ChemTech



International Journal of ChemTech Research CODEN (USA): IJCRGG ISSN: 0974-4290 Vol.9, No.04 pp 754-765, 2016

Egyptian Foreign Agricultural Trade with the Nile Basin Countries: Between Reality and Hope

Rania Mohamed Barghash, Afaf Zaki Othman*

Department of Agricultural Economics- Agricultural & Biological Research Division, National Research Centre, 33 El-Bohoth St., Dokki, 12622 Cairo, Egypt.

Abstract : Study focused on estimating the volume of trade with countries of the Nile Basin, as well as the efficiency of foreign agricultural trade indicators. Index of Export Similarity between period 2009-2014, where the calculated index indicating similarity between the production structures in Egypt and Rwanda, Sudan, Congo, and Kenya recorded relatively high values, By contrast, export similarity index for Burundi, Tanzania, Uganda, and Ethiopia recorded low values, thus there are great potentials for creating trade between Egypt and these countries given the differences and distinctive nature of the traded commodities. The estimated Trade Compatibility Index revealed that agricultural exports compatibility index, surpassed agricultural imports compatibility index, indicating that Egypt has better opportunities for expanding agricultural exports to the Nile Basin countries than expanding agricultural imports from them.

Results obtained from applying the Gravity Model of Trade revealed that the volume of agricultural trade between Egypt and the Nile Basin countries reached a maximum value in 2011, which is the closest to the hoped-for value by 1.6%. Study Recommended to activating agricultural integration between Egypt and the Nile Basin countries and Providing the Nile Basin countries with Egyptian expertise in the field of agriculture.

Introduction

Egypt has recently been witnessing a seriously increasing trend towards supporting Egyptian-African relations in general, and economic and agricultural relations with the Nile Basin countries in particular.Such trend has been imposed by the nature of the ongoing world developments, and developments in the nine countries of the Nile basin, namely Egypt, Sudan, Ethiopia, Kenya, Uganda, Tanzania, Democratic Republic of the Congo, Rwanda, and Burundi. The importance of establishing strong economic relations between Egypt and the mentioned countries emanates from the strategic importance they represent to Egypt by virtue of participation in the headwaters of the Nile water, or flows therein⁽¹⁾.

Despite the relative success Egypt's foreign trade policy achieved in increasing the diversification of Egyptian total and agricultural exports to international and African markets, such exports are facing fierce competition in these markets due to political changes and the currently established economic blocs, especially with countries of the Nile Basin. It is worth mentioning that the value of Egyptian agricultural exports to Nile Basin countries reached US\$ 197.5 million representing 5.01% of Egypt's total exports value of agricultural products, which is a very modest figure. Therefore, Egypt is striving to promote agricultural trade with all of the Nile Basin countries.

Research Problem

The research investigates the problem of the very modest volume of intra-regional agricultural trade between Egypt and countries of the Nile Basin despite the numerous trade agreements that have been signed to improve and increase total and agricultural intra-trade volume. It is worth mentioning that intra-regional agricultural trade volume reached 3.5% of Egypt's average volume of foreign agricultural trade, estimated at US\$ 14.1 billion over the period 2012-2014. In addition, Egyptian agricultural exports is facing fierce competition in the markets of these countries, which resulted in acquiring only a very modest percent of agricultural exports in only some of these markets (5%). It is therefore very important to identify how to improve and develop Egypt's agricultural trade with countries of the Nile Basin.

Research Objectives

The research aims to estimate the actual and expected volume and efficiency of foreign agricultural trade for both Egypt and countries of the Nile Basin, in addition to studying the volume of agricultural trade between Egypt and these countries, and to identify how to promote and increase Egypt's agricultural trade with countries of the Nile Basin.

Methodology and Sources of Data

The study applied both descriptive and quantitative statistical analysis to estimate some of the most commonly used efficiency indicators and indices ⁽²⁾ in order to assess the efficiency of Egypt's foreign agricultural trade with the Nile Basin countries:

1. Export Similarity

Export similarity provides useful information on distinctive export patterns from country to country. It can be estimated using the following equation:

Exports Similarity = [$\sum Min \{X_i(ac), X_i(bc)\} * 100$]

The value of export similarity index must range between zero and 100.

Where,

 x_i (ac) = percent of agricultural exports to total exports of country a.

 x_i (bc) = percent of agricultural exports to total exports of country b.

2. Trade Compatibility

Trade compatibility is estimated using the following equation:

Trade Compatibility =
$$1 - \left\{ \frac{\sum (M_{bi} - X_{ai})}{2} \right\}$$

Where,

Mbi = percent of agricultural imports to total imports of country b.

Xai = percent of agricultural exports to total exports of country a.

3. Compassing Competence

Compassing Competence is estimated using the following equation:

Compassing Competence:
$$\frac{\frac{EX}{IM}}{Min \{Im/Ex\}} \times 100$$

Where,

Ex = Egyptian exports to Nile Basin countries.

Im = Nile Basin countries' imports from the world.

The study also applied the Gravity Model of Trade, which is the most widely used model for assessing and analyzing trade agreement between countries and their impacts on intra-trade flows. In its basic form, the model assumes that the volume of trade between two countries increases as Gross Domestic Product (GDP) increases, and transportation cost and distance between their economic positions decline. After introducing population number and per capita income, the model was renamed as "The Developed Gravity Model of Trade". In addition, economic trade relations between countries of the Nile Basin have been measured using the Gravity Model of Trade⁽³⁾.

Model Characterization

According to the applied Gravity Model, the volume of trade between two countries (X_{ij}) is a function of: GDP for the two countries, population number, and geographic distance between the two countries (either between Capital Cities, or Commercial Centers), in addition to a set of dummy variables, as clarified below:

 $X_{ij} = \beta_0 Y_i^{\beta 1} Y_j^{\beta 2} N_i^{\beta 3} N_j^{\beta 4} D_{ij}^{\beta 5} A_{ij}^{\beta 6} u_{ij}$ (1)

Where,

 X_{ii} = volume of trade between the two countries

 Y_i , $Y_j = GDP$ for export and import countries, respectively.

 N_i , N_j = population number in both the export and import countries, respectively.

 D_{ij} = distance between Capital Cities, or Commercial Centers).

 A_{ij} = other factors in favour of, or obstructing trade between the two countries.

 $u_{ij} = error term.$

Equation (1) may take another form in which per capita income is used instead of population number, as clarified below:

$$X_{ij} = \gamma_0 Y_i^{\gamma 1} Y_j^{\gamma 2} Y H_i^{\gamma 3} Y H_j^{\gamma 4} D_{ij}^{\beta 5} A_{ij}^{\beta 6} u_{ij}$$
(2)

Where YH_i and YH_i represent per capita income at the export and import countries, respectively.

It should be noted that equations (1) and (2) are equal in case the coefficients are:

 $\beta_3=-\gamma_3 \qquad ; \qquad \beta_4=-\gamma_4 \qquad ; \qquad \beta_1=\gamma_1+\gamma_3 \qquad ; \qquad \beta_2=\gamma_2+\gamma_4$

Characterization of the second equation is usually used when estimating bilateral trade in some specific products, whereas equation (1) is used when estimating total trade.

Equation (1) can be put in the linear form:

 $\log X_{ij} = \beta_0 + \beta_1 \log Y_i + \beta_2 \log Y_j + \beta_3 \log N_i + \beta_4 \log N_j + \beta_5 \log D_{ij} + u_{ij}$ (3)

Where log indicates that variables are put in the logarithmic form.

The research applied the following formula to estimate agricultural trade between countries of the Nile Basin:

 $Log X_{ij} = \beta_0 + \beta_1 log Y_i + \beta_2 log Y_j + \beta_3 log N_i + \beta_4 log N_j + \beta_5 log Dis_{ij} + \beta_6 log Y dif_{ij} + \beta_7 log R + \beta_8 Dum_1 + \beta_9 Dum_2 + \beta_{10} Dum_3 + \beta_{11} Dum_4 + \beta_{12} Dum_5 + \beta_{13} Dum_6 + \beta_{14} Dum_7 + \beta_{15} Dum_8 + u_{ij}$ (4)

Where,

 $Ydif_{ii}$ = squared differences between GDPs of the export and import countries.

R = exchange rate at the export country against one unit of the import country's currency, multiplied by GDP Deflator for the importing country, and divided on GDP Deflator for the exporting country.

Language (L) has been introduced as a variable that may affect intra-trade between countries. It takes the value one for Egypt, and zero for the rest of countries. Dum_1 is a dummy variable that takes the value one for the year 2009, and zero for other years; Dum_2 is a dummy variable that takes the value one for the year 2010, and zero for other years, and so on until reaching Dum_4 .

The applied analysis relied on data about the Nile Basin Countries for the period 2009-2013, including Burundi, Democratic Republic of Congo, Ethiopia, Kenya, Rwanda, Sudan, Uganda, and Tanzania, in addition to Egypt. It is worth mentioning that the study data were obtained from the United Nations' Website, and that the number of observations amounted to 122. It is therefore clear that the study data are Panel Data, i.e., a mixture of cross-sectional data and time series data. Such kind of data is more useful in determining appropriate relationships between variables over time. In addition, it allows the monitoring of individual impacts of each of the two countries under study, which, if neglected, Ordinary Least Square Method (OLS) will return biased results in case such individual impacts are correlated with the regression coefficients.

Pooled Estimation has been applied to Panel Data under two methods, the first of which is the Random Effects Model (REM), which is usually used when trade flows between a sample of trading partners is randomly drawn. The second method is the Fixed Effects Model (FEM)⁽⁴⁾, which is a better method when estimating trade flow between predefined trading partners. The model was run using the two methods. The Wald Test has been applied to test the significance of the time variable. In addition, Hausman Test has been applied.

The research estimated the hoped-for volume of trade using the estimated model that proved better in terms of statistical criteria (significance of the estimated parameters, model significance, and associated problems), and in terms of economic criteria (expected signs, and size of parameters in case size is predefined).

Results & Discussion

1. Relative Importance of Foreign Agricultural Trade With The Nile Basin Countries

Results of studying the relative importance of foreign agricultural trade with the Nile Basin Countries are shown in **Table (1)**. It is clear that average value of trade over the period 2009-2014 amounted to US\$ 492.3 million representing 3.6% of the Egypt's total value of agricultural trade. The values of Egyptian agricultural export to, and imports from the Nile Basin countries amounted to US\$ 226 and 266.3 million, respectively, representing 5.8% and 2.8% of Egypt's total agricultural exports and imports, respectively.

Deficit in Egypt's Balance of Agricultural Trade amounted to US\$ 40.29 representing 0.7% of the total deficit in Egypt's Balance of Agricultural Trade, indicating a modest relative importance of Egypt's agricultural trade with countries of the Nile Basin, which calls for designing and implementing proper mechanisms for promoting trade with the Nile Basin countries.

| Years | Egyptian agricultural export | Egypt 's agricultural exports to | % | Egypt's total agricultural imports | Egypt's imports of agricultural | % | Egyptian Agricultural Balance | Agricultural balance with the | % | Agricultural foreign trade with | Agricultural foreign trade | % |
|---------|------------------------------------|--|------|--|---------------------------------------|------|-------------------------------------|-------------------------------------|----------|---------------------------------------|----------------------------------|------|
| 2000 | 2(04 72 | | 4.00 | 5020 14 | | 2.45 | 2145.42 | | 0.070202 | 111e | 0514.05 | 4.01 |
| 2009 | 3684.72 | 180.19 | 4.89 | 5830.14 | 201.18 | 3.45 | -2145.42 | -20.99 | 0.978322 | 381.37 | 9514.85 | 4.01 |
| 2010 | 4008.31 | 337.50 | 8.42 | 7902.65 | 263.26 | 3.33 | -3894.34 | 74.24 | -1.90636 | 600.76 | 11910.97 | 5.04 |
| 2011 | 3931.42 | 245.78 | 6.25 | 11157.94 | 280.28 | 2.51 | -7226.52 | -34.50 | 0.47741 | 526.07 | 15089.35 | 3.49 |
| 2012 | 3550.93 | 178.42 | 5.02 | 12169.53 | 281.50 | 2.31 | -8618.60 | -103.07 | 1.195951 | 459.92 | 15720.46 | 2.93 |
| 2013 | 4101.01 | 239.29 | 5.83 | 8373.15 | 261.32 | 3.12 | -4272.14 | -22.03 | 0.51572 | 500.62 | 12474.16 | 4.01 |
| 2014 | 4186.58 | 174.82 | 4.18 | 12246.28 | 310.18 | 2.53 | -8059.70 | -135.36 | 1.679495 | 485.00 | 16432.86 | 2.95 |
| المتوسط | 3910.49 | 226.00 | 5.78 | 9613.28 | 266.29 | 2.77 | -5702.79 | -40.29 | 0.706432 | 492.29 | 13523.78 | 3.64 |

Table (1): Relative Importance of Egyptian Foreign Agricultural Trade with the Nile Basin Countries Over The period 2009-2014 (Value in US\$ Million)

Source:http//unstats.un.org/unsd.comtrade/dqQuickQuery.aspx

2. Agricultural Trade Between Egypt and Countries of The Nile Basin

African markets in general, and Nile Basin countries in particular, are characterized by increasing financial risk, leading to the reluctance of many exporters despite the high export potentials, where such countries can absorb more Egyptian exports. Therefore, markets of the Nile Basin countries have been receiving special attention in Egypt's development strategy given the potentials of providing Egypt with raw materials and primary commodities at reasonable prices, let alone the advantage that such markets do not impose certain obligations, condition, or specification on Egyptian commodities like those imposed by markets of the European Union Countries⁽¹⁾.

Results in Table (2) indicate that average size of agricultural trade between Egypt and countries of the Nile Basin amounted to US\$ 492.3 million. It is clear that the value of agricultural trade with Kenya and Sudan reached US\$ 440.01 million representing 89.4% of Egypt's total value of agricultural trade with the Nile Basin countries. Ethiopia, Uganda, and Tanzania followed with value estimated at US\$ 17.06, 12.4, and 10.3 million, respectively, representing 3.5%, 2.5%, and 2% of Egypt's total value of agricultural trade with the Nile Basin countries, respectively. Trade between Egypt and the Congo, Rwanda, and Burundi recorded very modest volumes, where they represented only 0.54%, 0.99%, and 1.04% of Egypt's total value of agricultural trade with the Nile Basin countries, respectively.

| Table (2): Egyptian Balance o | f Agricultural ' | Trade with t | the Nile Basi | n Countries | Over the | Period 2009- |
|-------------------------------|------------------|--------------|---------------|-------------|----------|--------------|
| 2014 (Value in US\$ Million) | | | | | | |

| country | Egyptian agricultural exports to Nile countries | Egyptian agricultural imports to Nile countries | Egyptian agricultural balance with the Nile Basin countries | Foreign Trade | | | |
|----------|--|--|--|------------------|----------|--------|-------|
| | Value | % | Value | % | | Value | % |
| Sudan | 133 | 58.84 | 4.1 | 1.54 | 128.9 | 137 | 27.85 |
| Ethiopia | 4.06 | 1.79 | 13 | 4.88 | (8.94) | 17.06 | 3.46 |
| Congo | 2.66 | 1.18 | 0 | 0 | 2.66 | 2.66 | 0.54 |
| Uganda | 9.41 | 4.16 | 3 | 1.13 | 6.41 | 12.41 | 2.52 |
| Kenya | 58.91 | 26.07 | 244 | 91.61 | (185.09) | 302.91 | 61.52 |
| Rwanda | 3.84 | 1.7 | 1.01 | 0.38 | 2.83 | 4.85 | 0.98 |
| Burundi | 4.9 | 2.17 | 0.22 | 0.08 | 4.68 | 5.11 | 1.04 |
| Tanzania | 9.25 | 4.09 | 1.01 | 0.38 | 8.24 | 10.26 | 2.08 |
| Total | 226.0 | 100 | 266.34 | 100 | (40.31) | 492.36 | 100 |

Source :(-) Figures between brackets are negative, indicating a deficit.

http://unstats.un.org/unsd.comtrade/dqQuickQuery.aspx⁽⁵⁾

Studying the Balance of Agricultural Trade with the Nile Basin Countries revealed a deficit amounting to US\$ 40.3 million, representing 0.7% of the total deficit in Egypt's Balance of Agricultural Trade, estimated at US\$ 5.7 billion.

Results illustrated in Table (2) indicate that Egypt's Balance of Agricultural Trade achieved a surplus with all the Nile Basin countries, except for Ethiopia and Kenya, where deficits amounting to US\$ 8.94 and 185.09 million have recorded, respectively.

It is also clear from Table (2) that average value of Egyptian agricultural exports to the Nile Basin countries during the study period amounted to US\$ 226.000 million representing some 5.8% of the total value of Egyptian agricultural exports, estimated at US\$ 3910.5 million. Sudan ranked first with a value amounting to US\$ 133 million representing 58.8% of Egypt's total value of agricultural exports to Nile Basin countries. Kenya, Uganda, Tanzania, Burundi, Ethiopia, Rwanda, and the Congo followed with shares representing 26.07%, 4.16%, 4.09%, 2.17%, 1.79%, 1.7%, and 1.18% of the total value of Egyptian agricultural exports to Nile Basin countries.

It can also be noted that total value of Egyptian agricultural imports from the Nile Basin countries amounted to US\$ 266.34 million representing 2.77% of Egypt's total value of agricultural imports, estimated at US\$ 9613 million, representing 54% of Egypt's total value of trade with countries of the Nile Basin during the study period (2009-2014).

As regards Egyptian imports from the Nile Basin countries, Kenya and Ethiopia ranked first and second with values estimated at US\$ 244 and 13 million, representing 91.6% and 4.88% of Egypt's total value of imports from the Nile Basin countries. Sudan and Uganda ranked third and fourth with values estimated at US\$ 4.1 and 3 million, representing 1.54% and 1.13%, respectively. As for the rest of countries, i.e., Burundi and Tanzania, Egypt's total imports value from both countries recorded trivial amounts that represented only 0.08% and 0.38% of Egypt's total value of imports from the Nile Basin countries. No agricultural imports were recorded from the Congo during the study period.

The achieved results indicate a modest volume of agricultural trade between Egypt and some of the Nile Basin countries during the study period given the fact that some of these countries are members in one or more of other regional groups in the African Continent.

3. Efficiency Indicators of Egypt's Foreign Agricultural Trade With the Nile Basin Countries

a. Export Similarity Index

This index is used to measure the similarity between Egypt's production structure and Nile Basin countries' production structure. It ranges between one and 100. The higher the value of this index, the higher the degree of similarity between the structures of commodity exports in the two countries under study, indicating that opportunities to create trade between them are weak.

| Table (3): Indices of A | gricultural Exports | Similarity betwee | n Egypt and Cou | ntries of the Nile | Basin over |
|-------------------------|---------------------|-------------------|-----------------|--------------------|------------|
| the Period 2009-2014 | | | | | |

| Years | Sudan | Ethiopia | Congo | Uganda | Kenya | Rwanda | Burundi | Tanzania |
|---------|-------|----------|-------|--------|-------|--------|---------|----------|
| 2009 | 26 | 8.99 | 29.2 | 13.48 | 25.99 | 45.02 | 22.8 | 20 |
| 2010 | 31 | 7.26 | 28.21 | 16.87 | 26.81 | 49.61 | 22.95 | 20.13 |
| 2011 | 46 | 11 | 26.98 | 19.73 | 29.41 | 51.02 | 22.77 | 21.03 |
| 2012 | 49.66 | 14.5 | 21.65 | 21.06 | 28.03 | 55.02 | 23.01 | 21.99 |
| 2013 | 50.02 | 19.83 | 39.46 | 25.41 | 32.01 | 54.09 | 23.55 | 22.06 |
| 2014 | 53.69 | 21.02 | 39.46 | 26.41 | 39.45 | 57.85 | 23.99 | 22.89 |
| Average | 42.7 | 13.76 | 30.9 | 20.5 | 30.3 | 52.1 | 23.17 | 21.35 |

Source:- http://unstats.un.org/unsd.comtrade/dqQuickQuery.aspx⁽⁵⁾ - www.fao.org⁽⁶⁾

Findings presented in Table (3) reveal that average value of the estimated Index of Export Similarity between Egypt and countries of the Nile Basin amounted to 29.35%, where it recorded relatively high values amounting to 52.1%, 42.7%, 30.9%, and 30.3% for Rwanda, Sudan, the Congo, and Kenya, respectively. Such result indicates similarity between the production structures in Egypt and these countries, meaning that production structures are competitive more than complementary.

By contrast, export similarity index declined for Burundi, Tanzania, Uganda and Ethiopia, where it reached 23.18%, 21.35%, 20.5%, and 13.7%, respectively. Such result indicates differences between production structures in Egypt and countries of competitive and thus there are great potentials for creating trade between Egypt and these countries the Nile Basin, meaning that production structures are complementary more than, given the differences and distinctions between the exported commodities ⁽²⁾.

b. Trade Compatibility Index

Trade Compatibility Index measures the compatibility between exports/imports of a country and imports/exports by another country, which helps identify the possibilities of shifting trade between countries. The value of this index ranges between zero and one. The higher the value this index takes, the higher the degree of compatibility between exports from one country and imports by another country.

| Years | Sudan | Ethiopia | Congo | Uganda | Kenya | Rwanda | Burundi | Tanzania |
|---------|-------|----------|-------|--------|-------|--------|---------|----------|
| 2009 | 0.921 | 0.949 | 0.921 | 0.963 | 0.955 | 0.926 | 0.93 | 0.964 |
| 2010 | 0.925 | 0.954 | 0.926 | 0.95 | 0.959 | 0.942 | 0.945 | 0.966 |
| 2011 | 0.933 | 0.959 | 0.936 | 0.968 | 0.963 | 0.945 | 0.931 | 0.971 |
| 2012 | 0.939 | 0.960 | 0.958 | 0.969 | 0.963 | 0.959 | 0.933 | 0.98 |
| 2013 | 0.951 | 0.966 | 0.954 | 0.97 | 0.959 | 0.953 | 0.936 | 0.951 |
| 2014 | 0.959 | 0.968 | 0.959 | 0.971 | 0.971 | 0.961 | 0.977 | 0.966 |
| Average | 0.938 | 0.959 | 0.942 | 0.965 | 0.962 | 0.948 | 0.942 | 0.966 |

 Table (4): Trade Compatibility Index for Egyptian Agricultural Exports to, and Imports from the Nile

 Basin Countries over the Period 2009-2014

Source: www.fao.org (6)

Results illustrated in Table (4) indicate that Trade Compatibility Index for Egyptian agricultural exports to, and imports from the Nile Basin Countries amounted to 0.952 on average, indicating trade compatibility between the two sides, i.e., Nile Basin countries are considered appropriate markets for Egyptian exports of agricultural products. It is also clear from results illustrated in Table (5) that Trade Compatibility Index between Egyptian agricultural imports from, and exports to the Nile Basin Countries amounted to 0.910 on average, indicating the trade compatibility between the two sides, i.e., Nile Basin countries are considered appropriate markets for Egyptian agricultural imports from, and exports to the Nile Basin Countries amounted to 0.910 on average, indicating the trade compatibility between the two sides, i.e., Nile Basin countries are considered appropriate markets for importing Egyptian agricultural products.

 Table (5): Trade Compatibility Index for Egyptian Agricultural Imports from, and Exports to Nile Basin

 Countries over the Period 2009-2014

| Years | Sudan | Ethiopia | Congo | Uganda | Kenya | Rwanda | Burundi | Tanzania |
|---------|-------|----------|-------|--------|-------|--------|---------|----------|
| 2009 | 0.926 | 0.889 | 0.791 | 0.649 | 0.964 | 0.839 | 0.891 | 0.902 |
| 2010 | 0.936 | 0.911 | 0.798 | 0.777 | 0.978 | 0.845 | 0.901 | 0.903 |
| 2011 | 0.945 | 0.926 | 0.831 | 0.829 | 0.988 | 0.886 | 0.916 | 0.932 |
| 2012 | 0.958 | 0.933 | 0.841 | 0.899 | 0.995 | 0.889 | 0.923 | 0.947 |
| 2013 | 0.933 | 0.942 | 0.922 | 0.889 | 0.992 | 0.966 | 0.923 | 0.936 |
| 2014 | 0.941 | 0.988 | 0.939 | 0.911 | 0.989 | 0.971 | 0.944 | 0.946 |
| Average | 0.940 | 0.932 | 0.854 | 0.825 | 0.984 | 0.901 | 0.917 | 0.928 |

Source: www.fao.org⁽⁶⁾

A value of Trade Compatibility Index for Egyptian agricultural exports that is higher than agricultural imports indicates that Egypt has better opportunities for increasing agricultural exports to the Nile Basin countries than increasing agricultural imports from the Nile Basin countries. This means that the possibility for shifting trade so that Egyptian agricultural products replace those imported by the Nile Basin countries from the World is stronger than the possibility that agricultural products from the Nile Basin countries replace those imported by Egypt from the world. Such result indicates that markets of the Nile Basin countries are appropriate to Egyptian exports of agricultural products, but not the opposite.

It was found that Kenya, Burundi, Tanzania, Rwanda, the Congo, and Uganda are the countries that can provide Egypt with her needs of agricultural products the most, where the Index of Trade Compatibility between Egyptian agricultural imports from, and exports to the mentioned Nile Basin countries amounted to 0.984, 0.917, 0.928, 0.901, 0.854, and 0.825, respectively.

c. Compassing Competence

Compassing Competence is an Index used to measure the import capacity a country's market can absorb. Results in Table (6) reveal that the Compassing Competence Index for Nile Basin markets' capacity to absorb Egyptian exports amounted to 79.5% on average, where it ranged between a maximum of 100% only once in 2010, and a minimum of 63.4% in 2009. This means that Nile Basin countries' markets can absorb Egyptian exports of agricultural products given that they match consumers' tastes and the preferable export seasons, as well as the diversity of the exported agricultural products inside these markets.

| Egypt 's agricultural | Total imports of | Im/Ex | Im/min | Campassing |
|---------------------------|---|--|--|---|
| exports to the Nile Basin | countries of the | | (Im/ex) | competence |
| countries (EX) | world (IM) | | | |
| 180.19 | 6145.1 | 34.10 | 284.4 | 63.36 |
| 337.50 | 7289.66 | 21.60 | 337.5 | 100 |
| 245.78 | 6282.5 | 25.56 | 290.9 | 84.49 |
| 178.42 | 5365.5 | 30.07 | 248.4 | 71.83 |
| 239.29 | 6130.3 | 25.62 | 283.8 | 84.32 |
| 174.82 | 5177 | 29.61 | 239.7 | 72.93 |
| 226 | 6065.01 | 27.76 | 280.78 | 79.49 |
| | Egypt 's agricultural exports to the Nile Basin countries (EX) 180.19 337.50 245.78 178.42 239.29 174.82 226 | Egypt 's agricultural exports to the Nile Basin countries (EX) Total imports of countries of the world (IM) 180.19 6145.1 337.50 7289.66 245.78 6282.5 178.42 5365.5 239.29 6130.3 174.82 5177 226 6065.01 | Egypt 's agricultural exports to the Nile Basin countries (EX) Total imports of countries of the world (IM) Im/Ex 180.19 6145.1 34.10 337.50 7289.66 21.60 245.78 6282.5 25.56 178.42 5365.5 30.07 239.29 6130.3 25.62 174.82 5177 29.61 226 6065.01 27.76 | Egypt 's agricultural exports to the Nile Basin countries (EX) Total imports of countries of the world (IM) Im/Ex Im/min (Im/ex) 180.19 6145.1 34.10 284.4 337.50 7289.66 21.60 337.5 245.78 6282.5 25.56 290.9 178.42 5365.5 30.07 248.4 239.29 6130.3 25.62 283.8 174.82 5177 29.61 239.7 226 6065.01 27.76 280.78 |

 Table (6): Compassing Competence Index for Nile Basin Markets' Capacity to Absorb Egyptian

 Agricultural Exports over the Period 2009-2014 (Value in US\$ Million)

Source: http://unstats.un.org/unsd.comtrade/dqQuickQuery.aspx⁽⁵⁾ www.fao.org⁽⁶⁾

4. Results of Applying the Gravity Model of Intra-Trade Between Egypt and Nile Basin Countries: Reality and Hopes

Two trials have been run using Fixed Effect and Random Effect. Under each of the two trials, two sub-trials have been applied, one using average per capita share of GDP, and another one using population number.

Results obtained from the estimated model revealed the following: similarity between coefficient values estimated using per capita share of GDP and population number under Fixed and Random Effects; and similarity between coefficient values estimated using population number under Fixed and Random Effects. However, the best achieved results were those obtained from the Model in which population number was used instead of per capita share of GDP, where signs of the estimated parameters agreed the logic of economic theory (coefficient of population number took a positive sign for both the export and import country). In addition, statistical tests proved the significance of all of the estimated coefficients except for the exchange rate variable, which can be explained by the shortness of the study period. The language factor showed negative impact on the volume of intra-trade between Egypt and the Nile Basin countries. In addition, Wald and Hausman Tests proved the significance of the coefficients of implicit variables, whereas the calculated F value proved the statistical significance of the estimated Gravity Model, as shown in Table (7).

| Depe Method: P | endent Variable: XIJ Pooled Least Squares | | | | | | |
|-------------------|--|-----------------------|---------------|----------|--|--|--|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. | | | |
| C | -10.4485 | 1.38491 | -7.54454 | 0 | | | |
| YI | 1.31943 | 0.12439 | 10.6072 | 0 | | | |
| YJ | 2.613306 | 0.157021 | 16.64306 | 0 | | | |
| NI | -1.49007 | 0.199704 | -7.46139 | 0 | | | |
| NJ | -2.09093 | 0.2161 | -9.67577 | 0 | | | |
| DIS | -2.98771 | 0.148486 | -20.1211 | 0 | | | |
| R | 0.001309 | 0.004391 | 0.298069 | 0.7657 | | | |
| YDIF | 0.597418 | 0.039247 | 15.22188 | 0 | | | |
| L | -0.80854 | 0.158441 | -5.10311 | 0 | | | |
| DUMM1 | 0.263015 | 0.085496 | 3.076325 | 0.0021 | | | |
| DUMM2 | 0.23188 | 0.083985 | 2.760985 | 0.0058 | | | |
| DUMM3 | 0.296008 | 0.082683 | 3.580041 | 0.0004 | | | |
| DUMM4 | -0.17502 | 0.08385 | -2.08726 | 0.037 | | | |
| | Fixed Effects (Cross) | | | | | | |
| | | X-C = -4.21E-14 | | | | | |
| R-squared | 0.498257 | Mean de | 6.59109 | | | | |
| Adjusted R- | 0.490543 | S.D. dep | endent var | 1.395077 | | | |
| S.E. of | 0.995754 | Akaike ir | nfo criterion | 2.845005 | | | |
| Sum squared | 1547.773 | Schwar | z criterion | 2.929636 | | | |
| Log likelihood | -2231.09 | Hannan-(| Quinn criter. | 2.876445 | | | |
| F-statistic | 64.5897 | Durbin- | Watson stat | 1.795404 | | | |
| Wald Test: | | | | | | | |
| Test Statistic | Value | df | Probability | | | | |
| F-statistic | 15.1014 | (3, 1561) | 0 | | | | |
| Chi-square | 45.30421 | 3 | 0 | | | | |
| | Correlated Random E | ffects - Hausman Test | | | | | |
| | Test cross-section random effects | | | | | | |
| Test Summary | | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. | | | |
| Cross-see | ction random | 0 | 12 | 1 | | | |

 Table (7): Results of Applying the Gravity Model of Trade Using Population Number over the Period

 2009-2013

Source: (http://unstats.un.org/unsd/snaama/SelectionQuick.asp) ⁽⁹⁾

| years | | situation | | | | | |
|-------|---------|-------------|------------|-------|--|--|--|
| | Reality | Expectation | difference | % | | | |
| 2009 | 668.98 | 519.06 | 149.92 | 22.4 | | | |
| 2010 | 735.01 | 846.18 | -111.16 | -15.1 | | | |
| 2011 | 1007.48 | 1023.92 | -16.44 | -1.6 | | | |
| 2012 | 870.04 | 1380.66 | -510.61 | -58.7 | | | |
| 2013 | 938.16 | 1537.63 | -599.47 | -63.9 | | | |

Source: (http://unstats.un.org/unsd/snaama/SelectionQuick.asp) ⁽⁹⁾

Applying the results obtained from the estimated Gravity Model to evolutions in the volume of agricultural trade between Egypt and the Nile Basin countries revealed that it reached a maximum value of US\$ 1007.48 million in 2011, which is the closest to the hoped-for value by 1.6%, as shown in Table (8). As for the value that proved less than the hoped-for value, it reached US\$ 938.16 million, which is less than the hoped-for value by 63.9%. The year 2009 proved the best over the study period, where the hoped-for value surpassed the actual value by 22.4%.

Current situation of intra agricultural trade between Egypt and the Nile Basin countries, and between each of the Nile Basin countries and the rest of the Nile Basin countries, has been studied by estimating the hoped-for and optimum situation for this trade, in a trial to develop trade between the study countries (refer to Table 9). It was found that the best volume of agricultural trade for Egypt has been that recorded with Kenya, where it reached US\$ 266.88 million, which surpasses the hoped-for value by 80.5%. Trade volume between Egypt and Sudan amounted to US\$ 144.35 million, which is less the hoped-for value by 380.6%.

| Exporting | Importing country | situation | | | | | |
|-----------|-------------------|-----------|-------------|------------|-----------|--|--|
| country | 1 0 1 | Reality | Expectation | difference | %للفرق | | |
| J. | | | - | | من الراهن | | |
| E a sur é | Europ Carolana | 144.25 | 709.21 | 5(2.97 | 200 (| | |
| Egypt | Fmr Sudan | 144.55 | /08.21 | -563.87 | 390.6- | | |
| Egypt | Ethiopia | 1/.26 | 13 | 4.27 | 24.7 | | |
| Egypt | Dem. Rep. of the | 1.82 | 2.54 | -0./3 | -40.1 | | |
| Egypt | Uganda | 12.18 | 13.19 | -1.01 | -8.3 | | |
| Egypt | Kenya | 266.88 | 36.06 | 230.83 | 80.5 | | |
| Egypt | Rwanda | 4.59 | 4.59 | -0.01 | -0.002 | | |
| Egypt | Burundi | 5.3 | 0.34 | 4.96 | 93.6 | | |
| Egypt | United Rep. of | 9.94 | 10.65 | -0.71 | -7.1 | | |
| Fmr Sudan | Ethiopia | 2.53 | 3.76 | -1.24 | -49.0 | | |
| Fmr Sudan | Dem. Rep. of the | | 0.26 | -0.26 | | | |
| Fmr Sudan | Uganda | 28.72 | 4.06 | 24.66 | 85.9 | | |
| Fmr Sudan | Kenya | 16.11 | 1.99 | 14.12 | | | |
| Fmr Sudan | Rwanda | | 1.74 | -1.74 | | | |
| Fmr Sudan | Burundi | 0.03 | 0.13 | -0.1 | | | |
| Fmr Sudan | United Rep. of | 0.02 | 0.98 | -0.96 | | | |
| Ethiopia | Dem. Rep. of the | 0 | 0.01 | -0.01 | | | |
| Ethiopia | Uganda | 0.47 | 0.74 | -0.26 | | | |
| Ethiopia | Kenya | 9.41 | 0.41 | 9 | 95.6 | | |
| Ethiopia | Rwanda | 0 | 0.18 | -0.17 | | | |
| Ethiopia | Burundi | | 0.01 | -0.01 | | | |
| Ethiopia | United Rep. of | 0.04 | 0.02 | 0.03 | | | |
| Uganda | Kenva | 176.71 | 170.64 | 6.07 | 3.4 | | |
| Uganda | Rwanda | 24.58 | 28 39 | -3.81 | | | |
| Uganda | Burundi | 8 16 | 1 01 | 7 15 | | | |
| Uganda | United Rep. of | 12.82 | 3 69 | 9.14 | | | |
| Kenva | Rwanda | 10.1 | 17 17 | -7 07 | | | |
| Kenva | Burundi | 3 54 | 1 07 | 2 46 | | | |
| Kenva | United Rep of | 70.15 | 20.3 | 49 85 | 71.1 | | |
| Rwanda | Burundi | 4 08 | 4 42 | -0.34 | , 1, 1 | | |
| Rwanda | United Rep. of | 35.29 | 8 84 | 26.45 | 75.0 | | |
| Burundi | United Rep. of | 5.13 | 3.09 | 2.05 | 40.0 | | |

Table (9): Current and Hoped-for Value of Agricultural Trade between the Nile Basin Countries

Source: (http://unstats.un.org/unsd/snaama/SelectionQuick.asp) (9)

As regards the current and hoped-for volume of intra trade between the rest of the Nile Basin countries, it can be noted from Table (9) that intra-trade between Ethiopia and Kenya recorded the highest percent (95.6%). Intra-trade between Sudan and Uganda; Ruanda and Burundi; Kenya and Tanzania; Burundi and Tanzania; and Uganda and Kenya reached 85.9%, 75%, 70.1%, 40%, and 3.4%, respectively.

It is clear from what preceded that a relatively low volume of trade prevailed between Egypt and each of Sudan, Democratic Republic of the Congo, and Tanzania; whereas a notably large volume of trade has been recorded with Kenya. There was also a rise in the volume of trade between Kenya and each of Ethiopia, Tanzania, and Uganda.

Prospects for Increasing Trade between Egypt and the Nile Basin Countries

The previously introduced findings indicate potentials for increasing trade between Egypt and the Nile Basin countries through the following:

- Activating agricultural integration between Egypt and the Nile Basin countries by expanding the Integration Agreement between Egypt and Sudan to include the rest of the Nile Basin countries, where it provides for the activation of agricultural integration between Egypt and Sudan to execute a project that aims to cultivate 100 thousand acres in the Blue Nile State, in addition to utilizing 30 thousand acres in the White Nile State for red meat production.
- Operating land borders crossing between Egypt and Sudan, which started with the port of Qustul-Occhet, given the remarkable success achieved in the growth of trade and travel between the two countries, where the volume of trade exceeded ten million dollars per month, in addition to the positive contribution to increasing the volume of trade between African countries.

- Providing the Nile Basin countries with Egyptian expertise in the field of agriculture, which has been demanded by several African countries, especially the COMESA, for establishing model farms equipped with basic infrastructure for agriculture and water supply sources on areas ranging between 2000 to 20 thousand acres. Such farms can absorb large numbers of labor, in addition to providing a cheaper source of agricultural imports to Egypt ⁽⁷⁾.
- Activating the Free Trade Agreement between the three African Economic Blocs (COMESA, SADC and the East African Grouping), which includes the establishment of a free trade zone between the 26 countries of the three groups, including trade liberalization by 2017, which was signed by the leaders in Sharm El-Sheikh, culmination of the summit work ⁽⁸⁾.

Recommendations

Based on the achieved results, the research suggested a number of recommendations, the most important of which are:

- 1. It is imperative to increase the volume agricultural trade between Egypt and countries of the Nile Basin, especially Burundi, Tanzania, Uganda, and Ethiopia, given the differences between the production structures in these countries and Egypt's production structure, which allows for creating trade between Egypt and the mentioned countries given the differences and distinctive nature of the traded commodities.
- 2. It is preferable to increase Egyptian agricultural imports from the Nile Basin countries, especially Kenya, Burundi, Tanzania, Rwanda, Congo, and Uganda, where they are considered the countries that can provide Egypt with her needs of Agricultural commodities the most.
- 3. Activating agricultural integration between Egypt and the Nile Basin countries by expanding the Integration Agreement between Egypt and Sudan to include the rest of the Nile Basin countries, where it provides for the activation of agricultural integration between Egypt and Sudan to execute a project that includes the cultivation of 100 thousand acres in the Blue Nile State, in addition to utilizing 30 thousand acres in the White Nile State for red meat production.
- 4. Providing the Nile Basin countries with Egyptian expertise in the field of agriculture, which has been demanded by several African countries, especially the COMESA, for establishing model farms equipped with basic infrastructure for agriculture and water supply sources on areas ranging between 2000 to 20 thousand acres. Such farms can absorb large numbers of labor, in addition to providing a cheaper source of agricultural imports to Egypt.

References

- Mostafa Abd-Rabo El-Qiblaoui (Dr) & Fouad Mohamed Mekki (Dr); "Egyptian Foreign Total and Agricultural Trade with the Nile Basin Countries". Egyptian Society for Agricultural Economics; 18th Conference for Agricultural Economists, 13-14 October, 2010.
- Mamdoh El-Badri Mohamed (Dr); "Potentials for Agricultural Investment in the Nile Basin Countries". Egyptian Society for Agricultural Economics; 18th Conference for Agricultural Economists, 13-14 October, 2010.
- 3. Anderson, J., E. (1979); "A Theoretical Foundation for the Gravity Equation". American Economic Review, Vol. 69, pp.106-116.
- 4. Egger, p. (2000). "A note on the Proper Econometric Specification of the Gravity Equation", Economics Letters, Vol.66, pp.25-31
- 5. http://unstats.un.org/unsd.comtrade/dqQuickQuery.aspx.
- 6. www.fao.org
- 7. www.sis.gov.eg/Ar/Templates/Articles/tmpArticles.aspx?ArtID=4677
- 8. http://www.alnashra-eg.com/?p=33938
- 9. GDP and Per Capita Income: United Nations, National Accounts Statistics database, Statistics Division.
- 10. http://unstats.un.org/unsd/snaama/SelectionQuick.asp