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The Role of Policy and Governance



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Analysis of trade data quality in Eastern and Southern Africa region

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Abstract

Trade stakeholders such as national governments and regional economic communities have been investing to enhance intra-regional trade in Eastern and Southern Africa region. To measure the results of these investments, good and reliable trade data are essential. Any trade related policy decision making and planning are made based on analysis of available data. If the quality of trade data has a problem, the resultant macro-economic analysis and policy recommendation are misleading. Country A's recorded exports to Country B should match Country B's recorded imports from Country A, i.e. identical mirror records. Due to weak data infrastructure (entailing difficulties in data harmonization, different data collection methodologies and missing data), mirror statistics are often very different. The focus of this paper is to analyze the status of the quality of trade data in ESA region by use of total and absolute average discrepancy for the period 2010-2014. The methodology analyses consistency of trade data involving a specific product and on bilateral trade involving a sample of products. Focus products are grains and pulses, livestock/products, processed flour and vegetables, chosen based on data availability and prominence in food trade. The results show mixed scenarios: for some countries and products trade statistics are consistent while for others discrepancies were noted. We recommend continuous capacity building and strengthening of systems for collecting, analyzing and reporting trade data. There is need for joint data reconciliation and synchronizing data collection systems and procedures. We also recommend studies to establish the causes and characteristics of data discrepancies.

Key words: Data Quality, Exports, Import, Maize, Trade

Introduction

One of the key pillars of integration in the Common Market for Eastern and Southern Africa (COMESA) and East Africa Community (EAC) regions is intra-regional trade. The COMESA treaty calls for regional integration agenda through elimination of tariff and non-tariff barriers. The article 3 of the treaty sets out the aims and objectives of establishing the common market. These include:-

- Establishing a customs union, abolish all non-tariff barriers to trade among member countries;
- Establishing a common external tariff; co-operate in customs procedures and activities;
- Simplify and harmonize their trade documents and procedure among others.

Free intra-regional trade has potential to improve the welfare of citizens by improving food security, addressing poverty and increasing incomes. Free intra-regional trade increases availability of food, provides stability against domestic price surges, fosters growth of markets and ultimately drives economic growth (Durkin, 2015). Notably, trade especially in staple foods is expected to grow rapidly in the ESA region due to expanding markets as a result of rapid population growth, favourable economic prospects and rapid rate of urbanization. Further, the ESA region experiences diversified and different rainfall patterns across the countries resulting to staggered harvesting especially of main staples all year around. The staggered harvesting leads to diversified harvesting season which serves different markets in each country. Through cross-border trade food then moves from surplus areas in one country to food deficit areas in neighbouring countries throughout the year due to the staggered harvesting seasons.

Over the years, many stakeholders such as the national governments, regional economic communities, donor community, among others have been investing to enhance intra-regional trade in ESA region. In order to measure the results of these investments, good and reliable data on the volume and value of trade are essential. Reliable data reporting systems are essential for assessing the impacts of regional trade policies and trade enhancing investments. Any trade

related policy decision making and planning are made and implemented based on analysis of available trade data. Thus the need for good quality data to ensure accurate and evidence based decision making.

Ideally, data on the goods traded between two countries should be captured by each country respective customs office. Country A's recorded exports to Country B should be identical to Country B's recorded imports from Country A (mirror records). This sometimes is not the case due to some discrepancies caused by errors and different methods used in data collection, analysis and dissemination. However, the ideal expectation is that the two sides of the mirror statistics should be more or less similar. In developing countries due to weak data infrastructure, mirror statistics from two countries are often very different compromising the quality of trade data. Weak data infrastructure includes difficulties in data harmonization due to use of different recording systems, different data collection methodologies in addition to missing/incomplete regional trade data due to unrecorded trade. Poor quality data affects planning, monitoring and effective decision making. Thus the focus of this paper is to establish the status of the quality of trade data in ESA region by use of the discrepancy analysis and also find out if the trade data has improved since 2010-2014.

Literature review

A. Sources of discrepancies in trade data

Sources of data discrepancy between mirror records of export and imports include the following:

- a. Timing. Trade may be recorded at different times causing data discrepancy. Trade recorded and exported in one year and arrives destination in the next year is likely to be different due to some aspects like difference in exchange rates. If trade is growing very fast and trade recording is done on monthly bases, time lag in recording export and the imported goods may cause discrepancies.
- b. Shipping and insurance costs. Most countries report export data on a Free on Board (F.O.B) bases while for imports they are reported on Cost, insurance and Freight (C.I.F.) bases see Tsigas *et al.* (1992). The shipping and insurance costs are thus added up to the value of exports in order to move the goods from one

place to another causing the import data to be higher than export data. This creates a systematic reason for import data to be a little larger than export data.

- c. Difference in classification of goods. Goods may be classified differently by the exporter and the importer.
- d. Re-exports: Traded goods can move from country A to country B then to country C. In this case, goods may be recorded to originate from country A with a final destination to country B which can be different from country A as origin to destination C.
- e. Mis-invoicing and mis-attribution. Mis-invoicing involves under invoicing and/or over invoicing which is declaring the value of goods to be either higher or lower than their true value while mis-attribution takes place when traders deliberately make false declarations about the origin or destination of a good. This can be done by traders in order to evade tax/tariff.
- f. Smuggling. This may lead to discrepancy in trade statistics if a commodity is considered legal in one country while illegal in the other country causing commodity smuggling which is not recorded in official statistics so its value is zero. Some illegal goods may include certain drugs, explosives, weapons or pornographic materials among others.
- g. Non-recording of trade. This may occur when an exporter records the traded goods while the receiving country, the importer, does not record the imported goods.

B. Literature on trade data discrepancies

Good quality statistics are important as a resource for planning, policy and decision making. Macro and micro decisions are made based on available statistics thus if data is of poor quality, the analysis leads to unreliable and inaccurate planning and decision making. There is thus the need to improve trade data quality and hence facilitate trade policy analysis.

Sika *et al*, (2010) carried out a study on developing trade indicators which can be used to assess the intraregional trade dynamics for the main staple foods in the ESA region. Several available trade data sources were explored. Both formal and informal trade data were considered in order

to identify countries and products likely to be associated with reliable reported trade data. In the process, the project identified inconsistency in trade data from different sources. A comparison of mirror data showed high level of discrepancies in export and import data in the region across countries. Data on the exports of maize grain from Kenya and Tanzania to the region and exports of tomato and bovine meat from Uganda to the ESA region were reported to be consistent. The study by Sika *et al* (2010) clearly indicates the importance of good quality data in trade indicator development. Trade indicators can be used to show the impact of trade policy change and investment initiatives. The current study adds value to the study by Sika *et al* (2010).

International Trade Centre, (2005) has developed a write up on reliability of trade statistics. The notes have given methodological information on the indicators of consistency between trade figures reported by countries and their corresponding mirror estimates. The ITC work has also discussed the sources of discrepancies in reported trade data among them being different time of trade data recording, different trade system, re-exports, different classification, valuation of trade at CIF or FOB or even discrepancies can be caused by errors and estimation. ITC has also proposed various indicators that could be used to assess the discrepancies in reported trade data. ITC (2005) has proposed two methodologies that can be used to analyze trade data discrepancies mainly total discrepancy measure which assesses the consistency of the trade data reported at aggregated levels and an absolute average discrepancy measure which assesses the consistency of the trade data reported per product or on bilateral trade. The current study has used both total and absolute average discrepancy to evaluate trade data quality in ESA.

Munalula and Walakira (2007) reported on the methods used for measuring and monitoring data quality for international merchandise trade statistics (IMTS) in COMESA region. The study looked at methodological basis for compilation of IMTS, accuracy and reliability including data sources and assessment of the data sources. The study further looked at timeliness, consistency and accessibility of the trade data. The study findings suggest that most of COMESA member countries did not use similar methodological tools in collecting trade data. By 2006, the countries used different versions of the harmonized system to disseminate data. The data also lacked country of origin/destination. This brings in the challenge of data harmonization. Discrepancies were also observed in mirror statistics. A few countries transmitted data after the expected period

of data transfer which is three months after the reference month. The data was also reported to be accessible online to the public. The study recommends monitoring and evaluation of the quality of trade data of COMESA member states through online set up.

Yeats (1990) attempted to answer the question; do Sub-Saharan trade statistics mean anything? Using trade reconciliation and evaluation procedures by Organisation for Economic Co-operation and Development (OECD) the study by Yeats (1990) analyzed the accuracy of trade statistics by comparing the reported value of African exports with trade partner countries' reported import values. The results of the study showed major discrepancies between the trading partner exports and imports. The study attributed the discrepancies to majorly false invoicing and smuggling. Yeats (1990) concluded that there are major differences in intra-African trade statistics. Further statistical tests showed that the African trade data cannot be relied on to indicate the level, direction and trends in African trade. The Yeats' study gives basis for the current study, what is the level of intra-regional trade data discrepancies in ESA? Is the trade data still unreliable since 1990? Has the quality of trade data improved especially in the COMESA region? This study will attempt to answer this question using data on selected commodities traded among several countries in the East and Southern Africa region.

In a different continent from Africa, Ferrantino and Wang (2007) looked at discrepancies in bilateral Trade using the case of China, Hong Kong, and the United States. Mirror statistics was used to calculate the magnitude of statistical discrepancy. The study analyzed the data for China and multiple trading partners, Hong Kong being a re-exporter/re-importer. The study concluded that reporting of different values to importing and exporting authorities is a source of discrepancies in trade data. The misreporting of origins and destinations due to goods passing through many countries was also found to cause discrepancies in trade data.

Hamanaka (2011) assessed the quality of Cambodia's export and import statistics by use of mirror statistics of its trade partners. The paper identified discrepancies in trade data and the inconsistent in data was mainly caused by both commodity and direction misclassifications.

Hamanaka argues that a single bilateral mirror comparison does not give the manner in which misclassifications are committed. Which side, exporter/importer can be argued to have generated

the inaccurate statistic? Hamanaka recommended the use of multiple mirror comparison technique. This technique compares the results of various bilateral mirror analyses of trade statistics thus can be able to tell which direction and commodity misclassifications have originated from. Focus of current study is to determine the quality of trade data in ESA. Hamanaka study has enlightened on areas that require further research, if trade data is found to be of low quality in ESA, further research need to identify the manner including direction of the data inconsistency.

Hangzhou (2009) examined the bilateral merchandise trade statistics between China and the United States. A reconciliation study was carried out to explain and quantify the statistical discrepancies in the bilateral merchandise trade data. The study found out that the level of bilateral trade between United States and China has continued to grow. As bilateral trade is growing, the level of discrepancies has been growing. However discrepancy in the bilateral trade statistics was observed to decline. The main causes of discrepancy were reported to be conceptual and methodological differences in the collection and processing of the trade data. Specifically the discrepancies were attributed to statistical territory definitions, re-exports and time of recording trade. Intermediary trade and value addition also caused discrepancies. The study went further to adjust for discrepancies that can be quantified. This study relates to the current study as it shows areas of further research. If the current study reports noted trade data discrepancies, there is need for further research to establish the causes and characteristics of trade data discrepancies in ESA region.

Methodology

Choice of countries and food commodities

The countries of focus in this study are Burundi, Ethiopia, Kenya, Malawi, Rwanda, Uganda, Tanzania and Zambia. Apart from Tanzania, all the other countries are member of COMESA; the Regional Economic Community (REC) in ESA. The focus of this paper is analysis based on intra-regional trade, countries trading with partners in ESA region. The chosen countries were based on availability of data and also those countries with highest maize trade volumes in the region. Tanzania is not a COMESA member state but it is centrally located within the COMESA region and it is a key player in regional food staples trade in ESA. It is also a member of the East

African Community, to which Kenya, Uganda, Rwanda and Burundi belong with reported intra-regional trade especially of maize among the neighbouring countries.

The food commodities were chosen based on availability of data and the volume of trade in those commodities. The commodities of focus in this study are maize grain, rice grain, maize flour, wheat flour, beans and pulses, onions, tomatoes, live bovine animals, milk and cream, bovine meat, fish and crustaceans.

Data source

The data used were obtained from:-

i. COMSTAT

This is the COMESA data portal. The portal contains formal trade data as reported by individual COMESA member states to COMESA Secretariat. The quality of the data in terms of its accuracy, completeness and consistency is largely dependent on the capacity of national data systems in collecting, collating and reporting on trade data and statistics. It is also dependent on the ability of COMSTAT staff to cross-check the data and request countries to act when obvious anomalies are noted.

ii. Tanzania Revenue Authority (TRA)

Tanzania is not a COMESA member state but due to its geographic proximity and close trade relations with many countries in the ESA region, it has been included in the current study. Since it is not a COMESA member state; the country is not obligated to report formal trade data to COMSTAT. Formal trade data for Tanzania is therefore obtained directly from the Tanzania Revenue Authority.

Methodology for trade data discrepancy analysis

There are several measures of trade data discrepancy analysis that are used to measure consistency of reported data (ITC, 2005). The discrepancy analysis in the current study is based on a methodology developed and applied by the International Trade Centre (ITC, 2005). The ITC methodology assesses the consistency of reported data on the trade involving a specific product and also on the bilateral trade involving a sample of products, which is focus of our

discrepancy analysis. Discrepancy represents the difference expressed in percentage, between values of country initiating the mirror analysis and value of partner country with which the comparison is performed. The discrepancy is possible between 0% and 200%. If there is no discrepancy, it means that there is no difference in the data between two countries which is very rare occurrence, if the discrepancy is 200% it implies that one of countries has not registered the external trade. Generally trade between two countries, A and B, should be a mirror image of each other. In practice however, disparities exist between bilateral merchandise trade flows published by two countries.

For this study, we report total regional trade discrepancy and absolute average discrepancy of volumes and values since 2010 to 2014. Total regional trade discrepancy (To) expresses the sum of differences between exports of the product to each destination and mirror import records by each partner country as a ratio of total trade of that country for that product while average absolute discrepancy (Ao) shows the total discrepancy but avoiding the possibility of positive and negative discrepancies cancelling each other out. More details below:

1. Total regional trade discrepancy (To)

This expresses the sum of differences between exports of the product to each destination and mirror import records by each partner country as a ratio of total trade of that country for that product. The total discrepancy measure for trade data reported on product ‘p’ relative to exporting country ‘o’ is computed as follows:

$$T_{p,o} = \frac{(\sum_d(M_{p,o,d} - E_{p,o,d}))}{(\sum_d(M_{p,o,d} + E_{p,o,d}))} \dots\dots\dots (1)$$

where:

$E_{p,o,d}$ = reported exports of product ‘p’ from country ‘o’ to country ‘d’

$M_{p,o,d}$ = reported imports of product ‘p’ from country ‘o’ to country ‘d’; mirror value

The value of the discrepancy varies between 0% and 100%. The lower the value, the higher the degree of consistency. For example, a value of 10% indicates a stronger level of consistency of

trade statistics than a value of 20%. ITC suggests that total discrepancy measure should be around 5%, reflecting mainly the fact that import values computed at c.i.f (cost, insurance and freight) price should be slightly higher than the export values computed at f.o.b (free on board) price. For ESA, trade data would be considered consistent if the total discrepancy measure is around 5% but below 15% (Sika *et al*, 2010).

2. Absolute average discrepancy (Ao)

It shows average absolute discrepancy (Ao) in the relationship already expressed in equation 1 but avoiding the possibility of positive and negative discrepancies cancelling each other out and hence leading to the possibility of underestimating existing discrepancies.

The absolute average discrepancy measure for trade data reported on product ‘p’ relative to exporting country ‘o’ is computed as follows:

$$A_{p,o} = \sum_d \left(\frac{|M_{p,o,d} - E_{p,o,d}|}{\sum_d (M_{p,o,d} + E_{p,o,d})} \right) \quad (2)$$

ITC suggests that absolute average discrepancy measure should be around 5%, but for ESA region which is characterized by a generally poor data infrastructure as earlier mentioned, trade data would be considered consistent if the absolute average discrepancy measure is around 10% but below 20%.

The Total regional trade discrepancy (To) and the Absolute average discrepancy (Ao) were computed for eight countries: Burundi, Ethiopia, Kenya, Malawi, Rwanda, Tanzania, Uganda and Zambia and 11 commodities mainly bovine meat, dry legumes and pulses, fish and crustaceans, live bovine animals, maize flour, maize grain, milk and cream, onions, rice grains, tomatoes and wheat flour. The selection of countries and commodities was mainly based on availability of trade data and prominence in staple food trade .

Total and absolute discrepancy was analyzed using data for the period 2010 to 2014.

Results

A. Discrepancy analysis using maize mirror records

This section gives the discrepancies analysis between mirror records of maize trade in selected countries in ESA. Maize is the most important staple food in many countries in ESA (De Groot *et al.*, 2002; Pingali, 2001). Maize is also the most consumed, most traded food staple in ESA (Food trade in East and Southern Africa, 2015), thus main commodity of focus in this section. Mirror records are defined as a “bilateral comparison of two basic measures of a trade flow” (EuroStat, 2005). Mirror statistics are thus used to compare importer’s imports with its partner’s exports, and vice versa. We use both values in US\$ and volumes in kilograms for maize trade.

Maize mirror records between Kenya and Uganda

Figure 1 shows the exports from Uganda to Kenya and the reported imports by Kenya from Uganda. Minimal discrepancy was noted in year 2014 in comparison to the other years mainly by use of volume of maize in kilograms (Figure 1).

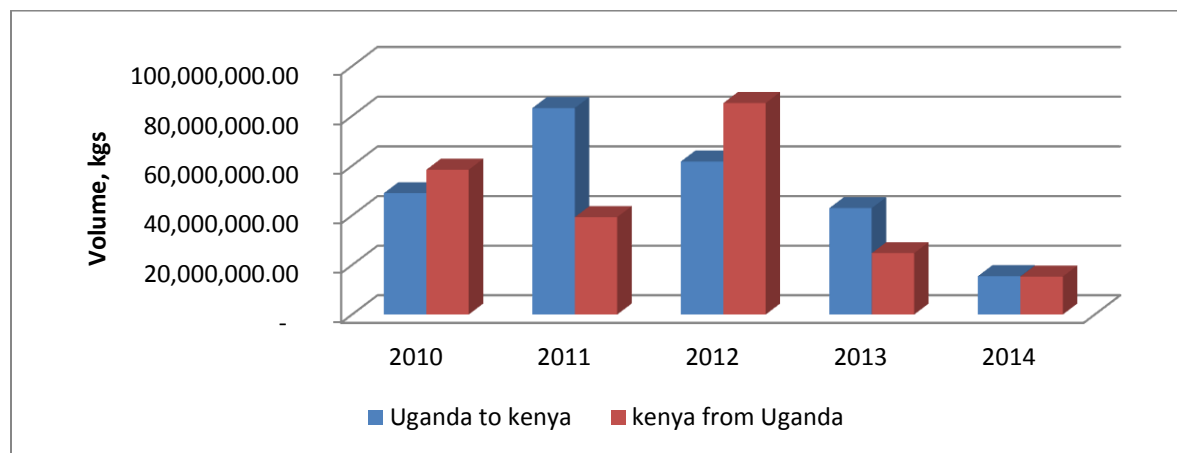


Figure 1: Maize weights in kg, mirror records as reported by Uganda and Kenya

The quality of reported exports by Uganda and reported imports by Kenya by use of maize values in US\$ shows different results unlike in figure 1. Figure 2 shows high discrepancies in trade flows between Kenya and Uganda by use of values in 2014.

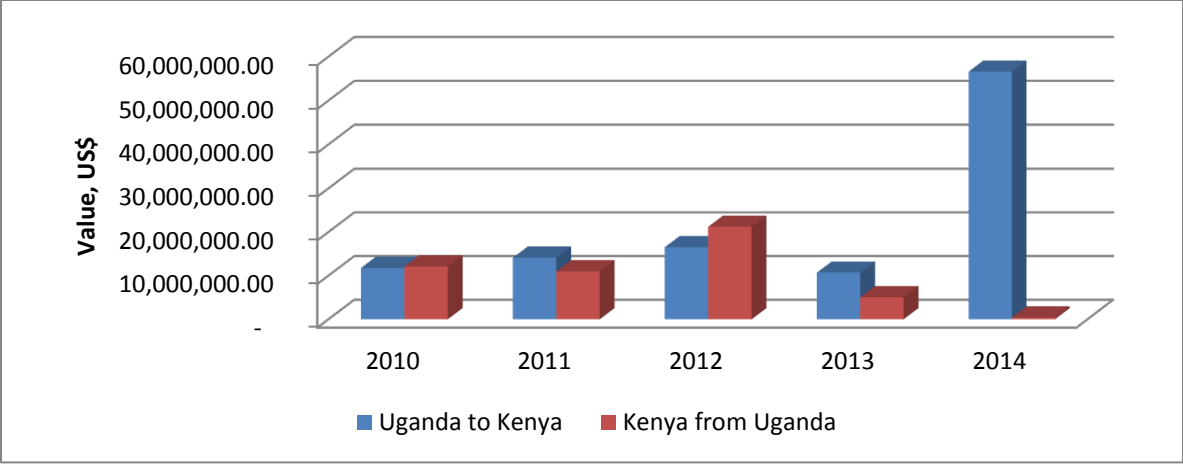


Figure 2: Maize Value (US\$), mirror records as reported by Uganda and Kenya

Maize mirror records between Kenya and Tanzania

Both values and volume imports and exports between Kenya and Tanzania have reported an almost similar trend, minimal discrepancies of reported mirror trade data since 2010 to 2014 (Figure 3 and Figure 4). There is also reported increased trade in 2014 between Kenya and Tanzania.

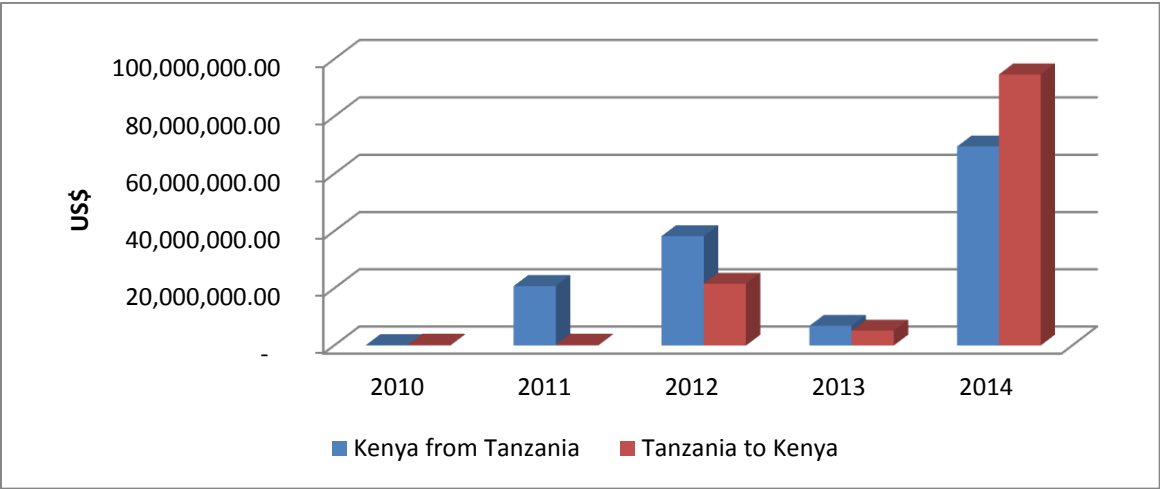


Figure 3: Maize Value (US\$), mirror records as reported by Tanzania and Kenya

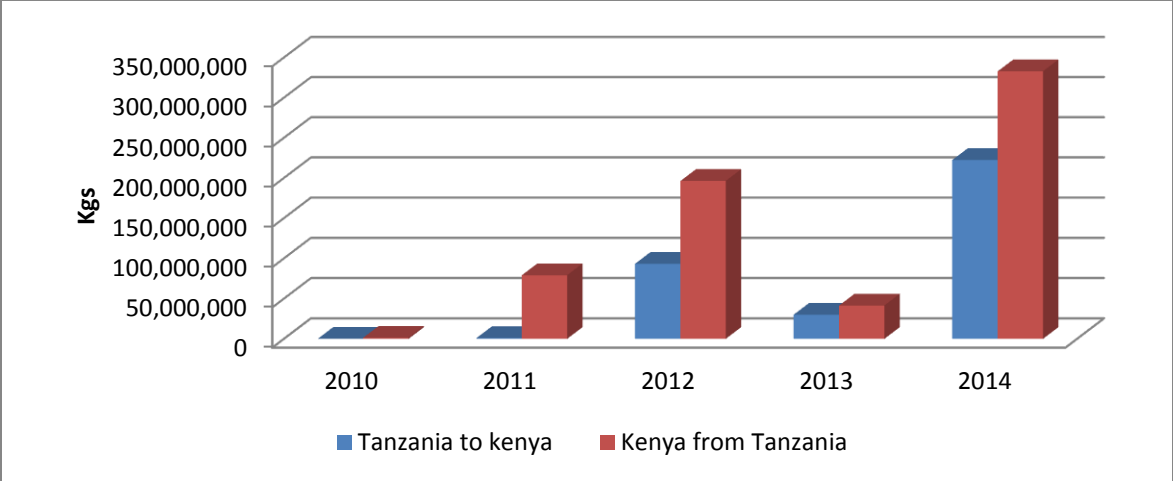


Figure 4: Maize weights in kg, mirror records as reported by Tanzania and Kenya

Maize mirror records between Malawi and Zambia

2012, 2013 and 2014 show some level of reported trade data consistency (Figure 5 and Figure 6) by use of values and volumes of maize trade between Malawi and Zambia. The same scenario has not been reported in 2010 and 2011. This shows improvement in trade data quality over the years (2012-2014) as reported discrepancies are minimal after 2012 to 2014.

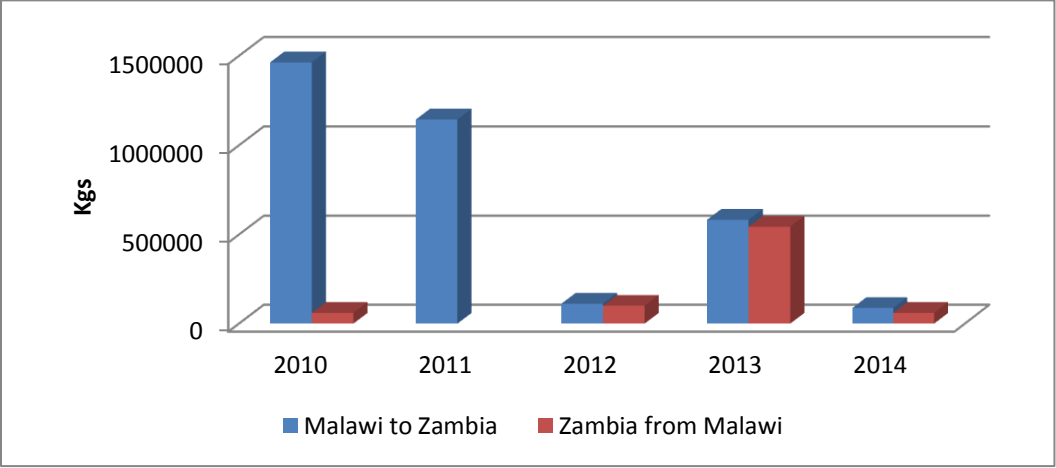


Figure 5: Maize weights in kg, mirror records as reported by Malawi and Zambia

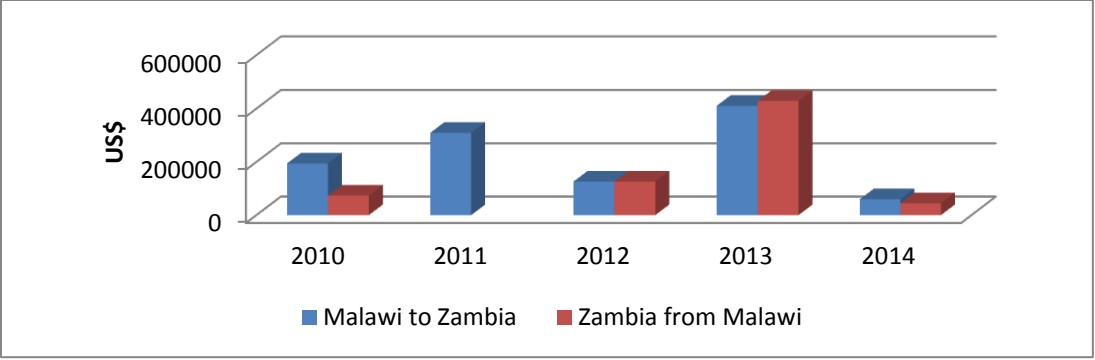


Figure 6: Maize values in US\$, mirror records as reported by Malawi and Zambia

Maize mirror records between Burundi and Rwanda

Mirror records of trade volumes in kilograms between Rwanda and Burundi can be said to be consistent between year 2010 to 2014 (Figure 9)

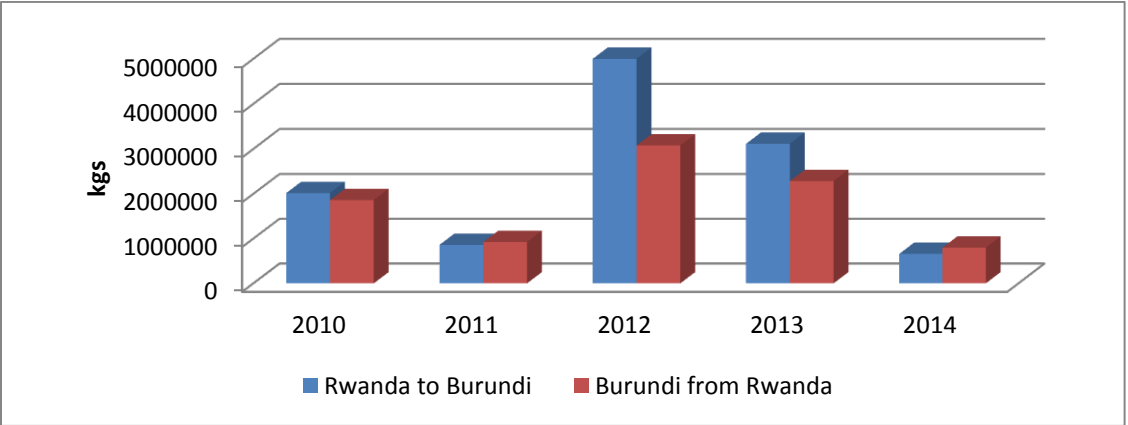


Figure 7: Maize weights in kgs, mirror records as reported by Burundi and Rwanda

Year 2012 shows high level of mirror data inconsistency in value terms between Burundi and Rwanda (Figure 10), showing data discrepancy in 2012.

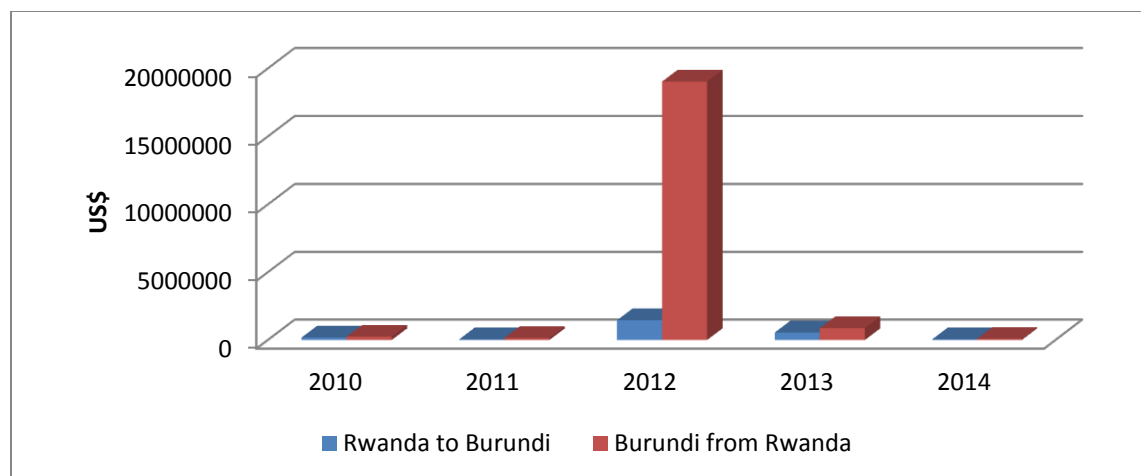


Figure 8: Maize values US\$, mirror records as reported by Burundi and Rwanda

B. Total regional trade discrepancy (To) and Absolute average discrepancy (Ao)

The current study has analyzed total regional trade discrepancy (To) and absolute average discrepancy (Ao) as proposed by ITC, (2005). ITC (2005) reports on methods that can be used to assess the consistency of trade data for a specific product and also on the bilateral trade involving a sample of products. The current study has adopted total discrepancy measure which assesses the consistency of the trade data reported at aggregated levels and an absolute average discrepancy measure which assesses the consistency of the trade data reported per product or on bilateral trade.

Food commodities are grouped according to the below categories:

- I. Grains and pulses comprising of maize grain, rice grains, beans and pulses
- II. Processed flour mainly wheat and maize flours
- III. Livestock\products consisting of milk, bovine meat, fish and crustaceans
- IV. Vegetables mainly tomatoes and onions

The discrepancy analysis results categorized by the groups of commodities for selected countries are reported below. Kenya, Rwanda, Tanzania, Uganda and Zambia are chosen based on availability of trade data and secondly the five countries report high intra-regional trade among themselves. Table 1 shows mixed scenarios among the food commodity categories and across

different countries. The grains and pulses from Kenya to the region are associated with relatively consistent reported trade data especially from 2010 to 2013. The total discrepancy measure for the grains and pulses trade data reported between Tanzania and the region as a whole is inconsistent from 2010 to 2014. However grains and pulses trade data seems to have improved in 2014 in Rwanda but the grains from Zambia to the region shows inconsistency from 2012 to 2014. Processed flours seem to report a different scenario with consistency of data especially in Rwanda and Zambia by use of both total regional and absolute average discrepancy. Livestock/products have also got good consistent data in Rwanda in relation to the region and also on bilateral base. Table 1 clearly shows mixed scenario in consistency of trade data at the regional level.

Table 1: Total regional and absolute average discrepancy (%) between 2010 and 2014 by commodity categories

Country/Product	Total regional trade discrepancy (To)					Absolute average discrepancy (Ao)				
	2010	2011	2012	2013	2014	2010	2011	2012	2013	2014
Kenya										
grain & pulses	12.7	-10.7	-11.1	-17.8	-42.0	17.5	16.4	19.4	53.9	42.2
livestock/products	-21.1	-5.9	-41.7	-42.0	-0.4	52.1	44.8	45.4	55.3	30.1
processed flour	48.3	-39.9	-76.2	-76.7	-5.4	63.6	43.2	79.2	77.0	70.8
vegetables	53.0	16.0	-49.5	-38.3	-33.1	72.6	19.0	50.9	46.9	43.7
Rwanda										
grain & pulses	-22.7	-8.4	56.3	22.7	-9.0	30.7	27.9	60.5	35.8	9.1
livestock/products	4.6	3.6	4.4	5.9	13.1	5.0	6.8	5.5	7.1	17.8
processed flour	2.7	4.8	4.3	9.2	2.5	6.9	4.9	5.2	13.5	2.5
vegetables	-86.4	18.1	-53.3	24.0	81.4	86.8	46.5	57.5	66.1	97.3
Tanzania										
grain & pulses	30.9	54.2	18.9	58.6	46.1	31.7	57.8	25.1	73.5	63.4
livestock/products	-25.9	6.3	-12.1	31.7	61.1	41.0	60.8	56.4	56.5	82.7
processed flour	-1.3	0.4	-94.6	4.4	-78.7	8.5	5.5	96.8	5.4	99.7
vegetables	63.9	70.1	-11.4	-12.9	-0.7	63.9	70.1	20.3	39.9	38.3
Uganda										
grain & pulses	13.5	17.7	26.7	51.7	-6.5	30.2	25.3	32.9	62.6	63.2
livestock/products	8.5	-1.0	16.8	-4.3	16.1	31.0	26.6	24.5	26.0	33.9
processed flour	15.0	11.8	4.6	11.4	-88.8	18.8	17.0	14.6	66.4	93.3
vegetables	88.8	67.3	94.6	89.9	-22.2	100.0	99.9	98.7	98.6	100.0
Zambia										
grain & pulses	2.9	5.8	-29.5	-30.5	24.8	10.0	11.2	29.8	43.0	26.5
livestock/products	3.7	0.1	3.1	-17.8	-24.9	25.2	6.9	7.0	24.5	29.7
processed flour	3.9	4.8	4.6	4.8	9.6	5.6	4.8	4.9	4.8	9.7
vegetables	4.9		-52.9	4.4	5.4	4.9		57.2	4.4	5.4

Source: Authors' computation

Some commodities across the different countries have reported consistent data while some countries have reported high discrepancies in some commodities. The question is what causes these different scenarios? This is an area for further research.

Further, detailed results by individual commodities are reported in Annex 1. Annex 1 shows mixed scenarios of discrepancies in trade data among different countries and commodities for the period 2010 to 2014 just as the analysis by use of categorized food commodities. For example in Burundi, consistent data is only reported in year 2014 for wheat flour only by use of both total and average discrepancies. In Ethiopia consistent data is only reported in year 2012 for bovine meat, live bovine animals, onions and tomatoes by use of both total and average discrepancies analyses. Consistent data in Kenya is only observed for maize grain for year 2010 and 2014 by use of total and average discrepancy method. Malawi has reported consistent data for 2012 to 2014 for rice grain. Further Rwanda data is also consistent over time for maize flour. Live bovine animals trade data is also consistent from 2010-2013 by use of both total and average discrepancies in Rwanda. There is a notable improvement in the quality of trade data on wheat flour trade data from Rwanda. On the other hand bovine meat, dry legumes and live bovine animals trade data from Zambia reports a consistency over time. The discrepancy measures for total trade for most of the traded commodities in Burundi, Uganda and Tanzania, at the regional level, are substantially higher than 10%, and the absolute average discrepancy values for total trade are substantially higher than 20% for most of the commodities under study in the same countries. This reflects data inconsistency due to the high discrepancies. See more details in Annex 1.

Conclusion and recommendation

The computed discrepancy indices have revealed mixed scenarios in trade data consistency. For some countries and some commodities, the trade data quality has improved as the reported discrepancies are within the acceptable percentage limits while some data is highly discrepant.

Some countries have recorded very clear improvement in the quality of trade data. For instance Zambia, the discrepancy indices are consistent for bovine meat, dry legumes & pulses from 2010-2014. Rwanda data is also consistent over time for maize flour. Ethiopia trade data in bovine meat, live bovine animals, onions and tomatoes was only consistent in 2012 and

becoming inconsistent in 2013 and 2014. Further, the discrepancy measure for most commodities in Burundi, Tanzania and Uganda fell outside the acceptable discrepancy level showing high inconsistency in trade data. The discrepancy analysis shows there is need to continue improvement in the quality of trade data due to the noted discrepancies across countries and across commodities.

Good quality trade data is essential for effective policy decision making in the ESA region. We therefore recommend investments aimed at improving the systems for collecting, analyzing and reporting trade data in the region. Specifically this can be achieved through:

1. Continuous capacity building and strengthening of systems of collecting, analyzing and reporting trade data. The capacity building should involve both institutional and human capacity in custom authorities and national statistical organizations.
2. Joint data reconciliation between national statistical office and customs authorities with and between countries.
3. Synchronizing the data collection systems and procedures
4. Awareness creation on importance of good quality statistics in ESA region

There is also need for further research to identify the characteristics and causes of the trade data discrepancy among the trading partners in ESA region.

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Annex

Annex 1: Discrepancies between mirror records in selected commodities (%) between 2010 and 2014

	Total regional trade discrepancy (To)					Absolute average discrepancy (Ao)				
	2010	2011	2012	2013	2014	2010	2011	2012	2013	2014
Burundi										
Dry legumes & pulses	100.0	51.9	99.7	100.0	93.1	100.0	51.9	99.7	100.0	94.1
Live bovine animals	100.0	100.0	25.9			100.0	100.0	25.9		
Maize flour	5.4	-44.9	90.7	99.6	97.3	5.4	74.6	90.7	100.0	97.3
Maize grain	99.8	-31.6	100.0	-92.0	99.3	99.8	57.6	100.0	92.0	100.0
Milk and cream	19.4	100.0	100.0	-94.7	-93.7	100.0	100.0	100.0	100.0	94.3
Onions	100.0	99.3	100.0	91.1	74.5	100.0	99.3	100.0	92.4	76.2
Rice grain	-71.6	61.0	100.0	97.6	100.0	71.6	61.0	100.0	100.0	100.0
Tomatoes	100.0	100.0	100.0	99.8	99.6	100.0	100.0	100.0	100.0	99.6
Wheat flour	100.0	100.0	100.0	-100.0	4.8	100.0	100.0	100.0	100.0	4.8
Fish and crustaceans	100.0	80.2	72.7	-1.0	33.1	100.0	100.0	75.3	99.8	33.1
Ethiopia										
Bovine meat			4.8					4.8		
Dry legumes & pulses	-30.6	-65.1	-53.2	-48.7	-57.4	30.6	100.0	53.6	48.7	57.4
Live bovine animals	-100.0	-100.0	4.8	-100.0	-100.0	100.0	94.8	4.8	100.0	100.0
Maize grain	-86.1	78.4	100.0	100.0	100.0	100.0	99.3	100.0	100.0	100.0
Onions	-100.0	-99.3	4.8	-100.0	-100.0	100.0	100.0	4.8	100.0	100.0
Tomatoes	-100.0	-100.0	4.8	-100.0	-100.0	100.0		4.8	100.0	100.0
Kenya										
Bovine meat	-77.0	19.3	-76.3	-50.7	-29.1	77.1	50.7	76.3	58.2	53.7
Dry legumes & pulses	0.5	-48.8	-31.6	-19.8	-75.3	7.2	3.6	43.3	48.0	75.6
Live bovine animals	-72.3	-1.2	-8.2	10.2	52.3	72.3	20.4	58.7	22.9	52.3
Maize flour	88.8	-10.7	-4.5	-69.6	54.5	89.0	23.1	21.2	70.9	61.0
Maize grain	3.6	-23.1	-7.9	20.5	-8.6	6.4	38.8	14.4	45.1	8.6
Milk and cream	15.1	26.5	-46.8	-47.2	13.1	40.2	9.9	47.1	56.5	20.3
Onions	71.5	6.3	-47.9	-36.7	-32.0	71.5	6.7	49.1	45.6	43.1
Rice grain	48.9	6.4	2.0	-50.9	-27.6	54.4	59.4	4.7	69.4	28.5
Tomatoes	-68.3	59.4	-67.7	-57.4	-49.1	80.0	52.6	71.7	61.4	51.8

Wheat flour	-20.4	-51.8	-91.3	-77.6	-82.1	20.6	53.7	91.4	77.8	83.5
Fish and crustaceans	-60.2	-53.0	6.1	-11.7	-20.7	64.3		12.0	51.5	31.3
Malawi										
Dry legumes & pulses	-28.6	-83.3	-12.0	-12.8	-14.3	28.6	23.8	19.0	12.8	42.1
Maize grain	57.8	22.2	15.0	-28.8	-43.5	84.1	93.7	15.4	31.8	43.5
Milk and cream	100.0	-93.7	-96.6	35.3	-81.9	100.0	61.7	96.6	50.0	81.9
Rice grain	0.2	-49.8	-6.8	-6.7	-1.3	1.7	4.8	6.8	6.7	1.3
Wheat flour	100.0	4.8	-87.3	-100.0		100.0	21.2	87.3	100.0	
Fish and crustaceans	-99.4	-12.7	4.7	-100.0	100.0	99.4		27.7	100.0	100.0
Rwanda										
Bovine meat	-100.0		4.8	100.0	100.0	100.0	42.5	4.8	100.0	100.0
Dry legumes & pulses	-34.2	-4.2	-11.9	8.3	-25.3	34.3	5.9	17.4	20.6	25.3
Live bovine animals	4.7	3.5	4.5	3.9	21.3	4.9	7.0	4.9	5.2	22.8
Maize flour	3.5	7.0	4.8	2.5	4.9	5.6	60.7	4.8	6.7	4.9
Maize grain	8.4	-13.7	80.2	7.5	-26.1	16.8	36.5	83.5	11.2	32.7
Milk and cream	-100.0	-30.1	2.0	7.1	-4.8	100.0	47.2	44.7	7.2	10.4
Onions	-86.4	35.4	-68.5	-20.2	-2.9	86.7	58.2	71.4	46.4	87.9
Rice grain	-4.7	-54.1	5.1	27.3	-7.4	38.8	44.1	5.4	42.1	7.4
Tomatoes	-100.0	-44.1	-12.2	100.0	99.3	100.0	4.8	20.2	100.0	99.3
Wheat flour	-6.3	4.7	4.2	12.3	1.6	23.2	23.2	5.3	16.6	1.6
Fish and crustaceans	4.9	23.2	3.7	-39.1	6.7	4.9		5.7	41.3	6.9
Tanzania										
Bovine meat			11.4				100.0	11.4		
Dry legumes & pulses	100.0	100.0	100.0	100.0	100.0	100.0	88.8	100.0	100.0	100.0
Live bovine animals	-86.2	-21.5	15.6	-84.3	-68.8	87.1	88.3	23.8	84.6	89.6
Maize flour	-82.4	43.8	43.8	36.2	53.8	86.8	100.0	82.8	36.2	76.4
Maize grain	19.5	82.9	16.6	64.0	51.1	30.5	65.3	21.6	68.5	64.8
Milk and cream	91.5	68.7	86.9	94.1	74.3	99.8	32.7	98.0	98.8	97.7
Onions	79.4	65.3	-10.1	13.0	8.1	79.4	76.5	20.6	23.9	21.7
Rice grain	25.5	29.8	11.7	52.7	27.0	25.7	4.3	30.2	75.6	55.8
Tomatoes	24.3	76.5	-18.7	-79.8	-25.8	24.3	55.7	18.7	81.5	85.8
Wheat flour	-0.1	-0.2	-97.1	4.3	-80.2	7.3		97.1	5.4	100.0
Fish and crustaceans	-32.4	-2.7	-23.7	21.8	61.4	36.9	4.8	54.5	48.8	82.3

Uganda										
Bovine meat	4.8	4.8	-100.0	-93.6	-97.0	4.8	11.4	100.0	94.2	98.2
Dry legumes & pulses	28.6	11.2	39.8	35.7	1.9	39.6	15.9	41.2	48.7	69.1
Live bovine animals	-36.8	34.6	69.8	16.8	-11.9	50.5	46.1	69.8	16.8	13.4
Maize flour	17.2	15.9	6.2	-6.0	-72.6	21.6	16.7	14.9	48.1	85.9
Maize grain	15.7	31.9	16.2	18.7	25.8	34.3	99.8	26.2	39.9	46.9
Milk and cream	61.7	14.2	6.9	-10.0	18.9	65.7	10.1	11.9	21.2	32.8
Onions	89.8	18.8	87.0	81.6	-10.6	100.0	100.0	99.1	100.0	100.0
Rice grain	-3.5	3.5	65.7	92.4	-100.0	15.1	24.4	65.7	92.7	100.0
Tomatoes	65.3	92.7	98.5	97.4	-35.6	100.0	33.1	98.5	97.4	100.0
Wheat flour	4.9	-17.4	-4.4	28.2	-97.1	5.9		13.2	84.0	97.2
Fish and crustaceans	5.7	-18.8	31.9	22.8	11.9	18.2	7.9	66.5	63.1	44.2
Zambia										
Bovine meat	4.8	1.3	3.8	4.7	3.4	4.8	8.9	5.7	4.7	3.8
Dry legumes & pulses	4.8	4.8	32.2	5.8	12.3	4.8	11.2	32.2	5.9	12.3
Live bovine animals	4.8	-5.3	8.2	1.3	3.8	4.8	13.1	8.2	1.3	6.0
Maize flour	-23.7	4.8	-28.7	28.4	100.0	30.6		35.2	28.4	100.0
Maize grain	2.8	5.8	-29.6	-30.6	25.6	10.2	4.8	29.8	43.1	27.3
Milk and cream	-64.4	13.1	0.0	-44.6	-33.5	66.7		7.1	51.8	37.2
Onions	4.9		-52.9	4.3	5.4	4.9		57.2	4.3	5.4
Rice grain	4.8	4.8	-20.8	4.3	13.0	4.8		27.5	4.3	13.2
Tomatoes	4.8			4.8		4.8			4.8	
Wheat flour	4.8		4.8	4.7		4.8		4.8	4.7	
Fish and crustaceans	22.1		4.8	-8.4		22.2		4.8	15.4	