: Authors’ calculations using AATM2021 database. Note: countries are arranged in order of importance. The top country is the most important import partner. For example, Egypt is the top country for Ethiopia’s regional agricultural imports followed by Sudan, Kenya, Tanzania and Uganda respectively.

## 2.2 Trade expansion potential

Interest in fostering regional trade is underpinned by the expectation of a certain degree of unrealized potential to expand cross-border trade flows among neighboring countries. That potential is determined primarily by what individual countries decide to produce and trade. The more they produce and exchange different bundles of goods and services, the more likely they are to trade with one another. The first two indicators used in this section, therefore, are the production and export similarity indices. These indices measure, rank and compare the relative importance of the production and trading of individual agricultural products for all relevant pairs of countries within the region. Next, we look at how much they trade with each other and with third parties. The extent to which they buy and sell the same goods and services with third parties can serve as a measure of the scope to redirect some of that trade internally. Thus, the analysis is extended to include two other indicators: the Trade Overlap Indicator (TOI) and the Trade Expansion Indicator (TEI). These indicators are calculated to assess the potential to expand trade among the target countries solely based on the structure of current trade patterns. They measure how much of the same product a given country exports and

imports at the same time, but to and from third-party countries, respectively. The TOI measures the overall degree of overlapping trade flows for a country or region, while the TEI measures the overlapping trade flows at the level of individual products for a country or region.

This section therefore explores the potential for trade among the sample countries and the type of agricultural commodities for which there is significant potential to expand cross-border regional trade. We first explore the similarities between countries in their production and trade patterns. This is followed by an assessment of trade overlaps and the potential to expand certain commodities in each of the sample countries.

### 2.2.1 Production and export similarity indices

The production similarity index (QSI) has been calculated for every country pair within the COMESA region, which results in a matrix of 420 index values covering 21 countries and 132 crop products, using FAOSTAT data. The distribution of the estimated production similarity index values for each of the nine countries of interest, paired with each of the other COMESA members, is presented in Figure 3. Each bar represents the proportions of index values that fall within different ranges. The majority of index values fall within the 0-40 range for every country. A value of less than 60 is conventionally interpreted as reflecting the existence of a degree of dissimilarity in production patterns; that is, a level of specialization among countries that is compatible with increased intra-regional trade expansion. The estimated index values reported in Figure 3 therefore suggest that there is sufficient dissimilarity or a degree of specialization in the current production patterns among target study countries, and hence significant scope for cross-border trade expansion within the group and with the rest of the Eastern and Southern Africa region.

However, Figure 3 also reveals a few country pairs for which the QSI value is higher than 60. There are only six such country pairs out of the 420 pairs of COMESA member states, as summarized in Table 5 along with their QSI values. For instance, production similarity is high between Eswatini and Mauritius. A QSI value of 95.7 suggests that these two countries exhibit highly similar patterns of specialization in production and therefore tend to compete in regional and world export markets. Indeed, sugarcane alone accounts for 95 and 97 percent of crop production in Eswatini and Mauritius, respectively. Likewise, with a QSI value of 69, production patterns are quite similar in Zambia and Zimbabwe where sugarcane, maize and cassava collectively represent 85 and 78 percent of crop production, respectively. The same is noted for Rwanda and Burundi, with a QSI value of 65.9, where banana, cassava and potatoes collectively account for up to 60 and 48 percent of crop production, respectively. The three other country pairs with high QSI values are Zimbabwe-Eswatini (60.4), Tanzania-Malawi (61.8) and Tanzania-Uganda (66.1).

This picture of low similarity in production patterns—suggesting untapped export expansion potential in the region—is also confirmed by the calculations of export similarity indices (ESI). Analogous to the production similarity index, the ESI measures the extent to which two countries have chosen to

specialize differently in terms of the bundle of commodities they export. The index values are interpreted in the same way as the QSI. In **Error! Reference source not found.**, the majority of country pairs fall within the 0-20 ESI value range, representing between 60 and 95 percent of all possible pairs of COMESA member states. In fact, all country pairs involving any of the nine countries of interest in this study have ESI values within the 0-40 range, except for Uganda-Zambia, which falls within the 40-60 range (42.7).

The combination of low production and export similarity indices reveals that there is sufficient dissimilarity in the current production and trading patterns between East African countries and hence significant scope for cross-border trade expansion in the region.

So far, this analysis has established the scope for future trade expansion based on the existence of dissimilar patterns of specialization in the production and trade of agricultural products among countries within the East African region. Two other indicators, the Trade Overlap Indicator (TOI) and the Trade Expansion Indicator (TEI), are used in subsequent sections to examine the potential to expand trade within the region based on current trade patterns.

**Figure 3:** Distribution of production similarity index values among COMESA countries, 2015–2019



Source: Authors' calculations using FAOSTAT crop production data

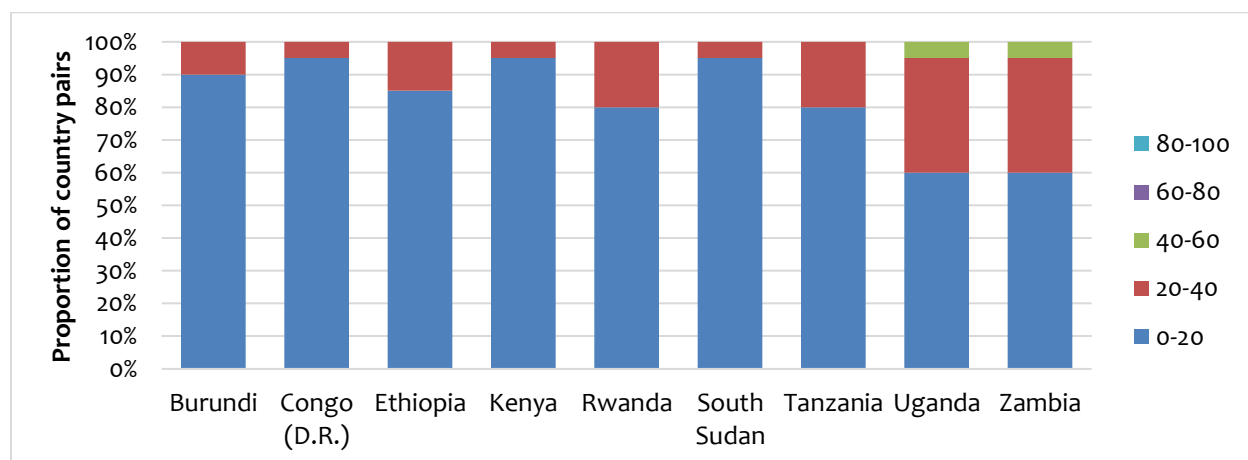
**Table 5:** COMESA country pairs with a high production similarity index value, 2015–2019

|           | BDI | SWZ  | MWI | MUS  | RWA  | UGA | TZA  | ZMB | ZWE  |
|-----------|-----|------|-----|------|------|-----|------|-----|------|
| Burundi   | BDI |      |     |      | 65.9 |     |      |     |      |
| Eswatini  | SWZ |      |     | 95.7 |      |     |      |     | 60.4 |
| Malawi    | MWI |      |     |      |      |     | 61.8 |     |      |
| Mauritius | MUS | 95.7 |     |      |      |     |      |     |      |

|          |     |      |      |      |
|----------|-----|------|------|------|
| Rwanda   | RWA | 65.9 |      |      |
| Uganda   | UGA |      |      | 66.1 |
| Tanzania | TZA |      | 61.8 | 66.1 |
| Zambia   | ZMB |      |      | 69.0 |
| Zimbabwe | ZWE | 60.4 |      | 69.0 |

Source: Authors' calculations using FAOSTAT crop production data

**Figure 4:** Distribution of export similarity index values among COMESA countries, 2015–2019



Source: Authors' calculations using AATM2021 database

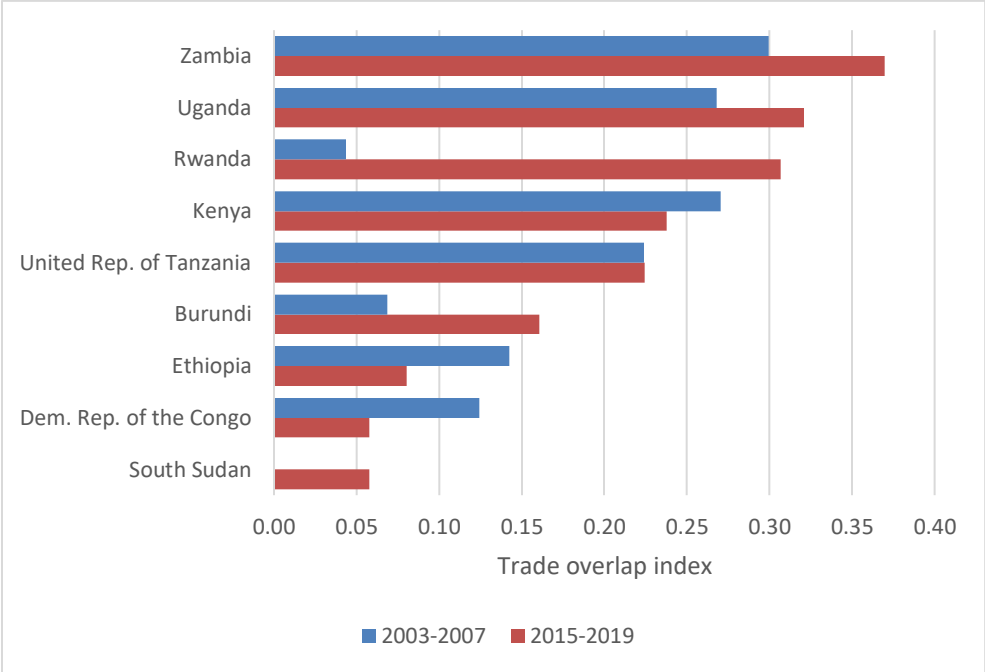
### 2.2.2 Trade overlap and trade expansion indicators

These two indicators measure how much of the same product a given country or region exports and imports at the same time. The trade overlap indicator (TOI) measures the overall degree of overlapping trade flows for a country or region as a whole, while the trade expansion index (TEI) measures the overlapping trade flows at the individual product level for a country or region. The TOI and TEI values obtained for the target countries are presented in **Error! Reference source not found.** and **Error! Reference source not found.**. The results indicate that there is a considerable degree of overlapping trade flows. Among the countries of interest for this study, the TOI value ranges from 5 percent for South Sudan to as much as 37 percent for Zambia in 2015–2019. **Error! Reference source not found.** shows that TOI values have generally risen since 2003–2007, except for the Democratic Republic of the Congo, Ethiopia and Kenya where they have decreased. In the vast majority of cases, normalized TOI values, obtained by dividing country TOI values by the TOI value for the region, are significantly less than 1. The overlapping regional trade must therefore be taking place between different importing and exporting countries. In other words, some countries are exporting (importing) the same products that are being imported (exported) by other countries in the region, but in both cases to and from countries outside the region. By redirecting such flows, countries should be able to expand cross-border trade within the region.

The TEI indicates which products have the highest potential for increased cross-border trade based on the degree of overlapping trade flows, without major changes in current domestic production or trade patterns. **Error! Reference source not found.** lists the products for which the different countries studied here exhibit the highest TEI values in the period 2015–2019. For Rwanda, Tanzania, and Zambia, milling industry products are among the best candidates for short-term trade expansion. The same applies to live animals for Zambia and South Sudan. Candidate trade expansion products for Kenya are found among oilseeds and oleaginous fruits, and also among raw hides and skins and leather. Leading products for Ethiopia and Uganda include essential oils and resinoids as well as edible fruits and nuts. In the Democratic Republic of the Congo, products such as lac, gums, resins as well as other vegetable saps present good scope for trade expansion. For Burundi, beverages, spirits and vinegar as well as tobacco and substitutes are the products with highest TEI values. It is interesting to note that both TEI and TOI values have seen a generally upwards trend over the past two decades.

The findings above indicate real potential to expand intra-regional trade in East Africa beyond current levels and within existing production patterns. But the actual performance of individual countries in regional markets is determined by many factors other than the scope or potential to do so. Therefore, the remainder of this section will examine actual country performance in regional agricultural markets and underlying changes in trade competitiveness across the COMESA region.

**Figure 5:** Agricultural trade overlap index, COMESA countries, 2003–2007 and 2015–2019



Source: Authors’ calculations using AATM2021 database

**Table 6:** Products with highest trade expansion index values among COMESA countries, 2003–2007 and 2015–2019

| Commodity group                                      | Country      | Trade expansion index |           |
|--|--------------|-----------------------|-----------|
|  |              | 2003–2007             | 2015–2019 |
| Products of the milling industry                     | Tanzania     | 0.876                 | 0.997     |
| Live animals   | Zambia       | 0.426                 | 0.985     |
| Live animals   | South Sudan  | 0.000                 | 0.977     |
| Essential oils and resinoids                         | Ethiopia     | 0.540                 | 0.972     |
| Products of the milling industry                     | Zambia       | 0.981                 | 0.937     |
| Meat and edible meat offal                           | Tanzania     | 0.629                 | 0.934     |
| Furskins and artificial fur                          | Rwanda       | 0.000                 | 0.917     |
| Oil seeds and oleaginous fruits                      | Kenya        | 0.733                 | 0.900     |
| Beverages, spirits and vinegar                       | Zambia       | 0.168                 | 0.893     |
| Edible veg. and certain roots and tubers             | Zambia       | 0.275                 | 0.886     |
| Beverages, spirits and vinegar                       | Burundi      | 0.093                 | 0.873     |
| Lac, gums, resins and other veg. saps                | Ethiopia     | 0.373                 | 0.859     |
| Lac, gums, resins and other veg. saps                | Congo (D.R.) | 0.222                 | 0.847     |
| Misc. edible preparations                            | Kenya        | 0.680                 | 0.836     |
| Edible fruit and nuts                                | Ethiopia     | 0.708                 | 0.828     |
| Preparations of cereals, flour, starch, or milk      | Tanzania     | 0.137                 | 0.813     |
| Products of the milling industry                     | Rwanda       | 0.009                 | 0.798     |
| Wool, fine or coarse animal hair                     | Tanzania     | 0.741                 | 0.783     |
| Raw hides and skins and leather                      | Kenya        | 0.095                 | 0.775     |
| Albuminoidal substances                              | Kenya        | 0.497                 | 0.753     |
| Food industries, residues, and wastes                | Ethiopia     | 0.485                 | 0.748     |
| Tobacco and manuf. tobacco substitutes               | Burundi      | 0.892                 | 0.735     |
| Essential oils and resinoids                         | Congo (D.R.) | 0.501                 | 0.689     |
| Essential oils and resinoids                         | Kenya        | 0.290                 | 0.681     |
| Raw hides and skins and leather                      | Ethiopia     | 0.002                 | 0.670     |
| Preparations of cereals, flour, starch, or milk      | Zambia       | 0.061                 | 0.657     |
| Prep. of veg., fruit, nuts, or other parts of plants | Tanzania     | 0.250                 | 0.628     |
| Essential oils and resinoids                         | Uganda       | 0.101                 | 0.627     |
| Beverages, spirits, and vinegar                      | Uganda       | 0.810                 | 0.615     |

Source: Authors' calculations using AATM2021 database

### 2.3 Trade competitiveness

The existence of trade expansion potential is not enough for trade to actually take place. Countries need the capacity and the institutional framework to be able to compete and realize their potential. A competitiveness analysis can shed further light on the gap between regional trade potential and its



realization. Such an analysis starts with the computation of indicators of competitiveness such as the revealed comparative advantage (RCA), the ratio of export prices (unit values), and the decomposition of market share growth in order to first provide a comprehensive perspective on competitiveness before turning to a detailed study of specific commodities. The revealed comparative advantage is a theoretical concept regarding the products and services an economy has demonstrated it is best at producing based on available resources. The RCA indicator can be calculated at different levels of aggregation: for a specific product or service, specific processing stage of a value chain, entire chain, or even an entire sector. It can be assessed for a country or for a group of countries within a regional economic community (REC). Competitiveness can also be measured by comparing the prices of goods and services produced by a given country with the prices of the same goods and services produced by a comparator group of countries. The indicator used here is built around the ratio of unit values of exports, used as a proxy for the cost of supplying regional markets. The third method used in the analysis of value chain competitiveness is the application of the model of market share growth decomposition. The decomposition model provides further insight into factors shaping the dynamics of regional agricultural trade competitiveness. It is used to identify drivers of market share performance and regional growth opportunities.

### 2. 3.1 Revealed comparative advantage index

In this study, the revealed comparative advantage (RCA) index was computed to further assess the degree of relative competitiveness among the target study countries. The RCA index compares the share of a given product in a given country’s export basket with that of the same product in total world exports. The normalized<sup>1</sup> RCA is positive for RCA indicators that are greater than 1 and negative otherwise. For very high RCA indicators, the normalized value tends toward 1. We have estimated nearly 1150 normalized RCA indicators for the various products exported by the different target countries. The majority, 77 percent, yielded a positive indicator value. For each country, the 20 products with the highest normalized RCA index value are presented in Table 7. All the products listed in the table have normalized RCA values above 0.78. The estimated RCA values confirm the earlier findings regarding the differences in patterns of country specialization within the region. Although the lists of 20 top products for the nine countries are made up of only 26 commodities, most of them are ranked in four or fewer countries. The exceptions are coffee, tea, mate and spices, which feature in eight of the nine countries. Likewise, edible vegetables and certain roots and tubers, live trees and other plants, and products of the milling industry feature in six countries.

**Table 7:** Highest normalized comparative advantage index values by country, 2015–2019 average

| Commodity categories         | BDI  | DRC  | ETH | KEN | RWA  | SSD | UGA  | TZA | ZMB |
|------------------------------|------|------|-----|-----|------|-----|------|-----|-----|
| Albuminoidal substances      |      |      |     |     |      |     | 0.99 |     |     |
| Animal or veg. fats and oils |      | 0.86 |     |     | 0.99 |     |      |     |     |
| Animal originated products   | 0.99 |      |     |     |      |     |      |     |     |

<sup>1</sup> The normalized RCA values are obtained with the formula:  $NRCA = (RCA-1)/(RCA+1)$ .

|                                   |      |      |      |      |      |      |      |      |      |
|-----------------------------------|------|------|------|------|------|------|------|------|------|
| Beverages, spirits, and vinegar   | 0.99 |      |      |      |      |      |      |      | 0.92 |
| Cereals                           |      |      |      |      | 0.99 |      |      |      | 0.98 |
| Cocoa and cocoa preparations      |      | 0.98 |      |      |      |      | 0.99 |      |      |
| Coffee, tea, mate, and spices     | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 0.96 | 1.00 | 0.99 |      |
| Cotton                            |      |      |      |      |      | 0.99 | 0.99 | 0.99 | 0.99 |
| Dairy produce, eggs, honey        |      |      |      |      |      | 0.95 | 0.99 |      |      |
| Edible fruit and nuts, edible     |      |      |      | 0.99 |      |      |      |      | 0.99 |
| Edible veg. and certain roots     | 0.98 |      | 1.00 | 0.99 |      | 1.00 | 0.99 | 0.99 |      |
| Essential oils and resinoids      | 0.99 |      |      | 0.98 |      | 1.00 |      | 0.99 |      |
| Food industries, residues         | 0.99 | 0.98 |      |      | 0.99 |      |      | 0.99 | 0.97 |
| Fur skins and artificial fur      |      |      | 1.00 |      | 0.99 |      |      |      |      |
| Lac, gums, resins, and other saps |      | 0.97 | 0.99 | 0.99 | 1.00 | 1.00 |      |      |      |
| Live animals                      | 0.98 | 0.83 | 1.00 |      | 0.99 |      |      |      |      |
| Live trees and other plants       |      |      | 1.00 | 1.00 | 0.99 |      | 1.00 | 0.99 | 0.97 |
| Meat and edible meat offal        |      |      | 0.99 |      |      | 0.98 |      |      |      |
| Oil seeds and oleaginous fruits   |      | 0.88 | 1.00 |      |      | 1.00 |      | 0.99 |      |
| Prep. of veg., fruit, nuts        |      | 0.88 |      | 0.99 |      |      |      |      |      |
| Products of the milling industry  | 1.00 | 0.78 |      |      | 1.00 |      | 0.99 | 0.99 | 0.96 |
| Raw hides and skins and leather   | 1.00 |      |      |      | 1.00 | 0.98 |      |      | 0.98 |
| Sugars and sugar confectionery    |      |      | 0.99 |      |      |      | 0.99 |      | 0.99 |
| Tobacco and tobacco substitutes   | 0.99 |      |      | 0.99 |      |      | 0.99 | 1.00 | 0.99 |
| Vegetable planting materials      |      | 0.98 | 0.99 | 1.00 |      | 0.99 |      |      | 0.98 |
| Wool, fine or coarse animal hair  |      |      |      | 0.98 |      |      |      |      |      |

Source: Authors' calculations using AATM2021 database

Note: BDI: Burundi; DRC: Democratic Republic of the Congo; ETH: Ethiopia; KEN: Kenya; RWA: Rwanda; SSD: South Sudan; UGA: Uganda; TZA: Tanzania; ZMB: Zambia.

### 2.3.2 Export unit value ratios

Table 8 is an excerpt from the calculations of the ratios of export unit value of 52 commodities for the nine countries included in the study from 2015 to 2019. For each commodity, it lists in the first column the country that proved to be the most price competitive compared to the remaining eight target study countries. The unit value ratios of each of the eight countries to that of the country in the first column are indicated in subsequent columns. In other words, the number in each cell shows, for the commodity in the second column, the ratio of the export unit value of the column country to that of the row country. Thus, a ratio higher than 1.0 indicates that the row country is more price competitive than the column country in exporting that commodity.

Table 8 therefore shows a sample of commodities for which individual countries are the most competitive. For instance, the value of 11 in the first row means that the unit price or cost of cassava exports by the Democratic Republic of the Congo (DRC), is 11 times that of Burundi. Burundi also shows much lower unit values than all other countries for cotton, cottonseed oil, coffee preparation, other fruits, other oilseeds and rice. Congo (D.R.) in turn outperforms other countries for various meat products, palm oil, potato and maize in terms of the unit cost of exports. Leading price-competitive

exporters are Kenya for cereals, vegetable oils and pigs; Rwanda for chicken meat and cereal and cocoa preparations; Uganda for coffee, eggs and cattle; Tanzania for cocoa, groundnuts and sheep and goats; and finally, Zambia for cottonseed, groundnuts and dairy products.

**Table 8:** Export unit value ratios among most competitive countries, by commodity, 2015–2019

|              |                   | BDI   | DRC  | ETH  | KEN  | RWA  | SSD  | UGA  | TZA  | ZMB  |
|--------------|-------------------|-------|------|------|------|------|------|------|------|------|
| Burundi      | Cassava           | 1.0   | 11.0 |      | 25.6 | 2.0  |      | 2.7  | 2.4  | 2.2  |
| Burundi      | Coffee Prep.      | 1.0   | 26.5 | 10.9 | 14.0 | 9.7  | 2.8  | 8.3  | 7.0  | 13.0 |
| Burundi      | Cotton            | 1.0   | 1.5  | 2.7  | 2.6  | 4.8  | 2.5  | 2.8  | 1.6  | 2.7  |
| Burundi      | Cottonseed oil    | 1.0   | 1.1  |      | 2.1  | 1.5  |      | 1.8  | 1.8  | 1.5  |
| Burundi      | Other fruits      | 1.0   | 7.1  | 4.8  | 8.4  | 6.1  | 3.7  | 2.0  | 3.4  | 6.3  |
| Burundi      | Other oilseeds    | 1.0   | 21.1 | 11.5 | 12.8 |      |      | 10.2 | 4.0  | 4.0  |
| Burundi      | Rice              | 1.0   | 10.8 | 1.7  | 5.1  | 8.5  | 8.7  | 7.0  | 4.3  | 4.4  |
| Congo (D.R.) | Cattle meat       | 19.8  | 1.0  | 42.9 | 45.0 | 58.2 | 49.0 | 27.2 | 35.0 | 27.5 |
| Congo (D.R.) | Maize             | 4.0   | 1.0  | 3.9  | 11.7 | 2.4  |      | 2.5  | 3.0  | 3.9  |
| Congo (D.R.) | Other meat        |       | 1.0  | 1.8  | 3.1  |      |      | 14.8 | 5.3  | 4.8  |
| Congo (D.R.) | Palm oil          | 4.2   | 1.0  | 3.1  | 1.9  | 2.3  |      | 2.3  | 2.4  | 2.3  |
| Congo (D.R.) | Pig meat          |       | 1.0  | 5.4  | 20.3 | 22.4 |      | 22.6 | 8.9  | 10.6 |
| Congo (D.R.) | Potatoes          |       | 1.0  | 2.9  | 2.7  | 1.9  |      | 3.9  | 10.4 | 12.2 |
| Congo (D.R.) | Chickens          | 105.0 | 1.0  |      | 14.0 | 20.2 |      | 15.2 | 10.3 | 70.2 |
| Ethiopia     | Milk              | 6.6   | 10.7 | 1.0  | 9.8  | 8.8  |      | 10.1 | 4.5  | 32.8 |
| Kenya        | Other Cereals     |       |      | 2.7  | 1.0  | 5.3  | 20.5 | 3.2  | 2.4  | 3.1  |
| Kenya        | Other veg. oils   | 1.4   | 1.5  | 51.1 | 1.0  | 2.7  | 17.2 | 3.6  | 2.7  | 3.4  |
| Kenya        | Pigs              |       |      |      | 1.0  | 7.5  |      | 5.0  |      | 7.4  |
| Rwanda       | Cereal prep.      | 3.3   | 3.4  | 5.5  | 2.5  | 1.0  | 2.1  | 1.3  | 1.6  | 2.6  |
| Rwanda       | Chicken meat      |       | 4.1  | 15.0 | 30.1 | 1.0  |      | 18.4 | 4.4  | 10.3 |
| Rwanda       | Cocoa prep.       |       |      | 4.1  | 6.8  | 1.0  |      | 12.6 | 3.2  | 28.0 |
| Uganda       | Coffee            | 1.4   | 1.5  | 2.1  | 2.6  | 1.8  | 3.2  | 1.0  | 1.1  | 1.5  |
| Uganda       | Eggs              |       | 1.3  | 4.3  | 4.5  | 2.1  |      | 1.0  | 5.4  | 8.7  |
| Uganda       | Cattle            | 1.1   | 13.1 | 3.4  | 1.3  | 2.7  |      | 1.0  | 4.2  | 2.5  |
| Tanzania     | Cocoa             |       | 1.3  |      | 1.7  | 1.9  |      | 1.3  | 1.0  |      |
| Tanzania     | Groundnut oil     |       |      |      | 27.7 | 10.0 |      | 11.1 | 1.0  | 9.1  |
| Tanzania     | Sheep & goats     | 2.3   | 79.0 | 5.5  | 42.8 | 6.3  |      | 3.1  | 1.0  | 1.3  |
| Zambia       | Cottonseed        |       |      | 5.7  | 6.4  | 12.6 |      | 1.1  | 1.1  | 1.0  |
| Zambia       | Groundnuts        |       | 3.9  | 1.5  | 1.8  | 2.7  | 1.3  | 1.8  | 1.1  | 1.0  |
| Zambia       | Other dairy prod. |       | 1.0  | 13.4 | 4.6  | 3.2  | 9.2  | 3.3  | 5.3  | 1.0  |

Source: Authors' calculations using FAOSTAT database

Note: BDI: Burundi; DRC: Democratic Republic of the Congo; ETH: Ethiopia; KEN: Kenya; RWA: Rwanda; SSD: South Sudan; UGA: Uganda; TZA: Tanzania; ZMB: Zambia. The number in each cell shows for the row commodity the ratio of the export unit value of the column country to that of the row country. Thus, a ratio higher than 1.0 indicates that the row country is more price competitive than the column country in exporting that commodity. "Other oilseeds" refers to any oilseed except groundnuts, soybeans, oil palm, sesame seed. "Other live animals" refers to any live animal except cattle, chickens, sheep and goats, and pigs. "Other vegetable oils" refers to any processed oil except cottonseed oil,

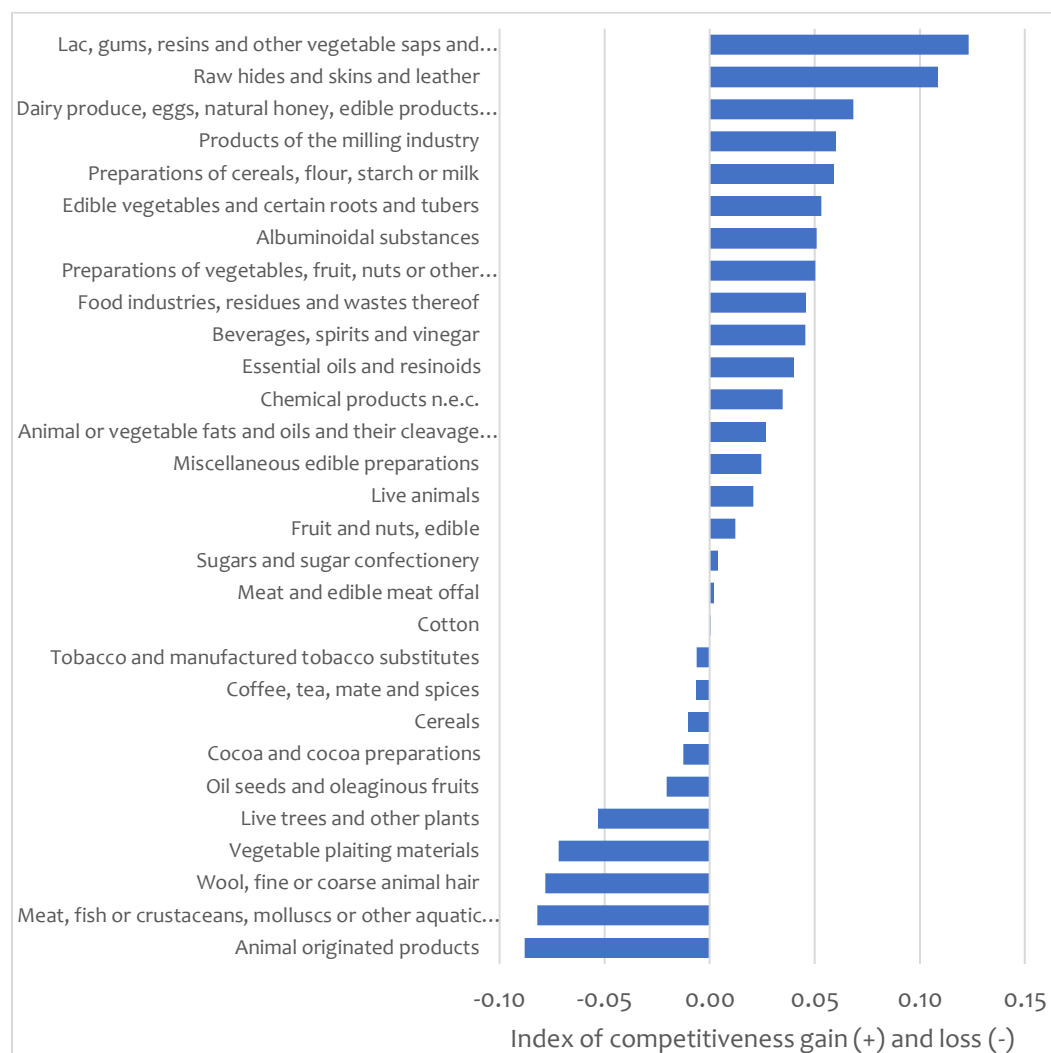
groundnut oil, soybean oil, palm oil and sesame oil. “Other cereals” refers to any cereal except maize, rice, millet, sorghum, and wheat. “Other meat” refers to any meat except cattle, chicken, sheep, goat, and pig meats.

### 2.3.3 Market share growth decomposition analysis

The performance of a given country or region (in terms of the change in its export share) can be decomposed into two components: a competitive effect and a market effect. The competitive effect is a measure of the change in competitiveness experienced by a country or region in exporting a good to a destination. It indicates some gain (or loss) of competitiveness by the country or region compared with its competitors in relation to the export destination being considered. The market effect measures the portion of a country or region’s export share growth attributable to faster or slower growth of world exports of that good to destination markets compared with global markets. It reflects the change in the importance of a destination for the country’s exports attributable to the expansion of markets.

The results from the market share growth decomposition analysis have been used to plot Figures 6 and 7. Figure 6 shows the magnitude of competitiveness gain or loss realized by individual commodities in world export markets from 2003 to 2007 and from 2015 to 2019. Two sets of commodities can be distinguished in the figure. The first consists of commodities that have recorded an increase in competitiveness. They include food items such as dairy produce and eggs, preparations of cereals and vegetables, edible roots and tubers, and live animals. The second set, in contrast, consists of commodities that have lost competitiveness. These include meat and fish, live trees and plants, oilseeds and oleaginous fruits, cereals and cocoa. Figure 7 shows the index of gain or loss in competitiveness realized by individual countries in exporting agricultural products to world markets. From 2003 to 2007 and from 2015 to 2019, South Sudan achieved the biggest gain in competitiveness, followed by Comoros, Madagascar, Eritrea, Libya, Mauritius, Egypt, Burundi, Uganda, Tanzania and Sudan. Seychelles, Djibouti, Zimbabwe, Ethiopia and Eswatini incurred the biggest loss in competitiveness, along with the Democratic Republic of the Congo and Malawi. Kenya, Rwanda and Zambia recorded little change in competitiveness.

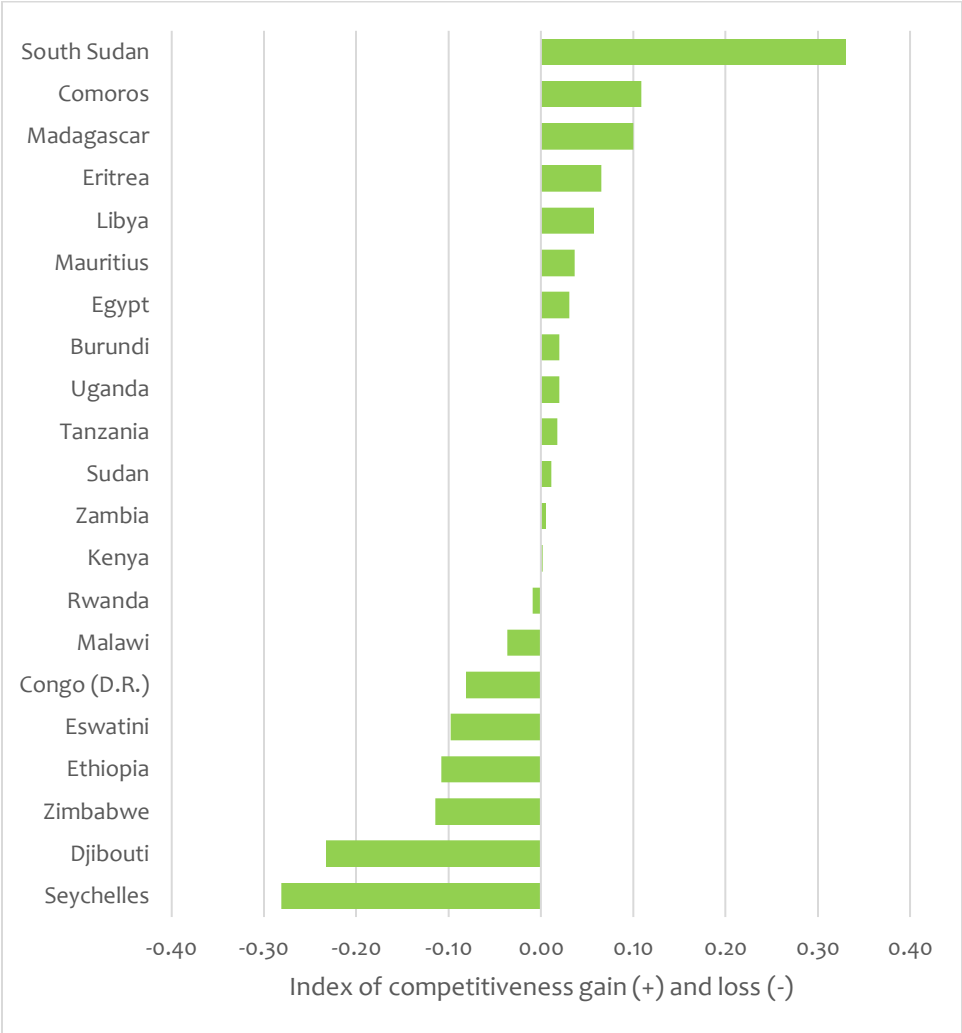
**Figure 6: Commodity competitiveness changes, 2003–2007 and 2015–2019**



Source: Authors' calculations using AATM2021 database

Note: The gain or loss is measured by subtracting 1.0 from the value the competitive effect measure.

**Figure 7: Country competitiveness changes, 2003–2007 and 2015–2019**



Source: Authors’ calculations using AATM2021 database

Note: The gain or loss is measured by subtracting 1.0 from the value the competitive effect measure.

**3 Regional Trade Potential and Candidate Commodities with Policy Changes**

The findings of the preceding sections indicate a real potential to expand intra-regional trade in East Africa beyond current levels, even within current production and trade patterns and without policy changes. This section therefore analyzes the outlook for intra-regional trade expansion over the next decade with anticipated policy changes. This is done by simulating alternative policy scenarios to boost intra-regional trade and by comparing the resulting effect on the level of trade flows up to 2030, with outcomes simulated under a baseline scenario that assumes the continuation of historical trends. This step of the analysis looks at available policy options to change the baseline trajectories and boost cross-border trade among the target countries. The three policy scenarios considered are (i) reduce cross-border trade barriers, (ii) lower the overall cost of trading, and/or (iii) increase production

capacity. The scenarios are simulated using the customized ESA-EMM model specified in Annex A1. The simulation is used to examine the alternative interventions and how they would contribute to fostering the competitiveness of regional value chains and further exploitation of the scope for cross-border trade expansion among target countries. The analysis enables us to identify the leading regional commodities with the greatest potential to boost cross-border trade in agricultural commodities under alternative policy options.

### 3.1 Projected intra-regional exports

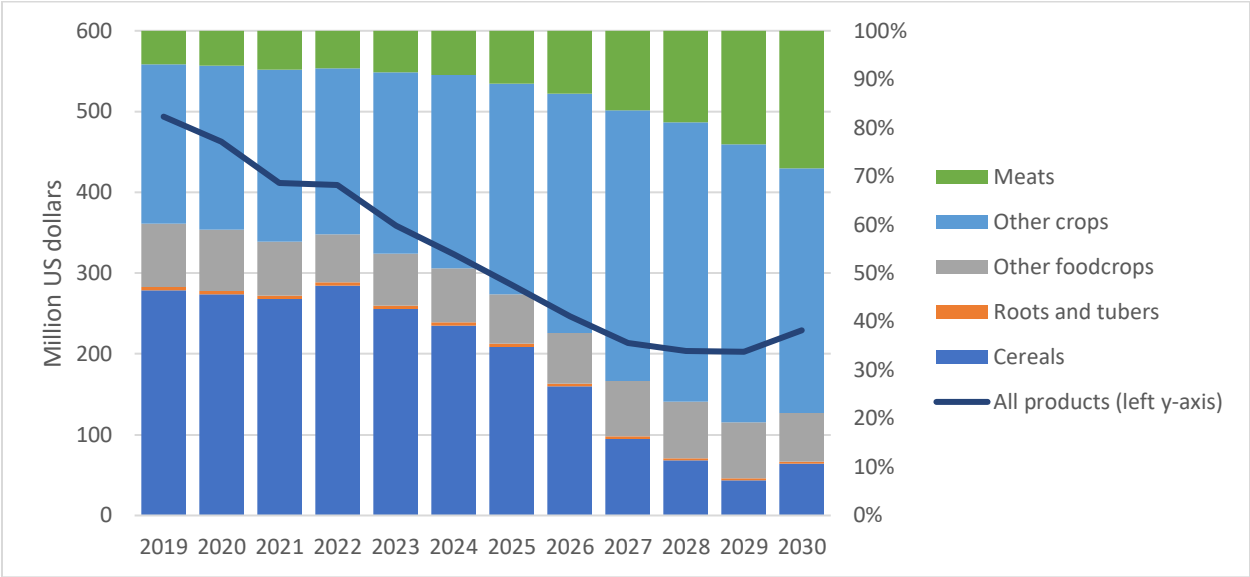
In the baseline scenario, regional trade patterns are assumed to continue to follow their historical trends without any major alteration through to 2030. Figure 8 presents the resulting changes in volume and composition of intra-COMESA exports of agricultural exports. Assuming a continuation of the current trends, the size of intra-regional agricultural trade is expected to continue its decline before stabilizing and starting to reverse around 2027/28. Over the next decade, the total value of agricultural exports is projected to drop by more than half, from US\$ 0.5 billion to a little less than US\$ 0.25 billion. The declining trend is due largely to a continued decline in intra-regional cereal exports, even as exports of other crops, mostly cash crops and meats, expand significantly.<sup>2</sup> The declining level of cereal exports is triggered primarily by falling cereal yields and harvested areas over the past decade in a number of member states. With these yield and area trends, domestic supply grows at a slower pace than domestic demand, which results in reduced exports. The reversal in the intra-regional cereal exports trend by around 2027–2028 results from the reduction in Egypt and Malawi’s exports being compensated for by emerging exports from Tanzania and other countries.

Unlike cereal exports, which are projected to fall from around 50 percent to 10 percent of agricultural exports, other, non-food crops and meats are projected to grow significantly in terms of their share of regional trade. Meats will more than triple their share in regional exports from less than 10 percent to nearly 30 percent, while the export share of non-food crops will climb to 50 percent in 2030 from approximately 35 percent 10 years earlier.

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<sup>2</sup>

**Figure 8:** Baseline intra-regional exports value and composition, 2019–2030, million US dollars



Source: EMM model simulation results based on FAOSTAT and WDI databases

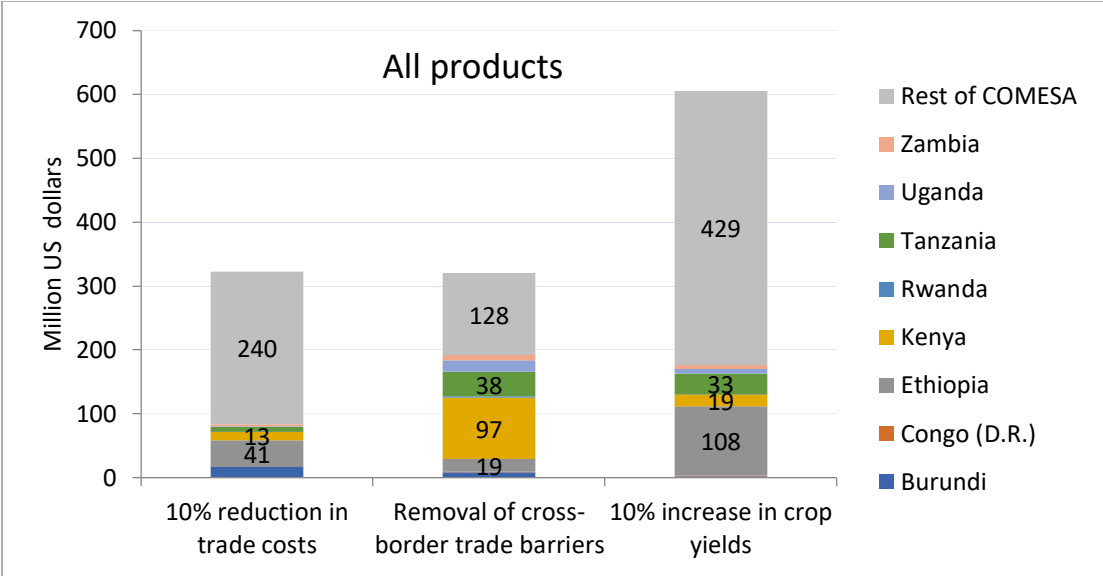
The above changes assume the continuation of current factors driving production and trade among COMESA member states. We now consider three sets of possible changes that countries could introduce in order to further boost regional trade above the projected baseline levels. These changes consist of interventions to effectively reduce the overall cost of trading, remove all cross-border trade barriers, and raise crop yields. Figure 9 shows the cumulative changes in intra-regional exports that would result from such interventions by 2030 compared to baseline values. The length of each bar represents the cumulative, overall increase in the total value of exports under the considered scenario above the baseline levels. The different colors with corresponding numbers show the distribution of the change in exports among the countries studied and the rest of COMESA.

The result depicted by the right-hand side bar indicates that efforts to effectively reverse the trend of declining yields would go a long way in fostering intra-regional trade. An increase in yields across the board by 10 percent is shown to raise intra-regional exports by more than US\$ 606 million by 2030, in effect averting the projected decline shown in Figure 8. The biggest winners under this scenario are Ethiopia with US\$ 108 million in additional export revenue, followed by Tanzania and Kenya, with, respectively, US\$ 33 million and US\$ 19 million in additional export revenue. Of the remaining additional export revenue, more than two thirds, or around US\$ 440 million, goes to the remaining COMESA member states. Under the other two scenarios, the additional export revenues for the region as a whole are 50 percent lower. A complete elimination of costs related to cross-border trade barriers would raise overall exports by slightly more than US\$ 300 million, of which about a third would go to Kenya and a little more than 10 percent to Tanzania. Total exports would increase by a comparable amount if countries cut overall trading costs by 10 percent each. Ethiopia would realize the most gain, with more than US\$ 40 million out of a total increase of around US\$ 300 million. It’s important to note



that the COMESA region as a whole benefits under each of these scenarios through a sizable increase in regional exports, ranging from 50 to 100 percent of the 2019 level of US\$ 600 million (Figure 9).

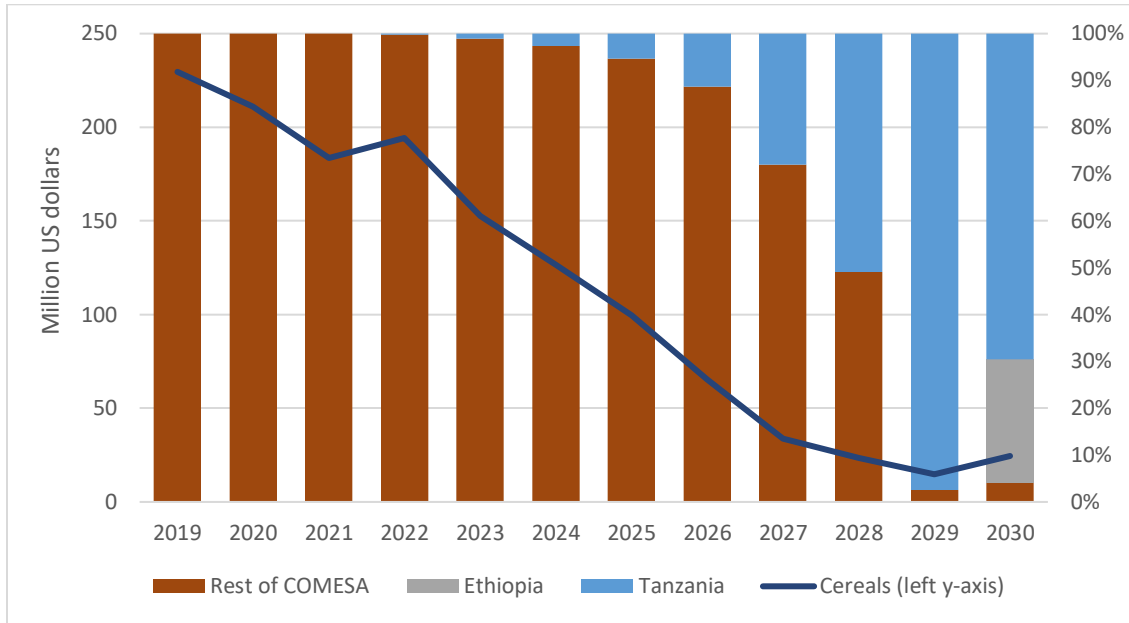
**Figure 9:** Cumulative change in baseline value of intra-regional exports, 2019–2030, million US dollars



Source: EMM model simulation results based on FAOSTAT and WDI databases

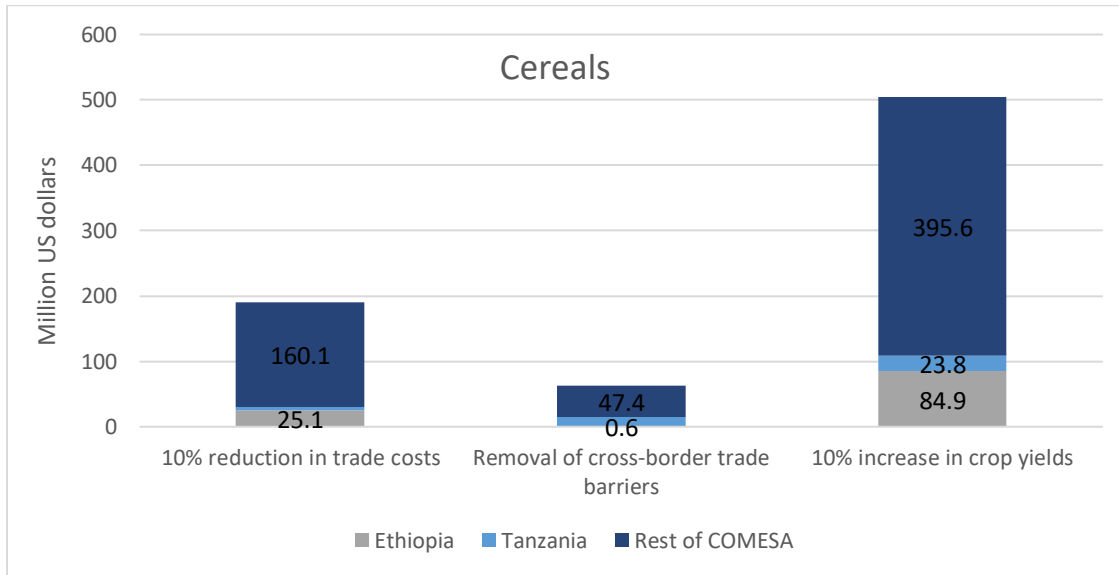
The same simulations were carried out at the level of selected commodity groups and the resulting changes in terms of projected exports under baseline as well as additional export revenues under the three alternative policy scenarios are shown in Figures 10-17. Figure 10 shows that based on a continuation of current trends, Tanzania will become the single most dominant player in a shrinking intra-regional cereals market. Ethiopia will be the only other meaningful exporter by the end of the decade. The dominant position of the two countries would change considerably under the three alternative scenarios, in particular under the 10 percent increase in yield scenario (Figure 11). Under the latter scenario, regional cereal exports would increase by an additional US\$500 million by 2030, cumulatively, or the equivalent of twice their current level. Ethiopia would move to being the top exporter, followed by Tanzania, but with the combined share of the two declining to around 20 percent of total regional exports from more than 90 percent under the baseline scenario. A reduction of overall trading costs across the board would raise cereal exports by US\$ 200 million by 2030 but that amount would not be sufficient to maintain the current level of US\$ 250 million. Again, Ethiopia and Tanzania would remain the dominant players but with an even smaller combined market share of around 15 percent.

**Figure 10:** Baseline intra-regional exports value and composition, cereals, 2019–2030, million US dollars



Source: EMM model simulation results based on FAOSTAT and WDI databases

**Figure 11:** Cumulative change in baseline value of intra-regional exports, cereals, 2019–2030, million US dollars

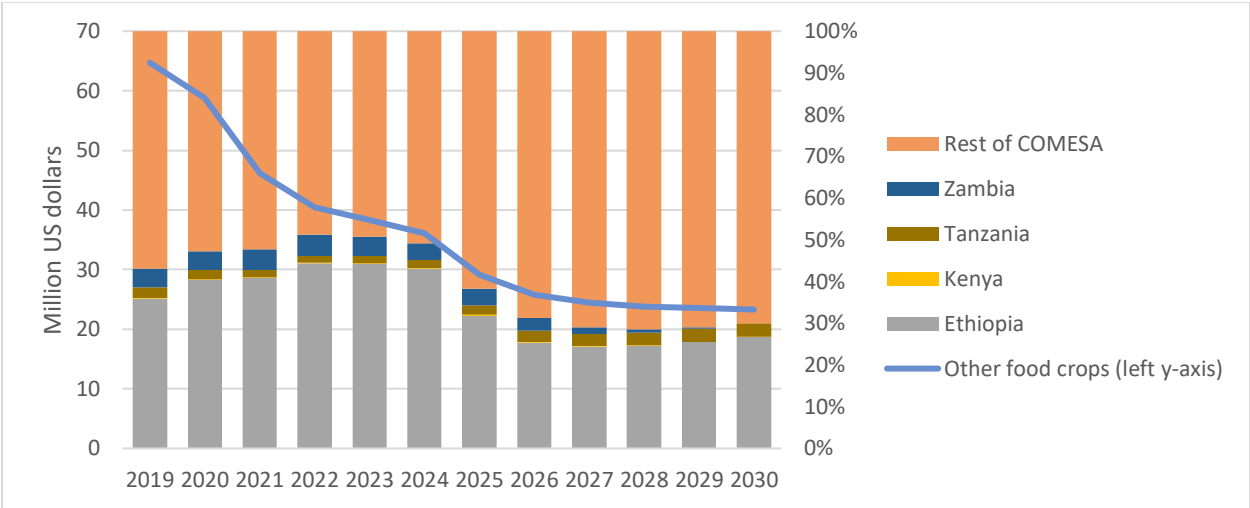


Source: EMM model simulation results based on FAOSTAT and WDI databases

Figure 12 and Figure 13 show the results for the baseline and alternative scenarios for other food crops. Under the baseline, assuming the continuation of current trends, regional exports are projected to decline from more than US\$ 60 million to less than US\$ 20 million in 2030, with Zambia joining Ethiopia

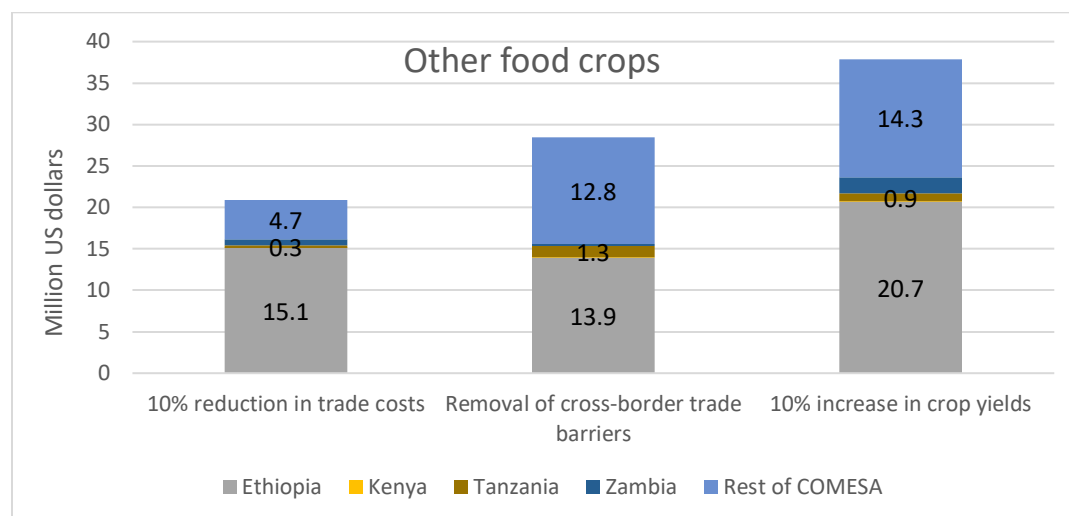
and Tanzania as the leading exporters. Their combined share will decline progressively, however, from nearly 45 percent to around 30 percent, still under baseline conditions. Regional exports are shown to increase significantly under all three alternative scenarios. Effective reduction of overall trading costs by 10 percent would raise regional exports by about US\$ 20 million above the baseline level, while eliminating cross-border trade barriers and raising yields by 10 percent would, respectively, boost exports by approximately an additional US\$ 30 and US\$ 40 million compared to baseline levels. Ethiopia, Tanzania and Zambia would capture most of the additional export revenue with a combined share ranging from 50 percent under the cross-border trade scenario to 75 percent under the trading costs scenario. Their combined share under the yield scenario is about 60 percent. The lion’s share of the additional export revenue is captured by Ethiopia.

**Figure 12:** Baseline intra-regional exports value and composition, other food crops, 2019–2030, million US dollars



Source: EMM model simulation results based on FAOSTAT and WDI databases

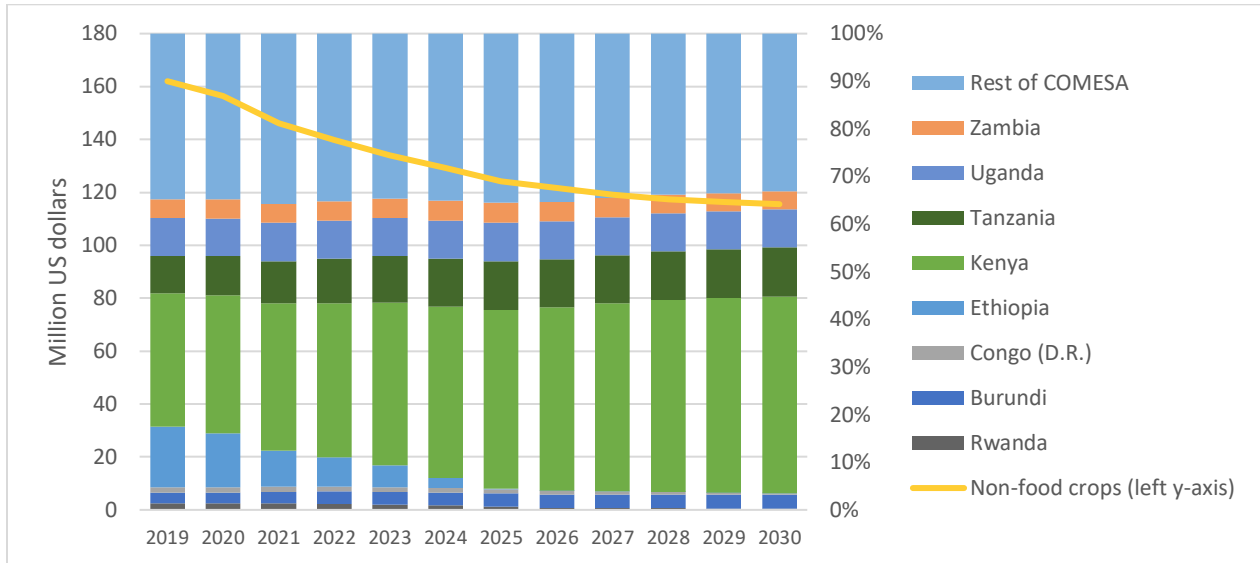
**Figure 13:** Cumulative change in baseline value of intra-regional exports, other food crops, 2019–2030, million US dollars



Source: EMM model simulation results based on FAOSTAT and WDI databases

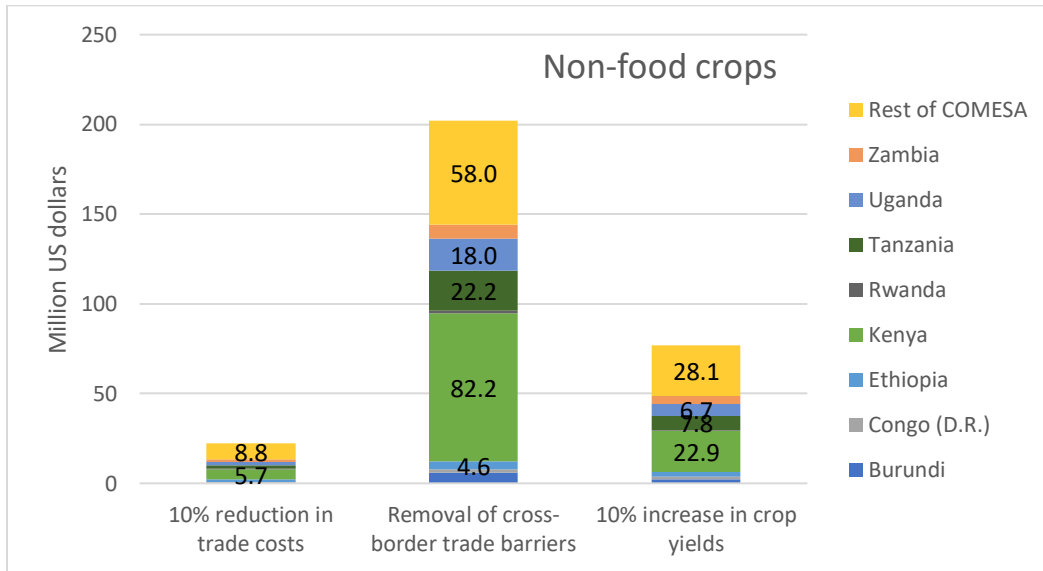
The export outlook for other non-food crops offers a much more diversified picture. The decline in regional exports is less severe, with values falling from US\$ 160 million currently to slightly less than US\$ 120 million (Figure 14). Over the course of the decade, Kenya is shown to raise its market share from around 25 percent to more than 40 percent. In contrast, Ethiopia, with a current market share of 15 percent, is projected to exit the regional export market by the middle of the decade. Tanzania and Uganda, and to a lesser extent Zambia, are the other main players next to Kenya. The same group of countries would continue to dominate under the three alternative scenarios, with Kenya still being the most dominant exporter (Figure 15). The elimination of cross-border trade barriers in particular would raise regional exports of non-food crops by as much as US\$ 200 million over the baseline values by 2030. Close to half of the incremental export revenue would be captured by Kenya and about 25 percent by Uganda and Tanzania. The increase in regional non-food crop exports is significantly less under the yield and trading costs scenarios, with cumulative additional export revenues of US\$ 80 million and US\$ 20 million, respectively. Again, Kenya and to a lesser extent Tanzania and Uganda are the main winners.

**Figure 14:** Baseline intra-regional exports value and composition, other non-food crops, 2019–2030, million US dollars



Source: EMM model simulation results based on FAOSTAT and WDI databases

**Figure 15:** Cumulative change in baseline value of intra-regional exports, non-food crops, 2019–2030, million US dollars

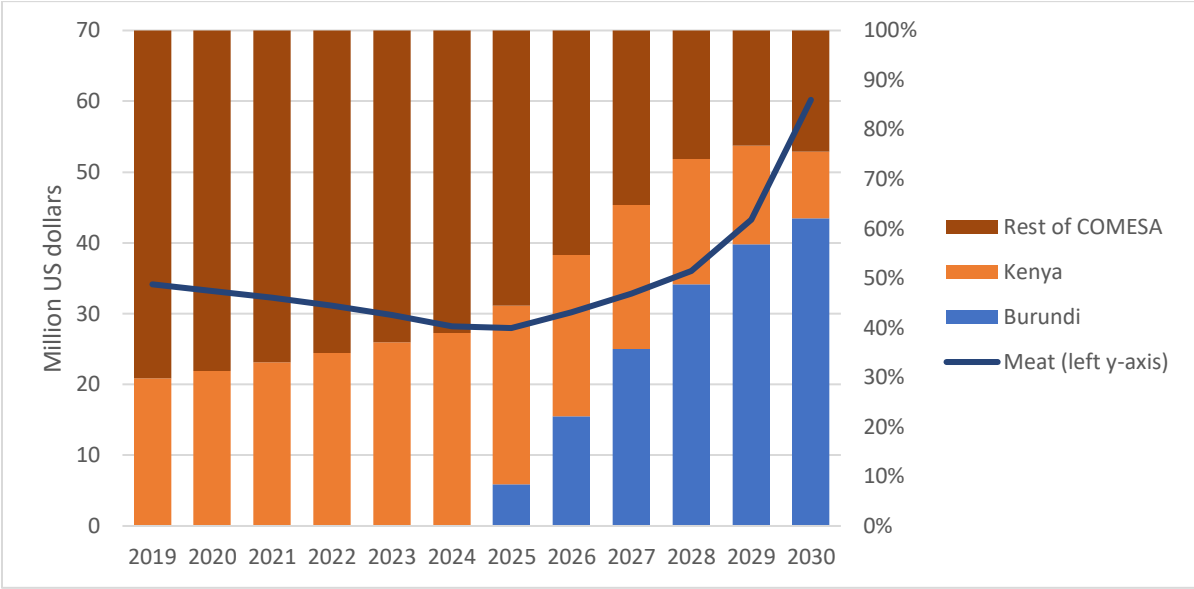


Source: EMM model simulation results based on FAOSTAT and WDI databases

The last commodity group we consider here are meats, which unlike all other commodity groups are projected to see a sharp rise in intra-regional exports, from US\$ 35 million currently to US\$ 60 million by 2030 under baseline conditions (Figure 16). Kenya, which currently accounts for about 30 percent

of regional exports, will see its share cut by half by the end the decade. Burundi is projected to enter the regional export market by the middle of the decade and will rise to a dominant position by 2030 with an export market share of 60 percent. Together with Kenya, it will control 75 percent of the regional meat export market by the end of the decade if current conditions continue.

**Figure 16:** Baseline intra-regional exports value and composition, meats, 2019–2030, million US dollars

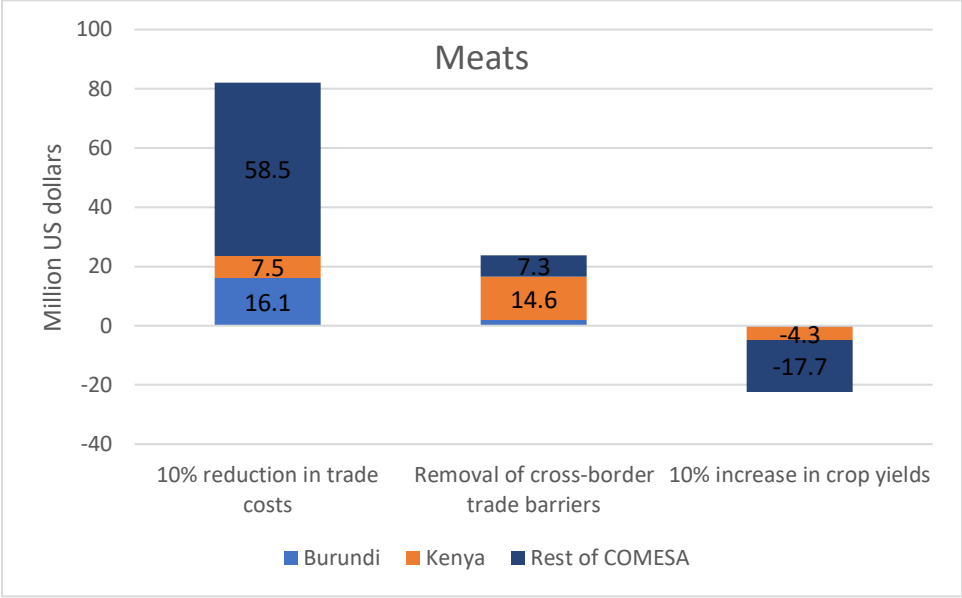


Source: EMM model simulation results based on FAOSTAT and WDI databases

Measures to cut trading costs across the board would have the biggest impact on regional meat exports, raising them by an additional US\$ 80 million cumulatively by 2030 (Figure 17). Additional exports from Burundi would account for 30 percent of that increase, and Kenya about 10 percent. The combined share of the two countries in additional export revenues generated under this scenario (40 percent) is much less than their average share under the baseline scenario (75 percent). The bulk of the additional export revenue will go to other COMESA countries, leveling the playing field somewhat.

Eliminating costs associated with cross-border trade barriers, on the other hand, would benefit Kenya primarily, as it would capture most of the increase in regional exports of about US\$ 20 million. In contrast, regional meat exports are projected to decline under the yield-increase scenario compared to baseline levels by a cumulative value of around US\$ 20 million by 2030. It’s intriguing that the increase in crop yields leads to falling meat exports, but this may be explained by falling feed costs, a rise in meat production and a decline in net demand.

**Figure 17:** Cumulative change in baseline value of intra-regional exports, meats, 2019–2030, million US dollars



Source: EMM model simulation results based on FAOSTAT and WDI databases

**3.2 Candidate agricultural commodities**

The simulations described in the preceding section revealed how commodities respond to various policy changes. This responsiveness is measured by the additional intra-regional export values generated under the simulated scenarios both in terms of dollar amounts and as a percentage share of baseline export value. The varied responsiveness reflects differences in the potential of those commodities to trigger the expansion of exports across the different countries within the region. In this section we build on the results from the preceding section to rank commodities according to their responsiveness to simulated policy changes.

Two rounds of candidate commodities selection have been carried out, first using the dollar amounts of additional export generated, then using the related percentage share of baseline export value. Both metrics are hereafter referred to as commodity scores. The selection procedure includes the following three steps. First, commodities are ranked in descending order of their score and across all the countries studied. In other words, across all the countries, the commodities that have the highest scores have the highest ranks and those with the lowest scores the lowest ranks. This first step has resulted in three country-by-commodity rankings, each corresponding to a simulation scenario. In the second step, the three rankings are combined into one ranking by sorting country-by-commodity rows by the minimum of the three ranks corresponding to the three simulation scenarios. In the third step, all country-by-commodity rows with a rank less than or equal to 20 have been retained and presented as matrix matching commodities with countries for which their export expansion potential is the highest.

Note that where dollar amounts are the scores considered for the rankings, the first 40 country-by-commodity rows have to be retained in order to have all nine countries of interest represented in the selection. Retaining only 20 would mean that Rwanda and Congo (D.R.) would not be represented as they come in subsequent rows. The matrix of candidate commodities by country are presented in Table 9 and Table , corresponding to the dollar value and percentage share scores, respectively. Table 9 presents the commodities that revealed the highest potential for regional export expansion in the individual countries studied.

**Table 9:** Candidate commodities based on values of additional exports created under simulation, by country.

|                      | Burundi | Congo (D.R.) | Ethiopia | Kenya | Rwanda | Tanzania | Uganda | Zambia |
|----------------------|---------|--------------|----------|-------|--------|----------|--------|--------|
| Cattle               | X       |              |          | X     |        |          |        | X      |
| Chickens             |         |              |          | X     |        |          |        |        |
| Cocoa                |         | X            |          |       |        | X        | X      |        |
| Coffee               | X       | X            | X        | X     | X      | X        | X      |        |
| Cotton               |         |              |          |       |        | X        |        | X      |
| Cottonseed oil       |         |              | X        |       |        | X        | X      |        |
| Freshwater fish      |         |              |          | X     |        | X        | X      |        |
| Groundnut oil        |         | X            |          |       |        |          | X      |        |
| Maize                |         |              | X        |       |        | X        |        |        |
| Nuts                 |         |              |          | X     |        | X        |        |        |
| Other fruits         |         |              |          | X     |        |          |        |        |
| Other live animals   |         |              | X        |       |        |          |        |        |
| Other meats          |         |              |          | X     |        |          |        |        |
| Other vegetable oils |         |              | X        |       |        |          | X      |        |
| Pig meat             | X       |              |          | X     |        |          |        |        |
| Sesame oil           |         |              |          |       |        |          | X      |        |
| Sesame seed          |         |              | X        |       |        | X        |        |        |
| Sheep & goats        |         |              |          | X     |        |          |        |        |
| Sheep & goat meat    | X       |              |          |       |        |          |        |        |
| Skin                 |         |              |          |       |        |          | X      |        |
| Soybean oil          |         |              |          |       |        |          | X      |        |
| Soybeans             |         |              | X        |       |        |          |        | X      |
| Tea                  |         |              | X        | X     | X      | X        | X      |        |
| Tobacco              |         |              |          | X     |        | X        |        | X      |
| Pulses               |         |              | X        |       |        | X        |        |        |
| Spices               |         |              | X        | X     |        |          |        | X      |

Source: EMM model simulation results based on FAOSTAT and WDI databases

Note: “Other oilseeds” refers to any oilseed except groundnuts, soybeans, oil palm, sesame seed.

“Other live animals” refers to any live animal except cattle, chickens, sheep and goats, and pigs.

“Other vegetable oils” refers to any processed oil except cottonseed oil, groundnut oil, soybean oil,



palm oil and sesame oil. “Other cereals” refers to any cereal except maize, rice, millet, sorghum, and wheat.

**Table 10:** Candidate commodities based on percentage change of additional exports created under simulation, by country

|                      | Burundi | Congo (D.R.) | Ethiopia | Kenya | Rwanda | Tanzania | Uganda | Zambia |
|----------------------|---------|--------------|----------|-------|--------|----------|--------|--------|
| Cattle               | X       |              |          | X     |        |          |        | X      |
| Chickens             |         |              |          |       |        |          |        | X      |
| Cocoa                |         | X            |          |       |        |          |        |        |
| Coffee               |         | X            |          |       |        |          |        |        |
| Cotton               |         |              |          |       |        |          | X      |        |
| Cottonseed oil       |         | X            | X        |       |        | X        |        |        |
| Eggs                 | X       |              |          |       |        |          |        |        |
| Groundnut oil        |         | X            | X        |       | X      | X        |        |        |
| Maize                |         |              | X        |       |        | X        |        |        |
| Other fruits         |         |              |          | X     |        |          |        |        |
| Other live animals   |         |              | X        |       |        |          |        | X      |
| Other vegetable oils |         |              | X        |       |        |          | X      |        |
| Pig meat             | X       |              |          | X     |        |          |        |        |
| Pigs                 |         |              |          |       |        |          |        | X      |
| Sesame oil           |         |              |          |       |        | X        |        |        |
| Sesame seed          |         |              |          | X     |        |          |        |        |
| Sheep & goats        |         |              |          | X     |        |          |        | X      |
| Sheep & goat meat    | X       |              |          |       |        |          |        |        |
| Soybean oil          |         |              |          |       |        |          | X      |        |
| Soybeans             |         |              | X        |       |        |          |        | X      |
| Tea                  | X       |              | X        |       |        |          |        |        |
| Pulses               |         |              | X        |       |        | X        |        |        |
| Spices               |         |              |          | X     | X      | X        |        | X      |

Source: EMM model simulation results based on FAOSTAT and WDI databases

Note: “Other oilseeds” refers to any oilseed except groundnuts, soybeans, oil palm, sesame seed.

“Other live animals” refers to any live animal except cattle, chickens, sheep and goats, and pigs.

“Other vegetable oils” refers to any processed oil except cottonseed oil, groundnut oil, soybean oil, palm oil and sesame oil. “Other cereals” refers to any cereal except maize, rice, millet, sorghum, and wheat.

#### 4 Overall Ranking of Commodities

This section builds on the candidate commodities identified in section 3 using projected regional trade outlooks and presented in Table 9 and Table 10, and aims to prioritize commodities at country level.

Country-level value chain prioritization is based on the comparative contribution of candidate commodities to improving other national development objectives in addition to boosting trade. The analysis looks beyond regional trade expansion and captures the performance of the candidate commodities in every country according to a predetermined set of development criteria. These criteria include income, employment, poverty, and gender and youth inclusivity. First, we present the methodology of the analysis before discussing the findings.

#### 4.1 Criteria for ranking priority commodities

Table 11 below shows the list of economic performance indicators that have been used to explore the effect of expanding trade on priority commodities identified in each sample country. The changes in regional aggregate exports and aggregate imports attributable to trade expansion in competitive agricultural value chains in each country is assessed using the regional trade model (ESA-EMM). The changes in aggregate value added, agricultural output, income growth, and employment are assessed using the trade expansion scenarios simulated by the economywide model (CGE). The poverty and gender and youth inclusivity effects are estimated using the MS model that simulates the employment and income growth results from the CGE model. These combined findings constitute the basis on which the contributions of candidate value chains are assessed.

**Table 11:** Lists of economic performance criteria

| <b>Result area</b>                           | <b>Specific criteria</b>   |
|--|--|
| Regional trade potential                     | 1. Intra-regional exports, average growth  |
| Potential for import substitution            | 2. Extra-regional imports, average change  |
| Contribution to value addition               | 3. Aggregate value added, average growth   |
| Contribution to food security and resilience | 4. Agricultural production, average change                                       |
|  | 5. Household real expenditure, average change                                    |
|  | 6. National, standard poverty, average change                                    |
|  | 7. Urban, standard poverty, average change                                       |
|  | 8. Rural, standard poverty, average change                                       |
|  | 9. National, extreme poverty and hunger, average change                          |
|  | 10. Urban, extreme poverty and hunger, average change                            |
| Contribution to women and youth employment   | 11. Rural, extreme poverty and hunger, average change                            |
|  | 12. Gender employment gap, average change of the ratio of female-to-male         |
|  | 13. Gender employment earning gap, average change of the ratio of female-to-male |
|  | 14. Youth employment gap, average change of the ratio of youth-to-adult          |
|  | 15. Youth employment earning gap, average change of the ratio of youth-to-adult  |

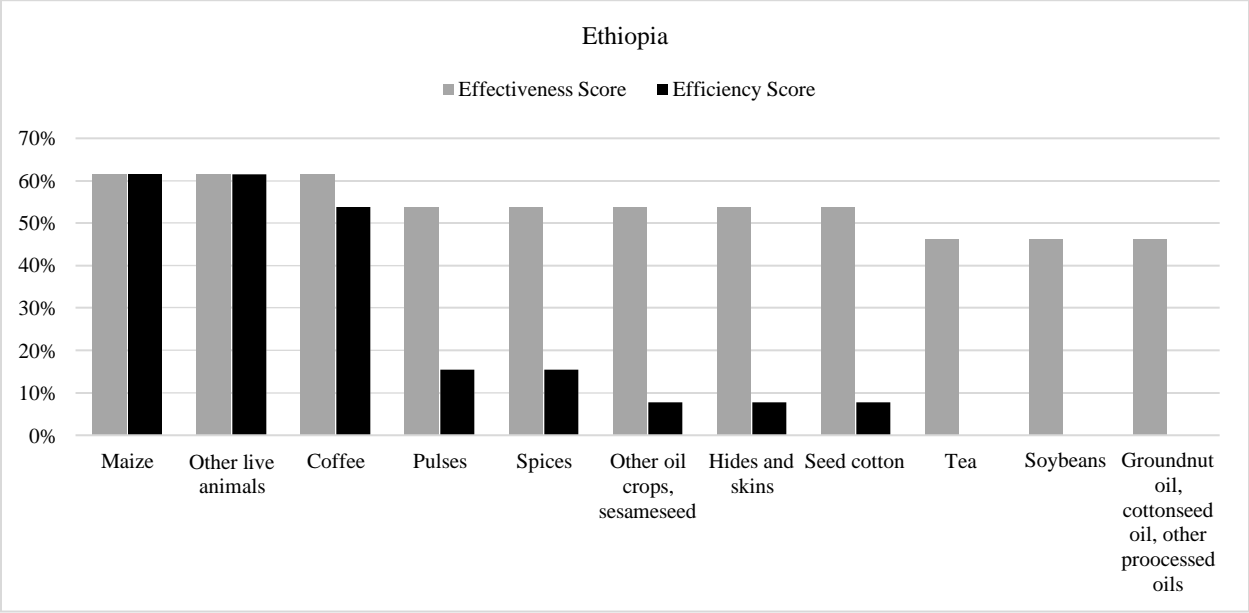
The contribution of the value chains is measured using the effectiveness and efficiency scores. The effectiveness score measures the proportion of result areas or expected outputs advanced by boosting trade in a specific agricultural value chain. For instance, an effectiveness score of 80 percent with respect to a given results framework indicates that increased regional trade for that specific agricultural value chain contributes to progress towards eight out of 10 result areas. The efficiency score takes into account the strength of the contribution, because two different value chains may positively affect the same number of criteria but with different magnitudes. Thus, the efficiency score measures the proportion of result areas advanced significantly by increased trade in a specific agricultural value chain. A result area is advanced significantly by a given value chain if its resulting change is greater than the average change for all value chains. For instance, an efficiency score of 50 percent indicates that increased regional trade in that specific agricultural value chain results in changes which are greater than the average for all value chains in five out of 10 result areas.

#### 4.2 Ranking based on effectiveness and efficiency score

##### **Ethiopia**

Increased cross-border exports of *maize*, *coffee*, and *other live animals*<sup>4</sup> positively affect 60 percent of the 15 development criteria and significantly improve (i.e., by more than the average of all candidate value chains) 54 to 60 percent of the criteria (Figure 18). These three commodities come at the top of the commodity list for Ethiopia. They are followed by *spices* and *pulses* with effectiveness scores of 54 percent and efficiency scores of 15 percent. Other commodities such as *seed cotton*, *hides and skins*, *sesame seed*, and *other oil crops* appear to be highly effective (54 percent) but less efficient than the aforementioned commodities. The remaining commodities show effectiveness scores of less than 50 percent and appear at the bottom of the commodity list.

**Figure 18:** Effectiveness and efficiency scores of candidate value chains for Ethiopia

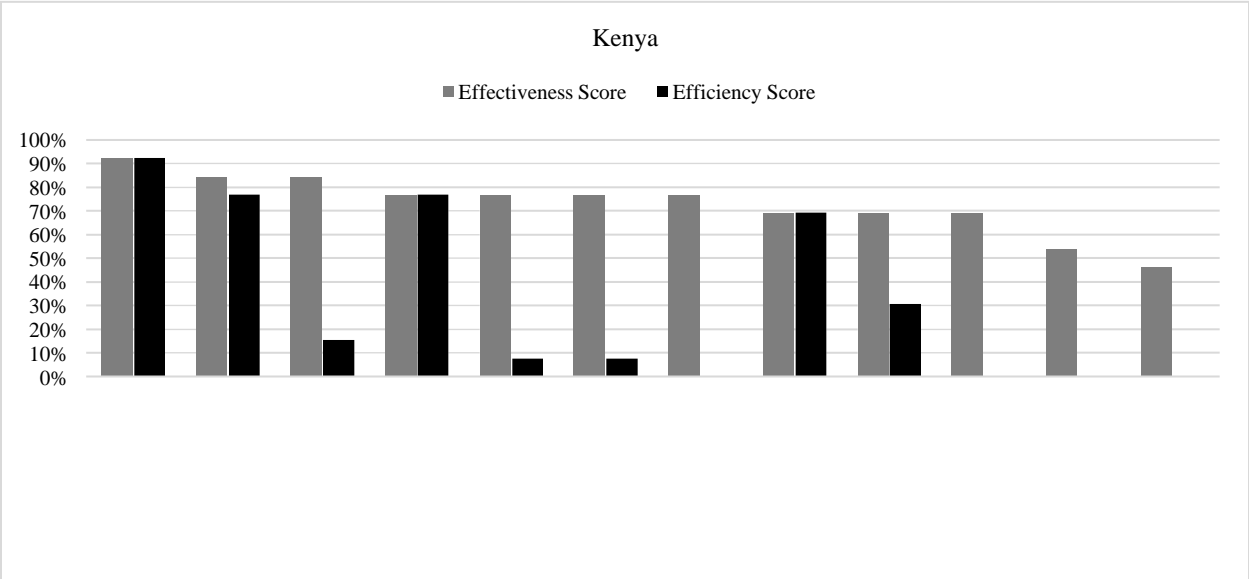


Source: Simulation results from the CGE-MS models.

**Kenya**

All of the candidate value chains are highly effective (69 percent and above) except tobacco and cottonseed oil (Figure 19). Among the effective commodity value chains, the following six commodities are also highly efficient (69 percent and above): goat meat, other meat, cattle, coffee, tea, and fruit. They are ranked at the top of the commodity list for Kenya. This group is followed by sheep and goats (efficiency score of 31 percent) and poultry (15 percent). The remaining commodities, although effective in general, are less efficient (below 10 percent) than the aforementioned commodities.

**Figure 19:** Effectiveness and efficiency scores of candidate value chains for Kenya



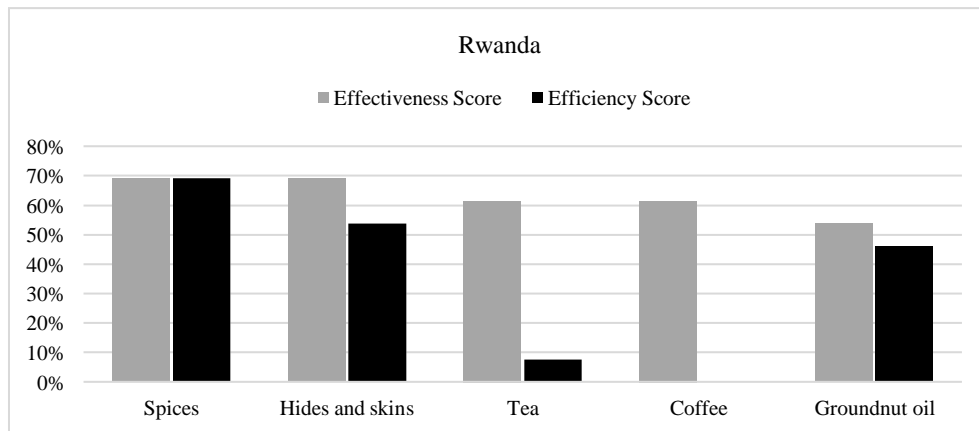
Goat meat and other meat  
Coffee and Tea  
Poultry  
Cattle  
Spices  
Freshwater Fish  
Sesame Seed  
Fruits  
Sheep and Goat  
Nuts  
Cottonseed Oil  
Tobacco

Source: Simulation results from the CGE-MS models.

### Rwanda

The five candidate value chains are all effective, with scores of at least 54 percent (Figure 20). Among them, only the *spices* and *hides and skins* value chains are highly efficient, with respective scores of 69 percent and 54 percent, and occupy the top ranks on the commodity list. These value chains are followed by *groundnut oil* with a 46 percent efficiency score. *Coffee* and *tea* do not significantly affect the development criteria although they contribute to advancing 62 percent of the criteria.

**Figure 20:** Effectiveness and efficiency scores of candidate value chains for Rwanda

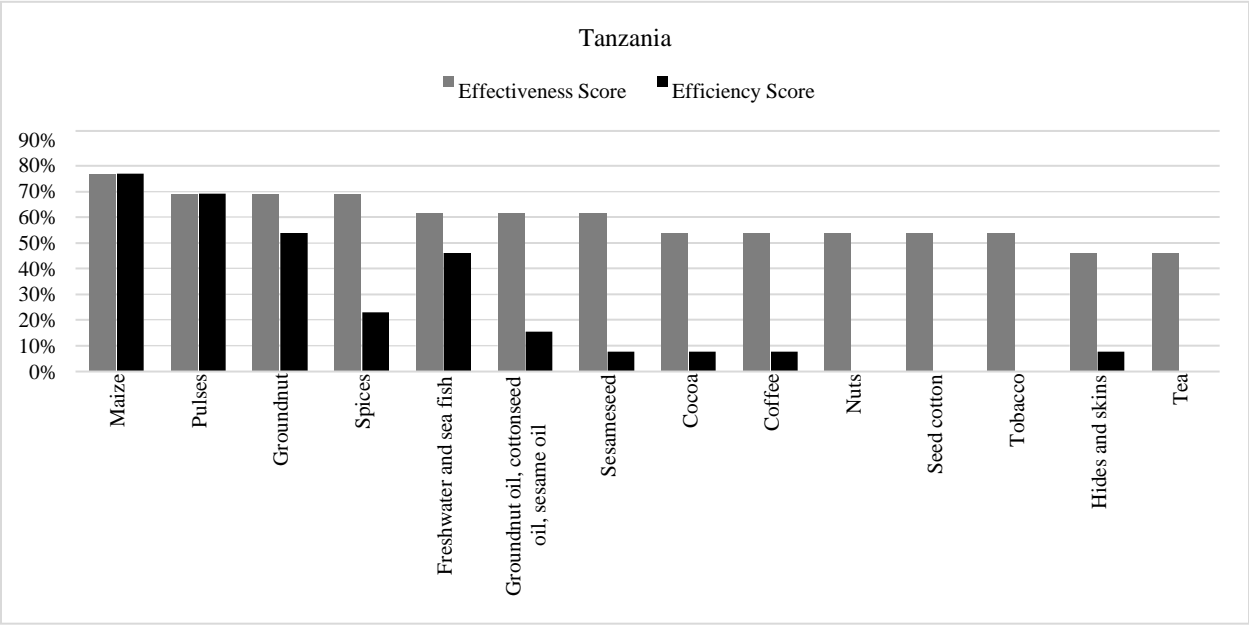


Source: Simulation results from the CGE-MS models.

### Tanzania

The candidate value chains are highly effective (54 percent and above) except *tea* and *hides and skins* (Figure 21). Among the effective value chains, *maize*, *pulses*, and *groundnut* appear at the top of the list because they display a high efficiency score (54 percent and above). This group is followed by *freshwater fish* and *sea fish* (46 percent efficiency scores), *spices* (23 percent), and *groundnut oil*, *cottonseed oil*, and *sesame oil* (15 percent). The remaining eight commodities are less efficient (below 10 percent) although effective in general.

**Figure 21:** Effectiveness and efficiency scores of candidate value chains for Tanzania

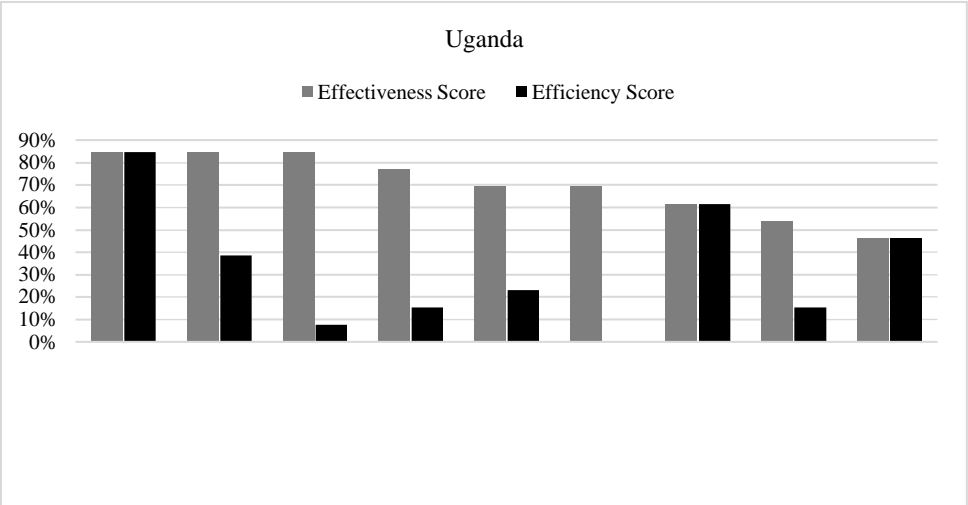


Source: Simulation results from the CGE-MS models.

**Uganda**

All candidate value chains are highly effective (54 percent and above) except the *freshwater fish* value chain (Figure 22). However, only *coffee*, and *other processed oils* display high efficiency scores (62 percent and above) and are ranked at the top of the country’s commodity list. *Seed cotton* and *cocoa* are highly effective (85 percent) but the former is far more efficient than the latter, with efficiency scores of 38 percent and 8 percent, respectively. Thus, *seed cotton* is ranked fourth while *cocoa* is in the eighth position. The *freshwater fish* value chain, with a high efficiency score, ranks third, although its effectiveness score is lower than that of other candidate value chains, including *seed cotton* and *cocoa*. *Cottonseed oil* *hides and skins* and *tea* are effective but relatively less efficient, with efficiency scores of 23 percent, 15 percent, and 15 percent, respectively.

**Figure 22:** Effectiveness and efficiency scores of candidate value chains in Uganda



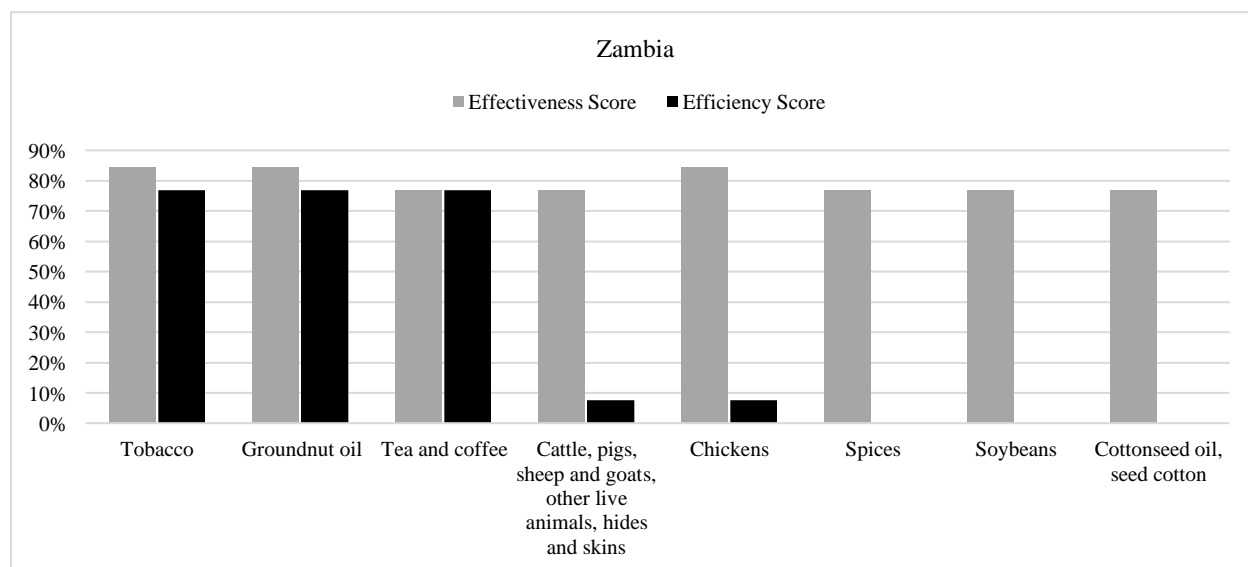
Coffee  
Seed cotton  
Cocoa  
Tea  
Cottonseed oil  
Tobacco  
Other processed oils  
Hides and skins  
Freshwater fish

Source: Simulation results from the CGE-MS models.

### Zambia

The candidate value chains all show effectiveness scores of 77 percent and above (Figure 23). Among them, *tobacco*, *groundnut oil*, *tea*, and *coffee* are highly efficient (77 percent and above) and rank high on the commodity list. The *chickens* value chain is effective (85 percent) but relatively less efficient than the aforementioned commodities (8 percent). It ranks fourth on the commodity list.

**Figure 23:** Effectiveness and efficiency scores of candidate value chains for Zambia



Source: Simulation results from the CGE-MS model

## 5 Summary and Conclusion

The two main objectives of the analysis presented in this report are: i) to explore the opportunities for expanding regional agricultural trade and improving competitiveness using the current trend of trade between the sample countries; and ii) to identify priority value chains with the potential to be competitive and to drive regional and national economic growth. Analysis of the current intra-regional trade trend revealed that the importance of agriculture in regional as well as total trade varies significantly across countries. The share of agriculture in regional trade varies from as little as less

than 3 percent in Zambia to close to 54 percent in South Sudan (the only instance of it exceeding 50 percent). Except for South Sudan and Congo (D.R.), the share of agriculture in regional exports is much lower than its share in total exports.

Regional trade represents about one quarter of total trade in the countries studied. Kenya and Uganda, and to a lesser extent Tanzania and Zambia, are the biggest players in regional agricultural export markets. These same countries dominate agricultural exports to the rest of the world, with Ethiopia joining the group in second position. On the import side, Kenya, Uganda, South Sudan and Rwanda are the biggest players, while Kenya, Ethiopia, Congo (D.R.) and Tanzania lead in terms of overall agricultural imports. At the regional level, tea, palm oil, maize and wheat are the commodities most frequently traded. It is worth noting that several products, including palm oil, oil cakes, and live animals, are represented only in cross-border exports. In terms of global trade, coffee is the most frequently exported commodity. Leguminous vegetables, oilseeds and oleaginous products, tea, tobacco, cocoa beans, maize, cotton, wheat, and rice are also among the top exported commodities.

Interest in fostering regional trade is underpinned by the expectation that there is a certain degree of unrealized potential to expand cross-border trade flows among neighboring countries. Production and export similarity indices were used to measure, rank, and compare the relative importance in every country of the production and trading of individual agricultural products for all relevant pairs of countries within the region. These indices revealed the existence of sufficient dissimilarity in the current production and trading patterns between East African countries and hence a scope for cross-border trade expansion in the region.

The analysis of the top-performing commodities in terms of contribution to regional trade expansion over the last decade was done by looking at the extent to which individual commodities have expanded their share in terms of regional exports as well as imports. The leading commodities driving regional trade expansion are cotton, coffee, maize, tobacco, and vegetable oils: their shares in both regional exports and imports increased between 2010 and 2019. Palm oil, nuts, and tea have also contributed to regional trade expansion, albeit to a lesser extent, by managing to raise shares in regional exports while failing to maintain their shares in regional imports. Wheat, rice, sorghum, and spices have contributed negatively to regional trade expansion with falling shares in both intra-regional exports and imports.

The findings of the preceding analysis indicate a real potential to expand intra-regional trade in East Africa beyond current levels, even with current production and trade patterns. The report therefore further examines an outlook for intra-regional trade expansion over the next decade and identifies value chains with the potential to be competitive and to drive national and regional economic growth. The analysis



customizes and applies a regional trade model to explore how a continuation of current supply and demand trends, including changes in crop yields, cultivated areas, outputs, and Gross Domestic Product (GDP), would shape long-term regional agricultural trade competitiveness and performance by individual countries. Using this customized model, a list of leading commodity value chains is compiled for each country based on their ranking in terms of future export growth and added export revenues under the baseline and alternative trade policy scenarios.

The analysis looks beyond regional trade expansion and captures the performance of the candidate value chains in every country according to a predetermined set of development criteria, i.e. income, employment, poverty, and gender and youth inclusivity. Building on the value chain ranking, the following value chains are identified in each country to contribute to advancing the national development goals and boosting the country's cross-border exports:

- ⇒ Ethiopia: Maize, coffee, other live animals, seed cotton, sesame seed, and other oil crops.
- ⇒ Kenya: Cattle, goat meat, other meat, coffee, tea, fruits, and poultry.
- ⇒ Rwanda: Spices, groundnut oil, and hides and skins.
- ⇒ Tanzania: Maize, pulses, groundnut, freshwater fish, and sea fish.
- ⇒ Uganda: Coffee, freshwater fish, other processed oils, and seed cotton.
- ⇒ Zambia: Groundnut oil, tobacco, tea, and coffee.

Building on the country prioritization of commodity value chains and ranking the candidate value chains according to the number of countries for which they appear in the above suggested list of priority commodities, six commodities appear to be of interest at the regional level: coffee, tea, maize, groundnut, seed cotton, and freshwater fish. Three of these commodities appear in the list of priority commodities for Ethiopia (coffee, maize, and seed cotton), Tanzania (maize, groundnut, and freshwater fish), and Uganda (coffee, seed cotton, freshwater fish); two commodities appear in the list of priority commodities for Kenya (coffee, and tea), and Zambia (coffee, and tea); and one commodity appears in the list of priority commodities for Rwanda (groundnut).

## References

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## Annex A1

An economy-wide, multi-country multi-market model of the East and Southern Africa region (ESA-EMM) will be used to address the core question of identifying agricultural value chains that reveal the highest competitive potential in the regional market and the most promising interventions for unlocking that potential in the near future. The model’s features are well suited to exploring changes in regional competitiveness that may result from exogenous changes in productivity, transport infrastructure, and market access variables. The most convenient features of this model for answering the research questions of interest for Policy LINK are highlighted in Table 1, including:

- Broad country coverage, which encompasses member states of the Common Market for Eastern and Southern Africa (COMESA) and/or the East African Community (EAC), embodying the nine countries under consideration by Policy LINK (Burundi, Democratic Republic of the Congo, Ethiopia, Kenya, Rwanda, South Sudan, Tanzania, Uganda, and Zambia).
- Differentiation of every country’s import (and export) of agricultural commodities by intra-regional and extra-regional origins (destinations).
- High disaggregation of the agricultural sector of each country into 49 distinct value chains, including cereals (6), roots and tubers (5), oilseeds (5), other crops (12), livestock (5), meats (5), other animal products (3), fisheries (2), and edible oils (6).

More general features of the ESA-EMM policy simulation tool are detailed below.

**Table A3.1. Country and commodity coverage in the EMM model**

|  |
|--|
| <b>COUNTRY COVERAGE: 19 COMESA MEMBER STATES + TANZANIA + SOUTH SUDAN</b>  |
| Burundi, Comoros, Democratic Republic of the Congo, Djibouti, Egypt, Eritrea, Eswatini, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Rwanda, Seychelles, Sudan, South Sudan, Tanzania, Uganda, Zambia, and Zimbabwe. |
| <b>COMMODITY COVERAGE: 49 AGRICULTURAL VALUE CHAINS + 2 NON-AGRICULTURAL SECTORS</b>   |
| <b>Cereals (6):</b> Maize, rice, millet, sorghum, wheat, other cereals.  |
| <b>Roots &amp; Tubers (5):</b> Cassava, yam, sweet potato, potato, cocoyam.  |
| <b>Oilseeds (5):</b> Groundnuts, soybeans, oil palm, sesame seed, other oilseeds.  |
| <b>Other crops (12):</b> Pulses, cotton, sugar, cocoa, coffee, tea, tobacco, vegetables, plantain, other fruits, spices, nuts.   |
| <b>Livestock (5):</b> Cattle, chickens, sheep and goats, pigs, other live animals.   |
| <b>Meats (5):</b> Cattle meat, chicken meat, sheep and goat meat, pig meat, other meat.  |
| <b>Other animal products (3):</b> Milk, eggs, skin.  |
| <b>Fisheries (2):</b> Sea fish, freshwater fish.   |
| <b>Edible oils (6):</b> Cottonseed oil, groundnut oil, soybean oil, sesame oil, palm oil, other edible oils.   |

**Nonagricultural sectors (2):** Traded nonagricultural goods, non-traded nonagricultural goods.

The EMM-ESA model is based on neoclassical microeconomic theory. It is built following Diao and Nin-Pratt (2007) and Nin-Pratt et al. (2009) and is extended to differentiate commodity trade flows by intra-regional and extra-regional sources and destinations (see Badiane and Odjo 2016). There is a representative producer in each country for each subsector. A supply function, rather than a production function, captures each representative producer's response to market prices. In crop subsectors, supply function is the product of yield and land allocation, with yield specified as a function of own price and land allocation as a function of all crop prices. Intermediate inputs are explicitly included in the model through a fixed input-output relationship with the sector's production. For each country, agricultural value added is obtained as the sum of the values of all commodity supplies, and the Gross Domestic Product equals the sum of agricultural and non-agricultural value added.

In each country, there are two representative consumers, one for rural households and the other for urban households. The representative consumer demands different consumer goods, including some products that are not locally produced. Demands are functions of per capita consumer income and market prices. They are derived from maximizing a Stone-Geary utility function for each representative consumer.

Per capita income is endogenous in the EMM model. For each country, rural and urban per capita income are determined by first allocating value added to rural and urban households using exogenously defined shares, and then dividing rural and urban income by rural and urban population, respectively.

Apart from optimal levels of domestic supply and demand variables, the EMM model solves for net trade positions (excess demand or supply) of different commodities for individual countries in the region under the assumption of perfect substitution between domestically and internationally produced commodities. However, the model assumes imperfect substitution between intra-regional and extra-regional import varieties of any commodity in excess demand. Similarly, the model assumes imperfect transformation of total exports of any commodity in excess supply into intra-regional and extra-regional export destinations.

For tradable goods, domestic producer and consumer prices are functions of exogenous world prices, taking into account exogenous marketing margins. For non-traded goods, domestic prices are endogenously determined by country-level market-clearing conditions, taking into consideration marketing margins on both the production and the consumption sides. Hence, imports of a commodity in excess demand are profitable to consumers only when the domestic price is lower than the import parity price less any transaction costs. Also, exports of a commodity in excess supply is profitable to producers only when the domestic producer price plus transaction costs is lower than the export parity price.

EMM-ESA is a recursive dynamic model. Dynamics are triggered through exogenous growth rates of non-agricultural income, farmland area, yields, and rural and urban populations in individual countries. The model is built as a mixed complementarity problem and allows for shifting market positions (non-traded, net-import and net-export) for each commodity and in each country. It is customized to reflect the agricultural sectors of the different economies involved using data obtained from FAOSTAT and

World Development Indicators along with supply and demand parameters taken from the relevant literature.

In Badiane and Odjo (2016), EMM is used to examine the scope for enhancing domestic food markets resilience through expanded regional trade integration. Four different scenarios are constructed. The first is the baseline scenario, which assumes a continuation of current trends in cultivated areas, yields and population growth up to 2025. It serves as a reference to evaluate the impact of changes under the remaining three scenarios. The latter scenarios introduce the following three different sets of changes to examine their impacts on regional trade levels: a reduction of 10 percent in the overall cost of trading across the economy; a removal of all cross-border trade barrier (that is, a reduction of their tariff equivalent to zero); and an across-the-board 10 percent increase in yields. These changes are to take place by 2025.

