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Impact of Arabic Spring on the Competitiveness of Arab States' Agricultural Exports to EU Markets

Ibrahim Soliman and Hala Bassiony

9.1 Introduction

The Arab States (21 countries) trade with the EU countries, which still represents the largest proportion of their total trade with the whole world. It amounted to 32.7% in 2017, while the contribution of their trade with countries in Latin America was about 2.8% of their total trade. On the other hand, the Intra-Arab States trade amounted to 20.5% (compiled and calculated from: World Integrated Trade Solution, 2017). The core of the declaration of the free trade agreements and trade facilitation among the Arab countries, announced in 1989, was the establishment of a free trade area among Arab countries which entered into force in 2005, with abolition of customs duties and taxes. Therefore, the EU markets have the priority in achieving competitiveness for the agricultural sector exports of the Arab countries.

The entry of Arabic States in the new world order implied trade liberalization and the implementation of the principle of comparative advantage in the use of resources, which in turn was supposed to lead to exports development, accelerating their economies' growth and increasing incomes of their citizens towards welfare (see: Ali 1999). However, it seems that the liberalization of foreign trade alone does not create competitiveness of a country as it does not necessarily increase domestic supply, production and employment (see: Soliman 2000). The local economic growth and productivity are the corner stone in doing such a job, as a result of the efficient management of national resources (see: Frankel and Romer 1999). The practices have demonstrated many obstacles and difficulties that faced Arabic States which limited the growth of exports and consequently slowed down the growth of income and consumption.

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The health and environmental specifications of food commodities have generated barriers on the Arab states trade, which decreased the expected benefits of free trade (see: Soliman 1992). Notably, the WTO agreements implicitly provided protection for the multinational companies, which expanded to become transnational companies. Therefore, it has been difficult to distinguish their geographical identity or nationality. They have practiced significant control in the global market, either in food and agricultural commodities trade or production inputs and technology. Such a control stemmed from being giant companies with capabilities to practice monopolistic behavior on world trade relationships; consequently, they have violated the rights of small farmers, particularly in the Arab countries (see: Soliman 1999).

Arab countries have experienced a deficit in the balance of trade of food and agricultural commodities and goods, which led them away from the area of competitiveness. While the agricultural imports of Arab countries accounted for about 24.5% in total Arab States merchandise imports, the contribution of agricultural exports in total merchandise exports has not exceeded 9.6% (compiled and calculated from: AOAD 2018). Therefore, the agricultural exports covered only 19.1% of its imports in 2017. The inability of local production to provide enough surplus for exportation of agricultural commodities has limited the capacity of Arab countries to penetrate the world markets, even though the Arabic States possess about 72.03 million hectares of cultivated land. In addition, the Arab countries hold a high proportion of irrigated land, reaching about 23.1% of the total cultivated land, while the world average is about 17.4% (see: Soliman 2007). Notably, low productivity was behind production deficit, whereas the Arab countries possess 4.2% of the world agricultural land, the agricultural output is around 3% of the world's agricultural output, as the productivity per hectare of agricultural land has not exceeded 77.6% of the world productivity. Low productivity reflects the technological gap between Arabic agricultural systems and the world system (Soliman 2007).

However, since 2011 the Arab states have faced dramatic political changes. Revolutionary movements have occurred in several Arab countries, such as Tunisia, Egypt, Syria, Libya and Yemen, in addition to the continuous instability in the political situation in Iraq since 1990. Such changes have had drastic socio-economic drawbacks on all Arab States. This has given the political title of the "Arabic Spring Era". Therefore, this study has considered the impact of such an era (2011–2017) on Arab States' agricultural exports' competitiveness in the major market which is the EU market, in comparison with agricultural exports to the same market before the "Arabic Spring Era", i.e. during the period 2000–2010. Accordingly, the objective was proceeded by following a model combining two criteria for evaluating the competitiveness of the agricultural exports of Arabic States to EU markets. First, the study estimated the index of the comparative advantage (RCA) of the selected countries in agricultural exports to EU markets. Secondly, the sustainability (continuity) of such a comparative advantage was quantitatively estimated as the stability in the comparative advantage index. Such criteria (RCA and Stability Coefficient) were applied for identifying the food commodity groups by country that have potential competitiveness in the European markets, throughout the two study periods before the Arabic Spring Era (2000–2010) and after the Arabic Spring Era (2011–2017). Arabic-Gulf States (the states of the Gulf Cooperation Council

(GCC)) were not included in the analysis, as they are almost all oil countries, where oil production represents more than 90% of their GDP and there is a lack of sufficient water resources for municipal uses, rather than irrigation (see Soliman 2000, 2007). In addition, there are some other countries that do not have a sufficient series of published required data along the period 2000–2017. These countries are Djibouti and Palestine (Gaza and West Bank).

9.2 Analytical Procedures

9.2.1 *Measuring Revealed Comparative Advantage Index (RCA)*

Equation (9.1) was used to calculate the revealed comparative advantage index (RCA), of Agricultural Exports of Arab States to the EU (see: Soliman and Bassiony 2012). When the value of this index surpasses a value of one, it indicates that such a country has a comparative advantage in exporting a certain commodity to a given market and vice versa. Thus:

$$RCA_{ij} = R \left[\frac{(x_{ij}/x_{it})}{(x_{nj}/x_{nt})} \right] \quad (9.1)$$

where:

RCA_{ij} = Revealed Comparative Advantage Index of Exports of State I and Food Group j

X = value of exports (\$1000)

i = an Arabic State

j = a commodity group

t = the total commodity groups

n = the EU markets

X_{ij} = Value of exports of merchandise group j from the State i (\$1000), to the selected markets

X_{it} = Total value of exports of all commodity groups except the specific group j from the State i, to the selected markets

X_{nj} = World exports of commodity group j except the exports of the commodity group j from the State i to the selected markets

x_{nt} = Total value of exports of all commodity groups (except the exports of group j) in the world minus all commodity groups in state i (except the export group j) to selected markets

To pass this stage of the model successfully, the exports of the food commodity groups from any of the selected four Arab countries to the EU markets should perform $RCA > 1$, as a necessary condition, while the sufficient condition was that the RCA value stayed above one along the whole study period (2000–2010).

9.2.2 Measuring the Coefficient of Instability in the RCA Value

The export of a food commodity from a selected Arab state to EU markets that showed a continuous value of $RCA > 1$ at the preceding stage of the applied model was introduced for a further appraisal in this last stage. It is the measurement of the instability coefficient (see: Akpaeti (2014), for the RCA values along the concerned two time series of 2000–2010 and 2011–2017). It was estimated using the time trend equation (Eq. 9.2). Thereafter, the percentage of the average absolute value of deviations of the estimated RCA values (\hat{Y}) was calculated from their actual values (y) applying Eq. (9.3), in order to derive the degree of instability of the RCA. However, a positive view to such assessment towards competitiveness implied measuring the degree of stability, rather than instability, for RCA values. Accordingly, such a coefficient was derived from Eq. (9.4). The high stability coefficient indicates the success of the export policies of that country for a certain food commodity group that performed sustainable (continuous) RCA values > 1 over a long time series:

$$\hat{Y}_{t_i} = \alpha + \beta T_i + \zeta_{ij} \quad (9.2)$$

$$\text{Estimated Instability Coefficient of } (y) = [(|y_t - \hat{y}_t|)/(\hat{y}_t)] \times 100 \quad (9.3)$$

$$(\text{Estimated stability coefficient} = [1 - (\text{instability coefficient})]) \quad (9.4)$$

where:

Y_t = the actual values of RCA in the year t

α = the estimated intercept of the regression equation (the average value of RCA at the base year, $t = 0$)

β = estimated average annual change in the RCA value

T_i = the time element as digital values, where: $i = 0, 1, 2 \dots, t_1$ and t_2 for the two concerned periods successively

ζ_{ij} = the estimated residual (Error) variable

\hat{y}_t = estimated value of RCA in the year t from Eq. (9.2).

9.3 Data Sources

The study relied on the following data sources: (1) Statistical Data Base of the Food and Agriculture Organization of the United Nations (see: FAO 2018), (2) Statistical Data Base of the World Bank (see: World Bank 2013), (3) Statistical Data Base of Arab Organization for Agricultural Development (AOAD, issues from 2014 to 2017), and (4) The United Nations Statistical Data Matrices of Trade Flows of Exported Commodities published by the Statistics Division of the [World Integrated Trade Solution](#) for the period 2000–2017. These sources provided data for the annual export value of the food commodity groups from the Arab states to the countries of

the European Union. However, the EU markets were treated aggregately in this study, as they follow almost the same agricultural foreign trade policies.

The study was concerned with 10 food commodity groups classified according to the standard international trade classification (STIC). It is a commercial classification that serves several purposes: customs, foreign trade policies, and commodity standards used in world trade. Therefore, it generates successive versions which are adjusted according to the dynamic changes in the structure of the world trade over time as a result of new or improved goods to reflect the pattern of international trade. Therefore, it is more useful for economic analysis. The targeted 10 commodity groups were aggregated under one group of food and live animals that take an aggregate code of zero (00), which is reclassified under sub-codes (01–09).

9.4 Results and Discussion

9.4.1 *Excluded Agricultural Arab Counties from the Analytical Model*

Notably, there are some Arab States with significant agricultural resources which were excluded from this study model, because they are currently facing drastic economic, political and social troubles and conflicts that are expected to last in the forthcoming years. These countries are Sudan, Syria, Iraq and Yemen. Therefore, they have shown either a zero value of RCA or no available data to calculate such an index since 2011. Such results are indicators of the absence of agricultural exports competitiveness (Table 9.1).

9.4.2 *Arabic Agricultural Export Commodities to EU with Sustainable RCA*

Results in Tables 9.2, 9.3, 9.4, and 9.5 show that three of the four identified countries (Egypt, Tunisia and Morocco) have shown a revealed comparative advantage index (RCA) larger than one from their exports to EU markets for their exports of fruit and vegetables. The RCA values had lasted above the level of one all over the concerned period (2000–2010). However, from the summary table (Table 9.6), Egypt showed the highest average value of RCA of $5.46 \pm (SE = \pm 0.32)$ with the highest stability of RCA among the three countries, i.e. 98.99%. Surprisingly, from the same table, Tunisia and Morocco have shown average RCA values of about one-third of the comparable value of Egypt, i.e. $2.63 \pm (SE = 0.18)$ and $2.61 \pm (SE = 0.12)$, respectively, even though both countries enjoyed the advantage of nearer location to EU markets than Egypt. Also, the two countries enjoyed preferable trade partners with the EU, particularly Morocco (Thabet 2011; Martinez and Garcia 2012). From Table 9.5, Sudan's exports of fruit and vegetables have not passed the condition of continuity of RCA value > 1 along all the years of the studied period (2000–2011).

Table 9.1 Index of comparative advantage of Syrian Agricultural Exports to EU markets

Year	Live animals	Meat	Dairy, table eggs	Fish	Grains	Vegetables, fruits	Sugar, honey	Coffee, tea, cocoa, spices	Animal feed	Other food items
2000	n.a	n.a	0.02	n.a	0.01	5.32	4.04	3.91	n.a	n.a
2001	n.a	n.a	0.02	n.a	0.00	1.56	1.82	20.27	n.a	n.a
2002	n.a	n.a	n.a	n.a	0.09	2.07	1.55	14.87	n.a	n.a
2003	0.06	0.01	0.04	0.0	3.51	1.84	1.62	2.28	0.27	0.30
2004	n.a	0.02	n.a	n.a	2.59	2.10	2.22	2.74	0.55	0.05
2005	n.a	0.01	0.02	0.01	5.02	1.78	1.00	2.06	0.02	0.20
2006	0.0	0.00	0.01	0.01	5.36	1.21	1.16	2.73	n.a	0.28
2007	n.a	0.01	0.01	n.a	2.44	2.88	1.09	2.39	n.a	0.20
2008	0.13	n.a	0.03	n.a	1.61	4.72	1.41	1.55	n.a	0.10
2009	0.06	n.a	0.03	n.a	0.24	4.39	2.48	3.86	0.02	0.36
2010	0.03	0.0	0.01	n.a	0.32	3.74	2.38	3.91	0.00	0.39
2011	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2012	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2013	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2014	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2015	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2016	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2017	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a

Source: Compiled and calculated from:

WITS (World Integrated Trade Solutions) <https://wits.worldbank.org/> and Eq. (9.1)

n.a = not available data

Table 9.2 Index of comparative advantage of Yemeni Agricultural Exports to EU markets

Year	Live animals	Meat	Dairy, table eggs	Fish	Grains	Vegetables, fruits	Sugar, honey	Coffee, tea, cocoa, spices	Animal feed	Other food items
2000	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2001	n.a	n.a	0	437.60	n.a	0.01	n.a	0.10	n.a	n.a
2002	n.a	0.01		395.15	0.02	0.39	n.a	0.06	0.01	n.a
2003	n.a	n.a	0.01	121.74	0.01	0.06	n.a	0.01	n.a	0
2004	n.a	n.a	0.06	177.55	0	0.04	n.a	n.a	n.a	0.01
2005	n.a	n.a	0	481.96	0.01	0.03	n.a	0.03	n.a	0.01
2006	n.a	0	0	592.03	0.01	0.03	0	0.03	0	0
2007	n.a	0	0	441.13	0.02	0.03	0	0.05	0	0.01
2008	n.a	n.a	0	675.25	0	0.03	0	0.04	0	0
2009	0.01	0	0.01	144.27	0	0.10	0	0.32	n.a	0.02
2010	n.a	n.a	0	163.97	0	0	0	0.10	n.a	0.01
2011	n.a	n.a	n.a	121.00	n.a	0.06	0	0.41	n.a	0.02
2012	n.a	n.a	n.a	75.36	0	0.07	0	0.74	n.a	0.03
2013	n.a	n.a	n.a	131.09	n.a	0.07	0.05	0.35	n.a	0.02
2014	n.a	n.a	n.a	48.80	n.a	0.14	0	0.65	0.42	0.05
2015	n.a	n.a	n.a	10.81	0	0.05	4.09	0.91	2.19	0.14
2016	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2017	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a

Source: Compiled and calculated from:

WITS (World Integrated Trade Solutions) <https://wits.worldbank.org/> and Eq. (9.1)

n.a = not available data

Table 9.3 Index of comparative advantage of Tunisian Agricultural Exports to EU markets

Year	Live animals	Meat	Dairy, table eggs	Fish	Grains	Vegetables, fruits	Sugar, honey	Coffee, tea, cocoa, spices	Animal feed	Other food items
2000	0.01	0.08	0	6.94	0.1	1.8	0.03	0.4	0.05	0.29
2001	0.01	0.07	0.02	5.17	0.12	2.44	0.11	0.38	0.1	0.16
2002	0.01	0.06	0.01	6.01	0.11	2.23	0.08	0.36	0.03	0.24
2003	0.01	0.07	0	6.22	0.15	2.1	0.07	0.42	0.05	0.09
2004	0	0.07	0.01	5.07	0.19	2.52	0.07	0.43	0.41	0.2
2005	0.01	0.05	0	5.34	0.22	2.63	0.09	0.38	0.11	0.2
2006	0	0.04	0	5.6	0.27	2.14	0.09	0.38	0.33	0.21
2007	0	0.03	0.01	5.43	0.19	3.14	0.23	0.42	0.36	0.37
2008	0.01	0.05	0	4.31	0.19	3.12	0.25	0.41	0.42	0.45
2009	0.23	0.05	0	3.58	0.25	3.3	0.27	0.49	0.36	0.64
2010	0	0.07	0	3.81	0.1	4.49	0.11	0.34	0.27	0.42
2011	0.01	0.08	0	5.49	0.1	3.79	0.08	0.29	0.24	0.19
2012	0.02	0.07	0	4.84	0.12	4.13	0.09	0.27	0.29	0.33
2013	0.01	0.06	0	3.92	0.14	4.34	0.09	0.44	0.47	0.3
2014	0.01	0.05	0	4.33	0.13	3.89	0.18	0.49	0.26	0.39
2015	0	0.03	0	4.83	0.12	3.24	0.09	0.4	0.58	0.22
2016	0.01	0.06	0	4.49	0.11	3.23	0.73	0.36	0.18	0.18
2017	0.01	0.03	0.02	3.69	0.1	3.02	1.6	0.37	0.13	0.14

Source: Compiled and calculated from:
WITS, World Integrated Trade Solutions, (<https://wits.worldbank.org>) and Eq. (9.1)

Table 9.4 Index of comparative advantage of Egyptian Agricultural Exports to EU markets

Year	Live animals	Meat	Dairy, table eggs	Fish	Grains	Vegetables, fruits	Sugar, honey	Coffee, tea, cocoa, spices	Animal feed	Other food items
2000	0.08	0.00	0.00	0.06	1.47	5.40	1.34	0.35	0.05	0.04
2001	0.09	0.00	0.00	0.03	2.58	3.68	4.82	0.21	0.01	0.05
2002	0.06	0.00	0.01	0.05	1.91	4.01	5.17	0.18	0.03	0.03
2003	0.06	0.00	0.01	0.06	1.69	4.27	4.83	0.18	0.04	0.04
2004	0.06	0.00	0.00	0.03	1.63	4.80	3.66	0.12	0.19	0.02
2005	0.03	0.00	0.00	0.05	1.83	4.79	3.60	0.10	0.11	0.03
2006	0.05	0.00	0.00	0.04	2.09	4.94	2.71	0.13	0.03	0.04
2007	0.07	0.00	0.00	0.05	1.53	6.62	2.15	0.12	0.11	0.04
2008	0.06	0.00	0.00	0.08	0.30	7.03	1.21	0.11	0.52	0.18
2009	0.04	0.00	0.01	0.08	0.56	7.27	0.58	0.14	0.22	0.13
2010	0.02	0.00	0.00	0.07	0.22	20.15	0.71	0.16	0.43	0.37
2011	0.01	0.00	0.00	0.10	0.12	18.15	1.02	0.19	0.91	0.17
2012	0.01	0.00	0.00	0.06	0.24	21.19	0.84	0.11	0.63	0.09
2013	0.01	0.00	0.00	0.06	0.26	19.29	1.17	0.06	0.58	0.10
2014	0.03	0.00	0.00	0.07	0.19	25.95	1.10	0.05	0.29	0.18
2015	0.01	0.00	0.01	0.04	0.33	18.03	1.22	0.10	0.43	0.16
2016	0.04	0.00	0.01	0.04	0.12	30.49	0.66	0.14	0.31	0.10
2017	0.06	0.00	0.01	0.06	0.01	39.20	0.59	0.10	0.42	0.10

Source: Compiled and calculated from:

WITS, World Integrated Trade Solutions, (<https://wits.worldbank.org>) and Eq. (9.1)

Identified years and commodity groups that have shown $RCA > 1$ are represented as Bold values

Table 9.5 Index of comparative advantage of Iraqi Agricultural Exports to EU markets

Years	Live animals	Meat	Dairy and table eggs	Fish	Grains	Vegetables and fruits	Sugar and honey	Coffee/tea/cocoa/spices	Animal feed	Other food items
2000	n.a	n.a	n.a	n.a	n.a	3.83	n.a	n.a	n.a	n.a
2001	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2002	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2003	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2004	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2005	n.a	n.a	n.a	n.a	n.a	3.64	n.a	n.a	n.a	n.a
2006	n.a	n.a	n.a	n.a	n.a	3.61	n.a	n.a	n.a	n.a
2007	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2008	n.a	n.a	n.a	n.a	n.a	3.98	n.a	n.a	n.a	n.a
2009	n.a	n.a	n.a	n.a	n.a	3.19	24.56	n.a	n.a	n.a
2010	n.a	n.a	n.a	n.a	0.52	9.41	1.65	n.a	n.a	1.84
2011	n.a	n.a	n.a	n.a	36.07	0.56	n.a	n.a	n.a	n.a
2012	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2013	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2014	n.a	n.a	n.a	n.a	n.a	4.03	n.a	n.a	n.a	n.a
2015	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2016	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2017	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a

Source: Compiled and calculated from:

WITS (World Integrated Trade Solutions) <https://wits.worldbank.org/> and Eq. (9.1)

n.a = not available data

Table 9.6 Index of comparative advantage of Sudanese Agricultural Exports to EU markets

Years	Live animals	Meat	Dairy and table eggs	Fish	Grains	Vegetables and fruits	Sugar and honey	Coffee/tea/cocoa/spices	Animal feed	Other food items
2000	0.01	0	0.53	0	2.27	0.85	13.22	0.24	0.92	0
2001	0	0	0	0	0.16	4.38	5.42	0.00	2.47	0
2002	0	0	0	0	0.47	1.68	24.43	0.00	0.73	0
2003	0.02	0	0	0	0.53	2.46	20.34	0.00	0.09	0
2004	0	0	0	0	0.54	4.84	7.90	0.00	0.02	0
2005	0	0	0	0	0.14	1.41	33.80	0.00	0	0
2006	0.01	0	0	0	0.39	1.84	29.03	0.00	0	0
2007	0.02	0	0.02	0	1.31	3.82	10.54	0.00	0	0
2008	0.05	0	0	0	0	0.63	50.40	0.00	0	0
2009	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2010	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2011	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2012	0	0	0	0	0.93	0.13	31.67	0	2.46	0.21
2013	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2014	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2015	0	0.04	0	0	0	0.13	569.59	0	0	0
2016	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2017	0.02	0	0	0	11.21	0.32	7.86	0.01	0	0

Source: Compiled and calculated from:

WITS (World Integrated Trade Solutions) <https://wits.worldbank.org/> and Eq. (9.1)

n.a = not available data

However, it showed an average value of RCA of about 2.4, even though such an average was insignificant as $SE = 9.4$ (see Table 9.6). Sudan exports of fruit and vegetables were watermelons and mangoes. The existing dramatic political, economic and social conflicts and troubles in Sudan represented most probably obstacles that prevented Sudanese fruit and vegetable exporters to EU markets from reaching sustainable competitiveness. Therefore, the study proposed that integration and consistency in trade policies of fruits and vegetables among the four identified countries would promote their competitiveness in the EU markets. The four countries enjoy diversified climate, soil water resources and location advantages. Therefore, they can establish joint venture projects for grading, packing processing, storage and transportation networks.

From Tables 9.3 and 9.4, Tunisia and Morocco have shown apparent sustainable competitiveness in fisheries product exports to EU markets. From Table 9.6, both countries performed high significant average values of RCA of about $5.17 \pm (SE = 0.27)$ and $6.34 \pm (SE = 0.17)$, respectively. However, RCA values of Tunisian exports of fisheries products were much more stable than Morocco, as the estimated stability coefficient indicated (see Table 9.6). Integration among the two countries in this concern would raise their share in EU markets.

From Table 9.5, exports of sugar and honey products from Sudan and Egypt to EU markets showed significant $RCA > 1$ for the whole period of 2000–2011 for Sudan. The RCA values of Egypt had dropped below 1 in only one year. The average value of RCA for Sudan exports was $21.68 \pm (SE = 3.8)$ with a stability coefficient around 79%, while it was only $2.73 \pm (SE = 0.43)$ with a stability coefficient around 3% for Egypt. Such results indicate a higher competitiveness of Sudanese exports of sugar products to EU markets than for Egypt. Egypt's exports policy is based upon utilization of the surplus designated capacity of its domestic refineries to refine some imported raw sugar for re-exportation (62% of exported value). The rest of the exports value included sugar confectionery (30%) and molasses (around 8%), as most produced molasses is used for processed feed mixes. Sudan has an actual surplus of domestic produced sugar cane which is refined locally up to raw centrifugal sugar (55%), while the remaining exports were molasses (45%), (compiled and calculated from FAO 2018). Therefore, both countries have a promising opportunity to integrate towards strengthening their competitiveness via joint venture projects. The recommended strategy implied to allocate larger areas for sugar cane production in Sudan is associated with utilization of the full capacity of sugar refineries in Egypt. The nearby harbors of Egypt to EU markets would add more competitiveness to such proposed integrated policies.

As Table 9.2 showed, the total grain exports of Egypt to EU markets achieved a comparative advantage throughout the study period except for the last five years (2008–2011). As the most important export of this food commodity group is paddy rice, the distortions in Egyptian rice export policy over the last 6 years were a major cause behind the deterioration of the value of RCA over the last 5 years. In addition, the rainfall fluctuation in the main rice exporting countries (China, Philippines, India, and Pakistan) caused fluctuations in the rice global supply between abundance and shortage. It was another major reason affecting Egypt's exports of rice (see: Soliman and Jabir 1997). The average value of grains exports of Egypt reached $1.37 \pm (SE = 0.22)$ (see: Tables 9.6, 9.7, 9.8, 9.9, 9.10, 9.11, and 9.12).

Table 9.7 Index of comparative advantage of Jordanian Agricultural Exports to EU markets

Year	Live animals	Meat	Dairy, table eggs	Fish	Grains	Vegetables, fruits	Sugar, honey	Coffee, tea, cocoa, spices	Animal feed	Other food items
2000	0	0	0	0	0	177.85	0.05	0.03	0	0.27
2001	0	0	0.25	0	0	65.82	0.12	0.19	0	0.16
2002	0	0	0	0	0.01	44.44	0.09	0.01	0.05	1.1
2003	0	0	0	0	0.01	17.45	0.17	0.13	0	2.58
2004	0	0	0	0	0.02	85.84	0.06	0.19	0	0.28
2005	0	0	0	0	0	456.73	0.01	0.03	0	0.06
2006	0	0.01	0	0	0	312.84	0.01	0.02	0	0.1
2007	0	0	0	0	0	264.79	0.03	0.02	0	0.15
2008	0.02	0	0	0	0	254.92	0.05	0.01	0.1	0.04
2009	0	0	0	0	0	393.01	0.02	0.01	0	0.1
2010	0	0	0	0	0	312.76	0.04	0.03	0	0.1
2011	0	0	0	0	0.01	458.44	0	0.02	0	0.03
2012	0.26	0	0	0	0.01	146.55	0	0.03	0	0.15
2013	0.53	0	0	0	0.04	25	0	0.09	0	0.98
2014	0.13	0.06	0	0	0.1	17.4	0	0.12	0	2
2015	0.23	0	0	0	0.08	10.22	0	0.12	0	3.38
2016	0.03	0	0	0	0.11	5.87	0	0.26	0	5.1
2017	0.01	0	0	2.508	0.15	5.87	0	0.21	0	5.3

Source: Compiled and calculated from:

WITS, World Integrated Trade Solutions, (<https://wits.worldbank.org>) and Eq. (9.1)

Identified years and commodity groups that have shown $RCA > 1$ are represented as Bold values

Table 9.8 Index of comparative advantage of Moroccan Agricultural Exports to EU markets

Year	Live animals	Meat	Dairy, table eggs	Fish	Grains	Vegetables and fruits	Sugar, honey	Coffee, tea, cocoa, spices	Animal feed	Other food items
2000	0.02	0.01	0	7.22	0	2.15	0.12	0.06	0.09	0.13
2001	0.04	0.01	0	6.47	0	2.2	0.15	0.09	0.16	0.19
2002	0.06	0.01	0	6.51	0	2.4	0.06	0.09	0.06	0.19
2003	0.08	0.01	0	6.29	0.02	2.45	0.09	0.07	0.12	0.17
2004	0.08	0.01	0	5.6	0.01	2.89	0.21	0.08	0.09	0.14
2005	0.06	0.01	0	6.21	0.01	2.72	0.17	0.04	0.08	0.17
2006	0.08	0.01	0	6.41	0.01	2.26	0.24	0.04	0.18	0.22
2007	0.05	0.01	0	7.31	0.01	3	0.14	0.05	0.1	0.24
2008	0.07	0.01	0	6.63	0.01	2.8	0.13	0.05	0.2	0.18
2009	0.06	0.02	0	6.1	0.02	2.94	0.11	0.06	0.3	0.18
2010	0.09	0.02	0	5.9	0.01	3.81	0.06	0.05	0.46	0.14
2011	0.1	0.02	0	5.44	0.01	4.77	0.06	0.06	0.26	0.12
2012	0.13	0.01	0	6.17	0	4.19	0.02	0.06	0.39	0.15
2013	0.1	0.02	0	6.03	0	4.29	0.02	0.07	0.22	0.16
2014	0.15	0.02	0	5.29	0.01	4.54	0.04	0.07	0.33	0.15
2015	0.1	0.02	0	5.54	0.01	4.04	0.09	0.05	0.24	0.16
2016	0.09	0.02	0	5.29	0.01	3.76	0.11	0.05	0.25	0.17
2017	0.09	0.02	0	5.9	0.01	3.81	0.06	0.05	0.46	0.14

Source: Compiled and calculated from: WITS, World Integrated Trade Solutions, (<https://wits.worldbank.org>) and Eq. (9.1)

Table 9.9 Index of comparative advantage of Lebanese Agricultural Exports to EU markets

Year	Live animals	Meat	Dairy, table eggs	Fish	Grains	Vegetables, fruits	Sugar, honey	Coffee, tea, cocoa, spices	Animal feed	Other food items
2000	0.06	0.02	0.13	0.03	0.20	2.15	3.30	1.15	5.58	1.68
2001	0.02	0.01	0.21	0.01	0.24	2.54	4.90	1.15	3.21	1.27
2002	0.05	0.02	0.21	0.02	0.26	4.89	3.24	1.47	0.65	1.23
2003	0.05	0.01	0.12	0.02	0.68	4.02	3.37	1.59	0.18	1.26
2004	0.00	0.02	0.15	0.01	0.77	3.68	3.93	1.35	0.29	1.38
2005	0.01	0.02	0.15	0.02	0.67	3.84	2.67	1.29	0.09	2.35
2006	0.02	0.02	0.15	0.01	0.46	4.78	1.81	1.55	0.01	2.00
2007	0.03	0.03	0.11	0.02	0.37	5.33	1.59	1.73	0.02	1.88
2008	0.05	0.05	0.05	0.02	0.20	6.46	2.06	1.45	0.01	2.03
2009	0.01	0.10	0.10	0.02	0.24	5.31	1.67	1.57	0.08	1.95
2010	0.01	0.14	0.10	0.09	0.37	5.36	0.97	1.15	0.07	1.43
2011	0.08	0.06	0.22	0.08	0.32	6.21	1.19	1.41	0.01	1.49
2012	0.00	0.01	0.07	0.03	0.36	4.30	1.19	1.72	0.18	3.14
2013	0.00	0.00	0.09	0.02	0.30	4.13	1.55	1.48	0.02	3.86
2014	0.00	0.01	0.05	0.01	0.34	3.03	1.85	2.09	0.04	4.26
2015	n.a	n.a	n.a	n.a	n.a	4.90	2.02	1.79	n.a	n.a
2016	0.01	0.00	0.06	0.45	0.29	3.15	1.14	2.28	n.a	3.57
2017	n.a	n.a	n.a	n.a	n.a,	4.72	1.57	2.21	n.a	n.a

Source: Compiled and calculated from: WITS, World Integrated Trade Solutions, (<https://wits.worldbank.org>) and Eq. (9.1)

Identified years and commodity groups that have shown $RCA > 1$ are represented as Bold values

Table 9.10 Index of comparative advantage of Algerian Agricultural Exports to EU markets

Year	Live animals	Meat	Dairy, table eggs	Fish	Grains	Vegetables, fruits	Sugar, honey	Coffee, tea, cocoa, spices	Animal feed	Other food items
2000	0.00	0.17	0.00	1.44	0.00	12.17	0.03	0.04	0.07	0.00
2001	0.00	0.13	0.00	1.54	0.00	8.02	0.13	1.09	0.07	0.01
2002	0.02	0.07	0.00	1.75	0.00	7.45	0.15	1.10	0.05	0.01
2003	0.00	0.10	0.00	1.63	0.00	4.80	0.01	2.77	0.05	0.04
2004	0.02	0.22	0.00	2.20	0.00	3.42	1.28	2.32	0.00	0.08
2005	0.00	0.10	0.00	2.17	0.01	3.95	0.94	2.01	0.00	0.18
2006	0.04	0.14	0.07	2.22	0.03	4.24	1.14	1.30	0.00	0.07
2007	0.00	0.20	0.00	2.40	0.01	4.95	0.80	1.20	0.00	0.08
2008	0.00	0.08	0.00	2.82	0.01	4.26	0.97	1.91	0.00	0.27
2009	0.00	0.09	0.00	1.58	0.00	3.66	5.11	1.19	0.00	0.21
2010	0.00	0.04	0.00	1.09	0.00	6.74	3.16	0.04	0.00	0.01
2011	0.00	0.01	0.00	0.29	0.00	1.42	76.94	0.09	0.00	0.05
2012	0.04	0.02	0.00	0.51	0.01	0.82	35.06	0.29	0.00	0.02
2013	0.00	0.02	0.00	0.27	0.01	1.52	52.35	0.50	0.04	0.06
2014	0.01	0.03	0.00	0.55	0.00	3.14	23.38	1.01	0.02	0.07
2015	0.07	0.03	0.00	0.79	0.01	1.49	12.93	1.36	0.00	0.15
2016	0.08	0.01	0.00	0.54	0.00	1.48	21.90	1.25	0.00	0.12
2017	0.02	0.00	0.00	0.81	0.03	2.12	16.53	1.05	0.01	0.09

Source: Compiled and calculated from: WITS, World Integrated Trade Solutions, (<https://wits.worldbank.org>) and Eq. (9.1)

Identified years and commodity groups that have shown $RCA > 1$ are represented as Bold values

Table 9.11 Trend Equations of the estimated RCA values in two periods: 2000–2010 & 2011–2017

Years	Live animals	Meat	Dairy and table eggs	Fish	Grains	Vegetables and fruits	Sugar and honey	Coffee, tea, cocoa, spices	Animal feed	Other food items
2000	n.a	n.a	n.a	n.a	n.a	3.83	n.a	n.a	n.a	n.a
2001	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2002	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2003	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2004	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2005	n.a	n.a	n.a	n.a	n.a	3.64	n.a	n.a	n.a	n.a
2006	n.a	n.a	n.a	n.a	n.a	3.61	n.a	n.a	n.a	n.a
2007	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2008	n.a	n.a	n.a	n.a	n.a	3.98	n.a	n.a	n.a	n.a
2009	n.a	n.a	n.a	n.a	n.a	3.19	24.56	n.a	n.a	n.a
2010	n.a	n.a	n.a	n.a	0.52	9.41	1.65	n.a	n.a	1.84
2011	n.a	n.a	n.a	n.a	36.07	0.56	n.a	n.a	n.a	n.a
2012	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2013	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2014	n.a	n.a	n.a	n.a	n.a	4.03	n.a	n.a	n.a	n.a
2015	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2016	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
2017	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a

Source: Compiled and estimated from Tables (9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10) and Eq. (9.2)

Table 9.12 Analytical summary table of estimated competitiveness criteria

Country	Commodity group	Aver. Value of RCA	SE	Stability coefficient	Aver. Value of RCA	SE	Stability coefficient
		Before Arab Spring			After Arab Spring		
Tunisia	Fish	5.2	±0.59	0.92	4.5	±0.50	0.92
	Vegetable and fruit	2.7	±0.43	0.90	3.7	±0.33	0.94
Jordan	Vegetable and fruit	216.95	±115.7	0.45	95.62	±119.2	0.19
Morocco	Fish	6.4	±0.51	0.95	5.7	±0.39	0.94
	Vegetable and fruit	2.7	±0.30	0.93	4.2	±0.22	0.97
Egypt	Vegetable and fruit	6.63	±3.67	0.60	24.21	±5.25	0.86
	Sugar and Honey	2.80	±1.34	0.69	0.94	±0.24	0.79
	Grains	1.44	±0.53	0.68	0.18	±0.11	0.56
Lebanon	Vegetable and fruit	4.40	±0.76	0.86	4.35	±1.80	0.80
	Sugar and Honey	2.68	±0.63	0.83	1.50	±0.36	0.83
	Tea/cocoa spices	1.40	±0.20	0.89	1.85	±0.20	0.92
Algeria	Vegetable and fruit	5.79	±0.52	0.79	1.71	±0.15	0.80
	Sugar and Honey	1.25	±2.20	0.74	34.16	±0.75	0.74
	Tea/cocoa/spices	1.36	±1.07	0.37	0.79	±14.22	0.56
	Fish	1.89	±0.90	0.53	0.54	±0.26	0.73

Source: compiled and calculated from Tables (9.2, 9.3, 9.4, 9.5, 9.6, 9.7) and Eqs. (9.2–9.4)
 Identified years and commodity groups that have shown RCA > 1 are represented as Bold values

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