COMESA's Revealed Comparative Advantage in Common Agricultural Commodities

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The Common Market for Eastern and Southern Africa (COMESA)

11 March 2016

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By

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Abstract

The paper undertakes an analysis of Revealed Comparative Advantage (RCA) for common agricultural commodities in the COMESA Region. The aim of the analysis is firstly, to determine the level of agro-processing in the region; and secondly, in support of the COMESA industrial policy and strategy, to identify commodities countries could focus on in setting up agro-food industries. To address these two issues, RCA is determined for selected agricultural commodities, which are divided into raw/semi processed and highly processed food stuff. Results reveal that many COMESA Member States show strong RCA in raw or semi-processed agricultural commodities with little or no corresponding RCA in highly processed derivatives of those commodities. In general, very few countries in the COMESA region show strong RCA in highly processed and diversified food commodities. This means that there is still a large scope for agro-processing, especially using the abundant traded raw materials. Countries can focus on agro-industries where they show strong RCA in the corresponding raw material base or precursor. Agro-industrialization can help reverse the negative trade balance in processed food commodities that the region is currently experiencing.

1. Introduction

Agriculture forms a key sector in African economies and plays a crucial role in trade and regional integration. According to the World Bank (2013), Africa now earns 23% of its annual growth from farming. Agricultural commodities form an important share of African trade, both regionally and internationally. However, the continent still records a negative trade balance with other international markets, and this trade deficit is increasing. The United Nation Conference on Trade and Development (UNCTAD, 2014) reported that in Africa, net food imports increased by US$ 14.3 billion from 1999-2001 to 2009-2011. This net food imports as a share of GDP increased from 3.2% in 1999-2001 to 3.6% in 2009-2011.
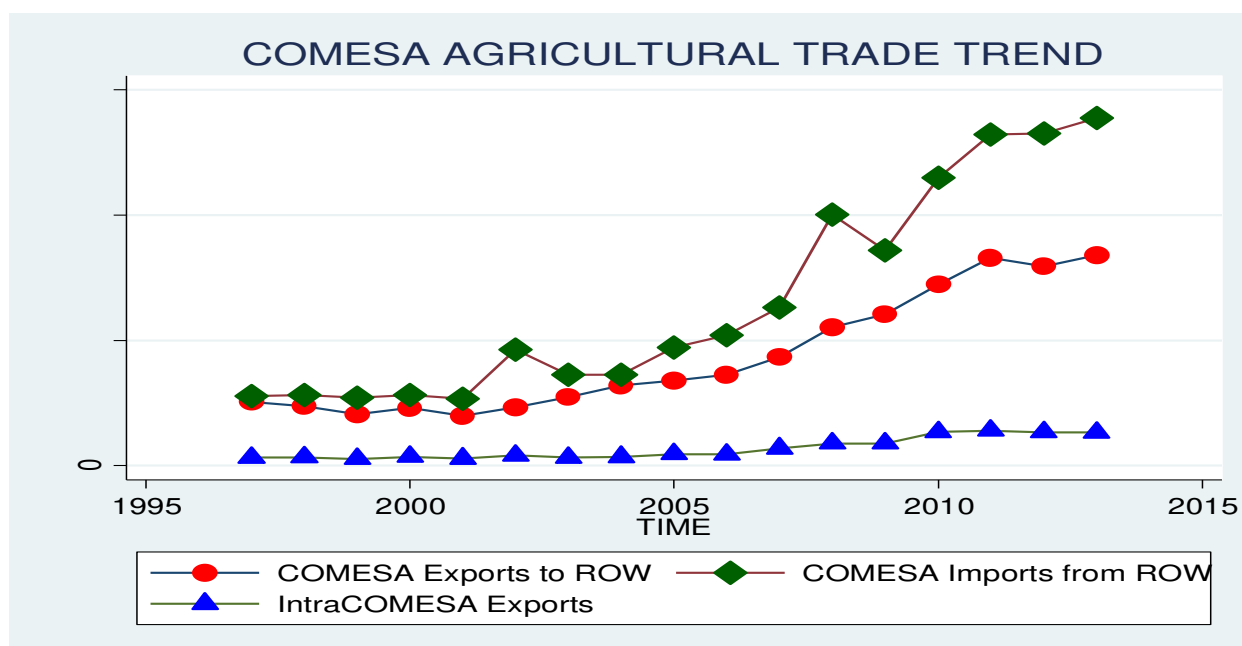
These imports are mainly processed finished products. This observation means that Africa has a huge scope to strengthen agro-industries and agro-processing. Further, intra-regional trade in remains depressed. Given this observation, the Malabo declaration clearly articulates the need to promote agricultural productivity and boosting intra-African Trade in agricultural commodities and services.

The COMESA region, like the rest of Africa is also experiencing a sustained negative trade balance in agricultural commodities despite the clear comparative advantage that the region has in agriculture.

The graph below shows intra-COMESA trade (Exports); and trade (Imports and Exports) between COMESA and the rest of the world (ROW) from 1997 to 2013.[1]

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[1] These commodities selected are based on HS2007 Product Classification code as listed in COMSTAT, the trade reporting platform of COMESA.

Figure 1: COMESA Trade in Agricultural Commodities

COMESA AGRICULTURAL TRADE TREND

Legend:
- COMESA Exports to ROW
- COMESA Imports from ROW
- IntraCOMESA Exports

Source: By Author from COMSTAT Data[2]

Trend analysis reveals that COMESA exports to the ROW have grown from US$ 5 Billion to US$ 17 Billion between 1997 and 2013, a 240 % increase. During the same period, COMESA imports from ROW have remained stubbornly higher than exports and have grown faster from US$ 5.5 Billion to about US$ 28 Billion, a 409 % increase. Intra-COMESA trade, as measured by total exports, have remain below exports and imports from the ROW. This is as expected since the ROW is a bigger market. However, the growth in Intra-COMESA exports has been quite impressive, from US$ 0.6 Billion in 1997 to US$ 2.6 Billion in 2013, a 333 % increase.

The COMESA region, like the rest of Sub-Saharan Africa tends to trade more with the ROW. According to an UNCTAD Report (2014), in terms of export restrictiveness, Sub-Saharan African countries faced the most liberal market access conditions with a MA-TTRI [3]of about 1 per cent in 2013. This is largely due to unilateral preferences with developed countries especially in Europe and USA. The same report noted that Sub-Saharan Africa market access is often relatively more favorable for inter-regional than intra-regional exports. This is partly due to preferences granted to least developed countries (LDCs), but also owing to tariff barriers imposed by Sub-Saharan African countries on trade amongst each other. The report further

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[2] *comstat.comesa.int/*
[3]MA-TTRI: is an index measuring the average level of tariff restrictions imposed on exports

highlights that Tariff Policy space is greater for Sub-Saharan African countries and lower income countries in general because of larger tariff water. [4] In this regard, boosting intra-regional trade will involve removal of tariff and non-tariff barriers (NTBs) that hinder trade. For the COMESA region, removal of NTBs remains very critical for increasing trade in agricultural commodities.

A two year (2012 and 2013) snap shot review of trade balance in these aggregated agricultural commodities show that the region's import bill is mainly composed of processed food rather that agricultural raw materials as Figure 2 below shows.

Figure 2: Trade Balance in Agricultural Commodities (US$ Million)
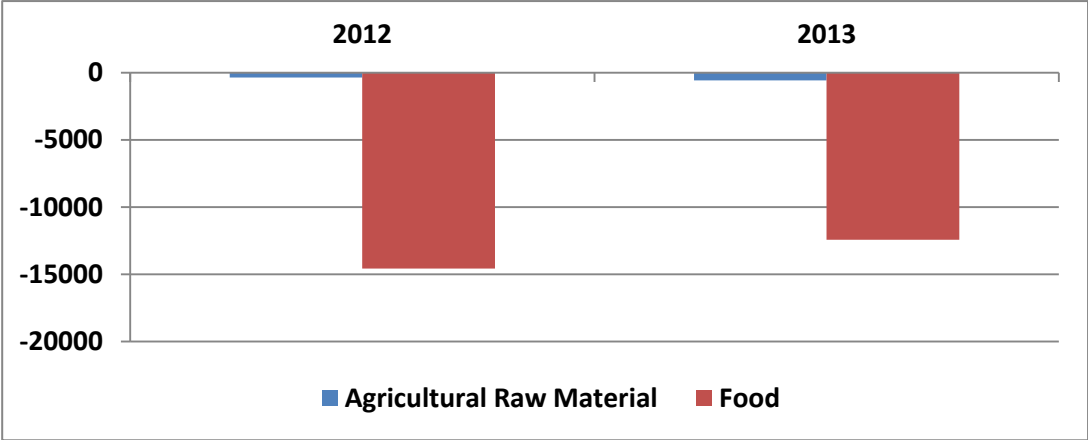
Source: By Author from COMSTAT Data

This trade deficit in processed food commodities is likely to rise even further, thanks to the bulging middle class and increasing demand for sophisticated food commodities, unless the region invest in agro-processing. These observations clearly support value addition through regional industrialization and trade facilitation.

However, to guide agro-processing, countries need to target commodities where they show RCA, especially in the parent raw materials. Using the product space, Hausmann and Klinger (2007) argue that countries change their export mix by jumping to products that are nearby, in the sense that these other products use similar capabilities to those used by the products in which they excel (i.e., those products in which they have revealed comparative advantage).

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[4] The extent to which a country's WTO bound tariff rate exceeds its applied rate

The concept of comparative advantage is applied to explain the propensity for countries to export commodities which they produce relatively more efficiently when compared to trading partners in a reference trading bloc. This implies that countries will have a tendency to export those commodities that they produce at the lowest cost. If this idea is pursued, it can be useful because it can encourage countries to specialize in commodities that they produce more efficiently and through trade, this will result in a more efficient use of scarce resources. There is no reason why this important trade concept cannot be used to inform agro-processing and value addition.

Value addition, product diversification and trade have a significant role to play in national and regional development. Studies have shown that countries with diversified production, and which are export oriented have relatively higher income per capita (Imbs and Wacziarg, 2003; Carrere, Strauss -Kahn, and Cadot, 2007). Further studies suggest that countries that produce and export value added products have stronger economies that their counterparts (Hausmann, Hwang, and Rodrik, 2007; UNIDO, 2009, De Ferranti et. al., 2000).

Agriculture, being vital in for most COMESA member states economies, is therefore a key sector to target for industrialization through the establishment of agro-food industries. COMESA industrialization policy realizes this, thus placing emphasis on agro-processing as a key pillar for industrialization. Industrialization, as defined in the EAC industrial strategy of 2012-2022, is the process in which a society or country transforms itself from being predominantly an agricultural economy and a producer of primary commodities to an economy largely driven by manufacturing of goods and services. The process of industrialization also gives rise to product diversification. Diversification can be attained through various ways. It could take the form of a movement into the production of higher value-added activities in existing export sectors (Pant and Panta, 2009).

With this pre-able, the aim of the paper is twofold: firstly, to determine the level of agro-processing in the region and secondly, in support of the COMESA industrial policy and strategy, to identify commodities countries could focus on in setting up agro-food industries. To address these two issues, RCA is determined for selected agricultural commodities which are divided into raw/semi processed and highly processed food stuff.

The rest of the paper is organized as follows: Section 2 describes the modeling approach used, section 3 presents the results, section 4 is the discussion and section 5 is the conclusion and policy recommendation.

2. Modeling Approach

One of the most potent and commonly used measure of industrial competitive performance, and which have gained international acceptance is the RCA (Galleto, 2003; Winkelman et. al., 1995, Utkulu et.al., 2004). The RCA was first introduced by Balassa in 1965 to identify the relative trade performances in countries. Given its long history and practical use, it has gained greater acceptance among applied trade economists. Hinloopen and Marrewijk (2001) argue that the use of the RCA index for identifying a country's weak and strong sectors is widespread, both among the academic scholars and the policy makers. It is considered to be a more appropriate measure of competitiveness because a group of countries is expected to have a much greater impact at the world level than an individual economy (Bender and Li, 2002; Batha and Jooste, 2004).

For a given country, Balassa (1965) defines the RCA of a product as the ratio of the share of that product in world trade. It measures a nation's exports of a product or service relative to its overall exports and to the corresponding export performance of a set of countries (Ferto and Hubbard, 2002). The Balassa index basically measures normalized export shares, with respect to the exports of the same industry in a group of reference countries.

Since it was first proposed, the Ballasa index has undergone many transformation and variation by various scholars (please see Memedovic,1994 and Vollrath, 1991). Below is the presentation of the commonly used indexes.

The standard Balassa index is specified in equation 1 below:

$$RCA_k^i = \frac{X_k^i / X^i}{X_k / X}$$

(1)

Where, with reference to a give region or globe;

X_k^i refers to exports of country i for commodity k; X^i refers to total country i exports; X_k refers to total exports of commodity k; X refers to total exports.

In the above formulation, RCA > 1 means a country has a revealed comparative advantage in commodity k while RCA<1 means the country has revealed comparative disadvantage in commodity k.

Donges and Riedel (1977) suggested the specification below:

$$RCA_k^i = \frac{\left. X_k^i - M_k^i \middle/ \sum_i X_k^i + M_k^i \right.}{\left. \sum_i X_k^i - \sum_i M_k^i \middle/ \sum_i X_k^i + \sum_i M_k^i \right.}$$

(2)

Where X refers to exports, M refers to imports, *i* refers to country and k refers to commodity. Again, in this specification, RCA>1 indicates that country *i* has comparative advantage for commodity k.

Bowen (1983) suggested the following calculation:

$$RCA_k^i = \frac{\left. T_k^i \middle/ Y^i \right.}{\left. \sum_i Q_k^i \middle/ Y_w \right.}$$

(3)

Where T_k^i refers to country i net trade (i.e. production minus consumption) of product *k* and Y^i and Y_w represent country *i*'s GNP and the world GNP, respectively; Q_k^i represent country *i*'s production of k. RCA>0 indicates country *i* has a comparative advantage in production of *k*; the greater the index, the stronger the advantage.

Vollrath (1991) suggested the following indices:

$$RCA_k^i = \frac{\left. X_k^i \middle/ X^i \right.}{\left. X_k \middle/ X \right.} - \frac{\left. M_k^i \middle/ M^i \right.}{\left. M_k \middle/ M \right.}$$

(4)

$$RCA_k^i = ln\frac{X_k^i / X^i}{X_k / X}$$

<div align="right">(5)</div>

$$RCA_k^i = ln\frac{M_k^i / M^i}{M_k / M}$$

<div align="right">(6)</div>

where X_k^i and X^i represent country *i*'s exports of product *k* and its total exports of other products; X_k and X represent the exports of product *k* and the total exports of other products by the rest of the world; M_k^i and M^i represent country *i*'s import of product *i* and its total imports of other products; finally, M_k and M represent imports of product *k* and total imports of other products by the rest of the world. In all these specifications, a positive RCA reveals a comparative advantage, while a negative value reveals a comparative disadvantage.

For this study, the RCA index as shown in equation 1 will be used. This is because the only data needed is the export data, making the analysis straight forward and yet robust. In general, all the indexes described above have some measurement problems, since they are defined in terms of autarkic price relationships that are not observable (Bender and Li, 2002; Batha and Jooste, 2004). They assume that the true pattern of competitive advantage can be observed from post-trade data, and trade statistics reflect only post-trade situations. Given that trade patterns may be distorted by government interventions (e.g. import restrictions, export subsidies), this may to an extent distort the RCA index, thus causing misrepresentation of underlying competitive advantage. Despite this, Bender and Li (2002) and Batha and Jooste (2004) are of the opinion that the RCA index is still acceptable since the impact of changes in trade policies can be deducted from movements of the RCA, even though it fails to distinguish between a region's factor endowments. Using equations with both exports and imports specification to calculate RCA indexes only confounds the problems cited.

As has been mentioned, this study uses the standard Ballasa index as shown in equation (1). However, the shortfall of RCA as specified in equation (1) is that it is asymmetric, meaning it has no upper bound for products with a revealed comparative advantage but lower bound at 0 for those with comparative disadvantage. The solution to this is to normalize the index, as has been proposed by Laursen (2000), who came up with the specification below:

$$NRCA_k^i = \frac{RCA_k^i - 1}{RCA_k^i + 1}$$

(7)

In this specification, $0 < NRCA_k^i < 1$ means country *i* has revealed comparative advantage in exporting product (or group of products) *k* to the world (or group of countries of reference). Similarly, $-1 > NRCA_k^i > 0$ means country *i* has revealed comparative disadvantage in exporting product (or group of products) *k* to the world (or group of countries of reference).

Data Source:

The data used for this analysis is obtained from COMSTAT.[5] These statistics are mainly derived from Member Country *EUROTRACE* databases. Statistics on International Trade in Services are derived from the balance of payments current account data from Central Banks of Member Countries. The time span for the analysis is from 2005 to 2013, giving a total of 9 years. The choice of more recent time span is on the premise that improvements in regional integration and economic progress will result in less trade distorting policies and advances in agro-processing, thus resulting in more robust RCA values.

3. Results

The products selected and their RCAs are reported in Tables 1 and 2 below:

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[5] http://comstat.comesa.int/DataAnalysis.aspx

Table 1: RCA, Selected Raw or Semi-Processed Agricultural Commodities

Commodity	Countries' RCA		
	Weak	**Intermediate**	**Strong**
0102 Live animals	Eritrea: Mauritius	Djibouti	Ethiopia: Rwanda: Sudan
4101 Raw hides and skins of bovine or equine animals, fresh or salted, dried, limed, pickled or otherwise preserved, but not tanned, parchment-dressed or further prepared, whether or not dehaired or split	Ethiopia, Madagascar	DRC	Burundi, Kenya, Libya, Rwanda, Sudan
0302 Fish, fresh or chilled (excl. fish fillets and other fish meat of heading 0304)	Burundi: Comoros: Djibouti: Sudan: Zambia	Eritrea: Libya: Mauritius: Rwanda	Ethiopia: Madagascar: Seychelles: Uganda:
0401 Milk and cream, not concentrated nor containing added sugar or other sweetening matter	Kenya: Libya: Malawi: Zambia	Zimbabwe	Egypt: Uganda
071410 Manioc (cassava)	Burundi: DRC : Ethiopia: Madagascar: Malawi: Zimbabwe	Rwanda	Uganda
090111 Coffee (excl. roasted and decaffeinated)		Comoros	Burundi, Ethiopia, Kenya, Rwanda and Uganda
100199 Wheat and meslin (excl. seed for sowing, and durum wheat)	Burundi: Djibouti: DRC: Malawi: Rwanda	Ethiopia: Uganda	Kenya
100590 Maize (corn)	Burundi		Malawi: Uganda: Zambia
100610 Rice in the husk, "paddy" or rough	Ethiopia: Libya: Malawi: Rwanda: Uganda		Egypt
100790 Grain sorghum	Djibouti: DRC: Malawi: Rwanda: Uganda: Zambia	Ethiopia: Kenya: Sudan	
1701 Cane or beet sugar and chemically pure sucrose, in solid form	Madagascar	Burundi, Uganda	Kenya, Swaziland, Malawi
070190 Potatoes, fresh or chilled.	Madagascar: Malawi: Zimbabwe		Ethiopia: Rwanda
0805 Citrus fruit, fresh or dried.	Swaziland		Egypt: Ethiopia: Kenya: Zimbabwe

Table 2: RCA, Selected Processed Agricultural Commodities

Commodity	Countries' RCA		
	Weak	**Intermediate**	**Strong**
0201:Meat and edible meat offal	Libya: Madagascar: Mauritius: Rwanda: Uganda: Zambia	Zimbabwe	Ethiopia: Kenya: Sudan
0304 Fish fillets and other fish meat, whether or not minced, fresh, chilled or frozen		Madagascar	Kenya,
0406: Cheese and curd	Burundi: Djibouti: Mauritius		Egypt
0403: Buttermilk, curdled milk and cream, yogurt, kephir and other fermented or acidified milk and cream, whether or not concentrated or flavoured or containing added sugar or other sweetening matter, fruits, nuts or cocoa	Mauritius		
110429 Grains of cereals, hulled, pearled, sliced, kibbled or otherwise worked (excl. rolled, flaked, flour, pellets, and oats and maize, and husked and semi- or wholly milled rice and broken rice)			Egypt, Ethiopia
110510 Flour, meal and powder of potatoes			
110811 Wheat starch			Egypt, Kenya
110812 Maize starch		Egypt,	
110813 Potato starch		Egypt,	
120034 Cassava Starch	Kenya		
170211 Lactose in solid form and lactose syrup, not containing added flavouring or colouring matter, containing by weight >= 99% lactose, expressed as anhydrous lactose, calculated on the dry matter		Kenya	
170230 Glucose in solid form and glucose syrup, not containing added flavouring or colouring matter and not containing fructose or containing in the dry state, < 20% by weight of fructose			Kenya
170260 Fructose in solid form and fructose syrup, not containing added flavouring or colouring matter and containing in the dry state > 50% by weight of fructose (excl. chemically pure fructose and invert sugar)	Kenya		
170290 Sugars in solid form, incl. invert sugar and chemically pure maltose, and sugar and sugar syrup blends containing in the dry state 50% by weight of fructose, not flavoured or coloured, artificial honey, whether or not mixed with natural honey and caramel			Kenya
1905 Bread, pastry, cakes, biscuits and other bakers' wares, whether or not containing cocoa; communion wafers, empty cachets of a kind	Madagascar	Ethiopia, Uganda	Kenya, Mauritius

	Weak	Intermediate	Strong
suitable for pharmaceutical use, sealing wafers, rice paper and similar products			
090121 Roasted, decaffeinated coffee			Ethiopia, Kenya
1902 Pasta, whether or not cooked or stuffed with meat or other substances or otherwise prepared, such as spaghetti, macaroni, noodles, lasagne, gnocchi, ravioli, cannelloni; couscous, whether or not prepared	Djibouti		Egypt, Kenya, Mauritius, Zimbabwe
1904 Prepared foods obtained by the swelling or roasting of cereals or cereal products, e.g. corn flakes; cereals, other than maize "corn", in grain form, pre-cooked or otherwise prepared			Egypt, Kenya
2009 Fruit juices, incl. grape must, and vegetable juices, unfermented, not containing added spirit, whether or not containing added sugar or other sweetening matter	Djibouti, Uganda		Egypt, Kenya
4101 Raw hides and skins of bovine or equine animals, fresh or salted, dried, limed, pickled or otherwise preserved, but not tanned, parchment-dressed or further prepared, whether or not dehaired or split	Ethiopia, Madagascar	DRC	Burundi, Kenya, Libya, Rwanda, Sudan
42 Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silk-worm gut)	Burundi, Kenya		Mauritius, Uganda, Zimbabwe

Source: Author's calculation form COMSTAT DATA

The classification of the RCA into weak, intermediate and strong is as follows:

- Strong – Countries showing RCA for more than 5 years;
- Intermediate – Countries showing RCA for 3-5 years;
- Weak – Countries showing RCA for 1-2 years.

4. Discussion

Trade statistics reveal that COMESA is still a net importer of agricultural commodities, especially processed food products. Intra-regional trade in agricultural commodities remains very low when compared to trade with the ROW. In this regard, efforts should be geared towards import substitution programmes and to enhance intra-regional trade. To tap into this potential, there is need to develop agricultural productivity and agro-processing industries. To guide and inform agro-industrialization, the concept of RCA has been applied as initially defined by Ballasa in 1965.

Results show that countries like Ethiopia, Rwanda and Sudan have a scope to develop meat value chains since they show strong RCA in live animals, the precursor commodity to meat and edible offals. However, only Ethiopia and Sudan are showing evidence of adding extra value to their livestock sector since they also show strong RCA in meat and edible offal, being joined by Kenya in this respect. Kenya does not show any signs of RCA in live animals, which could be an indicator that their livestock industry is well developed, with most of their livestock traded after some value addition. Another bi-product of livestock processing analyzed is raw hides and skins, where, Kenya, Libya, Rwanda and Sudan are showing a strong RCA. Paradoxically, Burundi and Libya do not show a strong RCA in meat and edible offals, a by-product of hides and skins. This could be and indicator that most of the meat and edible offals in these two countries are consumed internally, with little being exported.

Further investigation reveals that only Mauritius and Uganda show strong RCA in leather products, whose precursor is hides and skins. This means that Burundi, Kenya, Libya, Sudan and Rwanda have potential to develop leather based industries, which at the moment are showing evidence of being less developed despite the abundance of raw materials.

Ethiopia, Madagascar, Seychelles and Uganda are showing strong RCA in fresh or chilled fish. However, only Kenya is showing signs of adding value to their fish industries, with a corresponding strong RCA in sophisticated fish products like fish fillet.

Egypt and Uganda show strong RCA in milk and cream, with no country showing strong evidence of RCA in milk products like Buttermilk, curdled milk, cream and yogurt. Further, no country is showing evidence of strong RCA in other milk products like cheese and curds except Egypt, which shows no evidence of RCA in the precursor commodity (milk and cream). This could mean that most milk in Egypt is exported in processed form, an indication of strong industrialization and agro-processing in this sector. However, there is scope for further diversification of Egypt dairy sector given that the country is not showing any RCA in other sophisticated milk products like butter and yogurt. Further, no country is showing strong RCA in sophisticated milk products like lactose, an indication that there is still a large scope for value addition and product diversification in the COMESA milk sector.

Burundi, Ethiopia, Kenya, Rwanda and Uganda show strong RCA in unprocessed coffee with Ethiopia and Kenya only show strong evidence of RCA in processed decaffeinated roasted

coffee. This means there is scope for countries like Burundi, Rwanda and Uganda to develop their coffee value chains since they show strong RCA in the raw precursor commodity

Very few countries show evidence of RCA in highly processed food products like wheat starch, maize starch, potatoes starch and cassava starch with the exception of Kenya. Further, only Kenya and Madagascar show strong RCA in wheat products like bread, pastry and biscuits. This is despite the fact that several countries show strong RCA in many starch precursor commodities like potatoes, maize, wheat, cassava and rice. With respect to cereals, only Egypt and Kenya show strong RCA in prepared food cereal products despite many countries showing strong RCA in the precursor commodities.

Egypt, Kenya and Mauritius show strong RCA in pasta and pasta related commodities with only Kenya also showing also showing a strong RCA in the precursor commodity, which is wheat. This could be an indicator that Egypt and Mauritius have well developed wheat value chains and hardly export wheat and meslin in raw form.

Kenya, Malawi and Swaziland show strong evidence of RCA in cane and beet sugar with no corresponding RCA in sophisticated sugar products like glucose, fructose and syrups. Egypt, Ethiopia, Kenya and Zimbabwe show strong RCA in citrus fruits with only Egypt and Kenya showing strong RCA in value added fruit juices.

In summary therefore, this analysis suggest that most COMESA member states export raw unprocessed agricultural commodities. Further, even though some countries show evidence of adding value to their raw agricultural commodities, there is still scope for product diversification. This means that there is still a huge potential for investment in agro-processing if the region is to increase intra-regional trade in sophisticated food commodities and reduce their imports from the ROW.

Caveats and suggestions for further research:

Despite its usefulness and ease of manipulation, the RCA heavily relies on the quality and availability of the trade data. Conclusions can be flawed if the quality and availability of trade data is limited. For further research in using RCA to inform industrialization, there is need to

expand the products under analysis. It may also help to use RCA indices that include imports for comparison and increasing robustness of the analysis.

5. Conclusion and Policy Recommendations

This analysis has shown that there is a still a big potential for the COMESA region to develop agro-processing industries. Agro-processing increases the income multiplier of agricultural commodities. It also creates employment along the food chain. Establishing agro-industries should be guided by the countries' abilities to produce the precursor raw material, as discussed in this paper. That said, agro-processing should also be accompanied by Good Agricultural Practices (GAP) in a Hazard Analysis Critical Control Point (HACCP) production systems. These systems should articulate issues of labeling, certification and traceability in order to enhance trade and regional integration.

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